Arundo Eradication and Coordination

Project Information

1. **Proposal Title:**

   Arundo Eradication and Coordination

2. **Proposal applicants:**

   Richard Dale , Sonoma Ecology Center
   DiPietro Deanne , Information Center for the Environment
   Mark Newhouser, Sonoma Ecology Center/Team Arundo del Norte
   Bob Hass, Sonoma Ecology Center

3. **Corresponding Contact Person:**

   Mark Newhouser
   Sonoma Ecology Center
   205 First St.W. Sonoma CA 95476
   707 996-9744
   mnewhouser@vom.com

4. **Project Keywords:**

   Nonnative Invasive Species
   Riparian Ecology
   Watershed Management

5. **Type of project:**

   Implementation_Full

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:**

   Private non-profit

9. **Location - GIS coordinates:**

   Latitude: multiple

   Longitude: multiple

   Datum:

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

Walnut Creek, Sonoma Creek, Napa River, San Francisquito Creek, Putah Creek, Cache Creek, Tule River, San Joaquin River, Cottonwood Creek, Ash Slough, Lower American River, and Gray Lodge Wildlife Area. (see attached map) Approximately 250 acres of Arundo donax spread out over 70 miles of rivers and creeks is identified for eradication under this proposal.

10. **Location - Ecozone:**

    5.1 Upper Cottonwood Creek, 7.7 Butte Sink, 9.2 Lower American River, 10.1 Cache Creek, 10.2 Putah Creek, 12.4 Gravelly Ford to Friant Dam, West San Joaquin Basin, 2.1 Suisun Bay & Marsh, 2.2 Napa River, 2.3 Sonoma Creek, Code 15: Landscape

11. **Location - County:**

    Butte, Contra Costa, Fresno, Lake, Madera, Merced, Napa, Sacramento, San Mateo, Santa Clara, Solano, Sonoma, Tulare, Yolo

12. **Location - City:**

    Does your project fall within a city jurisdiction?

    Yes

    If yes, please list the city: Walnut Creek, Calistoga, Chowchilla, Palo Alto, Porterville, Fresno, Medera, Dos Palos, Los Banos, Clear Lake, Lakeport

13. **Location - Tribal Lands:**

    Does your project fall on or adjacent to tribal lands?

    Yes **If yes, please list the tribal lands:** Big Valley Rancheria, Blue Lake Rancheria, Elem Pomo Tribe, Habematolel Pomo of Upper Lake, Middletown Rancheria, Robinson Rancheria Band of Pomo Indians, Scotts Valley Band of Pomo Indians.

14. **Location - Congressional District:**

    1, 3, 5, 6, 18, 19, 21 and more to be determined

15. **Location:**

    California State Senate District Number: 2, 5, 6, 12, 16, 32 and more to be determined

    California Assembly District Number: 1, 5, 7, 9, 10, 14, 25, 30 and more to be determined

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

    3 but need 5 for adequate monitoring

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: 17-20%

Total Requested Funds: $2,066,432.00

b) Do you have cost share partners already identified?

Yes

If yes, list partners and amount contributed by each:

American River/CNPS grants $100K + Volunteer labor $180K $280,000

Cache Creek/NRCS $900, Lake County CRMP $10,410, WMA SB 1740 $59,779, F.C. zone 1 & 8 $5,901 $76,990

San Joaquin River/USBR $95K and S.J. Conservation Trust $35K $130,000

Cottonwood Creek/Madera County $50K, Chowchilla women's prison $50K $100,000

Information Center for the Environment/CERES $50,000

c) Do you have potential cost share partners?

Yes

If yes, list partners and amount contributed by each:

Tule River/Tule River Irrigation District 150,854

Gray Lodge Wildlife Area/DFG $8,475, CCC, volunteers, Jones Flying Service $16,500 24,975

All the above confirmed for a total of: $812,819

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):

    113320J033 Arundo donax Eradication and Coordination 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)

Kim Webb	**US Fish and Wildlife Service**	**209.946-6400 x311**	**kwebb@delta.dfg.ca.gov**
Tom Dudley	**UC Berkeley**	**510-527-7042**	**tdudley@socrates.berkeley.edu**
Robyn Myer	**USDA**	**(530) 792-5669, (707) 562-8956**	**robyn.myers@ca.usda.gov**
Karen Gaffney	**Circuit Riders Productions**	**707-838-6641, ext. 216**	**kgaffney@crpinc.org**

21. **Comments:**

This is the second phase of a fully funded NIS eradication project that covers a broad geographic area. The total area, including the planned expansion, includes 11 watersheds in 13 counties.

Environmental Compliance Checklist

Arundo Eradication and Coordination

1. **CEQA or NEPA Compliance**
   a) Will this project require compliance with CEQA?

      Yes
   b) Will this project require compliance with NEPA?

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

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

   CEQA Lead Agency: CA Department of Fish and Game
   NEPA Lead Agency (or co-lead:) US Fish and Wildlife Service
   NEPA Co-Lead Agency (if applicable):

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

   CEQA
   XCategorical Exemption
   -Negative Declaration or Mitigated Negative Declaration
   -EIR
   -none

   NEPA
   XCategorical Exclusion
   -Environmental Assessment/FONSI
   -EIS
   -none

   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.

   NIS vegetation removal, stream flow maintenance

4. **CEQA/NEPA Process**
   a) Is the CEQA/NEPA process complete?

      No

      If the CEQA/NEPA process is not complete, please describe the dates for completing draft and/or final CEQA/NEPA documents.

      CADFG is drafting statewide 1603, stream alteration agreement and will then determine CEQA categorrical exemption. Work in process, date of completion unknown

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 Required

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: City of Porterville, San Joaquin Parkway, American River parkway — Obtained

Permission to access state land.
Agency Name:

Permission to access federal land.
Agency Name:

Permission to access private land.
Landowner Name:

6. **Comments.**

#5. Many of the new partners in this project have standing jurisdiction in waterways and existing maintenence and weed management programs. With the exeption of a few private property owners, most eradication work will be done on lands owned or controlled by project partners.

Land Use Checklist

Arundo Eradication and Coordination

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?**

   Yes

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).

   non-native plant eradication only

4. **Comments.**

   Most access is through lands owned or in the jurisdiction of the listed managers and partners.

Conflict of Interest Checklist

Arundo Eradication and Coordination

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):

Richard Dale , Sonoma Ecology Center
DiPietro Deanne , Information Center for the Environment
Mark Newhouser, Sonoma Ecology Center/Team Arundo del Norte
Bob Hass, Sonoma Ecology Center

Subcontractor(s):

Are specific subcontractors identified in this proposal? No

Helped with proposal development:

Are there persons who helped with proposal development?

No

Comments:

All "subcontractors" are Project partners and submitted proposal information and budgets upon request.

Budget Summary

Arundo Eradication and Coordination

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.f	American River						35,000			35000.0	3500	38500.00
1.g	Cottonwood Creek/Ash Slough						77,500			77500.0	7750	85250.00
1.h	Cache Creek						75,229			75229.0	7523	82752.00
1.i	Gray Lodge Wildlife Area						6,691			6691.0	669	7360.00
1.j	San Joaquin River						45,000			45000.0	4500	49500.00
1.k	Tule River						147534			147534.0	14753	162287.00
1.1	Eradication Coordination and Administration	1500	60000	6000	2500	6350				74850.0	7485	82335.00
2.1	Level Two: Data Coordination and Administration	1000	40000	4000	4666	4833	2000	8666		64165.0	6417	70582.00
3.1	Level Three: Data Coordination and Administration	1250	50000	5000	1667	2330	28660	6660		94317.0	9432	103749.00
3.2	Eradication Equipment							266000		266000.0		266000.00
		3750	150000.00	15000.00	8833.00	13513.00	417614.00	281326.00	0.00	886286.00	62029.00	948315.00

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**
1a	Napa River						3700			3700.0	370	4070.00
1b	San Francisquito						3345			3345.0	334	3679.00
1c	Sonoma Creek						6800			6800.0	680	7480.00
1d	Putah Creek						16425			16425.0	1642	18067.00
1e	Walnut Creek						5107			5107.0	511	5618.00
1f	American River						19,250			19250.0	1925	21175.00
1g	Cottonwood Creek/Ash Slough						38,750			38750.0	3875	42625.00
1h	Cache Creek						29,444			29444.0	2944	32388.00
1i	Gray Lodge Wildlife Area						4552			4552.0	455	5007.00
1j	San Joaquin River						22,500			22500.0	2250	24750.00
1k	Tule River						65536			65536.0	6554	72090.00
1.1	Level One: Coordination and Administration	3000	120000	12000	2500	6350				140850.0	14085	154935.00
2.1	Level Two: Data Coordination and Administration	1000	40000	4000	4666	4833	2000	8666		64165.0	6417	70582.00
3.1	Level Three: Data Coordination and Administration	1250	50000	5000	1667	2330	28660	6660		94317.0	9432	103749.00
		5250	210000.00	21000.00	8833.00	13513.00	246069.00	15326.00	0.00	514741.00	51474.00	566215.00

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**
1a	Napa River						3700			3700.0	370	4070.00
1b	San Francisquito						3345			3345.0	334	3679.00
1c	Sonoma Creek						6800			6800.0	680	7480.00
1d	Putah Creek						16425			16425.0	1642	18067.00
1e	Walnut Creek						5107			5107.0	511	5618.00
1f	American River						19,250			19250.0	1925	21175.00
1g	Cottonwood Creek/Ash Slough						38,750			38750.0	3875	42625.00
1h	Cache Creek						30,662			30662.0	3066	33728.00
1i	Gray Lodge Wildlife Area						3,458			3458.0	346	3804.00
1j	San Joaquin River						22,500			22500.0	2250	24750.00
1k	Tule River						52,400			52400.0	5240	57640.00
1.1	Level One: Coordination and Administration	3000	120000	12000	2500	6350				140850.0	14085	154935.00
2.1	Level Two: Data Coordination and Administration	1000	40000	4000	4666	4833	2000	8666		64165.0	6417	70582.00
3.1	Level Three: Data Coordination and Administration	1250	50000	5000	1667	2330	28660	6660		94317.0	9432	103749.00
		5250	210000.00	21000.00	8833.00	13513.00	233057.00	15326.00	0.00	501729.00	50173.00	551902.00

Grand Total=2066432.00

Comments.

This budget is arranged in three levels, with Level One as the highest priority. Six new eradication partners are entered in the budget starting with 1.f in year one through three. Five existing partners are entered starting with 1.a in year two and three when additional funds are needed to complete the five

(5) years of follow-up monitoring necessary to ensure effective control of Arundo donax. The anticipated one year overlap of funding in year one is reflected in the lower initial cost for Eradication Coordination and Administration. Although the combined budget is significantly higher in year one due to initial start up costs for new partners, the economy of scale is fully realized by year two. The eradication equipment included in Level 3.2 can be excluded, if necessary, without affecting other activities included in Level Three. However, long term eradication costs may rise due to the unavailability of appropriate equipment, lack of options, and high biomass disposal costs. The data coordination in Level Two and Three include front end loaded mapping costs that will benefit current, proposed and future partners. A long term cost benefit is anticipated as upstream infestation sources are discovered, eradication site prioritization is achieved, and control efforts follow the resulting strategic eradication plans.

Budget Justification

Arundo Eradication and Coordination

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

Project Manager: 3750 Information Coordinator: 3750 Data Coordinator: 6750

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

All project staff receive a flat rate of $40/hr.

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

A 10 % benefit rate is used for SEC employees; project partners as contractors do not receive benefits.

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

Coordinators travel includes partner training, surveying, mapping, monitoring, advisory meetings, site inspections and workshop presentations. Mileage is estimated at $.30/mile.

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

$4500 Field Supplies $4100 Office Supplies $31,939 Computing

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.

All eradication partners are contracting to do their own eradication and monitoring of their watershed. Their rates vary.

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.

Gas-powered brush chipper, $230,000 3/4 ton truck for towing chipper, $36,000

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 presentatons, reponse to project specific questions and necessary costs directly associated with specific project oversight.

Project management costs are linked to project partner coordination and management, general administration, information and technology management, and other project related tasks. Partner management includes subcontract and eradication plan preparation and approval, communications, presentations, training, and site visits. General administrative duties include, budgeting, invoicing, progress report preparation, and partner report compilation. Information and technology management includes database and website maintenance, as well as development and dissemination of educational materials, articles, and all site survey/mapping/monitoring forms. Other tasks include reulatory compliance and insurance requirements and new partner search and development.

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

n/a

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.

Our overhead rate is fixed, and not linked to either federal or state funding. Overhead includes general office requirements, including rent, telephones, furniture, general office staff, and administrative oversight.

Executive Summary

Arundo Eradication and Coordination

Arundo donax Eradication and CoordinationPhase 2 A Program of Team Arundo del Norte Arundo Eradication and Coordination Program, Phase Two Executive Summary This proposal represents the planned expansion (Phase 2) of the current CALFED-funded Arundo donax Eradication and Coordination Program. This program is sponsored by Team Arundo del Norte (TAdN), a network of local, state, and federal organizations dedicated to the eradication of Arundo donax (giant reed) where it threatens rivers, creeks, and wetlands in Central and Northern California. It is being carried out by the Sonoma Ecology Center, founding member of TAdN. This is a full-scale implementation program to eradicate Arundo donax, a non-native invasive species (NIS). The second phase of the project adds new partners to the project, expands current eradication areas, and extends time for adequate monitoring. TAdN proposes to broaden our mapping efforts to address three priorities: locating upstream infestation sources, identifying stakeholders for coordination, and securing property access. The objectives of this program are to reduce Arundos negative impacts on valuable riparian and aquatic habitats, water supply, and natural stream geomorphology, including native plant displacement, increased flood and fire risk, and damage to property. Besides a short-term spike in downstream fine sediment supply, there are no adverse effects of Arundo donax eradication. The second phase of the program will initiate eradication projects in seven additional watersheds. These new partners are prepared to immediately begin Arundo eradication. The new sites are on Cache Creek, San Joaquin River, Tule River, American River, Ash Slough (a tributary of the Chowchilla River)/Cottonwood Creek, and the Gray Lodge State Wildlife Area. Current partners will continue work on Sonoma Creek, Walnut Creek, Napa River, Putah Creek, and San Francisquito Creek. The program will continue to provide, advice, permitting assistance, quality assurance, and coordination to emerging eradication efforts in the CALFED region. TAdNs eradication program, which this proposal continues, reduces the need for CALFED to administer numerous individual projects, while providing a structure for long-term eradication and monitoring of this NIS throughout the CALFED solution area. This approach is more efficient than funding many separate uncoordinated eradication efforts. It will focus Arundo-related efforts where they will be most effective and stop small infestations before they get out of control. Through TAdNs close links to watershed groups, agencies, and universities, information gathered on Arundos distribution patterns, ecological impacts, and eradication methods will be widely and immediately useful. TAdN members have been addressing the Arundo threat for many years, and are highly qualified to provide guidance and carry out program objectives. The cost for three years of Phase 2 funding (at Level 3) for eradication, technical coordination, monitoring, planning, and dissemination of Arundo-related information is $2,066,432. This cost is matched by $812,819 in in-kind contributions.

Proposal

Sonoma Ecology Center

Arundo Eradication and Coordination

Richard Dale , Sonoma Ecology Center
DiPietro Deanne , Information Center for the Environment
Mark Newhouser, Sonoma Ecology Center/Team Arundo del Norte
Bob Hass, Sonoma Ecology Center

Arundo donax Eradication and Coordination—Phase 2
A Program of Team Arundo del Norte

CALFED Proposal 2001

1. Problem

The non-native invasive species *Arundo donax* threatens the ecological integrity of the rivers and streams throughout the CALFED region, altering ecosystem processes and negatively impacting native species. *Arundo donax* alters California's riparian habitats and waterways by out-competing native species, destabilizing stream banks, increasing fire and flood hazards, and threatening endangered species.

Arundo donax has established itself as a climax species in several river ecosystems including the Santa Ana River and the Santa Margarita River in Southern California. Arundo is demonstrating its capacity to take over riparian habitat in several Northern California waterways—exemplified by its increasing dominance in the Sacramento and San Joaquin river systems—as well as in many smaller streams throughout the CALFED region.

When *Arundo donax* displaces native vegetation, the riparian area can no longer support a diverse population of native wildlife species. Arundo's destruction of overhanging canopy vegetation allows for greater solar exposure of surface water, resulting in lethal temperatures for steelhead and salmon. Avian and terrestrial species also lose nesting and foraging habitat.

Arundo ultimately destroys the mature woody canopy species through fire. The fire-adapted Arundo burns even when green and its tall canes carry the fire into the canopy of adjacent mature riparian trees. While the fire generally destroys the native trees, the Arundo resprouts from fire-resistant rhizomes. With its competition now gone, Arundo then emerges as a monoculture.

Arundo also alters stream flow and geomorphology. It grows readily on gravel bars and in the streambed, changing flow regimes and directing erosive flows to opposite banks. The flows undercut and destabilize stream banks, causing tree loss, property damage, and siltation. The silt impairs fish spawning grounds, leading to further stress on threatened aquatic species.

<u>Goals</u>:

- To stop the advance of the invasive species *Arundo donax* through direct, intensive eradication in infested sections of selected waterways in the CALFED region.
- To expand TAdN's program of coordinating most or all Arundo control projects in the CALFED region through a network of expertise, current information, educational materials, and uniform, science-based protocols.
- To reduce Arundo's negative impacts on valuable riparian and aquatic habitats, water supply, and natural stream geomorphology, including native plant displacement, increased flood and fire risk, and damage to property.

Objectives:

- Identify stakeholders.
- Promote local involvement and coordinated eradication efforts.
- Provide templates for project planning and monitoring.
- Train and assist with planning, surveying, funding, permitting, eradication, and monitoring.
- Oversee Arundo eradication and monitoring, and provide quality assurance.
- Collect and manage data on Arundo infestations, surveys, treatment, monitoring, and overall eradication success.
- Apply new technology to assist eradication efforts.
- Maintain and expand online information clearinghouse (listserv, website).
- Disseminate Arundo-related information.
- Develop a regional eradication strategy and recommendations for implementation .

Hypotheses:

- The techniques used effectively eliminate Arundo infestations.
- Native riparian vegetation increases after Arundo eradication.
- Channel reaches are less susceptible to bank erosion when Arundo is removed.
- Many eradication sites revegetate on their own.
- A regional approach to Arundo eradication in the CALFED region significantly reduces Arundo's presence.
- The coordinated management of materials, information, and activities benefits Arundo eradication workers.s

2. Justification

Conceptual Model: As described in the Problem description, Arundo invasion severely degrades riparian and aquatic habitats. Eradication of Arundo through effective planning, control methods, and follow up monitoring will reverse the decline in ecosystem health by allowing native plants, animal populations, and water and sediment patterns to reestablish. Without eradication, Arundo will overwhelm riparian systems and result in fires, floods, and overall ecosystem decline.

Sources: Though not officially listed as noxious by the USDA, *Arundo donax* is rated by the California Exotic Pest Plant Council (CalEPPC) as an A-1 list species, with the designation "Most Invasive Wildland Pest Plant; documented as aggressive invaders that displace natives and disrupt natural habitats." This rating signifies that Arundo is widespread in more than 3 Jepson Manual geographic subdivisions. (For a general description of *Arundo donax*, see the CalFlora Database: www.calflora.org). This species has been nominated as among 100 of the "World's Worst" invaders (Global Invasive Species Database: www.issg.org).

Adaptive Management: We adaptively manage this program to accommodate the needs of partners, sensitive species, specific sites, and local entities. Program forms for surveying and mapping protocols have already gone through several iterations based on partner feedback and field testing. The permit process has provided opportunities to adapt our treatment methods to accommodate sensitive species and reduce environmental concerns that potentially hold up the regulatory process. All partner eradication plans require site-specific considerations. Eradication methods, herbicide treatment, and monitoring are adapted to fit specific conditions revealed in the initial site survey. Regional and local eradication coordination requires rapid adaptation to available resources, stakeholder involvement,

property owner cooperation, and partner readiness. Multiple treatment and eradication methods allow eradicators the option to adapt to site-specific conditions, including geomorphological limitations, presence of sensitive species, proximity to water, and human resources.

3. Approach

Team Arundo del Norte was formed to coordinate across organizations and jurisdictions on all matters concerning the control of this noxious weed. This program's objectives were constructed during discussions and consultation with TAdN members, and its approach reflects the group's priorities. These priorities include:

- developing a body of high-quality information that can be shared and kept updated.
- tracking and collective response to challenges faced by individual groups carrying out eradication.
- continual development of better techniques for Arundo control.

The requested next phase of funding builds on the first phase to increase coordination and information exchange, and accomplish tasks that no one group alone is able to undertake. The program leverages considerable energy and funding already committed to the NIS management problem, bolstering existing localized efforts with resources and knowledge and placing them in the context of the whole CALFED ecoregion.

As in the first phase, this proposal highlights work that needs to be done to control Arundo but cannot be undertaken by a single group. Supporting local eradication projects with information and consolidating or standardizing repeated activities is the central theme for the Program. It is one that is gaining recognition for its value, as demonstrated by 6 new partners and expressed interest from at least 8 other potential partners. Local decisions and relationships are handled by the partners, and over-arching work that benefits all is carried out by the program with continual advising and guidance from the TAdN Advisory Committee. Scientific research results—as well as techniques, innovations, and new approaches to challenging problems and best management practices—benefit every eradication effort through this joint process of communication and coordination.

The methods used in the program are the result of group collaboration among stakeholders, and they continually evolve to reflect the updating of collective experience and knowledge. These include:

- an array of control methods recommended for the individual eradication projects.
- standardized monitoring and data management techniques.
- consolidating existing geographic information.
- use of the Internet to provide easy access to information and foster communication.

CALFED MAY FUND PHASE 2 OF THIS PROGRAM AT ONE OF THREE LEVELS. THE LEVELS ARE CUMULATIVE, EACH BUILDING ON THOSE BELOW IT.

<u>LEVEL 1</u>:
Level 1 accomplishes the following:

- Expands the number of Arundo eradication sites by funding eradication implementation and monitoring by 6 new partners at multiple sites in 7 watersheds. (See Location Map for Arundo Eradication Sites.)

· Extends the monitoring period for currently funded partners from three to five years.

The 6 new partners are: Upper Cache Creek, Lower American River, Tule River, San Joaquin River, Ash Slough/Cottonwood Creek, and Gray Lodge Wildlife Area. In all new locations, the partner watershed groups or agencies are completely prepared to eradicate Arundo on their streams. They have provided informed cost estimates for eradication, and require only labor and/or funding to begin immediately. The program will deliver funds and expertise to Level 1 groups to immediately carry out planning and eradication, and follow up with monitoring. Pretreatment surveys and follow-up monitoring will use methods developed under Phase 1 of the program. Level 1 provides current and new partners funding to do monitoring for five years instead of three, augmenting the current partner projects with two additional years of monitoring. This would bring eradication efforts in line with scientific recommendations for a full five years of monitoring following initial treatment. This level of funding continues the current level of program administrative support for a full-time Coordinator and a full-time Information/Data Coordinator.

LEVEL 2:
In addition to tasks proposed in Level 1, Level 2 will develop:
· Known Arundo distribution information for the CALFED region.
· A database of stakeholders with an interest in Arundo eradication.
· Recommended steps for additional mapping and GIS data management.
· Recommendations that prioritize areas for Arundo eradication.
· Identification of potential partnerships for priority eradication areas.

Set a Region-Wide Approach: Level 2 is a natural expansion of the program's original purpose: to coordinate for CALFED a region-wide approach to Arundo eradication throughout the solution area. Such an approach avoids the pitfalls of isolated eradication efforts by identifying all major problem infestations, allows for assessment of invasion patterns, prioritization of eradication work to be done, and the creation of partnerships for undertaking the work. The ability to see the big picture is critical in attempting any regional weed management campaign, and increases its chances of success. While there are numerous efforts to map Arundo, no one group has assumed responsibility for coordinating all of them. Consequently there is poor knowledge of the actual extent of the weed. Level 2 will consolidate these mapping efforts and bring the people creating them together for a coordinated initiative. It will take full advantage of TAdN's extensive membership and the members' expressed interest in cooperating. Enthusiastic participation can be expected, as this is work often discussed at TAdN meetings.

Create Arundo Distribution Map and Stakeholder Identification: The program conduct a campaign by phone and email to create an known Arundo distribution map for the entire CALFED region and a database of stakeholders with an interest in Arundo eradication. We will collect current knowledge of Arundo infestations by asking for estimates of Arundo location, density, and extent drawn on printed copies of USGS 1-meter orthophotos. The orthophotos, donated by the Department of Conservation and the Information Center for the Environment, will be sent with instructions for capturing current information about Arundo infestations and their severity. The survey will be sent to TAdN members, Weed Management Areas, and other groups identified as potentially knowledgable about the status of the plant in their area. They will be asked to share any maps of Arundo that they already have. The regional Arundo map will then be created by collecting the current knowledge and any shared data into a single GIS data layer. The survey will also be used to expand the program's list of stakeholders by

inquiring of active weed management groups about potential partnerships for Arundo work in their watershed.

Arundo distribution information for the CALFED region will also be collected at the CalEPPC conference and other venues where weed professionals meet. In 1999, TAdN displayed a poster of Northern California rivers and streams at CalEPPC's annual conference. Weed experts contributed valuable information using colored felt pens depicting presence and absence, and approximate severity of the infestation. We will digitize this and build upon it through the use of this approach and the survey.

Two workshops will be conducted to coordinate data holdings, compare data methodologies, and develop a set of recommendations for data coordination and management responsibilities. When the overview map is available, a workshop with all interested parties from TAdN will be held for the purpose of reviewing the map and assessing priorities for eradication (and any further mapping needed using aerial imagery or other remote sensing techniques). As with all other geographic data generated by the program, the CALFED region Arundo distribution map will be posted on the TAdN website using the map server developed in Phase 1.

LEVEL 3:
In addition to implementing the new eradication and Arundo reconnaissance proposed in Levels 1 and 2, Level 3 proposes to:

- Develop a practical method or methods for the automated detection of Arundo using remotely-sensed data.
- Purchase a chipper, a piece of equipment needed for biomass handling that can be shared among partners.

Assess Remote Sensing Imagery: Level 2 activities will likely reveal that there is considerable mapping work to be done to support ongoing eradication of Arundo in the CALFED region. While many different techniques are being used by those undertaking the task of mapping in small areas, it is widely recognized by members of TAdN that the development of remote sensing techniques for mapping larger areas will be useful. Level 3 of the program proposes to compare the available types of aerial and satellite remote sensing imagery to 1) assess the technical feasibility of using them to map Arundo, and 2) evaluate prices and availability for a larger scale mapping and change detection effort.

Experience From Putah and Cache Creek: Again there are opportunities for collaborating with others already doing some of the technique development and for partnering on the acquisition and use of these kinds of data. Two pilot regions offer the possibility of direct comparison of data types due to the availability of multiple datasets over the same area: Putah Creek and Cache Creek. The Putah Creek Coordinating Committee, an eradication partner already established with the program, has purchased high-resolution aerial imagery for detailed Arundo mapping. The Center for Spatial Technologies and Remote Sensing at UC Davis has offered to share its 1995 AVIRIS hyperspectral data for the entire creek as well as its recent developments in mapping Arundo using automated techniques with the data. AVIRIS can be also used to simulate other data types of coarser resolution such as LandSat TM. In the Cache Creek area there is extensive work being done by the Cache Creek Conservancy and the USDA, who have acquired AVIRIS imagery and orthorectified digital aerial imagery, and have developed an automatic classification method for tamarisk using the digital aerial photos. They are also working on the detection of several other important invasive species.

Other Resources: Dr. Marc Horney with UC Davis Extension has worked with Ikonos data and other airborn sensors for the detection of Arundo. The California Department of Conservation has offered to provide radar imagery for the Napa and Sonoma Valleys and the Central Valley from the Sutter Buttes to Fresno. Pacific Meridian has pledged a 30% discount on its Ikonos satellite. This program will coordinate with these willing partners to establish the spatial and spectral resolutions and the types of processing needed for the mapping of Arundo to an accuracy useful for eradication planning, and carry out a comparison of human-aided and computer-automated techniques. New imagery data will be acquired over an area that is known to be infested with Arundo and as yet unmapped, as determined by consensus of the lead mapping group assembled for advising Level 2. The comparison of techniques will thus result in the mapping of that region. A report will be issued on the program's findings along with estimated costs for mapping large regions for the weed.

The data comparison work will be offered as a research project to be undertaken at a university with an appropriate remote sensing facility such as the UC Davis Center for Spatial Technologies and Remote Sensing. Software for the handling of imagery data will be provided by the chosen research facility. The program's Data Coordinator will oversee the research project. Funds for the purchase of Ikonos Precision and DAIS 4-band imagery is requested. An opportunity will be sought to extend the area imaged with the funds by adding cost-share from a partner in the purchase of the imagery. All map products will be shared with the public on the Arundo map server.

Arundo Disposal: The safest and most cost-effective method for disposal of cut Arundo canes is on-site mulching with flail-mowers and barrel-type chippers. The shredded biomass speeds decomposition, eliminates stem propagation, and significantly reduces fire risk. Because the cost of purchasing this equipment is prohibitive for most partners, our proposal includes the purchase of a chipper and a tow vehicle for all partners to share. Its cost will be recouped within three years by eliminating the need for extensive handling and hauling of biomass. A chipper and a three-quarter ton pickup will be purchased for shared use, assisting with the biomass disposal in the eradication sites in accordance with agreed-upon methods.

4. Feasibility

The proposed eradication approach TAdN is using is eminently feasible because so many stakeholders have witnessed first-hand the harm that Arundo causes to riparian areas and therefore are highly motivated to kill this rapid-growing, highly invasive weed. A growing awareness among permitting agencies of the need to address the Arundo problem and the work TAdN has already initiated to secure regional permits increases the feasibility of the program. Of course there always exist contingencies that can delay individual eradication projects for unknown amounts of time, such as permitting or disposal issues.

The time that the program has allotted to accomplish eradication is appropriate. However, CALFED's three-year funding limit is shorter than the five-year period required to complete adequate monitoring for complete eradication. This proposal extends the monitoring period for currently funded partners. New partners will need an additional two years funding following the proposed fund period. We will pursue funding for a full 5 years of monitoring for all partners.

Access to property where Arundo infestations are located can be a challenge, especially when it is privately owned. Most of our current and proposed partners have jurisdiction over or have already begun negotiating access to the lands where targeted eradication sites are located.

We have been working to secure a regional permit for all partners within the CALFED region. By limiting our eradication and herbicide treatment to clearly defined "hand-work" methods, we hope to receive a CEQA categorical exemption for the first phase of our proposed statewide DFG 1603 permit. The Department of Pesticide Regulation has requested, on our behalf, a "not likely to adversely effect" concurrence from the Fish and Wildlife Service for the use of glyphosate which will satisfy the initial study requirements. To further reduce risk, applicators will use
an aquatic approved herbicide (Rodeo) near water or where potential for runoff or where soil migration may occur.

5. Performance Measures

Program performance will be monitored first in terms of the amount of Arundo successfully eradicated, and second by the value of the program's data and information products in affecting future eradication.

To monitor success of the eradication effort, partners will use a monitoring protocol being developed by Team Arundo del Norte and field tested by program staff and current partners. This protocol, a standardized data collection and reporting system with user-friendly data forms and instructions, includes: 1) an initial site assessment, 2) a treatment log, and 3) follow-up monitoring.

The protocol, its forms, and instructions are at http://teamarundo.org/eradproject/monitoring.html. It has been designed for ease of use and repeatability, and field-tested by the program's Data/Information Coordinator with current partners. New partners are trained to conduct the survey and monitoring, and to use hiker GPS units by the Data/Information Coordinator.

Current research suggests the need for at least five years of post-eradication monitoring to successfully eradicate Arundo. Level 2 of this proposal extends current partners' monitoring efforts to this five-year benchmark. If funding contracts have a shorter life span, partners can only be held accountable for that shorter time frame.

The data collected will be posted to a central database on the TAdN website for storage, analysis, and dissemination. A map server funded under Phase 1 will enable users to locate CALFED partners and their data by geographical areas. Data will be regionally integrated by other workers.

To monitor the program's value to eradicators and other stakeholders, in year 3 of the program a questionnaire will be distributed to all partners and posted on the website to secure feedback on the overall effects the program has had on the TAdN Arundo eradication effort in the CALFED region. The primary access point for the survey protocol and the Arundo information archive is the TAdN website. A simple way to assess its usefulness is to evaluate the trend in website usage. Server statistics will be collected and assessed for this purpose. The table below summarizes how the program will evaluate its success:

Hypothesis	Monitoring Parameters, Data Collection	Data Evaluation
· The techniques used effectively eliminate *Arundo* infestations.	· Measure Arundo kill-rate according to standards established by DFG (1998 Grey Lodge pesticide trials). · Photo documentation for 5 years (aerial if possible). · Amount of re-sprouting and re-treatment for 5 years after eradication. · Cost break-down.	· Compare kill-rate and cost of various methods. · Compare rates of Arundo (re)growth on treated and untreated sites.
· Native riparian vegetation increases after Arundo removal.	· Photodocumentation for 5 years (aerial if possible). · If there is active revegetation after eradication, provide follow-up photos and success data for 4 years. · Estimate percent cover of native and non-native plant species before eradication and at follow-up monitoring visits.	· Compare relative cover of native and non-native riparian vegetation onsite before and after eradication.
· Stream channel capacity increases at Arundo removal sites.	· Stream cross-section drawings and site photos.	· Compare cross-section drawings and site photos at sites before and after Arundo removal.
· Many eradication sites will revegetate on their own.	· Photodocumentation for 4 years. · Estimate percent cover of native and non-native plant species before eradication and at follow-up monitoring visits.	· Compare actively and passively revegetated eradication sites on similar reaches or streams.
· A regional approach to Arundo eradication in the CALFED area (as funding allows) significantly reduces Arundo's presence.	· Extent of area treated, and estimate of region-wide Arundo acreage.	· Estimate region-wide reduction of Arundo that could be expected under alternative program or with no treatment.
· The coordinated management of materials, information, and activities benefits Arundo eradication workers.	· Conduct survey of partners and other Arundo workers about the program. Collect website server usage statistics.	· Evaluate survey responses and website usage statistics.
Some eradication partners may have additional hypotheses and monitoring parameters.		

6. Data Handling and Storage

Collectively, partners' Eradication and Monitoring Plans will provide TAdN and CALFED with invaluable information on the distribution, spread, control, and ecological effects of Arundo, the most invasive riparian weed in the state. Phase 2 of the Arundo Eradication Program will expand the ability of the program to collect data of regional strategic importance.

Level 1 funding will use the database and data handling techniques developed under the first phase to support additional partners at the same level of data collection. This system uses paper forms taken into the field. Resulting data is entered into a central database using electronic forms on the TAdN website. The survey and monitoring database, once complete, will be temporarily housed at the Information Center for the Environment at UC Davis until moved to its final destination on the Arundo map server at the Sonoma Ecology Center. Text information presented on the website such as control methods and Arundo research papers are at this time housed at CERES with the TAdN website. Data will be made available for storage on paper or in digital format by the partners via an automated request function on the website.

Levels 2 and 3 propose to expand the ability of the program to collect data of regional strategic importance, and data management capacities will be expanded appropriately. Data and information developed under Levels 2 and 3 will be stored in GIS and database format at the Sonoma Ecology Center and copies shared with all interested stakeholders, such as The Interagency Ecological Program and the Department of Water Resources Flood Control Division. The map server being developed during Phase 1 will provide public access to Arundo distribution data, and stakeholder contact information will be available for networking purposes in accordance with the wishes of the stakeholder. In addition to storage and handling for the program itself, efforts will be made to incorporate the data standards and interchange formats developed by the USGS National Biological Information Infrastructure's new information "node" called the California Information Node (cain.nbii.gov). This program is focusing on the open exchange of invasive species data and the use of the data in new information products such as predictive modeling and alert systems. Through a partnership with the Information Center for the Environment, the lead for CAIN, this program's data is being made available on CAIN in the new standards as they are developed.

7. Expected Products/Outcomes

The products and outcomes of the program address these over-arching needs. They include:

- the Eradication Planning Packet, which guides eradication planning by partners.
- a streamlined permitting process.
- educational materials to use in outreach.
- a database of potential new partners and stakeholders.
- a database of eradication methods, resources, monitoring data, and authoritative information on all aspects of Arundo control.
- a map of Arundo distribution.
- assessment of mapping techniques, with a recommendation for the development of a region-wide dataset.

Eradication: Arundo eradication in 7 additional watersheds. Each project will be monitored for five years to ensure success, providing sufficient funds are secured.

Eradication Data: The program is building a database on eradication methods and progress of locally-led Arundo eradication projects in the solution area, with survey and monitoring data supplied by new program partners. This database will enable TAdN members to track the success of their work, analyze the efficacy of various Arundo eradication methods in different locations, and learn from the experiences of the other partners. As data becomes available, it will be posted on the TAdN website using the program's map server, allowing users to access Arundo eradication information by geographic area. (See Data Handling and Storage.)

Permits: The program is working to secure a statewide Department of Fish and Game (DFG) 1603 stream alteration agreement and U.S. Fish and Wildlife Service Informal Consultation/Letter of Concurrence. Together, these will grant permission for all partners in the CALFED area to proceed with Arundo eradication work based on the program's eradication protocols, thereby eliminating the need for individual partners to secure their own permitting. This will greatly streamline the process of preparing an eradication project and make it easier for local projects to be implemented earlier in the infestation.

Regional Arundo Distribution Maps: At Level 2 the program creates a distribution map of Arundo in the CALFED region. In the process it will develop an inventory of data that will be useful in further mapping, and create partnerships to assist with mapping and data management. In Partner regions it will coordinate with owners of existing aerial imagery to accomplish the mapping of the entire watershed where that imagery is available. All map information will be added to the program's map server being developed under Phase 1.

Stakeholder Information: A database of potential partners in areas with Arundo infestations will be created to foster a coordinated, region-wide approach to Arundo eradication.

Recommendations for Region-Wide Arundo Management: At Level 2, members of TAdN will evaluate the CALFED region Arundo distribution map and make recommendations for prioritizing eradication areas. Gaps in existing aerial imagery will be identified for infested areas and an acquisition plan developed. At Level 3 the program will develop and compare mapping methods for Arundo using automated classification of several kinds of digital imagery, and investigate the feasibility of mapping the weed over very large areas. Based on these findings, the program will recommend an analysis method and imagery type, and a plan and cost estimate for mapping those areas of the CALFED region that are still unmapped but known to be infested with Arundo.

Training and Education: This program gives partners intensive training in how to conduct Arundo eradication. Each communication with partners increases their knowledge and expertise on Arundo eradication planning, surveying, permitting, methods, monitoring, bank stabilization, revegetation, etc. Program staff meet with each partner and train them to use a hand-held Global Positioning System (GPS) receiver and conduct an initial site assessment using the program's data forms. The TAdN listserv provides another vehicle for information transfer, by enabling individuals to ask questions and receive answers from one another on issues related to Arundo eradication.

Information Archive: The TAdN website is continually being expanded to include more Arundo-related information generated by ongoing eradication, research, and education projects. Plans include adding the ability to search the website.

LEVEL 1 Deliverables: Eradication projects implemented by new and current partners at multiple sites in 7 watersheds by local partner and/or contractor. Eradication plans written, monitoring programs established. Visual mapping survey for new partner eradication areas. Continued addition of information to a database of potential eradication partners. Monitoring data for five years. Quarterly progress reports to CALFED. Yearly progress reports to TAdN. Final report.

LEVEL 2 Deliverables: A map comprised of known Arundo distribution information for the entire CALFED region. A database of stakeholders with an interest in Arundo eradication. Report of recommendations for additional mapping and GIS data management. Report of recommendations for prioritization of Arundo eradication areas and the partnerships that may be developed to accomplish the eradication.

LEVEL 3 Deliverables: Report comparing remote sensing data types for application to Arundo mapping. Arundo map for Cache Creek and at least 100 miles of previously unmapped riparian habitat.

8. Work Schedule
(See Attachment B.)

B. Applicability to CALFED ERP and Science program Goals and implementation Plan and CVPIA Priorities

1. ERP, Science Program and CVPIA Priorities.

This program directly addresses goals set forth by the CALFED NIS Strategic Plan and the ERP. The program addresses Goal 5 of the Ecosystem Restoration Program to "reduce negative biological and economical impacts of established non-native species," which is a BR-3 Bay Area priority and MR-1 multi-regional priority of this PSP. Relevant objectives include Objective 6 to "halt the introduction of invasive aquatic and terrestrial plants into Central California" and Objective 7 to "focus control efforts on those introduced species for which control is most feasible and of greatest benefit." Program objectives correspond with Goals I, II, and III of the NIS Plan to prevent and control the spread of NIS through appropriate management, and reduce their negative ecological and economic impacts. This program addresses the issues (NIS Plan) of leadership, authority and organization, coordination, cooperation and partnership, and education and outreach by providing the following:

- a base of expertise and a conduit for information exchange;
- a single body for coordination of Arundo eradication projects;
- guidance for the best methods for project implementation and monitoring;
- start-up of several projects in critical stream locations that would otherwise not move forward this year; and
- feeding new information from experiences and monitoring into a shared information pool.

The program addresses ERP priorities by improving and increasing aquatic and terrestrial habitats and ecological functions in the CALFED region. The program supports sustainable populations of diverse and valuable plant and animal species by removing a highly invasive plant that displaces these species. Removal of Arundo from stream channels prevents impediments and erosion that disrupt stream flow, cause flooding, and destabilize stream banks.

2. Relationship to Other Ecosystem Restoration Programs

The Arundo Eradication and Coordination Program is coordinating NIS eradication efforts with the CDFA Weed Management Area (WMA) Program. The WMA Program effectively organizes eradication efforts on a regional basis and we hope to strengthen this effort through our program's goals. Our cooperation and partnership with CDFA and WMA members is necessary to coordinate effective eradication planning and implementation. The TAdN Arundo Eradication Program is emerging as a model for Weed Management Areas. The program takes a coordinated regional approach, using proven treatment methods, sophisticated outreach techniques, and standardized survey and monitoring protocols. Collaborating with the WMA program provides TAdN a broader NIS and multi-region context.

The TAdN Arundo Eradication and Coordination Program remains closely linked to the California Exotic Pest Plant Council (CalEPPC), the California Native Plant Society, and the agencies and academic institutions represented by the diverse members of the TAdN Steering Committee. (See Qualifications, Section C.) The UC Davis Information Center for the Environment (ICE) and the California Resources Agency's CERES Program will continue to provide technology and database information for our program.

3. Requests for Next-Phase Funding.

(See Attachment A.)

4. Previous Recipients of CALFED Program

The first phase was titled the Arundo Eradication and Coordination Program, FWS Agreement# 113320J033. This program is in Year 1 of a three-year $818,000 funding cycle. The program has been in operation since May 2001. Its accomplishments as of October 2001 include:

- Established program requirements for all participating partners.
- Developed survey methods, mapping, and monitoring protocols and guidelines.
- Created field data collection forms based on the above protocols.
- Developed guidelines for writing a revegetation/restoration plan.
- Initiated state-wide DFG 1603 Stream Alteration Agreement.
- Secured a Department Pesticide Regulation request for a "not likely to adversely affect" letter of concurrence from the U.S. Fish and Wildlife Service. This concerns the use of the herbicide glyphosate for control of *Arundo donax*. This letter of concurrence will satisfy NEPA requirements for an informal consultation.
- Created a section on the TadN website where all protocols, guidelines, forms, and educational materials are available to the public.
- Upgraded the TadN information archive, creating improved categories for indexing information resources.
- Set up a program email listserv for communicating with the partners.
- Held two quarterly Steering Committee meetings to guide the program.
- Staff met with each partner to help conduct initial surveys and GPS/mapping training.
- Disseminated *Arundo* educational materials to interested stakeholders throughout the state.
- Set up a database on 16 potential partners.

5. System-Wide Ecosystem Benefits

This program has several biological and ecological benefits:

- Preserve existing native riparian habitat and prevent further spread of Arundo infestations.
- Restore native vegetation and processes already destroyed by Arundo.
- Protect and restore habitat for native fish and other species that depend upon native vegetation.
- Conserve water resources by reducing the Arundo biomass on these waterways.
- Protect and restore natural stream geomorphological processes by preventing channel bed aggradation, severe bank cutting, and silt deposition caused by Arundo biomass buildup.
- Protect vegetation, bank stability, and streamside property by reducing the threat of flooding and fire brought by advanced Arundo infestations.

6. Land Acquisition Proposals
NA

· **Qualifications**

Program Administration

The Program Administrator, the Sonoma Ecology Center (SEC), has had seven years experience in coordination of local Arundo eradication efforts, starting with its successful completion of a DWR Urban Streams Program grant project in 1994–95 to carry out eradication using volunteer labor in Sonoma Creek. This project led to the formation of Team Arundo, when, as the culmination of the project, SEC held a workshop to educate Northern California environmental management organizations on the ecological hazards of *Arundo donax* invasion. Richard Dale, Executive Director, is a veteran of local and regional environmental project management. Under his 12 years of leadership, the SEC has become a pivotal community organization with efforts in local planning, organic agriculture, environmental education, native habitat restoration, and watershed assessment.

Program Coordinator: Mark Newhouser, Restoration Project Chair, Sonoma Ecology Center; 20 years experience with landowner permission procedures, community project planning, and volunteer coordination. For the past five years he has coordinated Arundo eradication efforts in the Sonoma Valley Watershed, and since April 2001 has coordinated TAdN's Arundo Eradication and Coordination Program.

Information/Data Co-Coordinator: Deanne DiPietro, Environmental Project Lead, Information Center for the Environment (ICE), UC Davis. Geography graduate student specializing in remote sensing of invasive plants, especially Arundo, with the Center for Spatial Technologies and Remote Sensing at UC Davis (CSTARS). Program liaison to CERES, ICE, and CSTARS. Experience in landowner and volunteer coordination for Arundo eradication in Sonoma Creek; TAdN founding member, webmaster, and listserv manager.

Information/Data Co-Coordinator: Bob Hass, M.A., Education. Principal, Hass & Associates, a firm specializing in business communications and consulting. Over 25 years combined experience in editing, writing, public information, program administration, and environmental education.

Team Arundo del Norte Advisory Committee:
The Advisory Committee for these efforts is comprised of the following members, who are highly qualified to provide comprehensive guidance and carry out program objectives.

Lois Battuello, Napa River Landowner, Representative, Napa River property owners.
Neighborhood stewardship and Arundo eradication with vineyard owners and California Conservation Corps.

Gary P. Bell, The Nature Conservancy of New Mexico.
Conservation planning, restoration, threat-abatement strategies, ecological processes and land management. Founding member of Team Arundo in Southern California.

Mary Bettiga, MA. Agricultural Biologist, Napa County Agricultural Commissioners Office.
Weed control and eradication programs, pesticide use regulation.

Raymond I. Carruthers, Research Leader, USDA-Agricultural Research Service, Western Regional Research Center, Exotic and Invasive Weed Research Unit.
Biocontrol research.

Kristin Carter, MA Program, Administration, Computer Science and Technology, College of Engineering, California State University, Chico.
Program development, grant writing, project management, non-native eradication, permitting, contracting.

Josh Collins, San Francisco Estuary Institute.
Geographic information systems; spatial data integration and analysis for conservation and planning applications.

Mike Dannenberg, Deputy Agricultural Commissioner, Napa County Agricultural Commissioners Office.
Agricultural pest management, control and eradication, bio-control, pest detection.

Tom Dudley, Ph.D. Research Associate, Dept. of Integrative Biology & Environmental Sciences Program, UC Berkeley. Member, CalEPPC Board of Directors.
Research in ecology and impacts of non-native species in western streams and riparian areas; research on biological control methods for Arundo and Tamarix.

Karen Gaffney, Restoration Ecologist, Circuit Rider Productions, Inc. Past President, Society for Ecological Restoration, California Chapter. Switzer Environmental Fellow, 2000.
Research on extent and impacts of Arundo on riparian ecosystems, riparian zone mapping and GIS development, native plant restoration.

Jason Giessow, Santa Margarita and San Luis Rey Watersheds Weed Management Area and DENDRA Inc.
Development of field-tested mapping methodologies for exotic plants, integration and distribution of spatial weed data, coordination and implementation of large scale Arundo removal efforts.

Jesse Giessow, Santa Margarita and San Luis Rey Watersheds Weed Management Area and DENDRA Inc.
Research on establishment and spread of Arundo and native woody riparian species in Southern California, natural succession and native plant restoration after Arundo control.

Richard G Holman, MBA, Computer Science and Technology, College of Engineering, California State University, Chico.
Non-native eradication, bank stabilization, project management.

Marc R. Horney, Ph.D. Natural Resources Management and Range Livestock Production Advisor, University of California Cooperative Extension. Colusa, Glenn, and Tehama Counties.
GIS and GPS applications, remote sensing of vegetation, rangeland and watershed management.

Nelroy Jackson, Ph.D., Independent Consultant.
Research on control and management of *Arundo donax*, founding member of Team Arundo del Norte, member of the Invasive Species Advisory Committee.

Paul Jones, U.S. Environmental Protection Agency.
Streamlining permitting process, coordinating funding opportunities, eradication in South Bay Area watersheds.

Michael Krebsbach, Monsanto Corporation.
Herbicide use and regulation specialist.

Jan Lowrey, Cache Creek Conservancy Projects Manager, Cache Creek farmer/landowner.
Research and implementation of NIS and erosion control options on Cache Creek.

Rich Marovich, Streamkeeper, Putah Creek Coordinating Committee.

Robyn Myers, Ph.D., Natural Resource Conservation District.
Remote sensing specialist and biogeographer.

Kent Nelson, Recreation and Wildlife Resources Advisor, Environmental Services Office, CA Department of Water Resources.
DWR's liaison to TAdN.

Steve Schoenig, Invasive Species Coordinator, California Department of Food & Agriculture.
Weed Management Areas coordination, weed mapping specialist.

Harry Spanglet, Environmental Specialist, Environmental Services Office, California Department of Water Resources.
Wetland/riparian plant ecology, wetland restoration, remote sensing and vegetation mapping, geographic information systems.

David Spencer, Ph.D., USDA-Agricultural Research Service, Exotic & Invasive Weed Research Unit, Weed Science Unit, University of California, Davis.
Research in applied ecology of *Arundo donax* in Northern California.

Joel Trumbo, California Dept. of Fish and Game, Pesticide Investigations Unit.
Research on the impacts of herbicides on non-target fish and wildlife.

Ron Unger, Vegetation Management Specialist/Restoration Ecologist, EDAW. Restoration Coordinator, Putah Creek Council Board.
Liaison to Putah Creek Council, TAdN technical advisor, Arundo growth studies and ecology in southern California, riparian invasives abatement and habitat restoration.

D. Cost

1. Budget (see web forms)

2. Cost-Sharing

The following cost-share commitments have been approved for Phase 2 of the program:

Partners	
Cache Creek	$ 76,990
San Joaquin River	130,000
Gray Lodge State Wildlife Area	24,975
Tule River	150,854
Cottonwood Creek/Ash Slough	100,000
Lower American River	280,000
Subtotal	762,819
Other Sources	
CERES	30,000
CSTARS	20,000
Total	$ 812,819

E. Local Involvement

TAdN began as a local volunteer effort, and is still dedicated to locally-led eradication efforts. Local partners control decisions regarding all aspects of Arundo eradication. Each eradication partner is also partnering with local organizations in their respective watersheds. RCDs, Adopt-a-Watershed programs, local conservancies, WMAs, and a multitude of agencies comprise coalitions being established to address the Arundo invasion. As the TAdN Arundo Eradication Program grows, stakeholder groups and property owners will participate in eradication efforts. As awareness of the problem grows, these new stakeholders will provide access, volunteer labor, and the physical presence necessary to successfully monitor and eradicate Arundo. Most active weed management groups, native plant advocates, and restoration groups are aware of TAdN or already participating.

· **Compliance With Standard Terms and Conditions**

The applicant agrees to comply with all standard State and Federal contract terms.

G. Literature Cited and Supporting Research

Agricultural Research, April 2001. Article and photos describing researchers' (UC Berkeley ecologist Thomas L. Dudley, ARS entomologists Raymond I. Carruthers and Alan A. Kirk, and ARS plant

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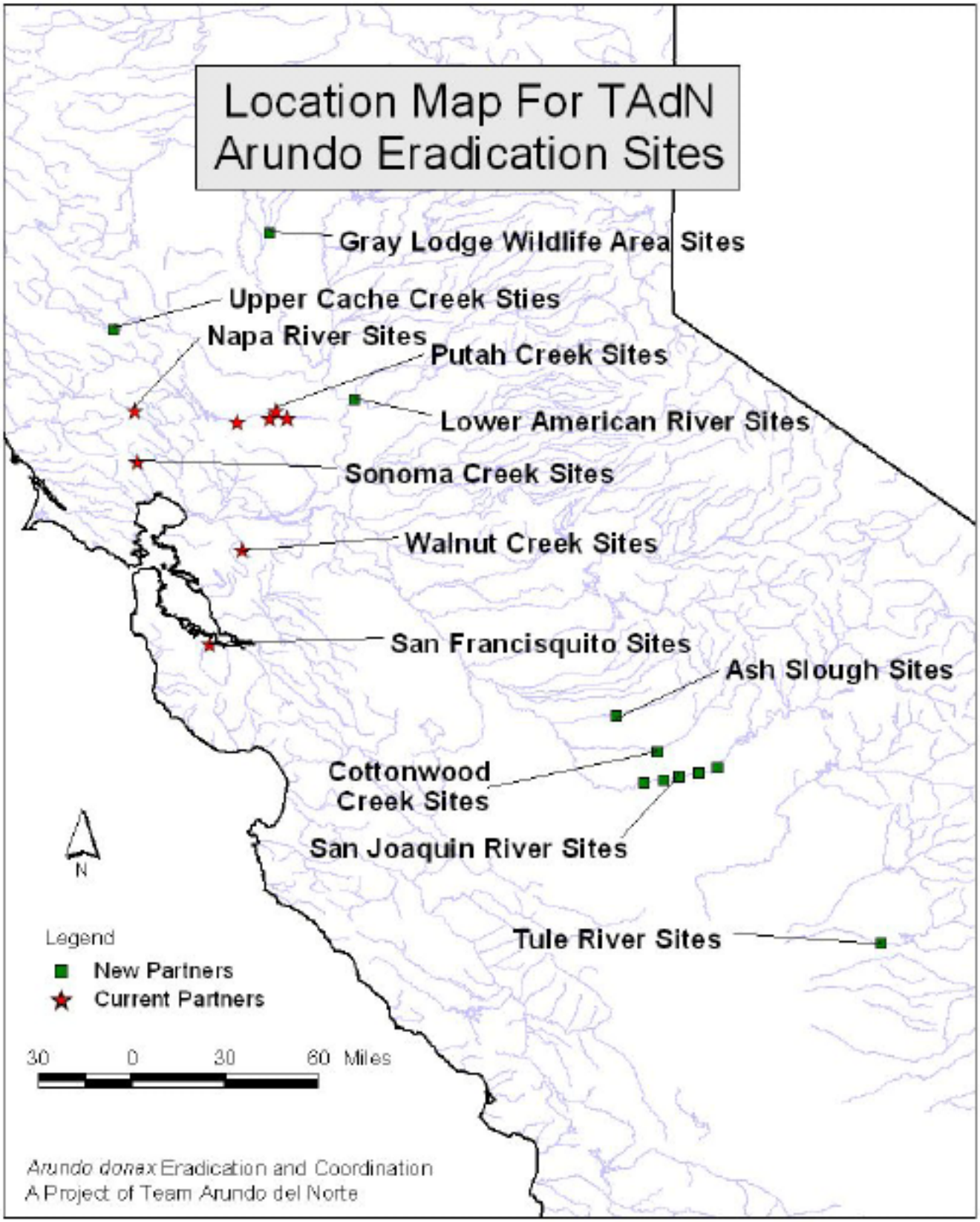
Location Map For TAdN
Arundo Eradication Sites
Gray Lodge Wildlife Area Sites
Upper Cache Creek Sties
Napa River Sites
Putah Creek Sites
Lower American River Sites
Sonoma Creek Sites
Walnut Creek Sites
San Francisquito Sites
Ash Slough Sites
Cottonwood
Creek Sites
San Joaquin River Sites
Tule River Sites
N
Legend
New Partners
Current Partners
30 0 30 60 Miles
Arundo donax Eradication and Coordination
A Project of Team Arundo del Norte

Arundo Donax Eradication and Coordination—Phase 2
A Program of Team Arundo del Norte
CALFED Proposal 2001

Attachment A: Requests for Next-Phase Funding

Project Description:

Team Arundo del Norte (TAdN) was formed in response to the urgent threat that Arundo donax (giant reed or giant cane) presents to the riparian and stream ecosystems of northern and central California. There are two pressing needs regarding Arundo: prompt on-the-ground eradication, and coordination of a region-wide effort. Sonoma Ecology Center (SEC), as a member of TAdN, proposed and received funding for a three-year umbrella project that would carry out CALFED's work with regard to the eradication and control of Arundo. This project is directing funds to eradication partners in five watersheds, with sites on Putah Creek, Sonoma Creek, Walnut Creek, Napa River, and San Francisquito Creek. The project is also providing much needed information exchange and coordination to other groups in the CALFED region, so that many more potential Arundo eradication and prevention efforts can proceed.

The project essentially creates an umbrella for Arundo eradication in the CALFED solution area, thus reducing CALFED's need to administer numerous individual projects. At the same time, it provides a structure for long-term eradication and monitoring of this NIS. This approach is more efficient than funding many separate uncoordinated eradication efforts. It will prevent small infestations from ballooning into disasters, will consolidate project funding applications to reduce agency workloads, and will focus Arundo related efforts where they will be most effective. Through TAdN's close links to watershed groups, agencies, and universities, information gathered by this project on Arundo's distribution patterns, ecological impacts, and eradication methods will be widely and immediately useful.

Scientific Merit of the Project:

Hypothesis: The hypothesis of the project is to stop the advance of the invasive species Arundo donax through direct, intensive eradication in infested sections of selected waterways of the CALFED region. This project will create a support framework to coordinate all Arundo control projects in the region through a network of expertise, new information, educational materials, and streamlined procedures.

Conceptual Model: When Arundo donax displaces native vegetation, the riparian habitat can no longer support a diverse population of native wildlife species. Arundo's destruction of stream canopy vegetation allows for greater solar exposure of surface water, resulting in lethal temperatures for steelhead and salmon. Arundo grows into streambeds moving stream flows and altering stream geomorphology, resulting in erosion and siltation destructive to fish spawning grounds and potentially damaging property. Aundo causes an overall decline of ecosystem health and reduction of native plant and animal diversity.

Eradication of Arundo through effective planning, control methods and follow up monitoring will reverse the decline in ecosystem health by allowing native plant and animal populations to reestablish.

Adaptive Management Framework: This project is actively adapting to the needs of partners as we test our surveying, mapping and monitoring protocols. The site survey forms have undergone several iterations based on feedback solicited from TadN Steering Committee members. The forms were modified further following staff field visits to two partner sites, at which time they were field tested. Originally individual partners were expected to secure permits for eradication work themselves. It soon became apparent that the time, cost, and expertise required to accomplish this task could be done more effectively by project staff seeking regional state and federal permits that would cover all partners in the CALFED region. This is the approach now being undertaken. Partners are having to adapt their eradication plans to the current constraint of a CEQA categorical exemption by using only low-risk eradication methods at present. In preparing revegetation/ restoration guidelines for partners, various options were provided so as to encourage partners to adapt their actions to their particular situations.

Existing Data Collection and Monitoring Program:

All eradication work will be described and monitored using the Arundo Eradication Project Monitoring Plan, a protocol and toolkit being developed by Team Arundo del Norte and field tested by project staff and current Partners. This protocol, a standardized data collection and reporting system with easy to use data forms and instructions, includes: 1) an initial site assessment, 2) a treatment log, and 3) follow-up monitoring.

The initial site assessment captures information about the eradication area's physical properties and vegetation as well as data on each stand of Arundo (latitude and longitude, length and width, and descriptive characteristics of the plant), as well as pre-treatment photos and stream channel cross-section sketches. Treatment logs will record the conditions on the treatment day, the number of people involved, and the exact control method and the techniques for executing it. Follow-up monitoring data will then be collected several times in the years following treatment to assess kill-rate and regrowth. Timing of the monitoring data collection will be accomplished within a timeframe meaningful for assessment of the results of the eradication effort. The treated Arundo will be monitored for signs of poor control or regrowth long enough after treatment to properly assess it and soon enough that it can be effectively re-treated if necessary. Exact timing of monitoring will depend upon several factors, including control method employed (the herbicide Stalker, for example takes approximately six weeks for the effects to be seen), land-owner permission, eradication timing, and weather and stream conditions. Current research suggests the need for at least five years of post-eradication monitoring to successfully eradicate Arundo.

The use of Global Positioning System units will allow the successful reslocation of the Arundo for treatment and monitoring, and the association of all the data to the location for which it is relevant. All data collected by the Eradication Partners will be uploaded to a central database for analysis and to provide a single point of access for the partners and public.

Field forms and detailed information can be found at http://www.teamarundo.org

Attachment B. Summary of Proposed Work to be Performed by Task with Schedules and Deliverables.

(Note: The proposed work is divided into 3 levels, and may be funded at any one. The levels are cumulative, each building on those below it. Schedules will be modified, depending on actual contract start and seasonal limitations.)

LEVEL 1

Task#	Task	Start Date	Schedule	End Date	Deliverable
	CURRENT PARTNERS				
1	Napa River				
	Eradication Plan	contract signing	NA	6 mo. after contract signing	document to funder
	Eradication	summer/fall, yr. 1, 2	yearly	summer/fall, yr. 2, 3	reported in quarterly reports
	Monitoring Implementation	summer/fall, yr. 1, 2	yearly	3 yr. after eradication	monitoring data posed on website, reported in final report
2	San Francisquito Creek	(same as for Napa River)			
3	Sonoma Creek	(same as for Napa River)			
4	Putah Creek	(same as for Napa River)			
5	Walnut Creek	(same as for Napa River)			
	NEW PARTNERS				
6	Upper Cache Creek				
	Eradication Plan	contract signing	NA	6 mo. after contract signing	document to funder
	Eradication	summer/fall, yr. 1, 2	yearly	summer/fall, yr. 2, 3	reported in quarterly reports
	Monitoring Implementation	summer/fall, yr. 1, 2	yearly	3 yr. after eradication	monitoring data posed on website, reported in final report
7	Lower American River	(same as for Upper Cache C.)			
8	Tule River	(same as for Upper Cache C.)			
9	San Joaquin River	(same as for Upper Cache C.)			
10	Ash Slough/Cottonwood Creek	(same as for Upper Cache C.)			
	COORDINATION TASK (ADMINISTRATION)				
11	Quarterly reports (fiscal and progress)	contract signing	quarterly	3 yr. after contract signing	quarterly reports (fiscal and progress)
12	Steering Committee meetings	Aug. 2002	quarterly	3 yr. after contract signing	agendas, meeting minutes, listserv
13	Add potential partners		quarterly	3 yr. after contract signing	20 potential partners added to database

LEVEL 1 (continued)

Task#	Task	Start Date	Schedule	End Date	Deliverable
	COORDINATION TASK (ADMINISTRATION)				
14	Eradication partners mtgs.	contract signing	as needed	3 yr. after contract signing	agendas, meeting minutes, list of participants
15	Assist new partners	contract signing	as needed	3 yr. after contract signing	list of potential funding partners, region-wide permits, on-site meetings with stakeholders to help with site assessment, mapping, monitoring
16	Final report	2.5 yr. after contract signing	NA	3 yr. after contract signing	document to funder, posted to website
	DATA/INFORMATION COORDINATION TASK				
17	Site assessment and monitoring database applic.	contract signing	ongoing	1 yr. from contract signing	database application
18	Training & support for eradication partners in use of monitoring database	contract signing		end of project	"How to Use" manual
19	Instructional materials for using monitoring database	contract signing	ongoing modifications	end of project	web pages & hardcopy materials
20	Digital archive of education & outreach materials in formats appropriate for download and printout	contract signing	ongoing	updated until end of project	digital archive on website
21	Eradication program description collection into Nat.Resource Projects Inventory (NRPI)	contract signing	ongoing	updated until end of project	data in NRPI with links from website
22	Online access to monitoring data & project info., including graphic user interface	contract signing	ongoing	updated until end of project	web/database application for posting monitoring data and the data itself
23	Website index & help pages	contract signing	ongoing	end of project	a well-designed website for the support of eradication partners and education of the general public

LEVEL 2

Task#	Task	Start Date	Schedule	End Date	Deliverable
	COORDINATION TASK (ADMINISTRATION)				
24	Coordinate region-wide approach to eradicaiton.	contract signing	ongoing	end of project	???
	DATA/INFORMATION COORDINATION TASK				
25	Plan phone/email survey on Arundo distribution	contract signing	ongoing	6 months after contract signing	phone/email survey
26	Plan poster campaign	contract signing	ongoing	end of year 1	maps/materials for conferences
27	Carry out phone/email campaign on Arundo distribution	6 months after contract signing	ongoing	end of year 1	map of known Arundo distribution for entire CALFED region; database of stakeholders interested in eradication
28	Carry out poster campaign	3 months after contract signing	ongoing	end of year 2	additional data on Arundo distribution from weed professionals; inventory of data on Arundo mapping
29	Prioritize infestation areas	start of yr. 2	ongoing	end of project	two workshops; report on recommended prioritization; report on recommendations for additional mapping and GIS data management

LEVEL 3

Task#	Task	Start Date	Schedule	End Date	Deliverable
	DATA/INFORMATION COORDINATION TASK				
30	Assess technical feasibility of using remote sensing imagery to map Arundo	contract signing	1-time task	end of project	report with recommendations; at least 100-mile map of Arundo in CALFED region