

F1-078

24 July 1997

DWR WAREHOUSE

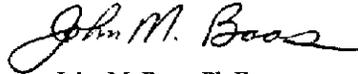
97 JUL 28 PM 12:12

Kate Hansel  
CALFED Bay-Delta Program  
1416 Ninth Street, Suite 1155  
Sacramento, CA. 95814

Dear Ms. Hansel:

The Timberline Associates team is pleased to submit a proposal for Category III funding. Enclosed please find 10 copies of a proposal entitled, "A Prototype GIS Database and Decision System for Prioritizing Acquisition of Aquatic Habitats in the Delta Region." The proposal is submitted as an "other services" type RFP. Please contact me if you have questions or require additional information. I look forward to hearing from you regarding this proposal.

Sincerely,



John M. Baas, Ph.D.  
Principal.

enclosures/jmb

DWR WAREHOUSE

**I. Executive Summary**

**Title:** A Prototype GIS Database and Decision System for Prioritizing Acquisition of Aquatic Habitats in the Delta region

97 JUL 29 PM 12:12

**Applicant Name:** Timberline Associates, Psomas Associates, EA Engineering, Science and Technology, Philip Williams Associates, and California Conservation Corps

**Project Description and Primary Biological /Ecological Objectives**

The CALFED process to date has listed several priority habitats and species in the Bay-Delta area and has identified numerous stressors that may adversely affect the functions and values of these habitats and species. Land acquisition will play a critical role in ensuring adequate protection and management of these priority habitats. However, comprehensive data on priority habitats in the Delta are lacking. One of the major products of this project will be a GIS of priority habitats and other relevant data layers for a prototype area. The habitat map layer will be created using a combination of statistical classification of satellite imagery, aerial photo interpretation, and field verification. This map will give some logic and foresight to an acquisition process that is opportunistic and unpredictable. The other information in the GIS will be economic, environmental condition, hydrology, and land use data for these priority habitats. A composite map of a prototype area will be created that will greatly facilitate decision making about acquisition targets. The other major product will be a decision making system to rank and prioritize parcels desirable for acquisition. Assuming that the prototype area can be successfully mapped, the Timberline team will apply for supplemental funding to extend this effort to map the entire legally defined Delta and Suisun Bay.

The primary biological benefit of having these products is the identification of parcels that contribute the most to ecological integrity and ecosystem connectivity. Secondary benefits include quicker implementation of ecosystem restoration and acquisition projects by providing information with sufficient detail for project level planning, and a decision tool that can be used for guiding future acquisitions in other portions of the CALFED project area.

**Approach/Tasks/Schedule**

The approach will involve synthesizing existing information in the first 60 days of the project about the priority habitats; their level of integrity, environmental condition, land use status, hydrology, and economic value. This information will be reviewed by the Timberline Team and an oversight committee to determine the structure of the GIS database and to identify data gaps. A detailed workplan will be written to guide the mapping strategy, and to develop a process for linking the GIS information to a decision making system for land acquisition. The project will utilize scientific expertise for workplan development, mapping, and establishing the decision system. Field verification of mapped habitat data and digitizing of any "hard copy" data will be done by CCC staff. The project will begin in October, 1997 and require one year for completion.

### **Justification for project and CALFED funding**

The project is proposed as an "other services" type. It focuses on Monitoring, Assessment, and Reporting and will provide much needed information about: tidal perennial freshwater aquatic, seasonal wetland and aquatic, instream aquatic, shaded riverine, midchannel islands and shoals, and North Delta agricultural wetlands and perennial grassland habitats.

### **Budget costs and third party impacts**

The budget for this project is \$275,294. There are not any third party impacts anticipated.

### **Applicant Qualifications**

Each key team member has an average of 10 years of experience in habitat inventory and mapping. Dr. John Baas has more than 10 years of experience in managing multi-disciplinary natural resource planning efforts and will serve as the project manager. Dr. Vedagiri has more than 10 years of experience in ecological risk management with an emphasis on wetland communities, and Dr. David Chapin is a wetland ecologist with extensive wetland delineation experience on the West Coast. Mr. Doug Mende is a ecologist, GIS, and remote sensing specialist with 15 years of experience with vegetation mapping. Mr. Andrew Leven is a soil scientist and aerial photo interpretation expert with extensive mapping experience with a variety of ecosystems in California, and Mr. Eric Sheehan is a GIS expert in habitat mapping using image classification. Mr. Burke has more than 10 years of experience with hydrology studies. The California Conservation Corps is a well established and well known organization in California with extensive experience in data collection and ecosystem restoration. With the exception of the CCC and Mr. Mende, all team members have regularly worked together during the last 3 years.

### **Monitoring and Data Evaluation**

Quality Assurance and Quality Control will be provided by ensuring adequate senior technical review of all methodologies and deliverables developed for this project. An oversight committee comprised of stakeholder members will be established at the beginning of this project. The committee will meet every other month with the Project Manager to make sure the project remains on a critical path. Quarterly reports will be produced and will identify any schedule slippage, project progress, staffing adequacy, and any unanticipated events that may alter the scope or progress of this project.

### **Local Support/Coordination with other Programs/Compatibility with CALFED objectives.**

The project will generally use local consultants and CCC staff from the Sacramento or Bay areas. This project will be coordinated with acquisition efforts and habitat mapping currently being conducted on a piecemeal basis by The Nature Conservancy and others. The project is consistent with the CALFED objectives of ecosystem restoration and water quality improvement.

**II. Title: A Prototype GIS Database and Decision System for Prioritizing Acquisition of Aquatic Habitats in the Delta region**

**Name of Applicant:** John M. Baas, Timberline Associates, P.O. Box 1475, Martinez, CA. 510-335-9778 (phone/fax) karthik1@value.net

**Type of Business:** Sole Proprietorship and Consulting firm

**Tax ID number:** 276-44-0505

**Technical and Financial Contact:** John M. Baas or Usha K. Vedagiri

**Participants/Collaborators:**

Timberline Associates  
Psomas Associates  
EA Engineering, Science, and Technology, Inc.  
Philip Williams Associates  
California Conservation Corps

**RFP Project Type:** Other Services

### **III. Project Description**

#### **a) Project Description and Approach**

The CALFED process to date has listed several priority habitats and species in the Bay-Delta area and has identified numerous stressors that may adversely affect the functions and values of these habitats and species. Land acquisition will play a critical role in ensuring adequate protection and management of these priority habitats. The Category III land acquisition program has monies available for the acquisition of land from willing sellers. However, there is no agency based acquisition approach or system to guide these efforts. Nor is there a comprehensive and current GIS database of the priority habitats. While the CALFED process may identify numerous parcels of land that are available for acquisition and are located within the Bay-Delta area, not all the parcels may be appropriate or equally desirable for acquisition. This is particularly true of priority habitat areas where multiple stressors may be present. A simple and rapid screening tool for the evaluation of potential acquisition areas in terms of their desirability and potential to further CALFED's restoration objectives would assist in ranking and prioritizing potential parcels and in making decisions regarding land acquisition.

This is proposed as a new project, and falls under the monitoring, assessment, and reporting category. This project would involve 1) developing a prototype map of priority habitats in a small portion the Delta, and 2) establishing a set decision system for the acquisition of priority habitat areas in the legally defined Delta, and Suisun Bay. The habitat types of focus include: tidal perennial freshwater aquatic, seasonal wetland and aquatic, instream aquatic, shaded riverine habitat, midchannel islands and shoals, and North Delta agricultural wetlands and perennial grasslands. The acquisition criteria will focus on ecological, land use status, and economic considerations. By applying the desirability criteria to each parcel of priority habitat proposed for acquisition, management decisions may be made regarding whether or not to pursue acquisition, the value of a particular parcel relative to others, and the potential benefits to ecosystem function and value of each parcel.

#### **b) Location and geographic boundaries of project**

The project area will focus on the legally defined Delta and Suisun Bay. This area was selected because the number of stressors imposed on the ecosystem are greatest here, and the programmatic actions regarding ecosystem restoration are the most ambitious (as measured in acres to be restored) in the Delta. Some of the proposed major efforts include restoring between 33,000 and 45,000 acres of agricultural land to tidal perennial habitat and tidal emergent wetlands., and restoring 20,000 to 25,000 acres of agricultural lands to tidally influenced freshwater marsh. The initial, prototype area to be mapped will be determined concurrent with workplan development. However, it is assumed the test area will not exceed more than 34,000 acres (one 7.5" quadrangle, 1:24000 scale).

#### **c) Expected benefits**

The primary stressors within the focus of this project include all but three of the identified list, (refer to the summary of technical team reports stressors and example restoration actions, June 1997) the exceptions being undesirable species interactions, population management, and wildfire. The priority habitats that are the focus of this proposal are all wetland and shoreline habitats and thus include six of the seven listed priority habitats including tidal perennial freshwater aquatic, seasonal wetland and aquatic, instream aquatic, shaded riverine, midchannel islands and shoals, and North Delta agricultural wetlands and perennial grassland habitats. All the listed priority species are known to use these habitats at one or more stages of their lives and therefore are included within the focus of this project.

By collecting comprehensive and current priority habitat data, this project will provide the following *primary benefits*:

- A multi layer GIS indicating priority habitats and their status and condition for the prototype area
- Facilitate ranking and prioritizing of parcels proposed for land acquisition
- Characterize the level of ecosystem integrity for each priority habitat type
- Identify areas that contribute the most to ecosystem connectivity

*Secondary benefits include the following:*

- Improve water quality and ecosystem restoration by facilitating project implementation
- May be developed into a long-term planning and acquisition tool with application to other portions of the CALFED project area
- Will help the CALFED project more rapidly transition from Phase II (programmatic EIS/EIR) to Phase III (project implementation) by providing a common database and map for implementation projects such as levee setbacks, ecosystem restoration, or water quality improvement
- Facilitate rapid allocation of monies for land acquisition such as surplus funds available at the end of the fiscal year
- Help focus water quality monitoring efforts by identifying sources and locations of chemical contaminants

*Third party benefits include:*

- A public domain GIS database

#### **d) Background and Biological/Technical Justification**

The need for the project is clearly evident since land acquisition and restoration are key components of the CALFED vision, regardless of which alternative is selected. As the CALFED project moves into Phase III in September, 1998, the need for more geographically specific and comprehensive habitat information will increase. Conversations with members of several nonprofit land acquisition entities and with acquisition managers for the U.S. Fish and Wildlife Service and the California State Wildlife Conservation Board indicate comprehensive data on the priority habitats is lacking. No other comprehensive mapping and decision criteria approaches are currently believed to be in place to achieve comparable objectives. While many entities may propose mapping of individual tributaries or developing focused management plans, this proposal provides a prototype mapping effort and decision tool that is linked to acquisition and management strategies for the entire Delta region, thus providing short-term and long-term strategic benefits. Acquisition criteria are needed to allow a systematic investigation of lands desirable for acquisition. Currently the land acquisition process is highly opportunistic and ad hoc. Support for a systematic approach to prioritizing acquisitions as described in this proposal has been offered by staff with the Trust for Public Land and the California Wildlife Conservation Board. The ranking and prioritization benefits deriving from the proposed project will be durable since changes in parcel or habitat attributes may be easily incorporated into the evaluation scheme. This is proposed as a new project.

#### **e) Proposed Scope of Work**

The project will be in a GIS mapping phase, and a decision system development phase. The proposed scope of work includes the following major elements.

- Collect available public domain information sources
- Develop a detailed workplan to specify image classification approach and ground truthing, and for establishment of acquisition criteria
- Establish a stakeholder review committee for Quality Assurance/Quality Control
- Procure satellite imagery, and selection of a habitat classification algorithm
- Use image classification to delineate habitat types in the prototype area
- Conduct ground truthing on publicly owned lands to determine image classification accuracy for the prototype area
- Develop desirability criteria for land acquisition
- Integrate all criteria into a decision-making framework

- Develop map of priority habitats and their locations and acreages in the test area
- Develop a report that prioritizes acquisition of habitats and the rationale for the priority ranking for the prototype area

#### **Collect existing information**

Existing sources of information will be gathered and used to validate the image classification process, and to aid in developing a field verification (ground truthing) sampling plan. With the exception of satellite imagery, the Timberline Team will only procure "public domain" data. Information will be most likely gathered from the following sources.

- Bay and Delta mapping and ecological monitoring projects
- Natural Heritage Program databases
- National Wetland Inventory Maps
- Location of activities and sources of contaminants (EPA)
- Current and intended land use of parcels in question ( Arc/Info format)
- SPOT Panchromatic image (California Dept. of Fish and Game data)
- Survey of willing sellers in the Delta ( Natural Heritage Institute data)
- Digital Elevation Model (DEM) data ( 7.5' USGS series)
- Soils data (Natural Resource Conservation Service)
- Hydrology features (FEMA maps)

The data summary deliverable will be a data dictionary format document with detailed descriptions about data accuracy for existing data sets. All data analysis and products will be developed using the latest version of Arc/Info.

#### **Stakeholder Review Committee**

The Timberline Team recognizes the need to coordinate this project with the stakeholder agencies, and ensure agency staff ideas are incorporated into this effort. To accomplish this, we propose that a 4 person review committee be formed, comprised of 2 members from the ecosystem roundtable, and 2 mapping specialists. Mr. Joe Watts, of the Topographic Engineering Division of the Army Corps of Engineers, is recommended as one of the mapping specialists. However, the exact review committee members will be identified in consultation with the CALFED project manager for the stakeholder agencies.

#### **Develop Workplan**

The workplan will provide details regarding the mapping and image classification protocols. It will review existing classification algorithms and make a selection of the one that is most suited to this project. The workplan will contain agreed upon definitions of the habitat types that allow their unambiguous identification by field staff during the ground truthing phase. It will identify

acceptable (typically 80%) classification accuracy levels, and specific areas where ground truthing will occur.

The proportion of the area subject to ground truthing depends on the number of habitat polygons per habitat class that are present in the prototype area. If there are numerous polygons over a large area, then about 30 samples per habitat type would be needed. In contrast if the project area is highly homogenous, such that there are only five polygons per habitat type, then all polygons would be sampled. The prototype area will ideally have all six habitat types represented to ensure image classification can distinguish all habitats. A useful delineator for determining the size of the prototype area is application of a Digital Elevation Model for determining the reaches of Delta tributaries.

There are several resolution levels (30m, 10m, or 5m) for which satellite imagery can be obtained, so a key component of the workplan will be determining the appropriate level of resolution. Unlike other information sources, there will be costs associated with obtaining the satellite data.

### **Image Classification and Habitat Mapping**

The initial classification approach will involve development of image processing signature files. Defined in simple terms, signature files can be conceived as a set of rules, that will be defined by the Timberline team ecologists and GIS staff. These rules will be used to "train" the software to recognize patterns and specific ranges of spectral values contained in the imagery. Through ground truthing, inspection of small scale color aerial photography, and National Wetlands Inventory digital data, the imager will be "seeded" with points of known habitat types. Spectral signatures will be derived for truthed areas and will be used to develop a set of rules by which the large areas can be classified as similar habitat. Software used for image classification tasks will probably will include ERDAS Imagine Professional and ESRI ArcView Spatial Analyst.

Upon successful classification of the priority habitat types, data will be converted to vector format for map production. Statistical analyses will characterize the project area at county and watershed levels. Spatial data files will be delivered in a format compatible with ESRI GIS packages. Map production tasks will include full color maps complete with base features at 1:24000 scale. Identical map extent of USGS quadrangle maps will be used. The habitat thematic data and quad extent corners will be plotted on mylar sheets for easy overlay on USGS quad maps. AML code will be documented to describe all processes of GIS data analysis.

### **Relationship between GIS development and Acquisition Decision System**

The development of acquisition decision system will proceed concurrently with GIS database development. However, weighting of each of 4 main criteria and prioritizing of parcels for acquisition will not occur until a composite map is created. The composite map will have habitat type, ecological integrity, environmental condition, land use status, hydrology, economic layers,

and base map features. Overlaying different combinations of these layers will facilitate development of acquisition criteria. **It is important to note that the Timberline team is not making recommendations for specific acquisitions, but is only developing a decision system and GIS.**

### **Acquisition Criteria**

The development of desirability criteria for land acquisition will include the following types of information: ecological integrity, environmental condition, economic criteria, and land use status. It is assumed that existing criteria for environmental condition, economics (defined as those landowners willing to sell, and appraised value of similar properties), and land use will only require minor modification for incorporation into a decision protocol. However, the criteria for ecological integrity will require substantial amount of effort before consensus will be reached regarding their appropriate definition. It is likely the ecological integrity criteria will be developed in a manner similar to guidelines used to develop Habitat Conservation Plans (HCP's). The Timberline team will review several HCP's such as the multi species HCP for San Diego County, the Coachella Valley, and San Bruno Mountain. Environmental condition criteria will focus on the magnitude of soil and water quality contamination, and proximity to known or potential sources of contamination.

A final list of acquisition criteria will be developed in conjunction with the stakeholder review committee. Integration of all criteria into a ranking and prioritization framework will be accomplished by developing either a numeric weighted score or high/moderate/low ranking for each of the criteria categories. The scores from the individual categories will then be combined into a single integrated rating for the parcel as a whole. Weights for each category will be developed in conjunctions with the stakeholder review committee. The final deliverable for this project will be documentation of the decision system.

### **f) Monitoring and Data Evaluation**

Monitoring and data evaluation will ensure the image classification/ground truthing protocols meet scientific standards, and ensure that the land acquisition criteria are logically defensible and relevant. Senior technical review will be accomplished by members of the Timberline team (refer to qualifications section), and through regular coordination meetings with an oversight committee (refer to scope of work above).

### **g) Implementability**

It is assumed that the mapping and development of decision criteria will be categorically excluded from NEPA/CEQA documentation. The Timberline team will avoid areas with potentially significant cultural resources, or areas of biological sensitivity (e. g., presence of nesting birds) during critical times of the year. Ground truthing will only occur on public lands, and permission from the appropriate management authorities will be obtained.

#### **IV. Costs and Schedule**

##### **a. Budget Costs**

The total cost for this project is \$275,294. There are no fees added by Timberline Associates to labor of members of the other firms on the team. Figure 4-1 is a detailed spreadsheet that tracks labor and other direct costs by each project task, and Figure 4-2 is a breakdown of direct labor, overhead, and fee for each proposed staff member.

##### **b. Schedule Milestones**

Table 4-1 displays the schedule milestones. The project is anticipated to take 14 months for completion. The project may be thought of as three phases. The initial stage of the project will involve procuring all the relevant information, establishing an oversight committee comprised of members of the stakeholder agencies, and developing a workplan. The next phase of the project will involve conducting an image classification exercise for the prototype area to ensure a high level of classification accuracy. The last phase of the project will focus on building a composite GIS map and using this information to guide development of land acquisition criteria. Coordination meetings with the oversight committee will be held every other month to ensure the project remains on a critical path.

##### **c. Third Party Impacts**

There are no third party impacts anticipated from this project.

EFFORT AND COST ESTIMATES

Project Name		GIS and decision system											
Date Prepared		July 24, 1997											
TOTAL PROJECT BUDGET													
Task #	Task Description	Baas	U Vedagiri	A Leven	D Chapin	D Mende	E Sheehan	T Burke	CCC staff	M Mathawa	Word Processing	ODCs	Total
Hourly Rate >>		\$82	\$105	\$80	\$80	\$95	\$75	\$110	\$12	\$57	\$25		
1.0	Project Management												
1.1	staff coord	\$17,056	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$17,056
1.2	committee mtgs	\$3,936	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$307	\$4,243
								\$0					
2.0	Startup							\$0					
2.1	kickoff mtg	\$1,312	\$840	\$0	\$840	\$760	\$0	\$880	\$99	\$0	\$0	\$630	\$5,161
2.2	estbl committee	\$656	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$656
								\$0					
3.0	Data gathering							\$0					
3.1	collection	\$3,280	\$8,409	\$640	\$3,200	\$2,280	\$6,000	\$11,000	\$0	\$0	\$0	\$0	\$34,800
3.2	prepare summary	\$1,968	\$840	\$0	\$840	\$1,900	\$1,200	\$1,760	\$0	\$0	\$700	\$110	\$9,118
								\$0					
4.0	Workplan							\$0					
4.1	prepare draft	\$1,968	\$4,200	\$0	\$3,200	\$1,520	\$0	\$4,400	\$0	\$0	\$1,000	\$110	\$16,398
4.2	prepare final	\$1,312	\$2,520	\$0	\$1,920	\$760	\$0	\$2,640	\$0	\$0	\$500	\$110	\$9,762
								\$0					
5.0	Image classif	\$656	\$0	\$0	\$3,200	\$2,850	\$4,500	\$6,600	\$0	\$0	\$0	\$2,580	\$20,386
5.1	Subtask	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5.2	Subtask	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
								\$0					
6.0	Field verification							\$0					
6.1	mobilization/recon	\$1,968	\$1,680	\$1,280	\$1,280	\$1,520	\$1,200	\$2,640	\$0	\$912	\$0	\$500	\$12,980
6.2	habitat sampling	\$1,312	\$0	\$12,800	\$12,800	\$0	\$0	\$4,400	\$22,816	\$9,120	\$0	\$12,450	\$75,698
								\$0					
7.0	Acquisition criteria							\$0					
7.1	ecological criteria	\$656	\$6,300	\$0	\$4,800	\$0	\$0	\$880	\$0	\$0	\$0	\$0	\$12,636
7.2	weighting scheme	\$3,280	\$4,200	\$640	\$640	\$760	\$0	\$880	\$0	\$0	\$0	\$200	\$10,600
7.3	doc decis. system	\$1,312	\$2,520	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,000	\$900	\$5,732
								\$0					
8.0	Map production							\$0					
8.1	digitizing	\$0	\$840	\$640	\$640	\$760	\$3,000	\$0	\$8,928	\$0	\$0	\$0	\$14,808
8.2	draft map	\$1,968	\$420	\$320	\$320	\$380	\$7,500	\$4,400	\$0	\$0	\$0	\$0	\$15,308
8.3	final map	\$1,312	\$0	\$0	\$0	\$0	\$6,000	\$2,640	\$0	\$0	\$0	\$0	\$9,952
End	Total	\$43,952	\$32,760	\$16,320	\$33,280	\$13,490	\$29,400	\$43,120	\$31,843	\$10,032	\$3,200	\$17,897	\$275,294
	Notes												

Figure 4-1. Cost summary.

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1-001821

## EFFORT AND COST ESTIMATES

Project Name		GIS and decision system											
Date Prepared		July 24, 1997											
		Projected ODCs											
Task #	Task Description	Airfare	Car Rental	Mileage	Subsistence	Phone	Fax	Fedex	Mali	Production	Subcontractors	Other	Totals
1.0	Project Management	\$0				\$250	\$30		\$100				\$380
1.1	staff coord												\$0
1.2	committee mtgs			\$307									\$307
		0											\$0
2.0	Startup					\$200	\$30						\$230
2.1	kickoff mtg	\$300	\$90		\$240								\$630
2.2	estbl committee												\$0
		0											\$0
3.0	Data gathering					\$250	\$20						\$270
3.1	collection												\$0
3.2	prepare summary							\$50		\$60			\$110
		0											\$0
4.0	Develop workplan					\$200	\$40						\$240
4.1	draft plan							\$50		\$60			\$110
4.2	final plan							\$50		\$60			\$110
		0											\$0
5.0	image classif.	\$300	\$180		\$480	\$100	\$20					\$1,500	\$2,580
5.1	Subtask												\$0
5.2	Subtask												\$0
		0											\$0
6.0	Field verif.					\$200	\$20						\$220
6.1	mobilization/recon											\$500	\$500
6.2	habitat sampling		\$1,200	\$1,000	\$5,250							\$5,000	\$12,450
		0											\$0
7.0	Acquisition criteria					\$200	\$20						\$220
7.1	ecological criteria												\$0
7.2	weighting scheme							\$100		\$100			\$200
8.00	map production					\$100		\$200	\$100	\$500			\$900
End	ODCs Total	\$600	\$1,470	\$1,307	\$5,970	\$1,600	\$180	\$450	\$200	\$780		\$7,000	\$19,457
	Notes												

Figure 4-1. Cost summary.

1-001822

1-001822

## EFFORT AND COST ESTIMATES

Project Name		GIS and Decision system										
Date Prepared		July 24, 1997										
		Projected Staff Hours										
Task #	Task Description	Basu	Vedagiri	A Leven	D Chapin	D Mende	E Sheehan	T Burke	CCC staff	M Mathews	Word Processing	Task Total
1.0	Project Management											
1.1	staff coord	208	0	0	0	0	0		0	0	0	208
1.2	committee mtgs	48	0	0	0	0	0		0	0	0	48
2.0	Startup											
2.1	kickoff mtg	16	8	0	8	8	0	8	0	0	0	48
2.2	estbl committee	8	0	0	0	0	0		0	0	0	8
3.0	Data gathering											
3.1	collection	40	80	8	40	24	80	100	0	0	0	372
3.2	prepare summary	24	8	0	8	20	16	16	0	0	28	120
4.0	Develop workplan											
4.1	draft plan	24	40	0	40	16	0	40	0	0	40	200
4.2	final plan	16	24	0	24	8	0	24	0	0	20	116
5.0	Image classif.	8	0	0	40	30	60	60	0	0	0	198
5.1	Subtask	0	0	0	0	0	0		0	0	0	0
5.2	Subtask	0	0	0	0	0	0		0	0	0	0
6.0	Field verif.											
6.1	mobilization/recon	24	16	16	16	16	16	24	0	16	0	144
6.2	habitat sampling	16	0	160	160	0	0	40	1840	160	0	2376
7.0	Acquisition criteria											
7.1	ecological criteria	8	60	0	60	0	0	8	0	0	0	136
7.2	weighting scheme	40	40	8	8	8	0	8	0	0	0	112
7.3	doc decs. system	18	24	0	0	0	0		0	0	40	80
8.00	Map production											
	digitizing	0	8	8	8	8	40		720	0	0	792
	draft map	24	4	4	4	4	100	40	0	0	0	180
	final map	16	0	0	0	0	80	24	0	0	0	120
<b>End</b>	<b>Hours Total</b>	<b>536</b>	<b>312</b>	<b>204</b>	<b>416</b>	<b>142</b>	<b>392</b>	<b>392</b>	<b>2560</b>	<b>176</b>	<b>128</b>	<b>5258</b>
	Notes											

Figure 4-1. Cost summary.

Name	Direct hourly labor	Overhead	fee	Burdened hourly rate
J. Baas	40	35	7	82
U. Vedagiri	37	55	13	105
A. Leven	38	33	9	80
D. Chapin	38	33	9	80
E. Sheehan	26	39	10	75
D. Mende	30	35	30	95
M. Mathews	20	30	7	57
CCC staff	12	0	0	12
T Burke	36	54	20	110

Figure 4-2. Unburdened and burdened rate structure for Timberline Associates and teaming partners.

**Table 4-1. Schedule Milestones**

<b>Date</b>	<b>Action(s)</b>
October 1, 1997	Contract is signed, Notice to Proceed issued
October 8, 1997	Establish oversight stakeholder agency committee
October 15, 1997	Kickoff Meeting
December 15, 1997	Data summary*/Coordination meeting
January 15, 1998	Submit draft workplan*
January 15, 1998	Coordination meeting
February 1, 1998	Submit revised final workplan*
February 15, 1998	Procure satellite imagery
March 15, 1998	Implement prototype classification exercise
April 1, 1998	Coordination meeting Prepare economic, land use, and environmental condition information for inclusion in GIS database
April 15, 1998	Train CCC staff in ground truthing protocols
May 1, 1998	Implement image classification and ground truthing for prototype area
May 15, 1998	Coordination meeting
June 1, 1998	Finalize economic, land use, and environmental condition layers for inclusion in GIS database
July 15, 1998	Coordination meeting
September 15, 1998	Complete ground truthing/development of priority habitat layer Coordination meeting
October 1, 1998	Finalize priority habitat map

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**Table 4-1. Schedule Milestones.**

<b>Date</b>	<b>Action(s)</b>
October 15, 1998	Complete draft composite map*
November 1, 1998	Determine weighting system for acquisition criteria
November 15, 1998	Coordination meeting/Complete final map
December 15, 1998	Document decision process

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**Notes:**

\*-indicates completion of a project deliverable  
Payments will be made upon receipt and acceptance of project deliverables  
Coordination meetings with the oversight committee will be held every 2 months.  
Quarterly progress reports will be submitted to the committee and other interested parties (e.g., The Nature Conservancy, Trust for Public Land)

## V. Applicant Qualifications

The Timberline team is composed of the following individuals/organizations. Figure 5-1 depicts team organization.

**John M. Baas, Ph.D., Timberline Associates** Dr. Baas will serve as the project manager for this effort. He will be responsible for all project tracking, coordination, and invoicing. He will serve as the primary liaison with the CALFED stakeholder advisory committee, will prepare monthly progress reports, and provide quality assurance and quality control on all project deliverables.

Dr. Baas is highly qualified to serve as project manager. He has more than 10 years of experience working with state and federal land managers on natural resource planning projects. He has a B.S. degree in wildlife biology, and a Ph.D. in Forest Resource Management. During the last three years, Dr. Baas has managed several vegetation management and environmental impact analysis projects that have relied heavily on Arc/Info data, and helped prepare numerous sustained yield management plans for a private timber corporation using GIS data on soils, stream channel condition, vegetation, and hydrography. Additionally, Dr. Baas served as a program manager for two years for an indefinite quantity contract for environmental compliance and natural resource planning for the National Park Service for all states west of the Mississippi River.

**David Chapin, Ph.D., Timberline Associates** Dr. Chapin will serve as the technical task leader for field verification of habitats. He will provide senior technical review and oversight for habitat verification, and development of a sampling plan to guide field work. He will work closely with Dr. Vedagiri to determine indicators of ecological integrity and how they are affected by environmental contaminants.

Dr. Chapin has 16 years of experience in wetlands studies and ecological restoration. He has a Ph.D. from University of Washington in Botany, and a Bachelor's degree in Biology from UC Berkeley. Dr. Chapin has been involved in riparian and wetland habitat mapping in northern California, has conducted TES plant surveys in subalpine and alpine environments in California, and has conducted wetland inventory and impact assessments relative to proposed timber harvesting in southeast Alaska.

**Usha Vedagiri, Ph.D., EA Engineering, Science, and Technology** Dr. Vedagiri will be the technical task leader responsible for developing the land acquisition criteria, and for providing information on the environmental condition of priority habitats that will be input for the GIS for the composite map. She will work closely with Dr. Chapin to develop ecological integrity criteria. Dr. Vedagiri will procure information relative to land uses and presence of soil and water quality toxic substances.

Dr. Vedagiri has more than 10 years of experience in ecological risk assessment. She has a B.S. degree in Botany, a Master's degree in urban planning and a Ph.D. in environmental science. Her

dissertation research focused on lead uptake of selected wetland species in highly degraded wetland areas New Jersey. Dr. Vedagiri has served as the technical task leader or project manager on projects with an ecological risk component for the Air Force, Navy, National Park Service, oil companies, and private developers. She has performed ground truthing and aerial photo interpretation to document the effects of oil spills on freshwater and estuarine wetland communities. She currently serves as a community member on the Restoration Advisory Board for Treasure Island and is active in the Society of Environmental Toxicologists and Chemistry.

***Doug Mende, M.S., Psomas Associates*** Mr. Mende will serve as the technical task leader for all GIS related matters. He will be responsible for ensuring satellite imagery, existing digital data to be incorporated into the GIS and final work products are accurate and complete.

Mr. Mende has over 13 years of experience encompassing nearly all aspects of Geographic Information Systems. His professional experience includes 3 years of technical management at Environmental Systems Research Institute (ESRI), and 4 years of GIS database administration for the County of San Bernardino in California. Mr. Mende is a recognized expert in the application of GIS technology to the problems of environmental assessment and natural resources management. He is also an experienced naturalist with an extensive background in the biological sciences and field and analytical experience including vegetation and wildlife surveys, biological resource impact assessment and mitigation planning, field data collection, and Global Positioning System (GPS) applications.

***Eric Sheehan, M.A., EA Engineering, Science, and Technology*** Mr. Sheehan will assist Mr. Mende with preparation of all GIS products. He will be responsible for image classification routines, for developing working maps as needed throughout the project, and will be responsible for development of the final map products.

Mr. Sheehan is a Geographic information system (GIS) specialist with 2 years of experience in habitat mapping and impact analysis. He has a Master's of Art degree in Geography and water resource, and is well versed in the use of ArcView and Arc/Info. He has conducted habitat analyses for the USDA Forest Service, the Air Force, oil refineries, and private timber companies. Mr. Sheehan has recently completed development of a GIS based "virtual hike" that passes through several life zones at a popular state park in California.

***Andrew Leven, M.S., Timberline Associates*** Mr. Leven is a soil scientist with more than 20 years of experience in watershed, ecological unit and soil mapping. He will serve as the senior technical review expert for utilization of aerial photography in this project and for any soil inventory work that is necessary to aid in identifying the priority habitats.

Mr. Leven is an expert in aerial photograph interpretation, having served as an aerial photo instructor for the U.S. Army. He has extensive, recent experience with watershed, soil, and habitat mapping throughout California for the USDA Forest Service, and a private timber company.

*Thomas Burke, M.S., Philip Williams Associates (not shown in Figure 5-1)* Mr. Burke will have primary responsibility for developing the hydroperiod and hydraulic information that will be put into the hydrology layer of the GIS.

Mr. Burke has more than 10 years of experience in hydrology. For five years he worked with Dr. Chapin on a project involving water rights adjudication, instream flow assessments, and riparian habitat for a confidential client in northern California.

*Mike Mathews, EA Engineering, Science and Technology* For this project Mr. Mathews would assist with field verification of habitat types, and in training and supervision of CCC crew members.

Mr. Mathews is a hydrology and watershed specialist with 6 years of experience in watershed analysis, watershed restoration, and timber and range planning. Mr. Mathews applies ecosystem management techniques at the watershed level and has expertise in stream hydrologic surveys, water quality management, fluvial geomorphology, and identification of riparian habitats. He has conducted riparian inventories in Oregon and northern California.

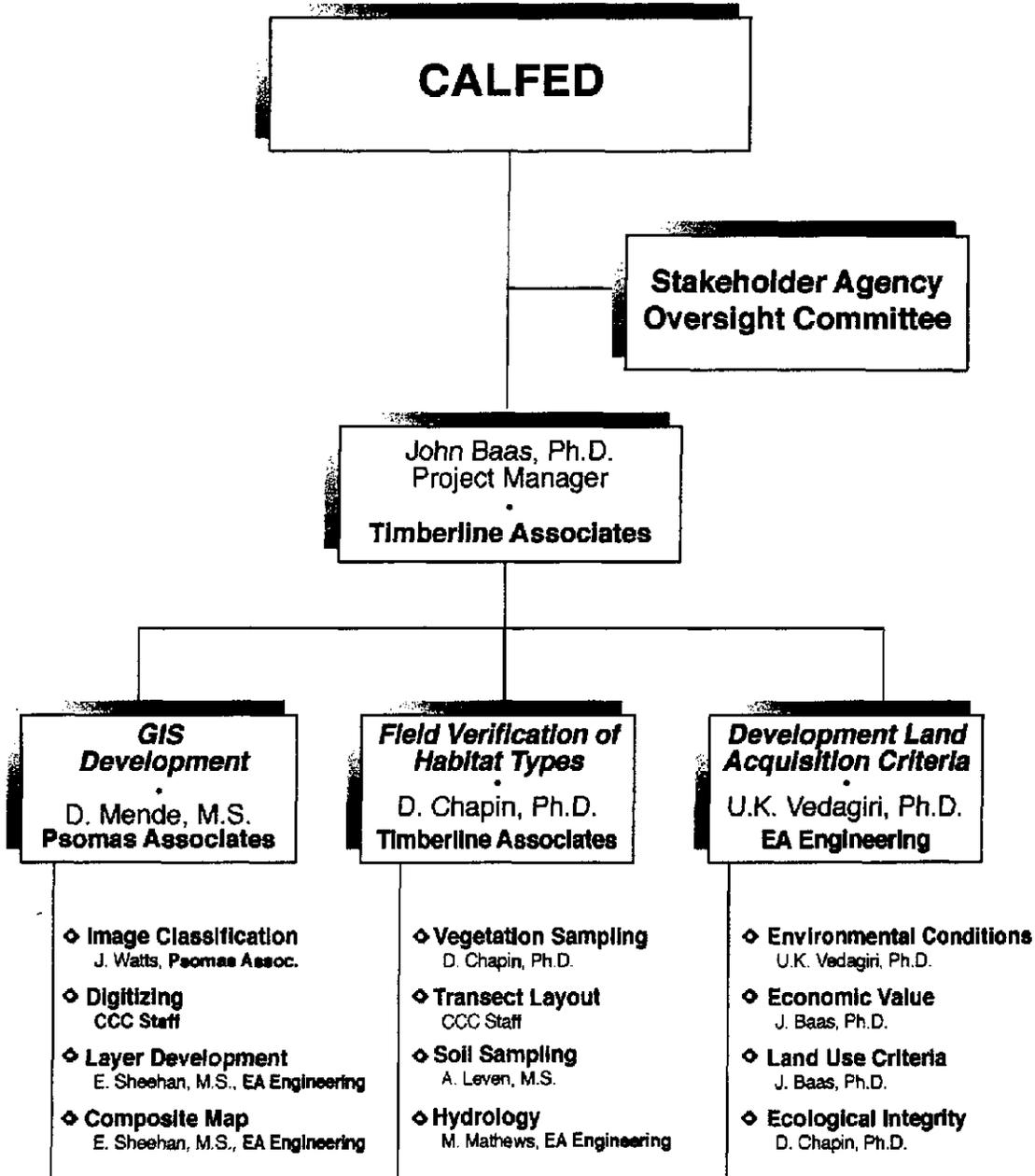
*Virginia Clark, California Conservation Corps* Ms. Clark will provide field staff to conduct ing. She has 15 years of experience in developing and managing field crews for ecological restoration and environmental management projects.

#### **Disclosure of Conflict Of Interest for EA Engineering, Science, and Technology, Inc.**

Pursuant to California Government Code Section 1090, EA Engineering, Science, and Technology, Inc. is disclosing a remote interest in proposals submitted for funding under CALFED's Category III program. EA staff, as third tier subcontractors to the Bureau of Reclamation, have provided technical and administrative support to CALFED agency staff in the Restoration Coordination Program. In this capacity, EA staff have assisted with documentation of public meetings of the Ecosystem Roundtable, and compiled technical team meeting information for distribution to Roundtable members and the public. EA's legal counsel has determined that EA's participation as a subconsultant in contracts that may awarded under the Category III program does not constitute a violation of California Government Code Section 1090.

#### **Sole Source Justification**

Consistent with Government Code 4525, all subcontractors were selected by Timberline Associates to provide environmental services in connection with this project. The selection was made on the basis of qualifications and demonstrated competence for the requested services, including documentation of fair and reasonable prices.



**Figure 5-1. Timberline Team Organization**

**Attachment D**

**Pertinent Terms and Conditions**

## NONDISCRIMINATION COMPLIANCE STATEMENT

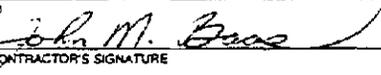
TIMBERLINE ASSOCIATES

COMPANY NAME

The company named above (hereinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

## CERTIFICATION

*I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is made under penalty of perjury under the laws of the State of California*

OFFICIAL'S NAME		John M. Baas
DATE EXECUTED	July 23, 1997	Contra Costa County
PROSPECTIVE CONTRACTOR'S SIGNATURE		EXECUTED IN THE COUNTY OF
PROSPECTIVE CONTRACTOR'S TITLE	Principal	
PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME	TIMBERLINE ASSOCIATES	

Agreement No. \_\_\_\_\_

Exhibit \_\_\_\_\_

**STANDARD CLAUSES --  
SMALL BUSINESS PREFERENCE AND CONTRACTOR IDENTIFICATION NUMBER****NOTICE TO ALL BIDDERS:**

Section 14835, et. seq. of the California Government Code requires that a five percent preference be given to bidders who qualify as a small business. The rules and regulations of this law, including the definition of a small business for the delivery of service, are contained in Title 2, California Code of Regulations, Section 1896, et. seq. A copy of the regulations is available upon request. Questions regarding the preference approval process should be directed to the Office of Small and Minority Business at (916) 322-5060. To claim the small business preference, you must submit a copy of your certification approval letter with your bid.

Are you claiming preference as a small business?

\_\_\_\_\_ Yes\*        X   No

\*Attach a copy of your certification approval letter.

**CALIFORNIA CONSERVATION CORPS**

Pacific Bays Service District, NORTH SATELLITE OPERATIONS  
1331 South 46th Street, Richmond, CA 94804  
(510) 237-0435 fax (510) 237-6415



July 23, 1997

John Baas, Ph.D.  
Timberline Associates  
P.O. Box 1475  
Martinez, California 94553

John,

The California Conservation Corps (CCC), North Satellite Operations is pleased to be part of the *CalFed Project* Timberline Associates is putting together. The CCC-North Satellites is aware this is a joint venture and are committed to doing what we agree upon. Our role and responsibility will be the "field work" portion, consisting of habitat verification, and the digitizing of information. If you need additional information please call me at (510) 237-0435.

A handwritten signature in black ink, appearing to read "Virginia Clark".

Virginia Clark  
Conservation Supervisor

cc: file