

Eelgrass Meadows as a Biologically Beneficial Indicator of Long-term Ecosystem Change and Health

Proposal to:

CALFED Bay-Delta Program
 1416 Ninth Street, Suite 1155
 Sacramento, California, 95814

Submitted by:

Merkel & Associates, Inc.
 3944 Murphy Canyon Road, C106
 San Diego, California 92123
ph: (619) 560-5465
fx: (619) 560-7779
e-mail: merkelinc@aol.com



97 JUL 28 PM 1:26
 DWR WAREHOUSE

Project Title: Eelgrass Meadows as a Biologically Beneficial Indicator of Long-term Ecosystem Change and Health

Principal Investigator: Keith W. Merkel, Principal Investigator
 Merkel & Associates, Inc.
 3944 Murphy Canyon Road, C106
 San Diego, California 92123
ph: (619) 560-5465
fx: (619) 560-7779
e-mail: merkelinc@aol.com

Organization Type: California Corporation; Certified Small Business

Tax Identification No: #33-0632638

Participants/Collaborators: None at present. If successful, it is our intent to seek ACOE and/or USCG participation to expand the program to map additional habitat features and hazards or to extend the program to south San Francisco Bay.

RFP Project Group Type: Group 3: Services

July 28, 1997

TABLE OF CONTENTS

I. PROJECT DESCRIPTION	1
I.a. Project Description and Approach	1
I.b. Location and Geographic Boundaries of Project	2
I.c. Expected Benefits	2
I.d. Background and Biological/Technical Justification	3
Eelgrass Habitat and Resource Values	3
Eelgrass as a Means to Monitor Ecosystem Health and Change	3
Eelgrass Status and Trends in San Francisco Bay	4
I.e. Proposed Scope of Work	4
I.f. Monitoring and Data Evaluation	6
I.g. Implementability	6
II. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT	7
II.a. Budget Costs	7
Cost Proposal	7
CALFED Funding Needs	7
Billing Program	7
II.b. Schedule Milestones	7
II.c. Third Party Impacts	8
III. APPLICANT QUALIFICATIONS	9
III.a. Firm Background	9
III.b. Team Organization	9
III.c. Key Project Staff	9
IV. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS	9
LITERATURE CITED	9

Eelgrass Meadows as a Biologically Beneficial Indicator of Long-term Ecosystem Change and Health

Merkel & Associates, Inc.

July 28, 1997

I. PROJECT DESCRIPTION

I.a. Project Description and Approach

This proposal is to develop and implement a comprehensive inventory and analysis program for eelgrass resources within northern San Francisco Bay and the lower Delta region in a manner which parallels programs developed for Mission Bay and San Diego Bay in southern California and which is being contemplated for Puget Sound and Chesapeake Bay. These existing model programs allow tracking of water quality changes, provide essential habitat management and restoration planning tools, and assist in the understanding of bay and estuary dynamics, sediment transport, and watershed influences.

Using the tools of differential Global Positioning System (dGPS) navigation, sidescan and downlooking sonar, and an ArcInfo GIS spatial database management systems, a comprehensive mapping of eelgrass resources is proposed which would serve as a baseline for future comparative inventories. Using the baseline (Phase 1) and future monitoring surveys (Phase 2), time series data will display trends in eelgrass distribution patterns. By combining the eelgrass mapping effort with nearshore bathymetric investigations (generated concurrently with the Phase 1 program) eelgrass expansion potential and restoration opportunities may be derived and analyzed. An understanding of the north Bay eelgrass distribution patterns derived under the current proposals will aid in furthering the development of future restoration programs.

This proposal is outlined in two phases. Both phases present individual benefits, but Phase II builds upon Phase I work. Taking this approach allows for incremental funding without jeopardizing the value of initial investment costs. The implementation and funding phases for the proposed work are outlined as follows:

Phase 1: Baseline Eelgrass Inventory and Nearshore Bathymetric Survey of North San Francisco Bay

Work would consist of the preparation of a baseline sonographic eelgrass surveys of northern San Francisco Bay including San Pablo Bay and Suisun Bay. Survey area boundaries are defined as the region extending from the Golden Gate Bridge and the San Francisco-Oakland Bay Bridge north and eastward to include Suisun Bay. Deliverables would include a technical survey report and hard copy and digital file ArcInfo GIS maps with eelgrass and nearshore bathymetry layers.

(optional): Baseline Eelgrass Inventory and Nearshore Bathymetric Survey of South San Francisco Bay

Phase 1 (optional unbudgeted task) is the continuation of the baseline survey effort to map eelgrass resources in the remainder of San Francisco Bay (south of the San Francisco-Oakland Bay Bridge). This work would aid in providing a more comprehensive understanding of eelgrass resources in the Bay, and would further assist in overall resource management strategies for sensitive habitats and species within the Bay Area, however, it may be considered of less direct value to the CALFED Bay-Delta Program and is thus not presented as an option for priority funding in this proposal.

Phase 2: Long-term Trend Analyses of Eelgrass Distribution Patterns

This phase of work is to conduct biennial surveys over a 10-year period of representative plots of mapped eelgrass habitat. The information will allow for an evaluation of trends in eelgrass expansion or contraction and changes in coverage density as these changes may reflect large scale changes in water quality and nearshore sedimentation. Surveys of sites extending along both the eastern and western shorelines of the Bay, from near the mouth up into the Delta region, would be conducted using the same sonographic techniques as described for Phase 1 baseline surveys. Deliverables would include 5, 2-year eelgrass status reports and interpretation of trends. Data, GIS maps and reports would be provided both in hard copy and digital file formats.

Subsequent phases of work are not included in this proposal as they depend upon the results of the Phase 1 inventories. Future phases are anticipated to include proposals to: (1) develop management strategies for existing eelgrass resources; (2) enhance eelgrass resources; and (3) conduct similar mapping efforts of other submerged aquatic vegetation further up the Delta for the purpose of identifying important spawning habitat areas for the delta and longfin smelt.

I.b. Location and Geographic Boundaries of Project

The work proposed to be conducted under this proposal will occur in north San Francisco Bay including San Pablo Bay and Suisun Bay. Survey area boundaries extend from the Golden Gate Bridge and the San Francisco-Oakland Bay Bridge north and eastward to include Suisun Bay. All proposed work will be conducted within the defined CALFED study area.

I.c. Expected Benefits

Sonographic eelgrass mapping and habitat distribution trend analysis, specifically of San Pablo Bay and Suisun Bay, would provide many benefits specific to the CALFED mission. The importance of good baseline data prior to initiation of such a major enhancement effort cannot be overstated. Eelgrass meadows are poorly understood in the system, yet they represent an extremely important habitat resource not only to Priority Species, but to the Bay-Delta ecosystem as a whole. The exact locations and coverage of these beds are not even known. This severely hinders resource management.

The proposed two-phase program addresses a habitat resource which is located at the end of the system in the North Bay area which, however, is strongly influenced by the inputs of the entire watershed. As a result, while the program directly addresses the Delta, Suisun Marsh, East-side Tributaries, and North Bay, it also reflects and thereby potentially addresses the San Joaquin and Sacramento River inputs to the system. The program has a further benefit in addressing habitat requirements of several of the identified Priority Species including:

- San Joaquin and East-side Delta tributaries fall-run chinook salmon
- Winter-run chinook salmon
- Steelhead trout
- Longfin smelt
- Spring-run chinook salmon
- Green sturgeon
- Striped bass
- Splittail
- Migratory birds

Phase 1 of this proposal addresses the need for a detailed and accurate baseline on which to base management decisions and evaluate success of management or restoration efforts. This phase provides the following specific benefits:

- A verifiable baseline for an important habitat resource with widespread benefits to Priority Species and Bay and lower Delta water quality.
- A tool for selection of long-term monitoring plots to analyze trends.
- A database on which to base future restoration or management decisions.
- Predictive capacity to target habitat enhancement opportunities and set realistic goals for future resource enhancement or mitigation-based projects.

Phase 2 of this proposal provides for the use of a natural system to serve as an indicator of long-term trends in Bay and lower-Delta health. This phase provides the following specific benefits:

- A biologically meaningful, easily understandable tool to track trends in the improvement of the eco-system.
- An economical and efficient means to examine large-scale spatial conditions within the Bay-Delta region.
- A reference/resource for resource managers and scientists to better plan and implement programs to benefit ecosystem or species conservation efforts.

I.d. Background and Biological/Technical Justification

Eelgrass Habitat and Resource Values

Eelgrass (*Zostera marina* L.) is a native marine vascular plant indigenous to the soft-bottom bays and estuaries of the northern hemisphere. The species is found from middle Baja California and the Sea of Cortez to northern Alaska along the west coast of North America and is common in healthy shallow bays and estuaries. Eelgrass growth is generally limited at the shore by desiccation stress at low tides and at depth by light reduction which is insufficient to meet photosynthesis requirements. Eelgrass meadows occur within the shallow bay habitats and in the more saline brackish water interfaces of the San Francisco Bay estuary.

Eelgrass plays many roles within the estuary system. It clarifies water through sediment trapping and stabilization. It also provides benefits of nutrient transformation and water oxygenation. Eelgrass serves as a primary producer in a detrital based food-web and is further directly grazed upon by invertebrates, fish, and birds. Eelgrass also provides physical structure to the community supports epiphytic plants and animals which in turn are grazed upon by larval and juvenile fish, other invertebrates and birds. Eelgrass is a nursery area for many commercially and recreationally important finfish and shellfish species including nearly all of the anadromous fish species found along the Pacific coast as well as oceanic species which enter the estuaries to breed or spawn. These areas are generally considered staging locations for anadromous fish runs, including chinook salmon. Pacific herring regularly spawn on eelgrass leaves and salmonid fry and smolt often spend extensive amounts of time within eelgrass habitats prior to heading for the open ocean. Shallow, productive eelgrass meadows provide food and/or shelter to many of the CALFED Priority Species including the longfin smelt, green sturgeon, and the salmonids, as well as the secondary priority species of striped bass and migratory birds during critical life stages.

Eelgrass as a Means to Monitor Ecosystem Health and Change

In addition to the high intrinsic values of eelgrass as a habitat, it also provides significant value as a tool for examining long-term trends in the eco-system as a result of water quality improvement or deterioration. It has ideal characteristics for use in monitoring system change. First, eelgrass is found at the end of the watershed within the Bay. As a result, overall watershed management effectiveness may be assessed. Second, eelgrass responds to persistent water quality stresses rather than short duration fluctuations. Eelgrass is adapted to a wide range of tolerances and is capable of averaging exposure conditions including temperature, turbidity, seasonal light levels, sedimentation rates, etc., to result in either positive growth or a gradual decline in the resource. This eliminates the day-to-day or minute-to-minute variability which is often seen with water quality testing and produces a more biologically meaningful measure of improvement or deterioration in water quality. Third, eelgrass has the added attraction of wide distribution in the Bay and self-sufficiency - which is in contrast to deployed environmental monitoring systems. In effect, eelgrass can be considered a naturally occurring, self maintaining, pre-deployed, multiple parameter water quality monitoring instrument -- with ancillary habitat benefits.

Elgrass Status and Trends in San Francisco Bay

The San Francisco estuarine complex is the second largest estuary in the nation consisting of approximately 460 square miles of water surface at high tide. In the late 1920's eelgrass was reported as an abundant species lining the shores of San Francisco Bay (Setchell 1929). More recently, a 1987 NMFS survey of the bay revealed only 316 acres (0.1% bottom coverage) of eelgrass throughout the Bay with much of the existing habitat exhibiting conditions of environmental stress (Wyllie-Echeverria and Rutten 1989, Wyllie-Echeverria 1990). In comparison, other bay and estuary systems such as San Diego Bay (11.4%), Mission Bay (55%), Humbolt Bay (approx. 16%), and Coos Bay (approximately 5%) support proportionally much greater eelgrass resources than does San Francisco Bay.

While watershed nutrient and sediment loading as well as bay dredging and filling have taken their toll on eelgrass resources of San Francisco Bay, conditions are not as bleak as once thought. In October 1996, eelgrass surveys were conducted from Richmond Harbor to just north of Point San Pablo for two separate Army Corps of Engineers project studies (SAIC and Merkel & Associates 1997a, 1997b). Studies were conducted using sonographic techniques for eelgrass mapping in turbid environments which were pioneered in southern California (Merkel 1988, 1992, US Navy SWDIV 1994). In this recent survey, 483 acres of eelgrass were identified over this short stretch of shoreline alone. This suggests either a significant expansion of eelgrass habitat since 1987 or improved survey techniques which are ideal for operating in the San Francisco Bay and Delta environments. It is believed that both factors may be involved in the documented improvement of eelgrass resources. Similarly, eelgrass investigations along the Oakland and Alameda waterfronts have revealed more extensive eelgrass in these areas than was once believed to exist.

While there is good reason for optimism with respect to recovery and improvement of eelgrass resources within San Francisco Bay, there remains no present comprehensive program to track eelgrass habitat trends, nor predict what may be recoverable in the future.

I.e. Proposed Scope of Work

The proposed work program consists of two phases with potential to expand the program under separate contracts in the future. Phase 1 (baseline surveys) of the program is essential to the implementation of Phase 2 (long-term trend analyses). However, Phase 1 has independent applicability and value and could be funded absent Phase 2. This section outlines the specific elements of each work phase and provides a summary of milestones to be achieved and deliverables to be provided. The approach to the work effort has already been outlined above (Section 1.a.), therefore this scope focuses only on critical elements necessary for evaluation of project approach, deliverables, and contract performance criteria.

Phase 1. Baseline Eelgrass Surveys

Task 1.a. Survey Mobilization

Under this task, all required pre-survey data collection, survey course layout, boat rigging, and equipment and materials acquisition would be provided. Field logistics include: survey timing, tidal condition, access limitations, marina support, and lodging. The survey equipment, vessel, and project field staff would be mobilized to the North Bay.

Task 1.b. Field Survey Effort

Navigation

Surveys will be conducted by navigating the 22ft R/V Hot Tuna along parallel tracklines using Hydro-Data GPS real-time navigational software operated on a PC notebook computer with differential GPS positional data coming from a Magnavox MX400 receiver equipped with a Leica differential correction receiver. The system provides a resolution of ± 3 meters as a combined error of the navigation system and side-scan equipment. All data will be collected in the North

American Datum of 1983 (NAD 83). Navigation tracklines will be off-set approximately 75-100 meters to provide complete acoustic survey overlap. Transect spacing will be determined by examination of prior transect coverage and will be adjusted, as necessary.

Acoustic Survey

Acoustic surveys will be conducted using a Klein or EG&G sidescan sonar operating at 500 kHz and a paper chart recording analog fathometer operating at 100-200 kHz as well as a digital fathometer operating at 50-100 kHz. Real time positional data will be fed to the computer along with time stamp data for the sidescan traces. Positional fix numbers will be marked to the fathometer trace to correlate all data sources with locational data. Digital fathometer outputs will be directed to the notebook for use in preparation of shallow water bathymetric charts of the surveyed area. Based on existing bathymetric charts, acoustic surveys are anticipated to cover approximately 270 km of coastline and 216 square kilometers of water area in San Pablo Bay and Suisun Bay.

Groundtruthing of the Acoustic Data

Acoustic data provides a sound-generated picture of the bottom and will identify structures on the basis of their acoustic reflectivity. Because of the air vacuoles in eelgrass leaves (lacunae), eelgrass provides a very reflective surface and is easy to see in acoustic mapping efforts and with practice, it is fairly easy to identify most of the features on the acoustic reports. However, regular field truthing is necessary to ensure that interpretation of data is correct and to address confusing features. For the present program, ground truthing will be conducted by use of both SCUBA divers and cabled video camera inspection of the bottom. Groundtruthing will be conducted on at least 600 records to provide wide distribution of sampling effort and adequate numbers to conduct statistical analyses on classification accuracy.

Task 1.c. Post Survey Data Processing

Following field surveys, data will be analyzed by plotting tracklines and recorded coverage data along scaled off-sets from the trackline. Eelgrass habitat will be coded using density classification methods employed in the Port of Richmond Eelgrass Surveys (SAIC and Merkel & Associates 1997a). Eelgrass distribution plots will be developed using a spatial grid contour model and the geostatistical contouring algorithms provided through the program Surfer efforts. Data will be imported into an ArcInfo GIS spatial database for spatial analyses, graphics plotting, and dissemination of digital data.

Task 1.d. Mapping and Reporting

This task is to prepare deliverables from the Phase 1 survey effort. A study report will be provided outlining the survey methods, survey limitations, groundtruthing and analytical error, and survey results. Maps will be provided in hard copy format within the report and as a separate digital mapping effort. A discussion of the distribution and density patterns, along with a tabulation of eelgrass acreage in the various beds will also be provided. Additionally, the report will provide recommendations and rationale for identification of long-term monitoring sites to track trends in eelgrass growth and distribution patterns (Phase 2).

Phase 2. Long-term Trend Analyses Using Eelgrass Distribution Patterns

This phase of the proposed work involves the implementation of time series surveys of eelgrass as a biologically meaningful measure of the status of the North Bay and lower Delta regions. This program is proposed to be implemented over a ten-year period in two-year monitoring intervals. Each monitoring interval includes a follow-up report which analyzes trends in a cumulative reporting format and which provides interpretation as to the factors driving eelgrass distribution over the period examined. Two specific tasks are involved in each of the 5 biannual survey periods. These are repeated with each subsequent monitoring.

Task 2.a-e.1 Field Survey Program

Field surveys of approximately 20 selected eelgrass sites will be surveyed using the techniques discussed in the Phase 1 program outlined above. Surveys will focus on evaluating expansion, contraction, or shifts in eelgrass distribution and coverage density patterns since the prior surveys. Surveys will examine areas of potential eelgrass habitat in the vicinity of the previously mapped beds to determine if expansion of eelgrass includes colonization of new areas. Surveyed sites will be distributed along both the east and west shorelines of the North Bay northeastward into the lower-Delta region.

Task 2.a-e.2. Post Survey Analysis and Report

Following each of the survey efforts, data will be processed to produce eelgrass distribution and density maps for the surveyed areas. Spatial trends will be examined to determine gradients of changes and results will be interpolated to predict the likely changes which have occurred in the overall Bay-lower Delta eelgrass communities. Depth-distribution growth curves will be examined to determine if changes in light attenuation is affecting eelgrass distribution patterns. Data will be presented in both a written report framework as well as digital files. Reports will be prepared and presented in draft and final versions.

I.f. Monitoring and Data Evaluation

The proposed work is a monitoring and evaluation program. Data analysis, monitoring of trends, and presentation of analyses has been discussed in section 1.e. of this proposal. Draft reports and analyses will be generated and provided to a review team consisting of seagrass biologists, hydrologists, Bay Area natural resource managers, and CALFED staff for review and comment prior to report finalization. The long-term monitoring program (Phase 2) is designed to be dynamic and responsive to the needs of other projects and monitoring programs. Site selection, the addition of sites, and the integration of physical measurements can all be accommodated into this program to further the benefits of the program to other activities.

Because the program output will have a wide applicability, it will be critical to make the data readily available to managers, scientists, planners, and the public. As a result, dissemination options will be sought through established web sites such as those maintained by the San Francisco Estuary Project, or the USGS and CALFED.

I.g. Implementability

The proposed work has no issues to be addressed with respect to its implementation. Work does not require any participation of local entities, private landowners, or other public agencies. All work is proposed to be conducted from navigable waters and no private property access is required to complete the work. Similarly, no permits are required. Seasonality is an issue, given that eelgrass reaches a peak in its growth in the summer and early fall months. This makes completing surveys during this period ideal. Given the timing of the 1997 Category III proposal request, field work would be scheduled to occur in summer 1998.

II. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

II.a. Budget Costs

Cost Proposal

The budget for the completion of the proposed work includes costs for all required program elements including labor, materials, equipment lease costs, and other direct costs (ODCs). Costs are presented separately for Phase 1 and 2 work efforts in the attached Cost Proposal spreadsheet. Costs under each phase are separated into tasks as described under Section I.e. of this proposal.

Costs for work have been based on experience gained in the performance of other large scale acoustic eelgrass mapping programs. Specific recent experience in the October 1996 surveys within the project area (SAIC and Merkel & Associates, 1997a and 1997b) further facilitates the projection of costs for travel and logistical constraints (e.g. tidally restricted access, weather driven inefficiencies).

For calculation of long-term monitoring costs, labor and general administrative costs were loaded with a 2 percent per year inflation factor. Material costs and ODCs were not calculated with an inflationary factor.

As proposed, funding thresholds occur between Phase 1 and Phase 2. Funding of individual tasks would not result in measurable benefit to meeting CALFED enhancement objectives. Similarly, funding of Phase 2 absent Phase 1 funding will not work. The cost to complete the unbudgeted Phase 1 (option) would approximately double the Phase 1 costs.

CALFED Funding Needs

CALFED Bay-Delta Program 1997 Category III funding is being requested for 100% of the Phase 1 and 2 work effort. Participatory funding for the optional task to cover the remaining Bay is to be sought through other public agencies with resource management and planning responsibilities within the Bay. It is possible that funding, if available, will come through a combination of agencies rather than any single entity. It is hoped that the CALFED funding can be used to leverage participation in the South Bay region.

At the present time, few programs are being funded for large-scale resource management inventories and long-term trend monitoring. This is due to the difficulty in effectively applying mitigation dollars to an incremental solution to a problem. Further, basic research grants are generally focused at resolving a specific question rather than tracking changes and trends in an eco-system or developing tools for applied management uses. In addition, conservation grants for monitoring tend to be made at a local level rather than on a regional-scale. As a result of these factors, funding to address regionwide or watershed issues is difficult to obtain, although highly necessary if we are to understand the dynamics of an eco-system.

Billing Program

Because of the intensive field effort, a protracted period will elapse between initiation of survey work and preparation and submittal of project deliverables. As a result, billings will be submitted after mobilization and during surveys and data processing on a monthly progress interval basis. Progress reports outlining work completed to-date will be provided in support of submitted invoices.

II.b. Schedule Milestones

The proposed work is to start with the implementation of Phase 1 in the Spring of 1998 with the final report due out in Spring 1999. Phase 1 field surveys would be conducted over the Summer and Fall of 1998.

Phase 2 field work will be conducted during the Summer months of 2000, 2002, 2004, 2006, and 2008. Reports from the field studies would be produced during the Winter of the same years. The proposed schedule of work for the two Phases is outlined as a bar chart as follows.

PHASE/TASK	1998							1999				
	J	J	A	S	O	N	D	J	F	M	A	M
Phase 1: Baseline Surveys												
Task a. Survey Mobilization	■											
Task b. Field Survey Efforts		■	■	■								
Task c. Post Survey Data Processing					■	■	■					
Task d. Mapping and Reporting								■	■	■	■	■
Technical Review of Draft Report										■		
Phase 2: Long-term Trends	J	J	A	S	O	N	D	J	F	M	A	M
Task a.1. 2-Year Field Survey			■	■								
Task a.2. 2-Year Post Survey Analysis					■	■						
Task b.1. 4-Year Field Survey		■	■									
Task b.2. 4-Year Post Survey Analysis					■	■						
Task c.1. 6-Year Field Survey		■	■									
Task c.2. 6-Year Post Survey Analysis					■	■						
Task d.1. 8-Year Field Survey		■	■									
Task d.2. 8-Year Post Survey Analysis					■	■						
Task e.1. 10-Year Field Survey		■	■									
Task e.2. 10-Year Post Survey Analysis					■	■						

II.c. Third Party Impacts

The proposed work would not be expected to have any adverse third party impacts. Additional regional ecological data will be made available through this effort and would be expected to positively contribute to the overall understanding of the Bay-Delta ecosystem management needs.

COST PROPOSAL FOR CALFED BAY-DELTA PROGRAM 1997 CATEGORY III PROPOSAL

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Overhead (GA and Fee)	Service Contracts	Material Costs	Misc. ODC's	Total Cost
Phase 1. Baseline Eelgrass Survey							
<i>a. Survey Mobilization</i>							
Principal Investigator	40	\$2,303	\$2,400				\$4,703
Vessel Capt./Navigator	80	\$2,480	\$2,560				\$5,040
Sidescan Sonar Operator	60	\$1,650	\$1,680				\$3,330
Marine Technician	80	\$1,840	\$1,920				\$3,760
Equipment Rigging						\$2,100	\$2,100
Travel Costs						\$600	\$600
Consumable Materials					\$2,000		\$2,000
<i>b. Field Survey Efforts</i>							
Principal Investigator	120	\$6,908	\$7,200				\$14,108
Vessel Capt./Navigator	736	\$22,816	\$23,552				\$46,368
Sidescan Sonar Operator	736	\$20,240	\$20,608				\$40,848
Marine Technician	736	\$16,928	\$17,664				\$34,592
Equipment Lease						\$38,400	\$38,400
Vessel Lease						\$24,000	\$24,000
Travel Costs						\$21,900	\$21,900
Consumable Materials					\$500		\$500
<i>c. Post Survey Data Process.</i>							
Principal Investigator	40	\$2,303	\$2,400				\$4,703
Vessel Capt./Navigator	80	\$2,480	\$2,560				\$5,040
Sidescan Sonar Operator	240	\$6,600	\$6,720				\$13,320
Marine Technician	40	\$920	\$960				\$1,880
Cartographer	360	\$8,280	\$8,640				\$16,920
GIS Operator	320	\$10,240	\$10,560				\$20,800
Biological Technicians	800	\$16,800	\$17,600				\$34,400
Consumable Materials					\$400		\$400

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Overhead (GA and Fee)	Service Contracts	Material Costs	Misc. ODC's	Total Cost
<i>d. Mapping and Reporting</i>							
Principal Investigator	48	\$2,763	\$2,880				\$5,643
Vessel Capt./Navigator	8	\$248	\$256				\$504
Sidescan Sonar Operator	16	\$440	\$448				\$888
Cartographer	24	\$552	\$576				\$1,128
GIS Operator	32	\$1,024	\$1,056				\$2,080
Clerical	16	\$272	\$272				\$544
Consumable Materials					\$600		\$600
Phase 1 Total Costs							\$351,099

Phase 2. Long-term Trend Analyses Using Eelgrass Distribution Patterns

a. Year 2: Survey and Analysis

a.1) Field Survey Program

Principal Investigator	80	\$4,698	\$4,896				\$9,594
Vessel Capt./Navigator	280	\$8,854	\$9,139				\$17,993
Sidescan Sonar Operator	240	\$6,732	\$6,854				\$13,586
Marine Technician	300	\$7,038	\$7,344				\$14,382
Equipment Rigging						\$1,600	\$1,600
Equipment Lease						\$14,500	\$14,500
Vessel Lease						\$4,900	\$4,900
Travel Costs						\$2,800	\$2,800
Consumable Materials					\$1,200		\$1,200

a.2) Post Survey Analysis and Report

Principal Investigator	40	\$2,349	\$2,448				\$4,797
Vessel Capt./Navigator	60	\$1,897	\$1,958				\$3,856
Sidescan Sonar Operator	40	\$1,122	\$1,142				\$2,264
Marine Technician	24	\$563	\$588				\$1,151
Cartographer	160	\$3,754	\$3,917				\$7,671
GIS Operator	80	\$2,611	\$2,693				\$5,304
Biological Technicians	420	\$8,996	\$9,425				\$18,421
Clerical	16	\$277	\$277				\$555
Consumable Materials					\$600		\$600

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Overhead (GA and Fee)	Service Contracts	Material Costs	Misc. ODC's	Total Cost
<i>b. Year 4: Survey and Analysis</i>							
<u>b.1) Field Survey Program</u>							
Principal Investigator	80	\$4,882	\$5,088				\$9,970
Vessel Capt./Navigator	280	\$9,201	\$9,498				\$18,698
Sidescan Sonar Operator	240	\$6,996	\$7,123				\$14,119
Marine Technician	300	\$7,314	\$7,632				\$14,946
Equipment Rigging						\$1,600	\$1,600
Equipment Lease						\$14,500	\$14,500
Vessel Lease						\$4,900	\$4,900
Travel Costs						\$2,800	\$2,800
Consumable Materials					\$1,200		\$1,200
<u>b.2) Post Survey Analysis and Report</u>							
Principal Investigator	40	\$2,441	\$2,544				\$4,985
Vessel Capt./Navigator	60	\$1,972	\$2,035				\$4,007
Sidescan Sonar Operator	40	\$1,166	\$1,187				\$2,353
Marine Technician	24	\$585	\$611				\$1,196
Cartographer	160	\$3,901	\$4,070				\$7,971
GIS Operator	80	\$2,714	\$2,798				\$5,512
Biological Technicians	420	\$9,349	\$9,794				\$19,144
Clerical	16	\$288	\$288				\$577
Consumable Materials					\$600		\$600
<i>c. Year 6: Survey and Analysis</i>							
<u>c.1) Field Survey Program</u>							
Principal Investigator	80	\$5,066	\$5,280				\$10,346
Vessel Capt./Navigator	280	\$9,548	\$9,856				\$19,404
Sidescan Sonar Operator	240	\$7,260	\$7,392				\$14,652
Marine Technician	300	\$7,590	\$7,920				\$15,510
Equipment Rigging						\$1,600	\$1,600
Equipment Lease						\$14,500	\$14,500
Vessel Lease						\$4,900	\$4,900
Travel Costs						\$2,800	\$2,800
Consumable Materials					\$1,200		\$1,200

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Overhead (GA and Fee)	Service Contracts	Material Costs	Misc. ODC's	Total Cost
<u>c.2) Post Survey Analysis and Report</u>							
Principal Investigator	40	\$2,533	\$2,640				\$5,173
Vessel Capt./Navigator	60	\$2,046	\$2,112				\$4,158
Sidescan Sonar Operator	40	\$1,210	\$1,232				\$2,442
Marine Technician	24	\$607	\$634				\$1,241
Cartographer	160	\$4,048	\$4,224				\$8,272
GIS Operator	80	\$2,816	\$2,904				\$5,720
Biological Technicians	420	\$9,702	\$10,164				\$19,866
Clerical	16	\$299	\$299				\$598
Consumable Materials					\$600		\$600
<u>d. Year 8: Survey and Analysis</u>							
<u>d.1) Field Survey Program</u>							
Principal Investigator	80	\$5,250	\$5,472				\$10,722
Vessel Capt./Navigator	280	\$9,895	\$10,214				\$20,110
Sidescan Sonar Operator	240	\$7,524	\$7,661				\$15,185
Marine Technician	300	\$7,866	\$8,208				\$16,074
Equipment Rigging						\$1,600	\$1,600
Equipment Lease						\$14,500	\$14,500
Vessel Lease						\$4,900	\$4,900
Travel Costs						\$2,800	\$2,800
Consumable Materials					\$1,200		\$1,200
<u>d.2) Post Survey Analysis and Report</u>							
Principal Investigator	40	\$2,625	\$2,736				\$5,361
Vessel Capt./Navigator	60	\$2,120	\$2,189				\$4,309
Sidescan Sonar Operator	40	\$1,254	\$1,277				\$2,531
Marine Technician	24	\$629	\$657				\$1,286
Cartographer	160	\$4,195	\$4,378				\$8,573
GIS Operator	80	\$2,918	\$3,010				\$5,928
Biological Technicians	420	\$10,055	\$10,534				\$20,588
Clerical	16	\$310	\$310				\$620
Consumable Materials					\$600		\$600

Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Overhead (GA and Fee)	Service Contracts	Material Costs	Misc. ODC's	Total Cost
<i>e. Year 10: Survey and Analysis</i>							
<u>e.1) Field Survey Program</u>							
Principal Investigator	80	\$5,481	\$5,712				\$11,193
Vessel Capt./Navigator	280	\$10,329	\$10,662				\$20,992
Sidescan Sonar Operator	240	\$7,854	\$7,997				\$15,851
Marine Technician	300	\$8,211	\$8,568				\$16,779
Equipment Rigging						\$1,600	\$1,600
Equipment Lease						\$14,500	\$14,500
Vessel Lease						\$4,900	\$4,900
Travel Costs						\$2,800	\$2,800
Consumable Materials					\$1,200		\$1,200
<u>e.2) Post Survey Analysis and Report</u>							
Principal Investigator	40	\$2,740	\$2,856				\$5,596
Vessel Capt./Navigator	60	\$2,213	\$2,285				\$4,498
Sidescan Sonar Operator	40	\$1,309	\$1,333				\$2,642
Marine Technician	24	\$657	\$685				\$1,342
Cartographer	160	\$4,379	\$4,570				\$8,949
GIS Operator	80	\$3,046	\$3,142				\$6,188
Biological Technicians	420	\$10,496	\$10,996				\$21,491
Clerical	16	\$324	\$324				\$647
Consumable Materials					\$600		\$600
Phase 2 Total Costs							\$665,888

PHASE 1 & 2 TOTAL COST

\$1,016,988

* Labor and overhead costs have a 2% per year inflation rate calculated into the Phase 2 monitoring and analysis program.

III. APPLICANT QUALIFICATIONS

III.a. Firm Background

Merkel & Associates, Inc. is an established San Diego-based biological consulting firm which conducts work along the Pacific Coast of the United States. The firm's stated goals are to offer technical information and insightful solutions to difficult and often complex biological and regulatory issues. Company staff has extensive prior experience in the biological consulting field, having completed over 2,600 projects in southern and central California; as well as additional work in Oregon, Washington, and Alaska. The firm has proven expertise and liaison with many federal, state and local agencies and governments, environmental groups, other environmental consulting firms, and private enterprise. Merkel & Associates offers specialized expertise in ecology, botany, and zoology, with special focus on marine and aquatic ecology. It also offers its clients extensive expertise in natural resource-based legislation, resource and regulatory agency interface and permitting programs, as well as habitat restoration and management.

Merkel & Associates is ~~at~~ the national forefront in coastal resource management issues and staff have prepared many important marine baseline biological studies and surveys of coastal bays and estuaries. Included on the list of work completed by the firm are a number of milestone habitat restoration and enhancement projects including the Le Meridian Submerged Plateau Eelgrass Mitigation Site, the Famosa Slough Enhancement Plan, the Mission Bay Coarse Grain Sand Beach Replenishment Study and the Mission Bay Marine Habitat Mitigation Banking Program. Presently the firm is conducting such ecological modelling and design programs as the 190 Acre Oakland Middle Harbor Shallow Water Habitat Design work for the proposed 50-foot Channel Deepening Project and the Eelgrass Distribution Controlling Factors Study for the 3000 Acre South San Diego Bay Eco-region.

With respect to large-scale long-term ecological monitoring programs, M&A is presently conducting a 10-year monitoring program for vegetation, benthic fauna, fish, birds, and water quality for the recently restored Batiquitos Lagoon. This 1.7 million dollar program is making use of many of the same survey tools and data management techniques proposed for the present study. Merkel & Associates has pioneered the use of acoustic survey techniques for mapping submerged aquatic vegetation, including eelgrass. These techniques have been employed in such areas as Mission Bay and San Diego Bay. Recently, M&A has applied these techniques in Northern San Francisco Bay along two portions of the eastern shoreline and will be using these techniques in August 1997 for mapping eelgrass along the Richmond-San Rafael Bridge.

III.b. Team Organization

The proposed work will be conducted by Merkel & Associates, Inc. under the direction of Keith W. Merkel, principal investigator and project manager for the work effort. Mr. Merkel would serve as the single point of contact for all technical and administrative elements. Mr. Merkel would be supported by Mr. Kevin Cull, vessel captain and navigator for the field studies. Also working under the direction of Mr. Cull and Mr. Merkel in the field investigations would be Mr. Orin Jewitt, sidescan sonar operator, and Ms. Rachel Woodfield and Mr. Stephen Rink, marine technicians. Data reduction, analysis and reporting would make use of the same staff with the addition of in-house cartographers and additional technicians. Mr. Mark Carpenter would provide GIS support services to the project to integrate data into the ArcInfo database system. This project team has worked together on similar ecological mapping and inventory programs for Batiquitos Lagoon, San Diego Bay, Mission Bay, and San Francisco Bay.

III. c. Key Project Staff

Key project staff for the proposed work include Keith Merkel, Kevin Cull, and Orin Jewitt. Biographical sketches of these individuals are provided in this section.

● **KEITH W. MERKEL, Principal Investigator/Project Manager,**

Mr. Merkel has over 14 years of professional experience and has coordinated, conducted, or assisted in over 2,500 biological investigations performed for a broad range of public and private clients. Mr. Merkel has worked on a variety of impact studies and mitigation programs associated with marine discharge, dredging, and coastal resource management in San Diego Bay, Mission Bay, Agua Hedionda Lagoon, Baticuitos Lagoon, Newport Bay, Morro Bay, and San Francisco Bay, California, as well as bays and estuaries in Oregon, Washington, and Alaska. He has a national reputation for marine habitat restoration and management, and is recognized for his ability to develop solutions to difficult ecological assessment problems. Mr. Merkel has often served as a facilitator and discussion leader for public workshops and agency meetings addressing ecological issues, regulatory program compliance and permitting, and habitat restoration. He has been a member of the San Diego Bay Working Group since its inception.

Mr. Merkel is respected in the biological and regulatory community, earning strong support from agency staff, environmental groups, and technical experts. On the basis of nominations by the U.S. Army Corps of Engineers, Waterways Experiment Station (WES), Mr. Merkel has served on a National Academy of Sciences technical advisory panel to the Committee on the Role of Technology in Marine Habitat Protection and Enhancement. Mr. Merkel has also acted as an advisor to the Portland District Army Corps of Engineers and the Oregon State Lands Commission in their evaluation of suitable restoration sites for marine resource mitigation projects. In addition, he has worked with resource and regulatory agencies in the development of regulatory and mitigation banking policies. He has authored numerous papers and spoken at national conferences on the topic of ecological impact assessment and marine habitat restoration. Mr. Merkel was the director and proceedings technical co-editor with Robert Hoffman (NMFS) of the 1988 California Eelgrass Symposium. He was requested by the Congressional Joint Powers Commission for base realignment to serve on the Environmental Technical Advisory Committee for California Base Closures. Recently, Mr. Merkel has been involved in modeling the dynamics of the south San Diego Bay environment and has been requested to work with the Army Corps of Engineers, WES on application of high performance computing to develop ecological models addressing eelgrass distribution in south San Diego Bay. Mr. Merkel is a Corps of Engineers identified wetland delineation instructor, is an active member of the Society of Wetland Scientists and Association of State Wetland Managers, and is a certified biologist within a number of local and regional agencies.

The diversity in Mr. Merkel's technical expertise and involvement in all levels of business administration have allowed him to efficiently manage large, multi-disciplinary teams and to effectively communicate all types of scientific, technical, and economic information in public and agency forums. Mr. Merkel is an effective written and oral communicator and is comfortable with presentations to large groups at all levels of technical background. He has coordinated workshops and has made presentations of materials in adversarial situations.

● **KEVIN J. CULL, Vessel Captain/Navigator/Cartographer**

Mr. Cull has 8 years of professional experience in the environmental biology and geography field, both within the public and private sectors. As a Senior Associate at Merkel & Associates, Mr. Cull serves as the overall project coordinator to ensure that staff and equipment demands are met for all of the firm's work. He uses a number of manual and software tools to track project schedules, coordinate project staff needs, and ensure timely completion of project work. Mr. Cull manages weekly scheduling meetings of all project managers and senior staff and maintains the flow of work and ensures the effective utilization of supporting technical, clerical, and administrative staff.

In addition to serving in a management role, Mr. Cull also works extensively on marine projects. Mr. Cull provides the firm expertise with navigational and cartographic equipment as well as computer software. He follows technological advancements in navigational and sampling hardware and software applications in order to ensure that the company remains efficient in its field logistics, data collection, and computer analyses. In his role as a marine resources project manager, Mr. Cull is a proficient boat handler, experienced diver, and capable operator of field instrumentation. He is an experienced research diver and has conducted over 50 marine resource investigations, habitat restoration projects, and mitigation monitoring programs. In addition, Mr. Cull has served as an environmental monitor for construction (marine and terrestrial) and dredging projects such as Mission Bay Shoreline Stabilization Project. In this role, he has conducted field sampling, coordinated with contractors and project owners, and prepared required reports to regulatory agencies. Mr. Cull has served as the captain and navigator for three previous large-scale acoustic eelgrass survey programs including two in northern San Francisco Bay.

● ***ORIN JEWITT, Sidescan Sonar Operator/Survey Cartographer***

Mr. Jewitt has over 20 years experience in conducting marine surveys along the California coast and in waters around the world. Coming from a background in off-shore geophysical investigations, Mr. Jewitt is well-versed in marine navigation and acoustic survey equipment use. He is the author of the custom navigation program Hydro-Data which makes use of GPS generated fix data for providing real-time direction to the boat pilot and log data for plotting x-y fix data. Mr. Jewitt has worked on every eelgrass sidescan acoustic survey project completed by Merkel & Associates and it is believed every such project completed in California. He will serve as the sidescan operator for the proposed work and will also assist in analyzing data and reducing information for graphic presentation.

IV. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

This proposal is made as a Group 3: Services proposal. As such, the following attachments are made to this submittal:

- Item 8: Nondiscrimination Compliance Statement
- Item 12: Small Business Preference and Contractor Identification Number Notice
- Small Business Certification Letter

We have reviewed the Terms and Conditions of Attachment D as well as the Standard Clauses for Services & Consultant Service Contracts for \$5,000 & Over with Nonpublic Entities. We take no exception to these terms, except for Attachment D: Standard Clause 1. Term of Contract. If Phase 2 of the proposed work is to be funded, it has a monitoring period of 10 years and would therefore exceed the 1 to 3 year contract period specified in Standard Clause 1. As a result, the contract would either need to be modified to address this issue, or incrementally authorized in shorter terms.

LITERATURE CITED

- Merkel, K.W. 1988. Mission Bay Eelgrass Inventory and Marine Habitat Surveys. September 1988. Prepared for the City of San Diego. San Diego, CA.
- Merkel, K.W. 1992. Mission Bay Eelgrass Inventory - September 1992. Prepared for the City of San Diego. San Diego, CA.
- SAIC and Merkel & Associates. 1997a. Port of Richmond Eelgrass Survey. Prepared for the U.S. Army Corps of Engineers, San Francisco District, San Francisco, CA
- SAIC and Merkel & Associates. 1997b. Eelgrass and Benthic Survey for the J.F. Baldwin Channel EIR/EIS Pipeline Alternative. Prepared for the U.S. Army Corps of Engineers, San Francisco District, San Francisco, CA
- Setchell, W. A. 1929. Morphological and Phenological Notes on *Zostera Marina L.* University of California Publications in Botany. 14(19):389-452. U.C. Press, Berkeley CA.
- U.S. Navy SWDIV. 1994. San Diego Bay Eelgrass Bed Survey and Density Determination. U.S. Navy Southwest Division, Natural Resources, San Diego, CA.
- Wyllie-Echeverria, S. 1990. Geographic Range and Distribution of *Zostera marina*, Eelgrass in San Francisco Bay. In: K. Merkel and R. Hoffman (eds.), Proceedings of the California Eelgrass Symposium, pp. 65-69. Sweetwater River Press, National City, CA.
- Wyllie-Echeverria, S. and P.J. Rutten. 1989. Inventory of Eelgrass (*Zostera marina L.*) in San Francisco/San Pablo Bay. NOAA/NMFS Admin. Rept. SWR-89-05.
- Wyllie-Echeverria, S. and R.M. Thom. 1994. Managing Seagrass Systems in Western North America: Research Gaps and Needs. Alaska Sea Grant College Program Rpt. No. 94-01.

NONDISCRIMINATION COMPLIANCE STATEMENT

COMPANY NAME

MERKEL & ASSOCIATES, INC.

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

BARBARA L. MERKEL

DATE EXECUTED

JULY 28, 1997

EXECUTED IN THE COUNTY OF
SAN DIEGO

PROSPECTIVE CONTRACTOR'S SIGNATURE

Barbara L. Merkel

PROSPECTIVE CONTRACTOR'S TITLE

PRESIDENT

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

MERKEL & ASSOCIATES, INC.

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* No

*Attach a copy of your certification approval letter.

DEPARTMENT OF GENERAL SERVICES

Office of Small and Minority Business

1531 I Street, Second Floor
Sacramento, CA 95814-2016

SB APP 19670715

July 15, 1997

REF# 0016623
MERKEL & ASSOCIATES INC
3944 MURPHY CANYON RD STE C106
SAN DIEGO CA 92123

Dear Business Person:

The Office of Small and Minority Business (OSMB) congratulates your firm on becoming a certified small business. This formal certification entitles you to a five percent bidding preference on state government contracts according to the Small Business Procurement and Contract Act.

Your small business certification applies ONLY to the following industry groups(s) within the designated business type(s):

Business Type	Roman Numeral	Industry Group Name
SERVICE	v	Consulting, Management and Public Relations

Certification
Effective
07/15/1997

Your firm's small business certification expires **07/31/1999**.

Annual Submission Requirement

To maintain your small business certification status, gross receipts for your firm and any affiliate(s) must be submitted at the end of each fiscal year. Proof of annual receipts may be submitted in the form of either:

1. An audited financial statement, or
2. A copy of the ENTIRE SIGNED Federal tax return(s) (FTRs) as filed with the Internal Revenue Service (IRS).
3. If the FTR for the most recently completed tax year has not yet been filed with the IRS, submit an original notarized Affidavit of Income (AI). (See enclosed AI and instructions). A copy of the signed tax filing extension must accompany the AI if the filing due date has passed.

Note: All AIs must be replaced with the corresponding ENTIRE SIGNED FTR(s) by the tax filing due date or by the filing extension's expiration date, whichever occurs first.

Prompt Payment Program

The Prompt Payment Act encourages state agencies to pay invoices on a timely basis to certified service and commodity small businesses and recognized nonprofit organizations. Prompt payment is reinforced by adding interest penalties for late payments. The program includes the use of a rubber stamp to alert state agencies of a firm's certified small business or nonprofit organization's status.

Only certified service and commodity small business firms actively working with the state may participate in the Prompt Payment Program. Construction firms' compensation on late/unpaid progress payments is addressed in Public Contract Code, Section 10261.5.

To receive a prompt payment stamp, the following three items must be submitted to the OSMB:

1. A written rubber stamp request. Include the applicant firm's name, OSMB Reference number, and

- your current mailing address.
2. A copy of a current state contract or purchase order soliciting services from the applicant.
 3. A \$15.00 check or money order made payable to the Department of General Services.

Reporting Business Changes

Your firm's business information must remain current with the OSMB or your certification status may be subject to suspension and subsequent revocation.

All changes in business name, structure or ownership requires submission of a new "Small Business and/or Disabled Veteran Business Enterprise Certification Application" (STD. 812). Address and/or telephone number changes must be submitted in writing or fax and must be signed by an owner/officer.

Proof of Eligibility

Maintain this original certification letter for future business needs. To demonstrate your firm's small business eligibility, include a copy of this letter in your state contract bid submittals.

Prior to contract award, agencies will assure the vendor is in compliance with Public Contract Code, Section 10410 et seq. addressing conflict of interest for state officers, state employees or former state employees.

Certification Renewal

A renewal application will be mailed to you prior to the expiration of your small business certification. However, should you not receive an application, please call us so that you may timely renew your certification.

If you have any questions, please contact me at (916) 322-7120, e-mail sharm@dgs.ca.gov, or fax (916) 442-7855. **Please have a copy of this letter and the STD.812 booklet when you call.** The OSMB offers various programs to further participation in state contracting. For more information regarding these programs, you may visit our Internet website at www.dgs.ca.gov/osmb, or call our OSMB Telephone Information System at (916) 322-5060.

Sincerely,



Sherry Harm
Certification Officer
Office of Small and Minority Business