F1-079.

National Wetland Science Training Cooperative

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A division of L.C. Lee & Associates, Inc.

25 July 1997

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

Subject: Proposal for the CALFED Bay-Delta 1997 Category III Ecosystem Restoration Projects and Programs

Dear Ms. Hansel:

The National Wetland Science Training Cooperative of L.C. Lee & Associates, Inc. is pleased to submit a proposal entitled *Development of a Hydrogeomorphic Functional Assessment Model for Sacramento River 3rd and 4th Order Riverine Ecosystems* for consideration by the CALFED Bay-Delta Program. As requested, 10 copies of the proposal are included.

We are anxious about the possibility of working with your program, and believe that our proposal is timely and should meet the requisite criteria for funding. If you have any questions, please do not hesitate to contact us.

Regards,

Peggy L. Fiedler, Ph.D.
Senior Associate

F1-079

I. EXECUTIVE SUMMARY

A. Project Title & Applicant Name:

1. Name: Development Of A Hydrogeomorphic Functional Assessment Model For Sacramento River 3rd and 4th Order Riverine Ecosystems
2. Applicant: The National Wetland Science Training Cooperative, a division of L.C. Lee & Associates, Inc.

B. Project Description & Primary Biological/Ecological Objective

1. Overall Goal: To provide a mechanism for assessment of functions of 3rd and 4th order riverine wetlands of the Sacramento River using a hydrogeomorphic ("HGM") approach. An HGM functional assessment protocol can be used to document project impacts; to guide the design of mitigation or other restoration-related wetland creation, enhancement, or restoration projects; to assess site- or regional-specific restoration success; and to trigger contingency measures at a project-specific level. Relevant to CALFED's goals of ecosystem restoration throughout the San Francisco Estuary, HGM assessment can be used for any (and potentially all) ecosystem restoration efforts, i.e., from documentation of site conditions, to restoration design, to assess restoration success, and to suggest when and if remedial actions should be taken.
2. Project Description: The National Wetland Science Cooperative ("NWSTC"), a division of L.C. Lee & Associates, Inc. ("LCLA") proposes to assess the ecosystem functions of 3rd and 4th order riverine ecosystem of the Sacramento River watershed, using the HGM method of functional assessment, to aid in the acheivement of Federal Clean Water Act and State of California goals for maintenance of physical, chemical, and biological integrity of Californian waters, specifically the Bay-Delta Ecosystem. These wetland and aquatic ecosystems are increasingly under pressure from urbanization, habitat fragmentation and degradation, pollution, and fishing activities. Additionally, the proposed functional assessment will identify site-specific stressors and their effects that may be suitable for ecosystem restoration, as outlined in the CalFed Program RFP.

C. Approach/Tasks/Schedule:

1. Approach: The NWSTC Team proposes to use a relatively new wetland functional assessment method, hydrogeomorphic assessment ("HGM"), as the basis for documenting the ecosystem functions of 3rd and 4th order riverine wetlands of the Sacramento River. This protocol for wetland ecosystem functional assessment was developed by a national team of wetland scientists and is founded upon (a) the recognition of differences among hydrologic and geomorphic characteristics of various classes of wetland ecosystems and (b) the use of reference systems as the basis for assessing changes in the functioning of wetlands. HGM classifies wetlands based on their (1) geomorphic setting (landscape position), (2) water source and transport, and (3) hydrodynamics (direction of flow and strength of water movement). The HGM method of functional assessment has been adopted and endorsed by all federal agencies that regulate wetlands, including the Natural Resources Conservation Service (NRCS) , U.S. Army Corps of Engineers (COE), and U.S. Environmental Protection Agency (EPA).

2. Tasks: The proposed research tasks are synoptically outlined as follows:

Phase I: Build Sacramento River 3rd & 4th Order Riverine Wetlands HGM Model

Task 1: Preliminary reconnaissance.
Task 2: Determine field sites.
Task 3: Visit and collect field data from riverine ecosystems that represent third and fourth order (low gradient) riverine wetlands.
Task 4: Draft the HGM model for 3rd and 4th order riverine wetlands.

Phase II: Field Test & Draft Sacramento River 3rd & 4th Order Riverine Wetlands HGM Model

Task 5: Field test/calibrate draft model for the subclass.
Task 6: Peer review of draft Sacramento riverine wetlands HGM model.
Task 7: Organize and hold an expert workshop to solicit additional peer review.
Task 8: Draft the Sacramento 3rd/4th order riverine wetland model guidebook for publication.

Phase III: Revise & Publish Sacramento River 3rd/4th Order Riverine Wetlands HGM Model

Task 9: Implement/field test the draft model guidebook.
Task 10: Review, revise and publish HGM Sacramento Riverine HGM functional assessment guidebook.

3. Schedule: The proposed functional assessment will begin September 15, 1997. Field work will continue through June, 1998, with peer review and revisional work during July through August. A final report will be submitted October 31, 1998.

E. Budget Costs/Third Party Impacts:
The proposed focused research is estimated to cost $180,000.00, as detailed in the budget section in the body of the proposal. Third party impacts are anticipated to be none at this time.

F. Application Qualifications:
Members of the team of researchers are nationally and internationally recognized scientists and wetland regulatory experts who developed the HGM functional assessment method. In particular, the co-PI Dr. Lee developed the Riverine HGM Model nationally and regionally; both principal investigators recently developed the Central California Coast HGM riverine model for the restoration of riverine wetlands in that geographic region. Overall, the proposed research team has extensive experience in wetland community ecology, hydrology, geochemistry, wetland protection, as well as functional and cumulative impact assessment in wetlands. All NWSTC scientists have worked in several different types of wetlands throughout the U.S. as well in California.

G. Monitoring and Data Evaluation:
1. Monitoring: Development of HGM models involves extensive field work that establishes baseline conditions for the wetland ecosystems documented (see project description in Part II). From these data, monitoring for project impacts, restoration success, or any impacts to wetland functions can be measured.
2. Data Evaluation (Peer Review): As described in Part II, the overall objective of the project is to develop a *field-tested* and *peer reviewed* operational draft guidebook for assessment of functions of 3rd and 4th-order riverine wetlands within the Sacramento River watershed. Thus peer review is incorporated into (and indeed, is critical to) the process of building of any HGM model.

H. Local Support/Coordination with Other Programs/Compatibility with CalFed Objectives: While there are no additional local funds supporting this research, the proposed work complements an ongoing regional effort to develop a draft HGM guidebook for vernal pool ecosystems within the Sacramento County. More broadly, HGM models for a variety of riverine wetland ecosystems have been developed throughout the country, and as such, the models are all consistent with the HGM approach developed primarily by the NWSTC. The proposed focused research is fundamental to the restoration of wetland ecosystems under the governance of the CALFED Bay-Delta Program, which is the articulated objective of the Category III RFP (p.1). A functional assessment will identify and quantify non-flow related factors that negatively impact the Bay-Delta ecosystem. By employing a scientifically defensible, nationally-adopted protocol for documenting wetland functions, one of CALFED's goals (i.e., to restore the San Francisco Estuary) is closer to being achieved.

II. PROJECT TITLE // Geographic Area & Priority Habitat

Development of a Hydrogeomorphic Functional Assessment Model for Sacramento River 3rd & 4th Order Riverine Wetland Ecosystems // Sacramento River & its Tributaries/ Shaded Riverine Aquatic Habitat & Instream Aquatic Habitat

Principal Investigators:
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Type of Organization/Tax Status: Corporation

Tax Identification Number: 91-1472759

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Participants/Collaborators in Implementation:
None.

RFP Project Group Type: Group 3, Services (Focused Research)

III. PROJECT DESCRIPTION

A. Project Description

We propose an interdisciplinary research project to assess wetland ecosystem functions of 3rd and 4th order riverine wetlands within the Sacramento River watershed using the hydrogeomorphic approach ("HGM") for assessing wetland functions. The results of this project will be the basis of a functional assessment model that can be used (1) to assess site-specific project impacts; (2) to guide the design of mitigation or other restoration-related wetland creation, enhancement, or restoration projects; (3) to assess site- or regional-specific restoration success; (4) to trigger contingency measures at a project-specific level. Overall the proposed research will provide critically needed information that can be used throughout the Sacramento River watershed and potentially throughout 3rd and 4th order riverine ecosystems throughout the American West.

A.1. Technical Approach: Wetland Ecosystem Functional Assessment: The Hydrogeomorphic Approach. A protocol for wetland ecosystem functional assessment was developed by a team of wetland scientists that is founded upon the recognition of differences among hydrologic and geomorphic characteristics of various classes of wetland ecosystems and the use of reference systems as the basis for assessing changes in the functioning of wetlands. HGM classifies wetlands based on their (1) geomorphic setting (landscape position), (2) water source and transport, and (3) hydrodynamics (direction of flow and strength of water movement). This approach, known as the hydrogeomorphic (HGM) approach, has been adopted by the major federal agencies that regulate wetland protection, including the Natural Resources Conservation

Service ("NRCS") , the U.S. Army Corps of Engineers ("COE"), and the U.S. Environmental Protection Agency ("EPA"). To date, the HGM method has been employed to assess ecosystem functions for a variety of wetland ecosystems across the county, including, for example, the depressional wetlands of the Mid-Atlantic Coast, Puget Sound riverine wetlands, Alaska interior slope and depressional wetlands, southeastern Alaska riverine wetlands, and prairie pothole (depressional) wetlands. Most importantly and relevant to the proposal, the HGM method has been applied to assess wetland ecosystem functions in central California, including 3rd and 4th order coastal streams from the city of Pacifica to the city of Santa Cruz, as well as the vernal pool ecosystems of the southern Sacramento Valley. This latter project involves the construction of slope, depressional, and riverine HGM models for vernal pool complexes. All of these projects have been accomplished or are in progress by our project team.

A.1.a. Background. Under the hydrogeomorphic approach, wetlands in a geographic region are assigned to classes based upon their hydrologic and geomorphic character. For example, in the case of the Sacramento River, the wetland class targeted for this proposal is third to fourth order streams (riverine). Riverine wetlands are wetlands that occur in floodplains and riparian corridors in association with channels of streams and rivers. Once the class of a wetland has been established (e.g., riverine, depressional, slope, fringe, expansive peatlands), under the HGM approach it is necessary to sample other wetlands in the region that belong to this same class. A team of knowledgeable wetland scientists collects data on four groups of wetland functions: hydrology, biogeochemistry, plant community maintenance, and habitat/faunal community maintenance. These data then comprise the "reference framework" that provides the range of conditions for the wetland class in question. Hydrogeomorphic assessments are restricted to only those functions operating in a specific wetland class. In contrast to the national Wetland Evaluation Technique (WET), hydrogeomorphic assessments require a population of regional reference wetlands as a benchmark.

The HGM functional assessment method looks at four groups of wetland functions at site-specific and landscape scales (see Table 1). Wetland class is probably the most robust indicator of wetland functioning. Because it is usually impractical to measure functioning directly, under the hydrogeomorphic approach indicators of functioning are measured instead. For example, one hydrologic function that riverine wetlands serve is the dissipation of the energy of high flows from floodwaters. An indicator that a wetland is serving this function is the presence of complex geomorphic features such as oxbows, meander scrolls, abandoned channels and backswamps. A set of variables found in the landscape has been developed for riverine wetland functions; these variables are measured at the reference wetlands. From these data, functional profiles of reference wetlands can be developed and compared to existing conditions at the project site to measure the direction and degree of differences in wetland functions. This comparison allows restoration designers an opportunity to see clearly the differences between attainable wetland conditions and conditions on the project site.

From the data collected at reference sites, it is then possible to develop wetland functional profiles and use them as templates for restoration design, assessing project impacts, etc. Changes in wetland functions from one condition to another (e.g., pre-project to post-project) are quantifiable because direction and/or degree of change from the reference state is the fundamental metric. In the case of the Sacramento River, a team of wetland scientists will collect data on 3rd and 4th order streams within the Sacramento River watershed.

At each reference site, the team of wetland scientists uses best professional judgement to determine whether or not the site being sampled is an "attainable reference," a term meaning the highest level of ecosystem functioning possible for a wetland class within the constraints of disturbance history and land use of the reference domain. By defining attainable reference conditions, the HGM

Table 1. Riverine Wetland Functions

Functional Group	Wetland Function
Hydrology	Dynamic surface water storage
	Long-term surface water storage
	Energy dissipation
	Subsurface storage of water
	Moderation of groundwater flow or discharge
Biogeochemistry (water quality)	Removal of dissolved elements and compounds
	Particulate retention
	Nutrient cycling
	Organic carbon export
Plant Community Maintenance	Maintain characteristic plant communities
	Maintain characteristic detrital biomass
Habitat/Faunal Community Support	Maintain spatial habitat structure
	Maintain habitat interspersion and connectivity
	Maintain distribution and abundance of invertebrates
	Maintain distribution and abundance of vertebrates

assessment method provides decision-makers with explicit measurable conditions that are possible to achieve in a wetland restoration. However, decision-makers may decide to restore a different level of wetland function due to budget constraints, political will, or other considerations. Wetland restoration designers are able to clearly see the differences between attainable and current conditions and to design the functional restoration accordingly.

B. Geographic Extent of Project

The potential "Reference Domain" for the Sacramento River ecosystems includes the entire Sacramento River watershed. Counties included within the geographic scope include Shasta, Trinity, Tehama, Butte, Glenn, Lake, Colusa, Sutter, Yuba, Nevada, Yolo, Sacramento, Calaveras, Amador, Eldorado, Placer, Sierra, and Plumas. Given the large geographic extent of this domain, knowledge of the range of functions and conditions in the Sacramento River is important and very efficient to highlight in the context of a national HGM effort. Perhaps most important, relatively pristine rivers (e.g., Molokume River) can serve as benchmarks or "Reference Standards" against which all other Sacramento riverine functions can be judged.

C. Expected Benefits

Use of the hydrogeomorphic approach extends beyond site-specific planning to a strategy that requires watershed-level analysis and detailed field investigations. The rationale for the resulting design is thoroughly documented, and success criteria and monitoring requirements are explicit. the restoration of wetland functions is quantifiable both in the immediate target area and throughout the surrounding biogeographic region. Specifically, once the HGM model has been built for 3rd and 4th order riverine, it can be modified for smaller or larger riverine wetland ecosystems within the Sacramento River ecosystem, or for any riverine ecosystem within the Bay-Delta Ecosystem (e.g., San Joaquin River).

D. CALFED Priority Habitats

1. Priority Habitats: The proposed HGM functional assessment will focus on 3rd and 4th order riverine wetland ecosystems of the Sacramento River, which will include two priority habitats as articulated within the CALFED RFP. These are (1) *Instream Aquatic Habitat* and (2) *Shaded Riverine Aquatic Habitat.* Because the HGM method includes the quantification of ecosystem functions within the stream channel as well as the adjacent riparian corridor, the proposed focused research will quantify two significant foci of the CALFED program. Importantly, the HGM protocol will assess all primary wetland functions of these priority habitats -- i.e., wetland functions such as biogeochemical cycling, plant community maintenance -- in addition to the habitat function for targeted animal species such as the anadromous fishes of the Bay-Delta Ecosystem.
2. Primary vs. Secondary Benefits: The primary habitats that will benefit from this proposed study are the priority habitats just discussed, i.e., shaded riverine aquatic habitat and instream aquatic habitat. Target species associated with these habitats include the Californian salmonids, splittail, striped bass, and a variety of other wildlife and plants. Initially, the benefits will be secondary as the model must be built before any HGM-specific restoration can be planned and implemented.
3. Third Party Beneficiaries: No third party beneficiaries have been identified at this time.

D. Background & Biological/Technical Justification

Members of the team of researchers are nationally and internationally recognized scientists and wetland regulatory experts. They have broad experience in wetland community ecology, hydrology, geochemistry, wetland protection, enforcement and compliance, functional and cumulative impact assessment in wetlands, and mitigation of impacts to wetlands. All team members have worked in several different types of wetlands throughout the U.S. as well California. Collectively, the team has unparalleled experience in research, applied science and regulation of wetlands.

Additionally, the HGM methodology has been accepted as the method to assess wetland functions by the federally agencies that regulate wetlands: NRCS, Corps of Engineers, and EPA. In California HGM models have been build for a variety of wetland classes including riverine (Central Coast Model constructed by L.C. Lee & Associates, Inc., for the City of Pacifica), and riverine/slope/depressional vernal pool complexes as constructed by L.C. Lee & Associates, Inc., for the EPA, Region IX. Building a riverine HGM model for the Sacramento River watershed would further national efforts to assess wetland functions, and in addition, serve to further CALFED programmatic goals.

E. Proposed Scope of Work

The proposed research is divided into three phases with 10 tasks as outlined below:

Phase I: Build Sacramento River 3rd & 4th Order Riverine Wetlands HGM Model

Task 1: Conduct preliminary reconnaissance to orient all team members to the HGM approach in California.

Task 2: Determine field sites from Sacramento River system and reference wetland sites using maps, aerial imagery, published literature, grey literature, and other relevant information sources.

Task 3: Visit and collect field data from riverine ecosystems that represent third and fourth order riverine wetlands (i.e., the target subclass).

Task 4: Based on field work and results of the preliminary model development, draft the HGM model for 3rd and 4th order riverine wetland for the Sacramento River watershed.

Phase II: Field Test and Draft Sacramento River 3rd & 4th Order Riverine Wetlands HGM Model

Task 5: Field test/calibrate draft model for the subclass. On the basis of team review during a second round of field testing, refine the draft model for 3rd and 4th order riverine wetlands, Reference Set, and appropriate Reference Standards.

Task 6: Submit the draft Sacramento riverine wetlands HGM model to initial outside peer review.

Task 7: Organize and hold an expert workshop to solicit additional peer review and to further refine draft model.

Task 8: Given steps 1-7 above, draft the Sacramento 3rd & 4th order riverine wetland model guidebook for publication.

Phase III: Revise & Publish Sacramento River 3rd & 4th Order Riverine Wetlands HGM Model

Task 9: Implement the draft model guidebook.

Task 10: Based on results of field implementation, review, revise and publish HGM Sacramento Riverine HGM assessment guidebook.

F. Monitoring and Data Evaluation

The data collected to build the HGM model is subjected to multivariate anlyis (DCCA) to ordinate the sites based upon the data collected. From this array, inferences can be drawn about the similarity (or differences) between and among sites. Additionally, as noted in the executive summary, peer review of the draft model is incorporated in several phases of the model development (see also the tasks 6 & 7 of Phase II outlined above).

G. Implementability

Because the proposed focused research does not involve a specific project with requisite state and federal permits for project completion, discussion regarding compliance with specific state and federal for a specific project impact(s) is not included. However, the overall project purpose of drafting an HGM guidebook for the assessment of riverine wetland functions within the Sacramento River watershed is to further aid in the acheivement of Federal Clean Water Act and State of California goals for maintenance of physical, chemical, and biological integrity of Californian waters. Additionally, however, all private property owners rights will be honored with respect to site access.

IV. Costs and Schedule to Implement Proposed Project

Cost Estimates: In developing this proposal, NWSTC has made every effort to accurately estimate all costs associated with the proposed project. We will work with the CALFED program to make sure that every reasonable opportunity is used to control costs. In this regard, however, certain basic assumptions need to be made concerning provision for flexibility for travel arrangements, scheduling, lay-over times, and unexpected expenses incurred because of a failure in logistics or technical support. These include, but are not limited to the assumption of travel origin of principal scientists and technicians from their homes and/or places of work, the need for principals to honor

family and professional commitments in a timely and efficient manner, and the need for technical teams to rest and regroup after long intervals in the field. If failures in plans, logistics or technical support result in unexpected expenses, NWSTC will document each such occurrence with all pertinent receipts, documentation of activities (time), and a written explanation of the circumstances. All cooperators agree to review each such instance of a case-by-case basis, and to reach a fair and consistent solution to the unexpected charges.

A. Budget Costs

Costs are broken down in specific costs associated with phases and tasks. Details of costs associated with each tasks can be provided if requested, but for the sake of brevity are not included in the proposal.

Phase/Tasks	Cost
PHASE I: Build Sacramento River 3rd/4th Order Riverine Wetlands HGM Model	
Task 1: Conduct preliminary reconnaissance to orient all team members to the HGM approach in California.	$1,000
Task 2: Determine field sites from Sacramento River system and reference wetland sites using maps, aerial imagery, published literature, grey literature, and other relevant information sources.	4,000
Task 3: Visit and collect field data from riverine ecosystems that represent third and fourth order riverine wetlands (i.e., the target subclass).	30,000
Task 4: Based on field work and results of the preliminary model development, draft the HGM model for 3rd and 4th order riverine wetland for the Sacramento River watershed.	44,000
Subtotal for Phase I	**$79,000**
PHASE II: Field Test and Draft Sacramento River 3rd/4th Order Riverine Wetlands HGM Model	
Task 5: Field test/calibrate draft model for the subclass. On the basis of team review during a second round of field testing, refine the draft model for 3rd and 4th order riverine wetlands, Reference Set, and appropriate Reference Standards.	$15,000
Task 6: Submit the draft Sacramento riverine wetlands HGM model to initial outside peer review.	1,000
Task 7: Organize and hold an expert workshop to solicit additional peer review and to further refine draft model.	45,000
Task 8: Given tasks 1-7 above, draft the Sacramento 3rd/4th order riverine wetland model guidebook for publication.	15,000
Subtotal for Phase II	**$76,000**

Phase III: Revise & Publish Sacramento River 3rd/4th Order Riverine Wetlands HGM Model

Task 9: Implement the draft model guidebook	$5,000
Task 10: Based on results of field implementation, review, revise and publish HGM Sacramento Riverine HGM assessment guidebook.	20,000
Subtotal for Phase II	**$25,000**

GRAND TOTAL ESTIMATE = **$180,000**

B. Schedule Milestones

Tasks	Target Date of Completion
1. Conduct preliminary reconnaissance to orient all team members to the HGM approach in California.	September 15, 1997
2. Determine field sites from Sacramento River system and reference wetland sites	September 30, 1997
3. Visit and collect field data from riverine ecosystems that represent third and fourth order riverine wetlands (i.e., the target subclass).	June 1, 1998
4. Based on field work and results of the preliminary model development, draft the HGM model for 3rd and 4th order riverine wetland for the Sacramento River.	June 30, 1998
5. Field test/calibrate draft model for the subclass. On the basis of team review during a second round of field testing, refine the draft model for 3rd and 4th order riverine wetlands, Reference Set, and appropriate Reference Standards.	July 31, 1998
6. Send draft Sacramento HGM model out for initial peer review.	August 15, 1998
7. Organize and hold an expert workshop to solicit peer review and to further refine draft model.	August 31, 1998
8. Given steps 1-7 above, draft the Sacramento 3rd/4th order riverine wetland model guidebook for publication.	September 15, 1998
9. Participate in the implementation of the draft model guidebook.	September 30, 1998
10. Based on results of field implementation, review and revise draft model guidebook.	October 31, 1998

V. Applicant Qualifications

L.C. Lee & Associates, Inc. ("LCLA") is an environmental consulting firm specializing in wetland and riparian ecosystem science, wetland restoration, regulatory assistance, and training. The firm has been based in Seattle, Washington since January 1990, and operates throughout the United

States and overseas.

The National Wetland Science Training Cooperative ("NWSTC") is a division of LCLA. It was founded in 1987 by Dr. Lee while he was serving as the senior wetland scientist for the U.S. Environmental Protection Agency in Washington, D.C. The idea behind the inception of NWSTC was to provide high quality technical training on wetland science, management, and regulatory processes to governmental personnel and other persons involved with wetland issues.

Recently, NWSTC has expanded into the development of hydrogeomorphic functional assessment models throughout the United States. Principal scientists involved in the development of HGM models include Dr. Lyndon Lee (Principal of LCLA), Dr. Peggy Fiedler (Senior associate with LCLA, NWSTC instructor, and professor of conservation biology at San Francisco State University), Dr. Mark Brinson (Professor of biology at East Carolina University and NWSTC instructor), Mr. Garrett Hollands (principal of Fugro (East), Dr. Wade Nutter (Professor of hydrology at the University of Georgia), and Dr. Dennis Whigham (Senior research ecologist at the Smithsonian Research Center, Edgewater, Maryland).

The co-principal investigators are Dr. Lyndon C. Lee and Dr. Peggy L. Fiedler. Dr. Lee has been working in wetlands, forestry, soils and wildlife for more than 25 years. From 1986 to 1989, Dr. Lee served as senior wetland ecologist for the U.S. EPA headquarters. During this time he was directly involved with the formulation of national wetlands policy and regulatory procedures. He also directed a team of technical experts that dealt with top priority, wetland problems throughout the country, and served as the Superfund and RCRA liaison from the Office of Wetland Protection. During the last 15 years Dr. Lee's consulting experience has taken him to all areas of the country, but more recently he has focused on the American West. He has completed more than 130 contracts with private industry, local, state and federal governments, and research and conservation organizations. He has extensive knowledge of wetland and wildlife ecology, forestry, and soil science. Dr. Lee is a nationally recognized expert in a wide variety of issues related to wetlands science and regulations, and has been the principal creative force in the development of the hydrogeomorphic approach to functional assessment.

Dr. Peggy L. Fiedler has more than 20 years of field, research and teaching experience in plant ecology and evolutionary biology. She is an internationally recognized expert in the field of conservation biology, and has published widely on a variety of conservation issues, including wetlands protection. Recently, under contract to U.S. EPA, Region IX, with coauthors Mr. Wayne Ferren and Robert Leidy, she developed the first adaptation of the Cowardin et al. wetland classification for California (see *Madroño* 43 (1), Supplement, 1996). Dr. Fiedler has also has extensive experience in wetland research in the Bay-Delta ecosystem, having conducted an extensive 4-year study on *Lilaeopsis masonii* (Apiaceae), a rare plant of the region. She has been affiliated with LCLA and the NWSTC since its establishment in 1989.

VI. Compliance with Standard Terms

The following forms are included with this proposal:

(1) Item 2: Standard Clauses; (2) Item 8: Nondiscrimination Compliance Statement; and (3) Small Business Preference and Contractor Identification Number. LCLA qualifies as a CBE (Combination Business Enterprise) and a DBE (Disadvantaged Business Enterprise) in the state of Washington. While LCLA is not a California firm, it is licensed to conduct business in the state of California. All forms are included following.

Item 2 (p 1/2)

Agreement No. _____

Exhibit _____

STANDARD CLAUSES – SERVICE & CONSULTANT SERVICE CONTRACTS FOR $5,000 & OVER WITH NONPUBLIC ENTITIES

Workers' Compensation Clause. Contractor affirms that it is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and Contractor affirms that it will comply with such provisions before commencing the performance of the work under this contract.

Claims Dispute Clause. Any claim that Contractor may have regarding the performance of this agreement including, but not limited to, claims for additional compensation or extension of time, shall be submitted to the Executive Director, CALFED Bay-Delta Program, or its designee, within thirty days of its accrual. State and Contractor shall then attempt to negotiate a resolution of such claim and process an amendment to this agreement to implement the terms of any such resolution. (NPWP)

National Labor Relations Board Clause. In accordance with Public Contract Code Section 10296, Contractor declares under penalty of perjury that no more than one final, unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-year period because of Contractor's failure to comply with an order of a federal court which orders Contractor to comply with an order of the National Labor Relations Board.

Nondiscrimination Clause. During the performance of this contract, the recipient,Ccontractor and its subcontractors shall not deny the contract's benefits to any person on the basis of religion, color, ethnic group identification, sex, age, physical or mental disability, nor shall they discriminate unlawfully against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, mental disability, medical condition, marital status, age (over 40), or sex. Contractor shall insure that the evaluation and treatment of employees and applicants for employment are free of such discrimination. Contractor shall comply with the provisions of the Fair Employment and Housing Act (Government Code Section 12900 et seq.), the regulations promulgated thereunder (California Administrative Code, Title 2, Sections 7285.0 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code Sections 11135 - 11139.5), and the regulations or standards adopted by the awarding State agency to implement such article. Contractor or recipient shall permit access by representatives of the Department of Fair Employment and Housing and the awarding State agency upon reasonable notice at any time during the normal business hours, but in no case less than 24 hours' notice, to such of its books, records, accounts, other sources of information and its facilities as said Department or Agency shall require to ascertain compliance with this clause. Recipient, Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. The Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

Statement of Compliance. The Contractor's signature affixed hereon and dated shall constitute a certification under penalty of perjury under the laws of the State of California that the Contractor has, unless exempted, complied with the nondiscrimination program requirements of Government Code Section 12990 and Title 2, California Code of Regulations, Section 8103.

Performance Evaluation. For consulting service agreements, Contractor's performance under this contract will be evaluated after completion. A negative evaluation will be filed with the Department of General Services. Category III

Availability of Funds. Work to be performed under this contract is subject to availability of funds.

Audit Clause. For contracts in excess of $10,000, the contracting parties shall be subject to the examination and audit of the State Auditor for a period of three years after final payment under the contract. (Government Code Section 8546.7).

Payment Retention Clause. Ten percent of any progress payments that may be provided for under this contract shall be withheld per Public Contract Code Sections 10346 and 10379 pending satisfactory completion of all services under the contract.

Reimbursement Clause. If applicable, travel and per diem expenses to be reimbursed under this contract shall be at the same rates the State provides for unrepresented employees in accordance with the provisions of Title 2, Chapter 3, of the California Code of Regulations. Contractor's designated headquarters for the purpose of computing such expenses shall be: Piedmont, CA.

Termination Clause. The State may terminate this contract without cause upon 30 days' advance written notice. The Contractor shall be reimbursed for all reasonable expenses incurred up to the date of termination.

Minority/Women/Disabled Veteran Business Enterprise Participation Requirement Audit Clause. Contractor or vendor agrees that the awarding department or its delegatee will have the right to review, obtain, and copy all records pertaining to performance of the contract. Contractor or vendor agrees to provide the awarding department or its delegatee access to its premises, upon reasonable notice, during normal business hours for the purpose of interviewing employees and inspecting and copying such books, records, accounts, and other material that may be relevant to a matter under investigation for record keeping purposes. Contractor or vendor further agrees to maintain such records for a period of three (3) years after final payment under the contract. Title 2 CCR Section 1896.75.

Priority Hiring Considerations. For contracts in excess of $200,000, the Contractor shall give priority consideration in filling vacancies in positions funded by the contract to qualified recipients of aid under Welfare and Institutions Code Section 11200. (Public Contract Code Section 10353)

Item 2
(p 3/2)

Drug-Free Workplace Certification. By signing this contract, the Contractor or grantee hereby certifies under penalty of perjury under the laws of the State of California that the Contractor or grantee will comply with the requirements of the Drug-Free Workplace Act of 1990 (Government Code Section 8350 et seq.) and will provide a drug-free workplace by taking the following actions:

1. Publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees for violations.

2. Establish a Drug-Free Awareness Program to inform employees about all of the following:

   (a) The dangers of drug abuse in the workplace,
   (b) The person's or organization's policy of maintaining a drug-free workplace,
   (c) Any available counseling, rehabilitation and employee assistance programs, and
   (d) Penalties that may be imposed upon employees for drug abuse violations.

3. Every employee who works on the proposed contract or grant:

   (a) Will receive a copy of the company's drug-free policy statement, and
   (b) Will agree to abide by terms of the company's statement as a condition of employment on the contract or grant.

This contract or grant may be subject to suspension of payments or termination, or both, and the Contractor or grantee may be subject to debarment if the department determines that: (1) the Contractor or grantee has made a false certification, or (2) the Contractor or grantee violates the certification by failing to carry out the requirements noted above.

Antitrust Claims. In submitting a bid to a public purchasing body, the bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder. See Government Code Section 4552.

If an awarding body or public purchasing body received, either through judgment or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery. See Government Code Section 4553.

Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under this part if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action. See Government Code Section 4554.

Americans With Disabilities Act. By signing this contract, Contractor assures the state that it complies with the Americans With Disabilities Act (ADA) of 1990, (42 U.S.C. 12101 et seq.), which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.

Corporate Qualifications To Do Business In California. Contractor must be currently qualified to do business in California as defined by the Revenue & Taxation Code, Section 23101 unless exempted. Both domestic and foreign corporations (those incorporated outside of California) must be in good standing in order to be qualified to do business in California.

Conflict of Interest. Current State Employees: a) No State officer or employee shall engage in any employment, activity or enterprise from which the officer or employee receives compensation or has a financial interest and which is sponsored or funded by any State agency, unless the employment, activity or enterprise is required as a condition of regular State employment. b) No State officer or employee shall contract on his or her own behalf as an independent contractor with any State agency to provide goods or services.

Former State Employees: a) For the two-year period from the date he or she left State employment, no former State officer or employee may enter into a contract in which he or she engaged in any of the negotiations, transactions, planning, arrangements or any part of the decision-making process relevant to the contract while employed in any capacity by any State agency. b) For the twelve-month period from the date he or she left State employment, no former State officer or employee may enter into a contract with any State agency if he or she was employed by that State agency in a policy-making position in the same general subject area as the proposed contract within the twelve-month period prior to his or her leaving State service.

Item 8

NONDISCRIMINATION COMPLIANCE STATEMENT

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.

Katharine M. Lee
OFFICIAL'S NAME

7/14/97
DATE EXECUTED

EXECUTED IN THE COUNTY OF: King (WA)

PROSPECTIVE CONTRACTOR'S SIGNATURE

Corporate Secretary
PROSPECTIVE CONTRACTOR'S TITLE

L.C. Lee & Associates, Inc.
PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

Item 12

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 BUT Not a California firm

*Attach a copy of your certification approval letter.

Attached is CBE letter from State of Washington (Minority, Women's, and Disadvantaged (Economically))

STATE OF WASHINGTON

OFFICE OF MINORITY AND WOMEN'S BUSINESS ENTERPRISES

406 South Water • Post Office Box 41160 • Olympia, Washington 98504-1160
(360) 753-9693 • FAX (360) 586-7079

April 29, 1997

Ms. Katherine Lee
L.C. Lee & Associates, Inc.
221 First Avenue West
Seattle, Washington 98119

RE: Certification Identification Number: D5C3912306

Dear Business Owner:

Congratulations! Your business has been recertified as a Combination Business Enterprise (CBE) for the State program and as a Disadvantaged Business Enterprise (DBE) for the Federal program. Your certification for both will expire one (1) year from the date of this letter. You should receive a recertification notice approximately sixty (60) days prior to your expiration date. If your recertification packet is received by this office **on or before** the expiration date, your firm will remain certified until processing is completed.

L.C. Lee & Associates, Inc. will be included in the Directory of Certified Minority, Women's and Disadvantaged Business Enterprises and will be listed under the following Standard Industrial Classification (SIC) code(s):

Primary - 8748 CONSULTANTS: ENVIRONMENTAL
Others - None

If you plan to expand the firm's functions, the Office must be notified in writing at least thirty calendar days before the effective date of the expansion. Further, it is required that the Office be notified within thirty calendar days of any changes made in the firm's size, ownership, control or operations.

If you have any questions or need assistance, please do not hesitate to contact this office at (360) 753-9697.

Sincerely,

FOR THE DIRECTOR

Vicky Schiantarelli
MWBE Program Specialist

JAM:VS:jw

DO NOT WRITE IN THIS SPAC

1884512

ENDORSED
FILED
In the office of the Secretary of Sta
of the State of California
FEB 28 1994

TONY MILLER
Acting Secretary of State

STATEMENT AND DESIGNATION BY FOREIGN CORPORATION

L.C. LEE & ASSOCIATES, INC.
(Name of Corporation)

a corporation organized and existing under the laws of the State of Washington
(State or Place of Incorporation)

makes the following statements and designation:

1. The address of its principal executive office is 221 First Avenue West, Suite 415, Seattle, WA 98119
(Insert complete address of principal executive office wherever located.)
DO NOT USE POST OFFICE BOX

2. The address of its principal office in the State of California is No office in California
(Insert complete address of principal office in California.)
DO NOT USE POST OFFICE BOX

DESIGNATION OF AGENT FOR SERVICE OF PROCESS WITHIN THE STATE OF CALIFORNIA

3. (Use this paragraph if the process agent is a natural person.)

_____,

a natural person residing in the State of California, whose complete address is

_____

_____
DO NOT USE POST OFFICE BOX

is designated as its agent upon whom process directed to the corporation may be served within the State of California in the manner provided by law.

RETURN COPY

COPY FOR YOUR INFORMATION

(FORM TO BE COMPLETED ON REVERSE SIDE)

I -001851

4. (Use this paragraph if the process agent is a corporation.)
Corporation Service Company, which will do business in California as CSC - Lawyers Incorporating Service, a corporation organized and existing under the laws of Delaware is designated as agent upon whom process directed to the undersigned corporation may be served within the State of California, in the manner provided by law.

NOTE: Before it may be designated by any foreign corporation as its agent for service of process, a corporate agent must comply with Section 1505, California Corporations Code. (See instruction 2.)

5. The undersigned corporation hereby irrevocably consents to service of process directed to it upon the agent designated above, and to service of process on the Secretary of State of the State of California if the agent so designated or the agent's successor is no longer authorized to act or cannot be found at the address given.

L.C. LEE & ASSOCIATES, INC.
(Name of Corporation)

(Signature of Corporate Officer)

Lyndon C. Lee, President
(Typed Name and Title of Officer Signing)

INSTRUCTIONS:

1. There must be annexed to this statement, an original certificate by an authorized public official of the state or place of incorporation of the corporation, to the effect that the corporation making the statement is an existing corporation in good standing in that state or place. IF A NONPROFIT CORPORATION IS TO BE QUALIFIED, the certificate must also indicate that the corporation is a nonstock, nonprofit corporation.

2. No domestic corporation may be designated as agent for service of process unless it has filed with the Secretary of State the certificate provided for by Section 1505, California Corporations Code (CCC), and no foreign corporation may be designated unless it has qualified for the transaction of intrastate business in California and has filed with the Secretary of State of the State of California the certificate provided for by Section 1505, CCC. A domestic or foreign corporation must be currently authorized to engage in business in this State and be in good standing status on the records of the Secretary of State of the State of California, in order to file a certificate pursuant to this section.
NOTE: A CORPORATION CANNOT ACT FOR ITSELF AS AGENT FOR SERVICE OF PROCESS.

3. If a corporation is required to qualify under an assumed name (name other than the true corporate name) pursuant to Section 2106(b), CCC, then in the first line of this statement set out the correct corporate name, followed by "which will do business in California as _____," setting forth the assumed name in the space indicated. The assumed name should not be set out in connection with the corporate name anywhere else in the statement.

4. If the corporation changes its name the corporation must file an Amended Statement by Foreign Corporation. A form may be obtained from the Secretary of State.

I-001852

State of California

OFFICE OF THE SECRETARY OF STATE

1884512

CERTIFICATE OF QUALIFICATION

I, TONY MILLER, Acting Secretary of State of the State of California, hereby certify:

That on the 28th *day of* February, *19*94,

L.C. LEE & ASSOCIATES, INC.

_____, *a corporation*

organized and existing under the laws of the state of Washington,

complied with the requirements of California law in effect on that date for the purpose of qualifying to transact intrastate business in the State of California and that as of said date said corporation became and now is qualified and authorized to transact intrastate business in the State of California, subject, however, to any licensing requirements otherwise imposed by the laws of this State.

THE GREAT SEAL OF THE STATE OF CALIFORNIA
EUREKA

IN WITNESS WHEREOF, I execute this certificate and affix the Great Seal of the State of California this 11th *day of* March 1994

Tony Miller

Acting Secretary of State

COPY FOR YOUR INFORMATION

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State of California

OFFICE OF THE SECRETARY OF STATE

1884512

I, TONY MILLER, Acting Secretary of State of the State of California, hereby certify:

That the annexed transcript has been compared with the record of file in this office, of which it purports to be a copy, and that same is full, true and correct.

IN WITNESS WHEREOF,
I execute this certificate and affix the Great Seal of the State of California MAR 2 3 1994

Tony Miller
Acting Secretary of State

COPY FOR YOU
INFORMATION

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