I. EXECUTIVE SUMMARY

A. PROJECT TITLE/APPLICANT NAME

Ecological Conditions Observation System (ECOS) Monitoring Program for Bay-Delta Environmental Restoration Projects/The Center for Natural Lands Management.

B. PROJECT DESCRIPTION AND PRIMARY BIOLOGICAL/ECOLOGICAL OBJECTIVES

The Center for Natural Lands Management's (Center) proposed project is the development of performance measures and indicators to determine ecological and biological success. The project is to develop a monitoring program for the Bay-Delta CALFED ecosystem restoration projects. As part of the Center's Ecological Conditions Observation System (ECOS), the monitoring program will be a systematic way to monitor adaptive management for terrestrial habitats in wetlands, including riparian, floodplain and watershed systems.

The Center believes that it is important for CALFED to establish monitoring protocols for restoration activities at the earliest possible time to provide existing conditions data, restoration projects' effectiveness and routine analysis of results for the adaptive management strategy. We propose to develop an institutional and system-wide monitoring program for the CALFED Ecosystem Restoration Plan program for adaptive management.

C. PROJECT APPROACH/TASK SCHEDULE

The Center will develop the following approaches to achieve the ECOS project goals: (1) form a multiple-disciplinary Core Group (blue-ribbon panel of experts) from the relevant disciplines to define the issues, develop the monitoring priorities, determine scale, candidate indicators, variables, habitat stressors, and guide the development of the program; (2) develop a monitoring methodology in coordination with academic, public agency and private party participants thereby encouraging universal applicability combining the best available scientific knowledge and management practices; (3) create a pilot program using this standardized methodology to collect the temporal data and spatial data (GIS, GPS, remote sensing,); (4) identify pilot sites and participants and establish parameters for testing ECOS in the field; and (5) facilitate the analysis and dissemination of the data to stakeholders and permitting agencies responsible for mitigation decisions.

We have identified the CALFED ecosystem restoration projects as an ECOS's pilot project for demonstrating an effective monitoring program, integrating the existing stakeholder and scientific review process established by CALFED for items 1 and 2 above. The schedule will be developed in consultation with CALFED staff to meet ERPP, stakeholder and scientific review and restoration projects overall schedules. See Attachment A for a generalized schedule.

D. JUSTIFICATION FOR PROJECT AND FUNDING BY CALFED

CALFED describes adaptive management as the method of adjusting strategies to accomplish the Ecosystem Restoration Plan (ERPP) goals through ongoing measurement of results. To implement adaptive management, CALFED is establishing standards to meet the ERPP objectives, and adapt future management actions according to what is learned. "Adaptive management relies upon the identification of indicators of ecosystem health, comprehensive monitoring of indicators to measure improvement over time, focused research, and phasing of actions (ERPP, 1997).

Since alternative management strategies are proposed to be part of the CALFED adaptive management program, information needs to be collected to measure those events that can change habitat conditions set for restoration and management. This information must be used to establish management and research priorities and effectively incorporate the results.

We propose to apply ECOS to the CALFED Bay-Delta ecosystem restoration projects because of the organization of the CALFED process, national implications, and initial support from some of the stakeholders participating in the CALFED process and participation from private foundations interested in providing matching funding. We believe the benefits of broader, long-term participation in monitoring and adaptive management will be of significant benefit to ecosystem restoration as a whole. ECOS is an innovative and integrative systematic long-term, regional monitoring approach replacing current inadequate short-term and intermittent monitoring.

E. BUDGET COSTS AND THIRD PARTY IMPACTS

No significant third party impacts are anticipated as a result of this project. The total ECOS program costs is $1,239,592 of which the Center has received $95,842; the request for the Category III grant is $1,143,750.

F. APPLICANT QUALIFICATIONS

The Center is a nonprofit 501(c)3 organization dedicated to ensuring the preservation of native species and their habitats through active, professional stewardship. The Center's mission is also to develop, advance and promote the science of conservation land management for the preservation of biological diversity. The Center is developing the Ecological Conditions Observation System (ECOS) project in furtherance of its mission. Traditionally conservation efforts have been justifiably dependent upon preservation of lands through acquisition and considerable energy has been devoted to planning the most effective way to do this. However, a similar emphasis must be placed on measuring the results of preservation, the effects of management, the contribution of coordinated resource management and, in short, implementing adaptive management.

G. MONITORING AND DATA EVALUATION

Our proposal is a monitoring and data evaluation project.

H. LOCAL SUPPORT/COORDINATION WITH OTHER PROGRAMS/COMPATIBILITY WITH CALFED OBJECTIVES

This proposal has significant support from state and federal resource agencies, the Biological Resources Division of the U.S.G.S., the NCEAS, The Nature Conservancy, numerous land trusts and conservation organizations, university researchers, the development community, city and county agencies and others. The planning for and coordination of ECOS includes cooperative efforts with local monitoring programs such as the Natural Community Conservation Planning Program (NCCP), University Natural Reserve System and the National Park Service. CALFED seeks to include in its Category III restoration projects monitoring, assessment and reporting. The ECOS pilot project as proposed establishes a systematic approach for comparing methodology for measuring performance and indicators to determine biological/ecological success.

ECOLOGICAL CONDITIONS OBSERVATION SYSTEM (ECOS) MONITORING PROGRAM FOR BAY-DELTA ENVIRONMENTAL RESTORATION PROJECTS

Applicant:
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Applicant Information:
certified nonprofit organization
exempt tax status
Federal ID#: 68-9233573

Technical/Financial contact person:
Sherry Teresa

III. PROJECT DESCRIPTION

A. PROJECT DESCRIPTION AND APPROACH

The Center for Natural Lands Management's (Center) proposed project is the development of performance measures and indicators to determine ecological and biological success. The project is to develop a monitoring program for Bay-Delta CALFED ecosystem restoration projects. As part of the Center's Ecological Conditions Observation System (ECOS), the monitoring program will be a systematic way to monitor adaptive management for terrestrial habitats in wetlands, including riparian, floodplain and watershed systems.

A Tool for Adaptive Management. CALFED describes adaptive management as the method of adjusting strategies to accomplish the Ecosystem Restoration Program Plan (ERPP) goals through ongoing measurement of results. To implement adaptive management, CALFED is establishing standards to meet the ERPP objectives, and adapt future management actions according to what is learned. "Adaptive management relies upon the identification of indicators of ecosystem health, comprehensive monitoring of indicators to measure improvement over time, research, and phasing of actions (ERPP, 1997).

Since alternative management strategies are proposed to be part of the CALFED adaptive management program, information needs to be collected to measure those events that can change habitat conditions set for restoration and management. This information must be used to establish management and research priorities and effectively incorporate the results. The following are the features and intended approach for our proposal:

Features and Approach. ECOS will develop environmental monitoring program protocols for gathering information necessary to understand the condition of the habitats and the effects of human activity in order to adapt management strategies to reach the goal of maintaining ecosystem health. The data is derived from existing data, monitoring resource management tasks, event observations, and research. The data is collected, analyzed and communicated through hardware and software in order to be generally available and critically reviewed.

ECOS is a means of communication between disciplines by creating a system of definitions, data handling protocol and analysis. ECOS's objective is to develop a standardized data collection, data storage, and communication including Geographic Information Systems (GIS) that will monitor restoration techniques and increase the effectiveness of adaptive management efforts. By linking a set of generally accepted restoration methods with databases and GIS, the proposed project will create an integrated system for implementing adaptive management and making restoration management decisions. ECOS provides a user-friendly, consistent, and coherent means to evaluate the restoration activity on a regional level. ECOS will have:

- application to a wide variety of different ecosystem types;
- consistent habitat and species level measures of success and failure;
- a practicable means for resource managers with a variety of resource management priorities

and budgets to collect, manage, combine and interpret data;

- the ability to show and predict results of management actions on an ecosystem-wide scale.

Program Phases. ECOS has two parts: 1) data definition collection to determine the kinds of information to be collected and the manner in which it will be collected; and 2) data manipulation or the manner of storing, communicating, analyzing, and visualizing the information.

Species and Habitat Monitoring. In general, the purpose of a monitoring regime is to ascertain the conditions of species and habitats. This is the foundation upon which the determination of restoration objectives and techniques for rehabilitating species and habitats must be based. CALFED has initiated this foundation by a series of tasks, such as describing the ecological stressors, identifying species exhibiting the effects of stressors, associating stressors with habitat function including rivers, floodplain, wetlands, riparian, upland and upper watershed habitat. The *Ecological Restoration Plan, Volume One* (ERPP) describes the vision of the restoration effort and specific restoration programs. The Center's proposed project will utilize the CALFED ERPP implementation and adaptive management strategy including the indicators as the features or attributes of the ecosystem that are expected to change over time in response to implementation of the restoration projects. These indicators will be the monitoring regimes whose data can be compared and evaluated for specific and as will as broad scale ecological health.

Habitat monitoring data may often be combined with incident or "event observation" (including human activity) and management strategy information for a better understanding of changes in the resource. The results of the observations will be entered into databases with a GIS component, which then allow their display and analysis as tables or maps. It is intended that CALFED would make such data accessible through server computers on the Internet.

Impact and Event Observation. Capturing real-time and on-the-ground observations in a systematic way will be one of the primary strengths of this program. For instance, knowing over time the effect of land use activities helps to rank steps needed in preventing additional habitat degradation. Maintaining observations on riparian corridors and associated floodplain helps to better define wildlife movement corridors. Observations may be coordinated with other resource management tasks. By compiling such information in databases and GIS, which provide the ability to analyze and display, significant improvements in riparian corridor management will occur.

Ecosystem Applications. An application is a defined, agreed upon method of collecting, storing and analyzing data to answer important questions. Monitoring applications for the ECOS must be capable of addressing issues at the ecosystem or watershed scale as well as specific sites. For example, an application may revolve around how to control invasive exotic plants or maintain water quality. Other examples are limiting invasions of pest species, motorized access, and how to integrate the ecological changes created by storm events into a sustainable ecological landscape. CALFED recognizes that because the most important management issues are often regional, applications to address them will be most successful when all stakeholders are involved in the process. The Center's proposal incorporates and emphasizes the design of the monitoring program to: involve stakeholders

in formulating the question to be addressed; rank research needs; design management recommendations, and support implementation. The results of specific applications will be contained in the database and GIS to facilitate spatial analysis, reporting and communication.

Management Activities. Resource management tasks are relevant to the Bay-Delta ecosystem restoration success and cost of sustaining resources. Using the Center's Property Analysis Record (PAR) database software, we quantify each restoration management task in terms of its objective, components, labor hours, equipment, skill level, schedule and cost. Having this base of information allows quantitative evaluations of management options, strategies, and priorities. Once quantified, management activities may be more rationally related to biological success and failure fostering adaptive management options based on a systematic framework. Incorporating restoration management tasks into the system enables benefit-cost comparisons to determine those activities that have the greatest benefit to the habitat. Further, analysis such as these will help conservation planners develop biologically sound and cost efficient rational adaptive management strategies.

The technologies employed to manipulate, manage, analyze and communicate data include databases and GIS, Global Positioning System (GPS) units, digitizer, plotters, and communication equipment. We are cognizant of constraints that exist in using these technologies. Since we expect ECOS to encourage a wide array of land managers to adopt this system and contribute and use data, the most functional and available equipment must be utilized for priority measurements. In addition, the communication system must include a central server to extend the range of users.

B. LOCATION AND/OR GEOGRAPHIC BOUNDARIES OF PROJECT

The area to be served by the proposed project will be the geographic scope of the Category III RFP diagram and referenced study area with emphasis on terrestrial land including wetlands and riparian habitat.

C. EXPECTED BENEFITS

The Center's ECOS proposal applies Bay-Delta ecosystem-wide with emphasis on monitoring restoration activities for riparian, wetlands and watershed restoration and management. In effect, the primary benefit is the ecosystem itself because ecosystem health will be addressed by monitoring restoration projects for adaptive management. Because the emphasis of the ECOS program is to monitor restoration activities on terrestrial elements including riparian, wetland, and floodplain habitat, the secondary benefits would be the aquatic resources which have a direct relationship to these habitats.

Third party benefits include: landowners who benefit from restoration projects for floodplain management; flood managers who benefit from watershed and flood management assessment providing data to support these alternative methods; resource managers responsible for adaptive management decisions; responsible agencies acting in their capacity as regulators or managers; and interested parties who benefit from an effective restoration management program.

Table 1 summarizes the stressor categories and restoration actions identified by CALFED that

Table 1
STRESSOR CATEGORIES ADDRESSED BY ECOS

Stressor Categories	Stressor Subcategories	Description of Stressors	Restoration Action	Example Locations *Assume system -wide.*
Alteration of Flows and other Effects of Water Management	Migration Barriers and Straying	Migration barriers caused by insufficient flow over shallow areas, delayed flooding of marshlands	habitat restoration	specific sites identified by CALFED: Antelope Creek
Floodplain and Marsh plain Changes	Physical isolation of floodplain or Marsh plain	Habitat fragmentation, loss of seasonal and tidal wetlands due to levee construction, or other land use changes	Restoration of floodplain habitat may involve reconnection of the floodplain to the river channel: establish setback levees to create shallow water habitat and other priority habitat types; restoration of seasonal and tidal wetlands.	Delta, Cosumnes, Mokelumne, Calaveras, Yolo Bypass, agricultural lands in Delta; North Bay
			Restore tidal wetlands	Delta, North Bay, Suisun Marsh
			Restore Shaded Riverine Aquatic (SRA) habitat	
			Conserve and manage floodplain habitat	
	Land use changes in the floodplain or Marsh plain	Urbanization, agriculture, grazing	Alterations in land management practices: increase areas of agricultural lands to provide foraging and nesting habitat for migratory birds;	
Channel Form Changes	Alteration of channel form	Loss of shallow water habitat, channel deepening, lack of floodplain, degradation of instream habitat conditions, loss of lotic conditions.	Restore natural physical processes within a managed system: channel restoration; restore wetland/slough complexes and implementing revegetation or other actions where necessary; restore floodplain or Marsh plain areas and convert land to tidal wetlands	Merced, Tuolumne, Stanislaus, Sacramento River Mainstem, North Bay

Table 1
STRESSOR CATEGORIES ADDRESSED BY ECOS

Stressor Categories	Stressor Subcategories	Description of Stressors	Restoration Action	Example Locations *Assume system -wide.*
	Channel aggrad.		Watershed plans and management; best management practices	
	Loss of existing riparian zone or lack of regeneration potential	Loss of food supply, loss of SRA habitat, loss of channel complexity	Riparian restoration including revegetation, post-flood management for riparian growth,	
Water Quality	Increased Contaminants	Acute or chronic toxicity caused by urban runoff, agricultural runoff, mine drainage, refineries, wastewater treatment plants, and other point or non-point pollution sources.	Watershed-wide solutions	
Land Use	Grazing	Loss of riparian habitat, increased erosion, decreased water quality	Watershed planning and management	
	Urbanization	Urbanization of the watershed that leads to loss of riparian habitat, habitat fragmentation, wetland drainage, and other impacts.	Monitoring plans for mitigation sites and enhancement measures	
	Forestry and agricultural practices	Forestry and agricultural practices in the watershed that lead to conversion of floodplain to ag use, subsidence, increased erosion, loss of habitat complexity, and water quality degradation.	Watershed plans and management and BMPs	

include habitat management. These listed actions would be the focus of the ECOS program for developing consistent monitoring for adaptive management.

D. BACKGROUND AND BIOLOGICAL/TECHNICAL JUSTIFICATION

The need for a systematic way for monitoring restoration effects for terrestrial habitat including wetlands, riparian, floodplain and watershed systems has been acknowledged in numerous discussions in the CALFED process. Additionally, the *Adaptive Monitoring Program, Vol. III*, will begin to develop the need for a systematic sound adaptive management regime with clear, unambiguous standards for attainment of ecological health and an integrity of scientific review. The Center's ECOS proposal is to provide an accessible, consistent and coherent means to evaluate the success of ecosystem restoration projects and adaptive management. The Center believes that objective evaluation of restoration project performance should be an integral part of every project so that we can learn from our experience

Steps Already Taken to Develop ECOS. The Center has taken several steps to create this system. We have developed several relational database systems to record and analyze information for resource management. These include the property database, PAR-generated management task database, the observation database, and the transect (monitoring) database. These systems may act as a springboard for the work to be done in creating ECOS. In addition, existing individual monitoring strategies are being collected and evaluated.

The Center received a grant to create an ECOS GIS program from the Conservation Technology Support Program, a consortium of firms that supports the use of GIS: Hewlett-Packard, Apple Computer, Environmental Systems Research Institute and the Smithsonian. Other grants have purchased a Global Positioning System.

Table 2 (Section IV) lists consultants involved in the conceptualization of ECOS.

E. PROPOSED SCOPE OF WORK

Ensuing Tasks: Our overall plan is to develop the ECOS monitoring program for CALFED consistent with its Adaptive Management program, and in collaboration with the CALFED staff, technical working groups and scientific review panel. Our proposal is to focus the ECOS program on the ecosystem restoration projects including those funded by Category III. Existing databases and GIS systems will be surveyed to ensure consistency and communication in so far as possible. The following is a brief explanation of the steps necessary to develop individual components of ECOS.

Monitoring Protocols. The Center assumes CALFED adaptive management standards will be established. If not, the Center would convene a monitoring protocol conference which will be composed of preeminent scientists in the realms of conservation biology, ecosystem and population ecology, and biostatistics. In either case, the goal is to establish a consensus for realistic monitoring criteria to assess the effectiveness of restoration projects and strategies for adaptive management. The results of this process will be prepared as a set of guidelines or protocols confirmed by scientists for ecosystem restoration managers.

Observation Protocols. Observation protocols used by the Center will be reviewed in conjunction with the monitoring protocols, to assess their applicability to ecosystem management problems. We will also be surveying observation protocols used by conservation managers and land managers in general and dealing with the problems of duplication, definitions, inconsistency and lack of comparability. Observation categories can be standardized and should include vegetation, animal, human and natural occurrences at a minimum. Finally, the observation protocol will be integrated into the overall relational database.

Ecosystem Applications. Elements of the monitoring protocol include the extent of stakeholder involvement, definition of the question, data required and forms of presentation and communication materials. A critical question for ECOS is the extent to which existing data and data collection methods can be incorporated into the system. Existing data and data collection methods may be focused on biological elements with local or regionally limited distribution. Identifying comparable data sets and incorporating existing databases into the system will enable ECOS to reduce the current level of duplication and avoid the collection of non-comparable data. Applications will be developed with assistance from the Technology Consultant to design methods of stakeholder involvement to address these issues.

Management Tasks. Management task databases will be integrated into the overall system (see PAR). Restoration land managers need to be able to measure the relative benefit of management methods and specific tasks, which will help to guide and rank management activities.

Sources of Database Information. We will evaluate the sources of data to be used by this system which will be dependent upon availability, accuracy, adaptability to the rest of the system, and cost in comparison to other sources; other sources include GIS data sets, remote sensing and GPS-developed data. These resources will be reviewed for their potential to fill potential gaps in information and to augment or simplify field collected data. When the data assessment is completed, we can proceed to building the database and GIS systems that maintain and communicate the best and most compatible information.

Database Design . The guiding principle of database design is compatible databases. The information must be accessible to all stakeholders. Products developed from the databases will be traceable to the original data. As in other steps of this process, these features are intended to encourage communication, comparison and analysis of information, reduce conflict among stakeholders and facilitate changes in resource management practices that will benefit species and habitats.

GIS Design . The structure of the GIS and related spatial databases should be flexible to encourage analysis as well as communication. As mentioned regarding databases, this system will be designed with reference to other systems in general use including CALFED and CVPIA programs. Of particular interest is the National Spatial Data Infrastructure being designed at the federal level by the Federal Geographic Data Committee. Local level components are being produced by URISA, the Urban and Regional Information Systems Association.

Additional tasks in customizing a GIS include development of naming conventions, data definitions and protocols (meta data), accuracy standards, data groupings, and geographical systems to be used. Meta data is of great importance in biological monitoring systems where we are trying to measure habitat changes over time. In monitoring habitat, altering the method of measurement can easily overwhelm actual year to year changes in the habitat itself.

The GIS will be designed to generate reports and maps needed by resource managers. The structure will be adaptable to meet future needs. Products required for analysis and products needed for communication will be clearly defined.

Communication Systems . The materials in ECOS will be available as structured databases and GIS, and guidelines. This step will determine the level of programming that is appropriate to facilitate use by resource managers. In addition, ECOS is expected to facilitate CALFED's incorporation of the monitoring program on its server computer for Internet access to data and maps.

F. MONITORING AND DATA EVALUATION

Since our proposal is a monitoring and data evaluation project, see sections above for relevant information to address this section.

G. IMPLEMENTABILITY

The monitoring program must be consistent with the CALFED Adaptive Management Program as part of the Bay-Delta EIS/EIR. Proposed partners are Biological Resource Division of the USGS, US Fish and Wildlife Service, the California Resources Agency, the University of California, CA Department of Fish and Game, the Natural Communities Conservation Plan program Core Group managers, the Nature Conservancy, and others.

The Center's team, in addition to staff and Board members, includes Dr. Dennis Murphy of the Center for Conservation Biology and the University of Nevada at Reno, Dr. Peter Stine of the Biological Resources Division of the U.S.G.S., Dr. Frank Davis of U.C. Santa Barbara and the National Center for Ecological Analysis and Synthesis (NCEAS), Dr. Michael Hamilton of the University Natural Reserve System. and Dr. Don Erman of the U.C. Davis Centers for Water and Wildland Resources.

IV. COSTS AND SCHEDULE

The total ECOS program costs is $1,239,592 of which the Center has received $95,842; the request for the Category II grant is $1,143,750. Attachment A itemizes the phases, tasks and schedule milestones for the proposed project. The budget and schedule will be refined to develop weekly and monthly tasks and milestones after consultation with CALFED staff.

V. APPLICATION QUALIFICATIONS

The Center and its staff are highly qualified to successfully implement this program.
Founded in 1990 and incorporated as a section 501(c)(3) nonprofit tax exempt organization, the Center's main mission is to protect biological resources through long-term stewardship of mitigation and conservation lands. The Center currently manages approximately 41,000 acres of land throughout California from Arcata to San Diego. In January 1997, the Center entered into a Memorandum of Understanding with The Nature Conservancy to transition land management responsibilities at several Conservancy sites to the Center. To date, over 20,000 thousand acres of TNC lands have been transferred for management.

The Center has developed a unique software program and database, the Property Analysis Record (PAR), to accurately predict short- and long-term stewardship activities and costs, and to assist land managers in planning stewardship projects in perpetuity. The Center has presented the PAR seminar to hundreds of public agency and private parties throughout the United States. The Center also provides services developing and implementing Habitat Conservation Programs (HCPs), conservation banking programs, preparing habitat management plans and cost analysis reports. We participated in the beginning phases and continue to be involved in the Natural Communities Conservation Planning process in Southern California.

The Center will be responsible for overall program coordination and implementation. Expert sub-consultants will be contracted to provide water quality, hydrology, appraisal and GIS production services. **Table 2** identifies the specific individual responsibilities to be filled by the program staff.

Table 2
Ecological Conditions Observation System (ECOS) Monitoring Program Team Members for Bay-Delta Environmental Restoration Projects

Program Title	Organization	Individual	Responsibilities
Executive Officer	Center	Sherry Teresa	General program oversight and advising
Program Manager	Center	Elizabeth Patterson, AICP	Lead team in implementing project schedule and meeting deliverables in a timely manner. Administer sub-contracts.
Project Coordinator	To be determined	To be determined	Assistant to the Project Manager. Administer contracts.
Monitoring Coordinator	Center for Conservation Biology/University of Nevada, Reno	Dennis Murphy	Coordinating monitoring protocols.
Database Consultant	To be determined	To be determined	Coordinate database structure and field names with special purpose databases such as the Native Plant Society database and the CDFG Natural Diversity Data Base so that data recorded in ECOS will be readily usable in these other formats.

Program Title	Organization	Individual	Responsibilities
GIS Consultant	To be determined	To be determined	Coordinating monitoring objectives with GIS capabilities.
Software Programmer	To be determined	To be determined	Developing software programs to integrate monitoring protocols and data observations with data input and communications.
Communications Consultant	To be determined	To be determined	Working with team members, develop methodology to establishing effective communication for data gathering and information dispersal.
Preserve Managers	To be determined	To be determined	Provide on-the-ground experience and test monitoring program.
Clerical Support	Center	To be determined	Editing project materials, dispersing information to team members, assisting Project Manger, coordinator and team members in meeting deadlines.
Technical Advisors	University of California, Santa Barbara and the National Science Foundation	Dr. Frank Davis	Provide guidance and input during all program phases.
	U.C. Davis	Dr. Don Erman	
	U.S.G.S, Biological survey	Peter Stein	
	Humboldt State University/CO. State University	Barry Noon	
Core Group	To be determined	To be determined	Peer review committee

B. CENTER'S STAFF BIOGRAPHIES

Sherry Teresa: Sherry Teresa formed the Center in 1990 and has 16 years experience in evaluating and protecting biological resources, including five years with the California Department of Fish Game. Ms. Teresa is skilled in the application of the California Environmental Quality Act (CEQA), National Environmental Protection Act (NEPA), Endangered Species Act (ESA), and the Clean Water Act Section 404 permit process. Her active involvement in regional conservation planning is demonstrated through participation in Habitat Conservation Plans (HCPs) and the Natural Communities Conservation Planning (NCCP) programs in southern California. Ms. Teresa was instrumental in developing the Center's PAR software and has performed dozens of PAR analyses on properties statewide. She has also written and worked extensively on habitat preservation for the Swainson's hawk. Ms. Teresa completed a Bachelor's degree in Zoology at Brigham Young University and a Master's degree in Biogeography and Ecosystems Analysis at UCLA. Her biological, regulatory, and project management experience make her well suited as Executive Officer

of the ECOS Project. The success of the Center and the wide use of the PAR software application demonstrate that she has the vision and the skills to see projects through from their inception to their successful implementation.

Brenda C. Pace: Ms. Pace is a specialist in real estate, land economics, and finance. Prior to her affiliation with the Center, Ms. Pace operated Pace Research Company, a consulting firm established in 1976. Earlier associations were with development firms and banking institutions. Ms. Pace holds a Bachelor's degree from the University of Oregon and graduated with a Master's degree in Regional Economics from UCLA. Her work at the Center has concentrated on establishment of systems for reviewing and analyzing mitigation properties. This work includes developing computer programs that incorporate the variety of requirements and activities necessary to maintain biological resources. It also includes the mechanisms for converting the costs of restoration and long-term maintenance into figures useful for the establishment of special districts or endowments.

Elizabeth Patterson: Ms. Patterson AICP, is a Center board member. She has extensive experience in environmental and natural resources policy, regulations, planning and management. She served as program director for aquatic resources policy of the California State Lands Commission, has worked with several environmental organizations in various capacities, and has experience before and within the California State Legislature. Ms. Patterson served as staff for the Senate Subcommittee on River Protection and Restoration to develop a legislative program. Ms. Patterson has served as CEQA environmental officer and Environmental Specialist (IV) for CEQA/NEPA review. She has more than 15 years experience working with local, regional, state and federal agencies and non-governmental organizations.

References

Steve McCormick, The Nature Conservancy (415)777-0487

Dr. Frank Davis, U.C. Santa Barbara, Dept. of Geography (805) 893-3438

Dr. Don Erman, U.C. Davis, Director of the Center for Water and Wildland Resources, (916) 752-8070

Dave Harlow, U.S. Fish and Wildlife Service, (916) 653-9767

VI. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

The Center will comply with standard terms and conditions associated with a CALFED grant award.

Attachment A

ECOS Program Budget and Schedule

I-005620

Attachment A
ECOS Development
Schedule and Budget
Center for Natural Lands Management

	Position	Match	Needed	Steps Completed Hours	Labor	Expense	First Period-Six Months Hours	Labor	Expense	Second Period-Six Months Hours	Labor	Expense	Third Period-Six Months Hours	Labor	Expense	Fourth Period-Six Months Hours	Labor	Expense
INVESTED																		
CTSP Award		18,959				18,959												
GPS Unit		9,865				9,865												
GPS Training	Preserve Mgrs.	1,065		24	840	225												
Training	Project Coordinator	6,670		120	4,320	2,350												
Invested Subtotal		36,559		144	5,160	31,399												
PHASE I-Defining the Data to be Recorded																		
Equipment																		
Computer Hardward			18,000						18,000									
Software			6,500						6,500									
Digitizer			8,900						8,900									
Plotter			7,500						7,500									
Monitoring Protocol																		
Invite and convene Core Group, determine monitoring priorities, develop guidelines.	Executive Officer		4,575				85	3,825	750									
Coordinate/participate	Project Manager		4,975				65	4,225	750									
Coordinate/Participate	Project Coordinator		5,070				120	4,320	750									
Lead for Core Group	Monitoring Coordinator		31,950				480	31,200	750									
Coordinate Support	Clerical		3,260				120	2,760	500									
Conference Support	NCEAS	18,000							18,000									
Conference for 12 Participants	Core Group Particpants	15,000					200	15,000										
Applications & Definitions																		
Prepare standards for research function, population, range, extrapolition what-ifs. Use a restoration area as a pilot test site	Executive Officer		4,075				35	1,575	2,500									
	Project Manager		5,750				50	3,250	2,500									
	Project Coordinator		8,980				180	6,480	2,500									
	Database Consultant		11,400				120	11,400										
	Population Ecologist Consult.		25,000						25,000									
	Project Coordinator		9,760				220	7,920	1,840									
	Preserve Mgrs.		13,700				320	11,200	2,500									
	Monitoring Coordinator		*16,800*				220	14,300	2,500									
	Clerical		2,455				85	1,955	500									
Observation Database																		
Define baseline requirements.	Executive Officer		3,300				40	1,800	1,500									
Refine and integrate database to complement other protocols	*Project Manager*		7,200				60	5,700	1,500									
	Project Coordinator		9,420				220	7,920	1,500									
	Database Consultant		25,250				250	23,750	1,500									
	Monitoring Coordinator		9,420				220	7,920	1,500									
	Preserve Mgrs.		8,800				180	6,300	2,500									
	Technicicans		50,000						50,000									

Management Tasks													
Integrate with other database.	Executive Officer		4,400		80	3,600	800						
Develop task-characteristic-result relationships and what-if functions.	Project Manager		2,750		30	1,950	800						
	Monitoring Coordinator		4,700		60	3,900	800						
	Database Consultant		11,400		120	11,400							
	Project Coordinator		5,120		120	4,320	800						
Coordination													
GIS Coordination	GIS Consultant		22,400		220	20,900	1,500						
Communications Coordination	Comm. Consultant		12,900		120	11,400	1,500						
	Project Coordinator		9,700		200	7,200	2,500						
	Monitoring Coordinator		15,500		200	13,000	2,500						
Phase I Subtotal		33,000	390,910		4,220	237,470	170,940						
PHASE II-Defining the System													
Data Sources													
Teale, CNPS Database,	GIS Consultant		32,900					320	30,400	2,500			
Natural Heritage Database,	Project Coordinator		12,640					300	10,800	1,840			
Remote Sensing.	Preserve Mgrs.		4,200					120	4,200				
	Data Purchases		25,000							25,000			
	Monitoring Coordinator							80	5,200	1,850			
Database Design	Executive Officer		1,350					30	1,350				
Setting databases, relationships, definitions.	Project Manager		2,600					40	2,600				
	Core Group Participants		9,000					120	9,000				
	Database Consultant		21,000					200	19,000	2,000			
	Project Coordinator		10,640					240	8,640	2,000			
	Monitoring Coordinator		18,750					250	16,250	2,500			
	Preserve Mgrs.		6,700					120	4,200	2,500			
Monitoring Protocol													
Preparing the guidelines in concert with Core Group Participants for draft publication.	Executive Officer		4,100					80	3,600	500			
	Project Coordinator							300	10,800	1,500			
	Monitoring Coordinator		43,750					650	42,250	1,500			
	Core Group Participants	9,000	14,200					120	9,000	5,200			
	Clerical		5,750					250	5,750				
	Printing		3,000							3,000			
	Distribution		650							650			

Coordination															
	Executive Officer		2,300			40	1,800	500							
	Project Manager		4,400			60	3,900	500							
	GIS Consultant		11,400			120	11,400								
	Comm. Consultant		11,400			120	11,400								
	Project Coordinator		10,140			240	8,640	1,500							
	Monitoring Coordinator		17,100			240	15,600	1,500							
Phase II Subtotal		9,000	272,970			2,210	119,490	21,350							
PHASE III-Implementation and Review															
Testing															
Field test monitoring and enter data into system. Import management task data.	Database Consultant		30,000						220	20,900	1,500	80	7,600		
	Project Coordinator		19,560						240	8,640	1,500	220	7,920	1,500	
	Preserve Mgrs.		20,400						220	7,700	2,500	220	7,700	2,500	
Test and review reporting	Monitoring Coordinator		42,600						300	19,500	2,500	280	18,200	2,400	
	Clerical		21,560						360	8,280		360	8,280	5,000	
	Technicians		50,000								50,000				
Reporting															
Write ECOS documentation for publication and distribution.	Executive Officer		2,250						50	2,250					
	Project Manager								65	4,225					
Consider standalone database using *ARCINFO* software.	Project Coordinator		12,960						360	12,960					
	Software Programmer		38,500						350	38,500					
	Clerical		2,760						120	2,760					
	Printing		5,000								5,000				
	Distribution		650								650				
Prepare Draft Guidelines															
Prepare GIS and Communications Proposal Specifications	GIS Consultant		9,600									80	7,600	2,000	
	Comm. Consultant		9,700									60	5,700	4,000	
	Project Coordinator		2,880									80	2,880		
	Monitoring Coordinator		5,200									80	5,200		
	Software Programmer		24,200									220	24,200		
Phase III Subtotal		0	273,620						2,285	125,715	63,650	1,460	71,080	17,400	
Total Cost		$78,559	$937,500												
Contingency @ 10%			93,750												
Administrative Costs at 22%*		17,283	206,250												
Total ECOS Cost		$95,842	$1,143,750												

Combined Match and Funding Requests $1,239,592

* Administrative costs included facilities, equipment, and other relevant overhead. Benefits are included in salaries for employees.

Attachment B

Center for Natural Lands Management
Description of the Property Analysis Record (PAR)

I-005624

The Property Analysis Record: Paying for Perpetuity

Every parcel preserved for the benefit of biological resources requires management involving some level of expense. If not planned in advance, management in perpetuity can escalate into a tremendous capital requirement. The ideal, of course, is to establish a funding source that provides enough income to cover annual stewardship costs and includes a buffer to offset inflation.

How Much Money Is Enough?

The basic yardstick for deciding how much is needed is the average annual cost of management. Unfortunately, there is no easy answer for determining this, and managers around the country are struggling to develop formulas for calculating these costs. The costs vary widely with the nature of the land, the type of protection (owned or under easement), the purpose of conservation (endangered species, visitor services, education), and further varies year by year.

The Property Analysis Record

The Center for Natural Lands Management has developed a new tool, the Property Analysis Record (PAR). The PAR is a computerized database methodology that is extremely effective in helping land managers calculate the costs of land management for a specific project. The PAR helps analyze the characteristics and needs of the property from which management requirements are derived. It helps pinpoint management tasks and estimates their costs as well as the necessary administrative costs to provide the full cost of managing any property. The PAR generates a concise report which serves as a well-substantiated basis for long-term funding including endowments, special district fees, and other sources.

PAR Seminars

The Center presents the Property Analysis Record (PAR) methodology to land trusts, governmental agencies, environmental consultants, project proponents, and other interested parties throughout the state of California through the seminar, "Planning Sustainable Conservation Projects." PAR software and a user's manual are provided to participants, and software is upgraded as new versions are introduced.

The PAR Seminar enables participants to:

- Understand the need for long term stewardship;
- Readily determine and justify the long-term activities and financial requirements of a conservation project;
- Develop biologically and economically sustainable projects;
- Identify a complete array of management responsibilities;
- Provide an understanding of the financial components and financing mechanisms for stewardship;
- Provide an accurate tool to standardize management and costing methodologies;
- Increase communication and partnerships to produce cost-effective conservation projects.

As a part of the PAR seminar, participants are taught short-term and long-term planning concepts; management techniques; methods of estimating tasks and budgets; methods of establishing financing, including endowments; and utilizing fees and special districts to fund the stewardship necessary to preserve the habitat in perpetuity.

The Future

The Society for Ecological Restoration (SER), based in Madison, Wisconsin has recognized the value of the PAR methodology and has arranged to sponsor seminars across the United States beginning in January 1997. Previous seminars have been jointly funded by the National Fish and Wildlife Foundation, the Dean Witter Foundation, ARCO Foundation, and the David and Lucile Packard Foundation.

Although the Center's primary focus has been on protecting California's species, habitats across the country will benefit from what we've been able to apply here in California. Each state faces their own challenges with conservation efforts. And because the PAR is a flexible tool, managers from other states will now learn the methodology and be able to apply that knowledge to their individual circumstances.

The PAR software will be modified over the coming months to become even more useful to ongoing conservation management. In these new versions, the long-term budgets of the PAR can be modified using the basic techniques of the PAR to provide short-term budgets, work-schedules by individual, and the fund budgets needed by investment managers. Over the long-term, other management techniques such as GIS will be integrated into the PAR making the system more universally adaptable.

Synopsis

There are many reasons for using the PAR. The initial reason is to anticipate and prepare for the costs of long-term management of the habitat. The ultimate reason is to create better, more sustainable conservation projects. The PAR embodies the recognition that to be sustainable ecologically, a conservation project must also be sustainable financially. Without planning in perpetuity, many of our conservation projects may only be temporary. The PAR helps overcome the difficulties of planning in perpetuity in a straight-forward and user-friendly manner.