F1-222

I. Executive Summary

a. Ecological Systems and Natural Process Restoration Along the Sacramento River: The Sacramento River Environmental GIS Library / Charles W. Nelson

b. Project Description and Objectives

This proposal seeks funding to begin consolidating all of the existing GIS information currently available on the Sacramento River watershed into a Sacramento River Environmental GIS Library. It will bring together digital information from all of the agencies currently collecting data on the Sacramento River and house copies at California State University, Chico's Geographical Information Center (Center). The project includes converting thematic coverages into a format that can be overlaid and used interchangeably.

While the Sacramento River Environmental GIS Library (Library) proposal stands alone, it is also linked to an overall package of CALFED proposals. The Library will be used to develop a collection of GIS coverages that can be used by agencies, organizations, and conservancies to aid decision making strategies along the Sacramento River and major tributary streams.

c. Approach/Tasks/Schedule

We plan to complete this project in three stages. The first stage (Task 1) involves equipment purchase and data gathering. Task 2 involves installation of the data onto a dedicated server that others can easily access. The Center is connected to the CSU- Net, have high speed server capability, and have a functioning web site that will be used for downloading archived GIS information. The final stage in this process (Task 3) involves providing access, including making the information secure and developing restricted access, where needed. Task 3 also includes the development of a Sacramento River web site.

d. Justification for the Project and Funding by CalFed

This project complements with and will interface with current Sacramento River strategy which seeks to protect the river by trying to understand river processes. A GIS provides a key spatial component in this evaluation process. Agencies and organizations can use this GIS information to prioritize areas for possible purchase, restoration or establishment of conservation easements.

In order to set priorities and rank sites, it is necessary to collect information from all those agencies who generate GIS information. While many agencies have mapping efforts that satisfy their local agency's needs, no one agency has inventoried or attempted to bring this information under one roof. Also, there is no agency currently housing GIS information that is set up to deal with the public. An institutional setting like a CSU, Chico is a good place to archive Library information so that it can be accessible.

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DWR WAREHOUSE

d. Budget Costs

Project Phase and Tasks	Direct Labor Hours	Direct Salary and Benefits	Overhead (Indirect)	Service Contracts	Materials/ Acquis. Contracts	Misc. Other Direct Costs	Project phase and task
Task 1-Data Gathering	2864	45,360.00	11,652.50	0.00	0.00	1,250.00	58,262.50
Task 2-Installation	1323	26,770.00	9,105.00	0.00	9,500.00	150.00	45,525.00
Task 3 -Maintenance	1563	26,601.00	9,187.75	0.00	10,000.00	150.00	45,938.75
TOTAL COST							149,726.25

f. Applicant Qualifications

The Geographical Information Center (Center) at California State University, Chico, was established in 1988 to introduce digital mapping technology to the region and to provide valuable on-the-job training and employment opportunities for our students. Our primary areas of expertise include cartography, remote sensing, and geographical information systems (GIS).

The Center has been involved in a series of mapping projects for various northern California federal, state and local resource agencies. We are actively involved in three watershed conservancy projects (Butte, Deer and Battle Creeks) and will be players in another four proposals. We have developed partnerships with and currently share GIS information between our institution and state, federal, local and non-profit agencies.

g. Monitoring and Data Evaluation

Developing a GIS library involves bringing together information from many diverse sources and at many different map scales. Information is often hard to find and comes in a variety of computer formats. Metadata (data about data) is an important part of any GIS mapping process and will be important in developing the Library's database.

The key to the future of developing a digital map library lies in the initial setup. Data evaluation comes when the system begins operation. Monitoring will be done both by soliciting suggestions but also by monitoring actual users. Since we see the Library as an ongoing venture, monitoring and data evaluation is crucial for the success of this undertaking.

h. Local Support/Coordination with other Programs/Compatibility with CalFed Object.

Digital GIS information is housed on many different state, federal, and local agency servers. Everyone has their own internal use but no one has tried to consolidate information under one roof. I was approached on two separate occasions and by two separate entities (California Department of Water Resources and The Nature Conservancy) to submit this proposal. I have since gathered support from an additional two agencies (the California Department of Fish and Game and the U.S. Fish and Wildlife Service) who say that they need access to multi-agency GIS information on the Sacramento River.

This proposal fits into several other proposals in this CalFed funding cycle and will be used by agencies to help in decisions regarding prioritization and selection of sites for possible purchase, restoration , and establishment of conservation easement along the river.

II. Title Page

a. **Project Title**: Ecological Systems and Natural Process Restoration Along the Sacramento River: The Sacramento River Environmental GIS Library

b. **Applicant**: Geographical Information Center/ Charles W. Nelson, Director, California State University, Chico, Chico, CA 95929-0425, (916)898-5969, email:cnelson@gic.csuchico.edu, contact person and project director.

c. **Type of Organization**: Auxiliary organization of California State University, Chico as provided for in California Educational Code Title 5 / Non-profit.

d. **Tax ID**: 68-0386518.

e. **Technical and financial contact**: Jeff Wright, Director, Office of Sponsored Projects, California State University, Chico, Chico, CA 95929-0870, (916)898-5700, Fax 898-6804, email: jwright@oavax.csuchico.edu.

f. **Participants/Collaborators in Implementation**: California Department of Water Resources-Northern District (Stacey Cepello), Fish and Game-Region 1 (Jim Nelson), U.S. Fish and Wildlife Service-Sacramento office (Kelly Amy), The Nature Conservancy

g. **RFP Project Group Type** - Other Services

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I-004884

III. Project Description

a. Project Description and Approach

This proposal seeks funding to begin consolidating all of the existing GIS information currently available on the Sacramento River watershed into a Sacramento River Environmental GIS Library. It will bring together digital information from all of the agencies currently collecting data on the Sacramento River and house copies at California State University, Chico's Geographical Information Center (Center). The project includes converting thematic coverages into a common format that can be overlaid and used interchangeably. Material for this library will come from a variety of GIS coverages now existing on federal, state, and local area network servers.

We plan to complete the project in three stages. Task 1 includes data gathering and purchasing a computer with adequate storage that will act as a server for the digital library. Data gathering involves gathering digital GIS information from agencies and organizations that we have partnerships with as well as establishing new relationships with others doing digital mapping. Task 2 includes the installation of GIS data onto the newly acquired server and making it accessible. We are connected to the CSU- Net system, have server capability, and currently have a functioning web site. Task 3 includes maintenance of the system. Maintenance of a digital library includes keeping information up-to-date, and continually adding to the system. Task 3 also includes providing ways to distribute the information and includes the development of a Sacramento River web site.

Bringing together information on any watershed as vast as the Sacramento River involves knowing the key players. Since California State University, Chico also functions as a state agency, the Center already has established a series of partnerships with key resource agencies including the California Departments of Water Resources (DWR), Fish and Game, and Forestry and Fire Protection (CDF), the U.S. Bureau of Reclamation, and the Natural Resources Conservation Service (NRCS). We also provide contract mapping to The Nature Conservancy. Therefore, we have a "jump start" in bringing such a task together.

While the Sacramento River Environmental GIS Library proposal stands alone, it is linked to an overall package of CALFED proposals that are interrelated in their goals. Titled "Ecological Systems and Natural Process Restoration Along the Sacramento River", it includes projects submitted by the California Department of Water Resources, the Wildlife Conservation Board, the U.S. Fish and Wildlife Service, The Nature Conservancy, and the Point Reyes Bird Observatory. Spatially developed GIS information showing information like geology, soils, precipitation, riparian vegetation, flood zones, meander belts, and land use (a partial list) are important components that help aid decision makers in developing programs along the Sacramento River and its tributaries.

The Sacramento River Environmental GIS Library (Library) is the first phase of an ongoing process as is any library. New maps are developed by agencies every day. Others become obsolete and need revision. Therefore, this project will function like the hub of a wheel, with the spokes pointing to agencies that both provide and use spatial information.

b. Geographical boundaries

The boundaries for this proposal include the Sacramento River watershed and extend from the river's source on Mt. Eddy to the Delta (Sacramento urban area). It includes all major tributary streams where information is available.

c. Expected benefits

While many agencies have mapping efforts that satisfy their local agency's needs, no one agency has inventoried or attempted to bring this resource information under one roof. Also, there is no agency currently housing GIS information that is set up to deal with the public. An institutional setting like a university is a good place to archive spatial information so that it can be accessible for both project use but also for research purposes.

This project complements with and will interface with the current Sacramento River strategy which seeks to protect the river by trying to understand river processes. Agencies like the Department of Fish and Game, the U.S. Fish and Wildlife Service and The Nature Conservancy plan to use GIS information to prioritize areas for possible purchase, restoration or establishment of conservation easements.

In order to set priorities and rank sites, it is necessary to collect information from those agencies who generate this information. A GIS provides a key spatial component in this evaluation process. Few federal, state, or local agencies are set up to deal with nor do they have the personnel to provide this level of support.

d. Background and technical justification

In 1986, the California State Legislature passed Senate Bill 1086, which called for a management plan for the Sacramento River. An important part of any comprehensive plan for the Sacramento River is a shared information base which includes maps. The Sacramento River Geographical Information System was developed by the California Department of Water Resources (DWR) to assist the Advisory Council with locally based decision making, helping both scientists and lay people in understanding and analyzing land use and vegetation patterns, flooding, erosion, and channel dynamics along the river. The Sacramento River GIS currently includes around 40 thematic GIS layers but only covers areas along the mainstem of the river.

A partial list of other agencies that have collected GIS information on the river includes the California Department of Fish and Game (Central Valley Wetlands and Riparian GIS, California Natural Diversity Data Base), U.S. Fish and Wildlife Service (National Wetlands Inventory maps), the Federal Emergency Management Agency (FEMA flood maps) and the California Department of Forestry and Fire Protection (Integrated Hardwood maps, Sustainable Landscapes maps). The GIC has also been actively involved mapping and digitizing large scale riparian vegetation maps (1"=400') of the Sacramento River (Keswick Dam to Sacramento) using S.B.1086, U.S. Bureau of Reclamation and CalFed 1996 funding.

In addition, there is a wealth of information available from other agencies from local government to watershed conservancies that could add to this data base. For instance, Butte County has a parcel based GIS which has a wealth of planning information like land use and land ownership. In fact, these maps were one of many

different GIS data sets used by the Center to develop the Butte Creek Watershed Conservancy base maps.

Many local, state, federal, and private organizations are involved with riparian management along the river and could benefit from this proposal. Local agencies including counties, cities, resource conservation, flood control, irrigation, reclamation and levee maintenance districts have jurisdictions along the Sacramento River. State agencies that have jurisdiction along the river include the Wildlife Conservation Board, the Fish and Game Commission, the Reclamation Board, the Department of Parks and Recreation, the Department of Boating and Waterways, the California Water Commission, the Office of Emergency Services, the Department of Forestry and Fire Protection, the Regional Water Quality Control Board, and the State Lands Commission. Each agency has a charge and many have a list of programs and areas that they administer along the Sacramento River.

At the federal level, the U.S. Bureau of Reclamation has been involved with construction and maintenance of a variety of federal water development and reclamation projects including projects along the Sacramento River. Other programs include the Bureau of Land Management (BLM is working to acquire 19,000 aces of river land north of Red Bluff), the U.S. Geological Survey, the U.S. Army Corps of Engineers, the Natural Resource Conservation Service (formerly the Soil Conservation Service), the U.S. Forest Service, the National Marine Fisheries Service, the Environmental Protection Agency, and the Federal Emergency Management Agency.

In addition, there are a series of private organizations that are becoming involved in river issues. For instance, The Nature Conservancy (TNC) has been involve with their Sacramento River Project, a riparian protection, restoration, and sustainable agriculture project focusing on sites along the main stem of the river between Red Bluff and Colusa. TNC has used large scale riparian maps developed by the Center to plan restoration activities on the river. They will be submitting proposals in this funding cycle that will make extensive use of GIS information developed in this proposal to help them in locating potential sites for purchase and restoration within the Sacramento River meanderbelt.

While all of these agencies could benefit from a spatial GIS library, there is no unified force consolidating this information. For instance, development of a restoration program requires bringing together information from many different agencies, i.e., ownership (county), flooding (DWR), levees (DWR), riparian systems (DWR, GIC, USFWS), land use (county), and soils (NRCS).

Wouldn't it be nice to have direct access to all of these thematic layers in one central location and on overlays that register? Wouldn't it be nice to know something about the information available at a particular location, including dates that the data was collected, who collected it, scales, and data limitations. Is there an index of aerial photography for the Sacramento River? This proposal seeks to initiate the establishment of a central point for accessing this type of information.

e. Proposed scope of work

We plan to complete this project in three stages. The first stage (Task 1) involves equipment purchase and data gathering. Before we begin any effort, it is important to

know what is out there. Fortunately, because the Center is a functioning GIS lab with over 10 years of experience working on the river we have already begun this task and are familiar with most of the GIS information currently available.

We plan to spend a large portion of our time on the Internet and meeting with public and private agencies who do resource GIS work collecting digital information. This will be the most difficult task as it includes a inventorying a variety of GIS projects with a myriad of scales and formats that must be evaluated for possible incorporation into large spatial database on the river. There will be numerous data conversion problems bringing data from one coverage into another system.

Task 2 involves installation of the data onto a dedicated server that others can easily access. The installation a GIS of this magnitude involves adequate hardware, a good, high speed network, and talented and qualified personnel. We have a GIS Systems Analyst who has a graduate degree in GIS and over ten years of experience installing networks and network security. The Center has a data storage backbone that can currently house up to 35 gigabytes of digital information. This will double in size under the current proposal. We are hard-wire connected to the CSU- Net, have server capability, and currently have a functioning web site established for downloading project information.

The final stage in this process (Task 3) involves providing access. To do this, it is important to have an adequate backbone installed and in place. Accessibility has to include making the information secure and developing restricted access, where needed. Task 3 also includes providing ways to distribute the information and deciding who should have access privileges and who will not.

Accessibility will be provided via a server for downloading capability. The site will be secure and have adequate password protection. For those agencies with limited network access, we have the ability to cut CD-ROM's that can be used with GIS software.

This proposal includes the development of a Sacramento River web site. Many of our employees and more talented students have a strong cartographic background. We plan to use this talent to develop several educational maps on the river from the data that we collect.

f. Monitoring and data evaluation

Developing a GIS library involves bringing together information from many diverse sources and from many different scales. Information is hard to find and comes in a variety of computer formats. Few agencies have adequate indexes and many have systems which require an experienced systems analyst to make the data usable.

One of the key components to the Library will be the development of a extensive and complete metadata file. Metadata (data about data) is an important part of any GIS mapping process and will be important to help evaluate the usefulness of a regional database. Matadata tells the user where the data came from and how old it is. It discusses the file size, scales, projections, and computer format. This kind of information can save the GIS analyst hours of time in downloading large files with useless information.

Data evaluation will come with the use of the system when it is installed. We plan to solicit suggestions as the library develops. Monitoring will be done both by

soliciting suggestions but also by monitoring actual users. Since we see the Library as an ongoing venture, monitoring and data evaluation is crucial for the success of this undertaking.

The key to the future of this undertaking lies in the success in setting up this Library. Therefore, we plan to carefully and continually monitor our effectiveness at each stage.

g. Implementation

While this proposal has no actual paying partners, we have at least four agencies who will contribute to our efforts by supplying data and in-kind efforts to help develop the Library. The Department of Water Resource Northern District office (Cepello) has committed $100,000 of their 1997-98 SR-GIS efforts into developing GIS information to add to this effort. The Department of Fish and Game (DFG) - Region 1 (J.R. Nelson) will be supplying data and will be using data that we collect in their Sacramento River implementation effort to evaluate and prioritize restoration sites. DFG has received a $60,000 grant from the U.S. Fish and Wildlife Service to develop this implementation program.

Finally, the Library proposal is part of a group of CalFed proposals in this funding cycle called "Ecological Systems and Natural Process Restoration Along the Sacramento River" which includes projects submitted by the California Department of Water Resources (Upper Sacramento River Fisheries and Habitat Management Program…), the Wildlife Conservation Board (Floodplain Acquisition Project), the U.S. Fish and Wildlife Service (Active Restoration of Riparian Forests), The Nature Conservancy (A Meanderbelt Implementation Project), and the Point Reyes Bird Observatory (Use of Bird Populations to Conserve, Monitor, and Restore Riverine Habitat. All of these proposals include topics that need good reliable map data.

We see no major problems obtaining GIS data except in agencies where data is available for sale. Also, if information is not available for direct downloading (files too large), we will provide an annotated bibliography including metadata file explaining how to obtain. Where feasible, we will provide examples of maps as well.

IV. Costs and Schedule to Implement Proposed Project

Project Phase and Tasks	Direct Labor Hours	Direct Salary and Benefits	Overhead (Indirect)	Service Contracts	Materials/ Acquis. Contracts	Misc. Other Direct Costs	Project phase and task
Task 1-Data Gathering	2864	45,360.00	11,652.50	0.00	0.00	1,250.00	58,262.50
Task 2-Installation	1323	26,770.00	9,105.00	0.00	9,500.00	150.00	45,525.00
Task 3 -Maintenance	1563	26,601.00	9,187.75	0.00	10,000.00	150.00	45,938.75
TOTAL COST							149,726.25

b. Schedule Milestones

This project is scheduled to be a two year effort and involves three tasks. All of the tasks overlap. Equipment and software purchases will begin immediately after the project contract is signed. This includes purchasing a dedicated server, setting it up for use on CSU-NET. Task 1 also includes data gathering which is scheduled to take approximately six months. A certain amount of data will be available immediately. Other information will take searching and may involve data conversion.

When adequate data has been assembled, evaluated and/or converted, implementation can begin. Task 2 (installation) is scheduled to start in four to six months. Installation also includes developing security measures in cooperation with participating agencies. We will make GIS data accessible as it is installed onto the server. We estimate that some level of access will be available within six months of project startup.

Maintenance (Task 3) is ongoing and will never end as long as the Library is up and running. Included in this proposal is funding to support the Library through 1999 (this proposal has a two year cycle). Alternative sources will be developed to enable continuance beyond this date. The web site will be developed within two months after the system goes online.

Project payments will be billed as tasks (or portions of tasks) are completed. This will be necessary as all three tasks overlap. We will provide monthly progress reports to monitor progress.

c. Third Party Impacts

No third party impacts are contemplated.

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V. **Applicant qualifications**

The Geographical Information Center (Center) at California State University, Chico, was established in 1988 to introduce digital mapping technology to the Northern California and to provide valuable on-the-job training and employment opportunities for our students. The Center's mission is both academic and service oriented. While the training and eventual placement of students is the key aspect and reason for the Center, the development has resulted in a renewed University commitment to strengthen ties to the public and private sector of the North State.

Our primary areas of expertise include cartography, remote sensing, and geographical information systems (GIS). Contracts are administered through the University Foundation, providing both direct contracts and interagency agreements. The Center offers ESRI-certified instruction in ArcView.

Capabilities -

Applied Technology	Education
Geographic Information Systems (GIS)[1]	Manuals
Map Compilation and Production	Demonstration Projects
Computer Cartography/ Map Digitizing	User Training
Global Positioning Systems (GPS)	Workshops
Aerial Photo Interpretation	Seminars
Satellite Image Processing	Consultations

[1]ESRI products (ARCINFO, ArcView, ArcCAD software).

Facilities and equipment

The Center is housed in the College of Behavioral and Social Sciences, located in Butte Hall on the California State University, Chico campus. Our lab software runs on UNIX, Windows, Windows NT, and Macintosh operating systems. Our central campus location gives us direct access to numerous academic resources.

Personnel

We have 15 personnel including a Director, a GIS Systems Analyst, an Office Manager, three GIS Analysts, four GIS Assistants, and 5 graduate and undergraduate Interns.

Relevant Center contracts

The development of a GIS database is a large task that requires the cooperation of all of the agencies that currently provide digital map data on the Sacramento River. California State University, Chico Center has been an active player in riparian mapping since 1978 when we first mapped the Sacramento Valley for the Department of Water Resources as part of the Central Valley Riparian Mapping Project. Our latest effort began in 1991 using A.B. 1086 funds to develop a large scale (1"=400') base map and GIS for southern Shasta County under guidance of the Upper Sacramento River Stream Corridor Protection Program. Funding continued in 1993 and has now been completed through Shasta, Tehama, and Butte Counties. Continued funding was secured from 1996-97 CalFed - Category III funding to continue mapping to the City of Sacramento.

The Center has been involved in a series of other mapping projects for various northern California federal, state and local resource agencies. We are actively involved in three watershed conservancy projects (Butte, Deer and Battle Creeks) and will be players in another four proposals. We have developed partnerships with and share GIS information between our institution and state, federal and non-profit agencies. Data products developed from these efforts will provide additional new data for this GIS.

Enclosed is a partial list of recent GIS contracts related to resources mapping. All use ARCINFO or ArcView software.

Sacramento River Stream Corridor Protection Program - Phases 1-4. Mapping riparian vegetation along the Sacramento River and its Sacramento Valley tributaries from Keswick Dam to the City of Sacramento, for the CalFed Bay-Delta Program, California Department of Water Resources, the U.S. Bureau of Reclamation and the California Department of Fish and Game. 1991-present.

Butte, Deer, and Battle Creek Conservancy Mapping. Developing supporting base maps and a GIS to support these three conservancy efforts. 1996-present.

Tehama County Vernal Pool Mapping. Mapping and classifying vernal pool complexes in Tehama County for the California Department of Fish and Game. June,1997.

Cantara Watershed Mapping. Mapping vegetation in the Upper Sacramento River watershed from Shasta Lake to Mt. Eddy for the California Department of Fish and Game and the Cantara Trustee Council. June, 1997.

Northern Sacramento Valley Sustainable Landscapes Project. Using digitized growth projections and hardwood GIS coverages to assess potential hardwood loss in five northern California counties for the California Department of Forestry and Fire Protection. 1995-present.

Southern Shasta County Vernal Pool Mapping. Adding a vernal pool map layer to existing riparian coverage and base in order to set up a vernal pool mitigation bank for the California Department of Fish and Game.

Sacramento River Cantara Spill Vegetation Mapping. Mapping vegetation and vegetation damage along the spill section of the Upper Sacramento River for the California Department of Fish and Game. 1992-1995.

References

Stacey Cepello
California Department of Water Resources
Northern District
2440 Main Street, Red Bluff, CA 96980
(916) 529-7352

James R. Nelson,
Natural Heritage Supervisor
California Dept. of Fish and Game-Reg.1
601 Locust Street, Redding, CA 96001
(916) 225-2315

IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

July 24, 1997

Charles W. Nelson, Director
Geographic Information Center
California State University, Chico
Chico, California 95929-0425

Dear Mr. Nelson:

The U.S. Fish and Wildlife Service (Service) supports the Californian State University-Chico proposal to CalFed for consolidating and maintaining the Geographical Information System (GIS) data on the Sacramento River watershed. This facility would be valuable to our agency in regards to our ongoing duties involving the river and is of special interest for a current project funded by the Central Valley Project (CVP). This current project is looking at development of conservation criteria that would prioritize and target areas along the river for restoration potential. Access to a GIS center would aid in completion of this project. The Service is continually conducting investigations and assessments of water projects, habitat management, and other projects that impact the Sacramento River. The availability of this data would reduce time and cost in searching and acquiring coverages needed to make biological evaluations of proposed projects. The Chico State proposal would also provide a catalog or library of what information is available and would reduce duplication of efforts.

We appreciate your intentions and efforts in proposing this project and wish you success. Thank you for the opportunity to offer our support.

Sincerely,

David L. Harlow

for Wayne S. White
Field Supervisor
U.S Department of the
Interior Coordinator

The Nature Conservancy

California Regional Office
201 Mission Street, 4th Floor
San Francisco, California 94105

TEL 415 777-0487
FAX 415 777-0244 & 415 777-0772

International Headquarters
Arlington, Virginia
TEL 703 841-5300

July 25, 1997

Lester Snow, Executive Director
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, California 95814

Dear Mr. Snow:

The Nature Conservancy would like to express strong support for the Category III proposal being submitted by California State University at Chico entitled "**Sacramento River Environmental GIS and Mapping Support**". The proposed project will develop a Geographic Information System to map biological and physical attributes on the Sacramento River; these elements will be key in determining appropriate acquisition and restoration targets along the River.

This proposal is one of a host being submitted by a variety of partners for Category III funding during this funding cycle. These elements support a vision for ecosystem protection and restoration which is clearly larger than the sum of their parts. These complementary proposals are:

- Ecosystem and Natural Process Restoration on the Sacramento River: Floodplain Acquisition Project (for acquisition and management of an estimated 1,500 acres), submitted by the Wildlife Conservation Board, Fish and Wildlife Service, and The Nature Conservancy;
- Ecosystem and Natural Process Restoration on the Sacramento River: Active Restoration of Riparian Forest (for direct planting of 300 floodprone acres), submitted by the above partners;
- Sacramento River Environmental GIS and Mapping Support, submitted by California State University at Chico;
- Ecosystem and Natural Process Restoration on the Sacramento River: The Use of Bird Populations to Monitor, Conserve, and Restore Riverine Habitats, submitted by Point Reyes Bird Observatory; and
- Ecosystem and Natural Process Restoration on the Sacramento River: A Meanderbelt Implementation Project, submitted by The Nature Conservancy.
- Upper Sacramento River Fisheries and Riparian Habitat Management Program (SB 1086) Implementation: Watershed Management Planning and Coordination," submitted by DWR.

We appreciate your consideration of this proposal in light of the overall ecosystem effort, and look forward to working together to create a healthy Sacramento River ecosystem.

Regards,

Steve McCormick

Steve McCormick
Regional Director

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STATE OF CALIFORNIA

NONDISCRIMINATION COMPLIANCE STATEMENT

STD. 19 (REV. 3-90) PMC

COMPANY NAME

CSU, Chico Research Foundation

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

CERTIFICATION

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

OFFICIAL'S NAME

Jeff Wright

DATE EXECUTED

7/24/97

EXECUTED IN THE COUNTY OF

Butte

PROSPECTIVE CONTRACTOR'S SIGNATURE

Jeff Wright

PROSPECTIVE CONTRACTOR'S TITLE

Director, Office of Sponsored Programs

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

CSU, Chico Research Foundation

CONTRACTING

Recent GIC clients

Cities of Chico, Paradise, and Red Bluff

Counties of Butte and Trinity

Administration and Associated Students at California State University, Chico

California Department of Water Resources

California Department of Fish and Game

California Department of Parks and Recreation

California Department of Forestry and Fire Protection

California Energy Commission

Natural Resources Conservation Service

U.S. Bureau of Reclamation

FOR INFORMATION

Contracts are administered through the University Foundation, California State University, Chico. Both standard and interagency agreements are available. For further information, please contact

Robert J. Bakke, Associate Director and Manager for State Programs
Office of Sponsored Projects
California State University, Chico
PHONE: 916-898-5700
FAX: 916 898-6804
E-MAIL: rbakke@oavax.csuchico.edu

-or-

Charles W. Nelson, Director, or **Christine Crown,** Lab Manager and Instructor, Geographical Information Center, Department of Geography and Planning, California State University, Chico, Chico, CA 95929-0425
PHONE: 916-898-5969
E-MAIL: cnelson@oavax.csuchico.edu
OR ccrown@oavax.csuchico.edu
FAX: 916-898-6781

The Geographical Information Center

The Geographical Information Center (GIC) at California State University, Chico was established in 1988 to introduce digital mapping technology to the region and to provide valuable on-the-job training and employment opportunities for students.

California State University, Chico

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The Center's mission is both academic and service oriented. While the training and eventual placement of students is the key aspect and reason for the Center, the development of the GIC has resulted in a renewed University commitment to strengthen ties to the public and private sector of the North State.

Our major focus is geographical information systems (GIS) technology. We work primarily with ESRI GIS software (Arc/Info, ArcView, ArcCAD) and offer the ESRI-developed *Introduction to ArcView* course.

Major clients include federal, state, and local government agencies. We specialize in developing turnkey systems from data integration through GIS implementation. The GIC offers service agreements that provide either on-going maintenance or a final product.

SERVICES AVAILABLE

Applications
- Map Compilation and Production
- Map Digitizing
- Computer Cartography
- Geographic Information Systems (GIS)
- Aerial Photo Interpretation
- Satellite Image Processing
- Global Positioning Systems (GPS)

Education
- Manuals
- Demonstration Projects
- User Training
- Workshops
- Seminars

FACILITIES AND EQUIPMENT

The GIC is housed in the College of Behavioral and Social Sciences, located in Butte Hall on the California State University, Chico campus. We are a state-of-the-art digital mapping facility. Our University affiliation gives the GIC direct access to numerous academic and campus resources.

The GIC has its own anonymous FTP site for convenient transfer of digital information via the Internet. We operate on UNIX, DOS (Windows), NT, and Macintosh platforms.

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