F1-229

Proposal: Riparian Bird and Habitat Monitoring

DWR WAREHOUSE

I. Executive summary

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a. Title and applicant

Title: Ecosystem and natural process restoration on the Sacramento River: Monitoring, conserving and restoring riparian bird populations and their habitats.

Applicant: The Point Reyes Bird Observatory, Stinson Beach, CA 94970

b. Project description and biological objectives

PRBO is seeking $204,742 dollars over a 3-year period to collect the scientific data needed to assess the recovery of the Sacramento River ecosystem. We propose to implement on-the-ground data collection that quantify the efficacy of CALFED and The Nature Conservancy restoration programs. By comparing population parameters with landscape features and habitat variables we will be able to measure ecosystem health and predict ecosystem viability over time.

The proposed project will use information on bird populations in relation to habitat characteristics to provide a sound scientific basis to guide restoration, acquisition, and adaptive management of the flora and fauna Sacramento River watershed, focusing on riparian habitat. Our approach will be to biologically assess sites for their acquisition and restoration potential. By combining on-the-ground data collection (of both birds and vegetation attributes) with a Geographical Information System (GIS) we will develop predictive models that can guide conservation efforts. Furthermore, standardized monitoring data will help evaluate the efficacy of restoration practices on wildlife populations. By monitoring demographic parameters of bird populations we will be able to identify restoration and management practices (e.g. fragmented forests) that negatively impact bird populations. We will then using monitoring data to guide adaptive management techniques that maintain the natural processes supporting healthy, biologically diverse, riparian ecosystems.

PRBO has been conducting intensive investigations of riparian bird systems in the Central Valley and its tributaries since 1991, in partnership with federal and state agencies and other non-governmental organizations. The proposed project provides a means to expand and link information with restoration and management activities across agencies. Results of this project will guide adaptive management practices that will benefit the maximum number of wildlife species.

c. Approach

Monitoring of primary and secondary demographic parameters of riparian birds will be conducted at 29 sites in the lower/middle Sacramento River and select tributaries. Information on habitat, vegetation, and landscape will also be collected, integrated, and used to develop predictive GIS-based models.

d. Justification and background

In the past century the Sacramento River Valley, one of the largest riverine ecosystems in the Western North America, has lost over 95% of its riparian habitat (Gaines 1977). The widespread decline of birds in the Sacramento river watershed reflects the deterioration of the entire ecosystems and its wildlife populations. It is therefore not surprising that the majority of

Sacramento River's riparian bird species are considered threaten, endangered, or species of management concern.

Birds have long been recognized as indicators of healthy and diverse ecosystems (Terborgh 1989, Temple and Weins 1987, Martin 1995). They are relatively common and easy to survey and monitor (Ralph et al. 1993). They are taxonomically diverse with numerous species distributing themselves along definable micro-habitat gradients and because of rapid metabolic rates are highly susceptible to environmental stressors (Verner 1985, Martin 1995).

PRBO initiated studies of riparian bird communities in the upper Sacramento River in 1991 and in the lower and middle Sacramento River in 1993, conducting this latter work for The Nature Conservancy and the US Fish & Wildlife Service Sacramento Wildlife Refuge. This project seeks to build on that foundation and develop predictive models to assess riparian habitat quality for birds and other wildlife.

e. Budget Costs and Third Party Impacts
We seek $204,742 from CALFED for the three-year project. Cost-sharing (in the amount of $204,696) is available from grants from the Hewlett Foundation and Packard Foundation (already awarded), and from a pending grant proposal to be submitted to the National Fish & Wildlife Foundation. We anticipate no negative third party impacts as a result of this project.

f. Applicant qualifications
PRBO, a non-profit research organization dedicated to advancing conservation through science, is well-qualified to carry out this project. It has been studying population processes in birds and their relationship to habitat characteristics for over 30 years. It has been carrying out studies of riparian birds in the Sacramento River watershed since 1991. The two principal scientists on this project, Geoffrey Geupel and Dr. Nadav Nur, have many years of experience studying riparian birds in their natural habitats. Dr. Nur also holds a M.S. in Biostatistics and is well-qualified in population modeling and analysis. The principal scientists will collaborate with Prof. James Quinn (Information Center for the Environment, UC Davis).

g. Monitoring and data evaluation
Data collected will be compatible with other projects conducted in the Sacramento River watershed (most riparian bird studies have been conducted by the Point Reyes Bird Observatory itself), and elsewhere in California and the West, through the Riparian Habitat Joint Venture and Partners in Flight.

h. Local support/coordination; compatibility with CALFED objectives
This project is compatible with all CALFED objectives. The foundation for this project was established in 1993; since then PRBO has been working closely with management agencies and landholders to carry out biological surveys of riparian birds and their habitat in the lower Sacramento River. The project is coordinated with other agencies and organizations interested in conserving and restoring riparian habitat through the Riparian Habitat Joint Venture.

II. Title page

A. Title: Ecosystem and natural process restoration on the Sacramento River: Monitoring, conserving and restoring riparian bird populations and their habitats.

B. Applicant Organization:
Point Reyes Bird Observatory, Stinson Beach, CA 94970

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C. Type of Organization: California non-profit organization

D. Tax Identification Number: Tax Id # 94-1594250

E. Technical and Financial Contact Person: Same as above.

F. Collaborators: This project involves close collaboration with two groups: The Nature Conservancy, and The University of California - Davis (Information Center for the Environment); the applicant is already collaborating with both on related work. Additional collaborators on this project include: US Bureau of Land Management, US Bureau of Reclamation, California Dept. of Fish and Game, CA Department of Water Resources, California State University - Chico, The California Resources Agency, Sacramento Audubon Society, The Nature Conservancy, National Audubon Society, National Fish and Wildlife Foundation, USDA Forest Service, US Fish and Wildlife Service, and Corning High School,

G. RFP Project Group Type: Group 3, Services

III. Project Description
a. Project description and approach

Description: The proposed project will use information on bird populations in relation to habitat characteristics to provide a sound scientific basis to guide restoration, acquisition, and adaptive management of the flora and fauna Sacramento River watershed, focusing on riparian habitat. Our approach will be to biologically assess sites for their acquisition and restoration potential. By combining on-the-ground data collection (of both birds and vegetation attributes) with a Geographical Information System (GIS) we will develop predictive models that can guide conservation efforts. Furthermore, standardized monitoring data will help evaluate the efficacy of restoration practices on wildlife populations. By monitoring demographic parameters of bird populations we will be able to identify restoration and management practices (e.g. fragmented forests) that negatively impact bird populations. We will then using monitoring data to guide adaptive management techniques that maintain the natural processes supporting healthy, biologically diverse, riparian ecosystems.

PRBO is requesting $204,742 to accomplish the following objectives:

1) Implement standardized, on-the-ground monitoring protocols that will identify riparian features, such as vegetation type and landscape characteristics, required to maintain viable bird populations and healthy, riparian systems. The information gathered will provide the bases for adaptive management.
2) Develop and evaluate predictive habitat models, based on vegetation, habitat and landscape characteristics using GIS, to identify and prioritize sites of exceptional value for acquisition and restoration.
3) Develop restoration and management guidelines that incorporate flooding and other natural processes critical to the maintenance of riparian ecosystems.
4) Develop recommendations for adaptive management of riparian ecosystems that include management of adjacent agricultural lands, particularly orchards and other crops, as well as field margins that provide cover for wildlife.
5) Disseminate restoration guidelines and best management practices through California's new riparian conservation program "The Riparian Habitat Joint Venture" and through active participation (e.g. scoping sessions, ecosystem planning, CalSER conferences) with state, federal, private agencies and other collaborators.

Approach: This project builds on initial surveys of riparian (and adjacent) habitat at 19 sites along the Sacramento River (between Keswick and Verona) and select tributaries, conducted by the Point Reyes Bird Observatory and collaborators. To accomplish objective 1: Implement standardize monitoring and objective 2: Develop predictive models, PRBO and collaborators will continue to collect bird and vegetation data at these 19 sites (some with 5 years of data; Table 1) and an additional 10 sites using standardized monitoring methodologies (e.g, Martin and Geupel 1993, Ralph et al. 1993). New sites chosen will include areas of high biological integrity (reference sites), restored sites (both passive and active), degraded riparian and a variety of agricultural sites.

Field data collected on bird population characteristics will include information on bird abundance and diversity and allow us to determine long-term maintenance of viable, diverse ecosystems. With the inclusion of spatial patterns on survival and productivity we will determine

Table 1. PRBO Riparian Bird Monitoring Sites.

A. Core PRBO Study Sites in the Lower Sacramento River Drainage.

Project Name	Site Name	Begin Year	Point Counts?	Mist Nets?	Nest Plots?	Veg. Sampling?	Bird Species Richness 1996	Song Sparrow Abundance Index 1996	Yellow Warbler Abundance Index 1996
Lower Sac.	Codora	1995	yes	no	no	yes	21	0.00	0.00
	Flynn	1993	yes	yes	yes	yes	34	0.00	0.00
	Haleakala	1993	yes	no	no	yes	35	0.00	0.00
	Kopta Slough	1996	yes	no	yes	yes	35	0.00	0.00
	La Baranca	1993	yes	no	yes	yes	38	0.00	0.00
	Ohm	1993	yes	yes	yes	yes	29	0.00	0.00
	River Vista	1993	yes	no	yes	yes	19	0.00	0.00
	Ryan	1993	yes	no	no	yes	24	0.00	0.00
	Stony Creek	1994	yes	yes	yes	yes	28	0.00	0.00
	Sul Norte	1993	yes	yes	no	yes	25	0.00	0.00
E.Park Res.	Little Stony Creek	1997	yes	yes	yes	yes	-	-	-
	Digger Pine Flat	1997	yes	no	no	yes	-	-	-
	East Entrance	1997	yes	yes	yes	yes	-	-	-
Lassen	Lost Creek	1997	yes	no	no	yes	-	-	-
	Gurnsey Creek	1997	yes	yes	no	yes	-	-	-
	Warner Creek	1997	yes	yes	no	yes	-	-	-
	Rice Creek	1997	yes	no	no	yes	-	-	-
	Black Rock	1997	yes	yes	no	yes	-	-	-
Bobelaine	Bobelaine Sanctuary	1995	yes	yes	no	yes	-	-	-

B. Additional PRBO Study Sites in the Sacramento and San Joaquin River Drainages.

Project Name	Site Name	Begin Year	Point Counts?	Mist Nets?	Nest Plots?	Veg. Sampling?	Bird Species Richness 1996	Song Sparrow Abundance Index 1996	Yellow Warbler Abundance Index 1996
Upper Sac.	RM 36	1991	yes	yes	no	yes	27	0.46	0.33
	Prospect	1991	yes	yes	no	yes	24	1.01	0.42
	Soda	1991	yes	yes	no	yes	30	0.49	1.14
	Castella	1991	yes	yes	no	yes	30	0.82	0.73
	Conant	1991	yes	yes	no	yes	29	0.65	0.26
	Sims	1991	yes	yes	no	yes	36	0.36	0.65
	Pollard Flat	1991	yes	yes	no	yes	38	0.16	0.03
	Dog Creek	1991	yes	yes	no	yes	38	0.26	0.10
	Madrone	1991	yes	yes	no	yes	26	0.39	0.65
	Kelly	1991	yes	yes	no	yes	27	0.23	0.03
Caswell	Caswell State Park	1997	yes	no	no	yes	-	-	-
San Luis	Elk Pasture	1995	yes	no	yes	yes	18	0.28	0.00
	Middle San Joaquin	1995	yes	no	yes	yes	37	1.15	0.00
	North San Joaquin	1995	yes	yes	yes	yes	40	1.02	0.00
	South San Joaquin	1995	yes	yes	yes	yes	29	2.49	0.00
	Sousa	1995	yes	no	yes	yes	16	3.61	0.00
	Salt Slough	1995	yes	no	yes	yes	38	1.08	0.04
	West Bear Creek	1995	yes	no	yes	yes	32	0.04	0.00
Cosumnes	DWR	1995	yes	no	yes	yes	39	0.71	0.00
	Tall Forest	1995	yes	yes	yes	yes	39	0.82	0.00
	Valensin	1995	yes	no	yes	yes	41	0.00	0.00
	Willow Slough	1995	yes	no	yes	yes	45	0.31	0.00
	Wendell's Levee	1995	yes	no	yes	yes	38	2.12	0.00
	Wendell's Road	1995	yes	yes	yes	yes	34	1.51	0.00

the viability of wildlife populations over time. Working with Dr. James F. Quinn (U C Davis), scientific director of the Information Center for the Environment and director of the California Rivers Assessment Project (see Letter of Collaboration, attached), we will incorporate bird information, habitat information, and landscape information (obtained from remote-sensing data) into a Geographical Information System (GIS). Integration of bird habitat data with existing layers of geographically-explicit information systems will provide the basis of predictive models incorporating bird-habitat-landscape data.

PRBO will use the data to make predictions regarding riparian ecosystems at specific sites identified as valuable for acquisition and restoration, derived from remote-sensed data. We will follow up our predictions with field surveys to validate the predictive models and link it to fish and vegetative data (as available). Discrepancies between predicted and observed vertebrate community structure will allow us to further refine our predictive models and may point to important areas for further study. The integrated bird-habitat-landscape models developed will provide a quantitative framework that The Nature Conservancy and other land holding agencies can apply, to compare and rank current and potential riparian sites in order to efficiently allocate limited resources for acquisition and restoration.

To develop, promote and publish riparian restoration guidelines (objective 3) we will continue to investigate processes that maintain healthy riparian ecosystems. Recent riparian work of PRBO on the Sacramento River and Cosumnes River before and after major floods (including the 1995 winter/spring floods and the New Year's flood of 1997), will allow us to begin to document the benefits and detriments of flooding and dike removal in the Central Valley. Our efforts will investigate the natural value of flooding in the management of healthy river systems. We will thus be able to provide critical information that can guide water management policy in order to optimize the health of riparian ecosystems.

In order to develop adaptive management recommendations (objective 4), we will evaluate the effects on bird abundance, diversity and viability of key riparian management issues, including effects of patch size and habitat fragmentation, revegetation, and the integrated management of areas adjacent to riparian corridors. By showing how birds rely on agricultural crops, orchard under-stories, and field margins adjacent to fragmented riparian corridors, we seek to improve the quality of additional areas and integrate their management with riparian areas. Our final product will be scientifically-reviewed restoration and management guidelines that will give land mangers the knowledge to maintain diverse and resilient river systems.

PRBO has been one of the primary catalysts that brought state, federal and private interests together to form the Riparian Habitat Joint Venture (see objective #5). PRBO staff will continue to serve on the Joint Venture's Technical Committee to provide technical assistance and help prioritize the Joint Venture's efforts. By working directly with the California Department of Fish and Game and the Wildlife Conservation Board, PRBO will provide objective criteria to evaluate and rank potential projects to acquire or restore riparian habitat. We will also disseminate adaptive management recommendations through collaborators of the Joint Venture. Technical reports that identify the best management practices for riparian areas and adjacent habitats, including orchards or other agricultural areas, will be prepared for refuge managers and local land owners. Summaries will also be written for policy makers, land owners and the general public.

While this project stands alone, it is being submitted for Category III funding in concert with several other complementary proposals; please see Letter of Support from the Nature

Conservancy (attached). These elements support a larger vision for ecosystem restoration that engenders the support and participation of the local community, which is crucial to the ultimate success of these regional efforts. When considered together, these elements present a vision that is clearly larger than the sum of the individual parts. What follow are the names of the other proposals in this mix:

Ecosystem and Natural Process Restoration on the Sacramento River: Floodplain acquisition project (for acquisition and management of an estimated 1,500 acres);
Ecosystem and Natural Process Restoration on the Sacramento River: An analysis of conditions required for riparian forest establishment;
Sacramento River environmental GIS and mapping support;
Ecosystem and Natural Process Restoration on the Sacramento River: Active Restoration of Riparian Forest (for direct planting of 300 floodprone acres);
Ecosystem and Natural Process Restoration on the Sacramento River: A meanderbelt implementation project.

Entities working to implement these activities include, in addition to the Point Reyes Bird Observatory: CA Department of Water Resources, California State University at Chico, local private landowners, The Nature Conservancy, US Fish and Wildlife Service, and Wildlife Conservation Board/CA Department of Fish and Game. Many of these partners have been working in the project area on these and other activities for more than eight years.

b. Location

The region encompassed in this project includes 29 sites in riverine and agricultural habitats immediately adjacent to the Sacramento River and its tributaries, stretching from Keswick (Shasta County) south through Verona (Sutter County); see maps (Figures 1 and 2). Counties include Shasta, Tehama, Glenn, Colusa, Yolo and Sutter Counties (Figure 2).

c. Expected benefits

This project will provide direct benefits for one priority habitat identified by the CALFED Implementation Strategy, shaded riverine aquatic habitat, and one priority species group, the neotropical migratory bird guild. The project will address four of the 12 identified stressor groups and can be expected to yield direct or indirect benefits that would alleviate these stressors.

This project addresses one of the stressors associated with Channel Form Changes, "Loss of existing riparian zone or lack of regeneration." This project will provide key information to guide riparian protection and restoration efforts which address this stressor, by identifying important areas suitable for protection and/or restoration, and providing information on current and future ecosystem health, as indicated by abundance and viability of riparian bird populations. In particular, this project will develop a set of criteria (involving habitat and landscape features) that characterize healthy, normally functioning riparian habitat.

This project addresses stressors characterized by "Undesirable Species Interactions." Birds are especially sensitive to this type of stressor, through its effects on predation (especially predation on the nest and its contents) and nest parasitism (specifically, effects of the Brown-headed Cowbird). This project will quantify the effect of these stressors (nest-predation and nest-parasitism) and characterize factors that exacerbate or mitigate their deleterious impacts; management actions can then be designed to minimize or reverse deleterious effects.

This project addresses stressors associated with "Land Use," specifically Grazing and

PRBO Riparian Study Areas in Northern California

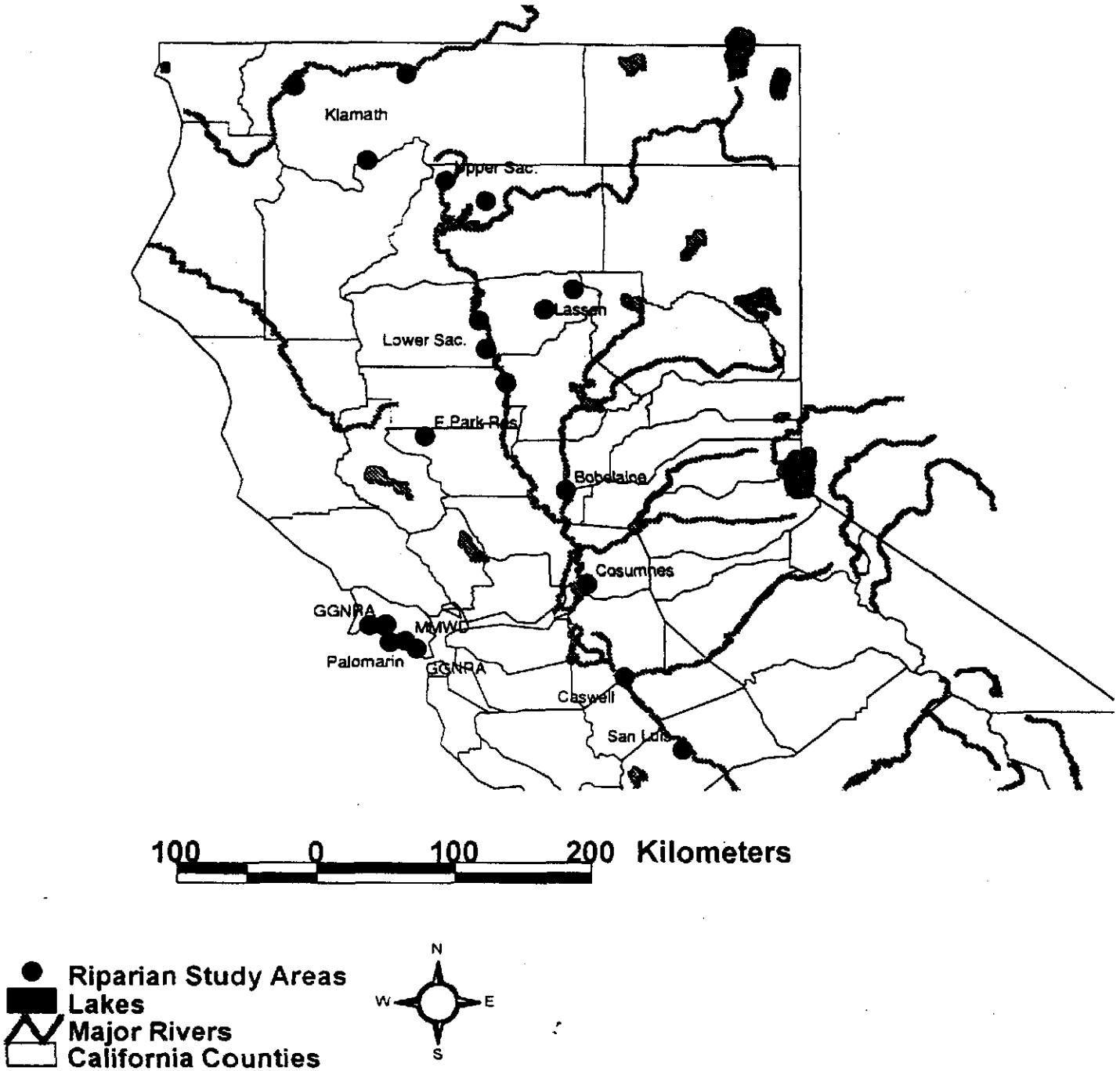

Figure 1. Map of project area and other areas which have been monitored for riparian birds and their habitats in Northern and Central California, by Point Reyes Bird Observatory and its collaborators. Each filled circle signifies one or more sites. Only some of these are part of the current project (see Figure 2 and Table 1 for details).

PRBO Riparian Study Sites in the Sacramento River Drainage

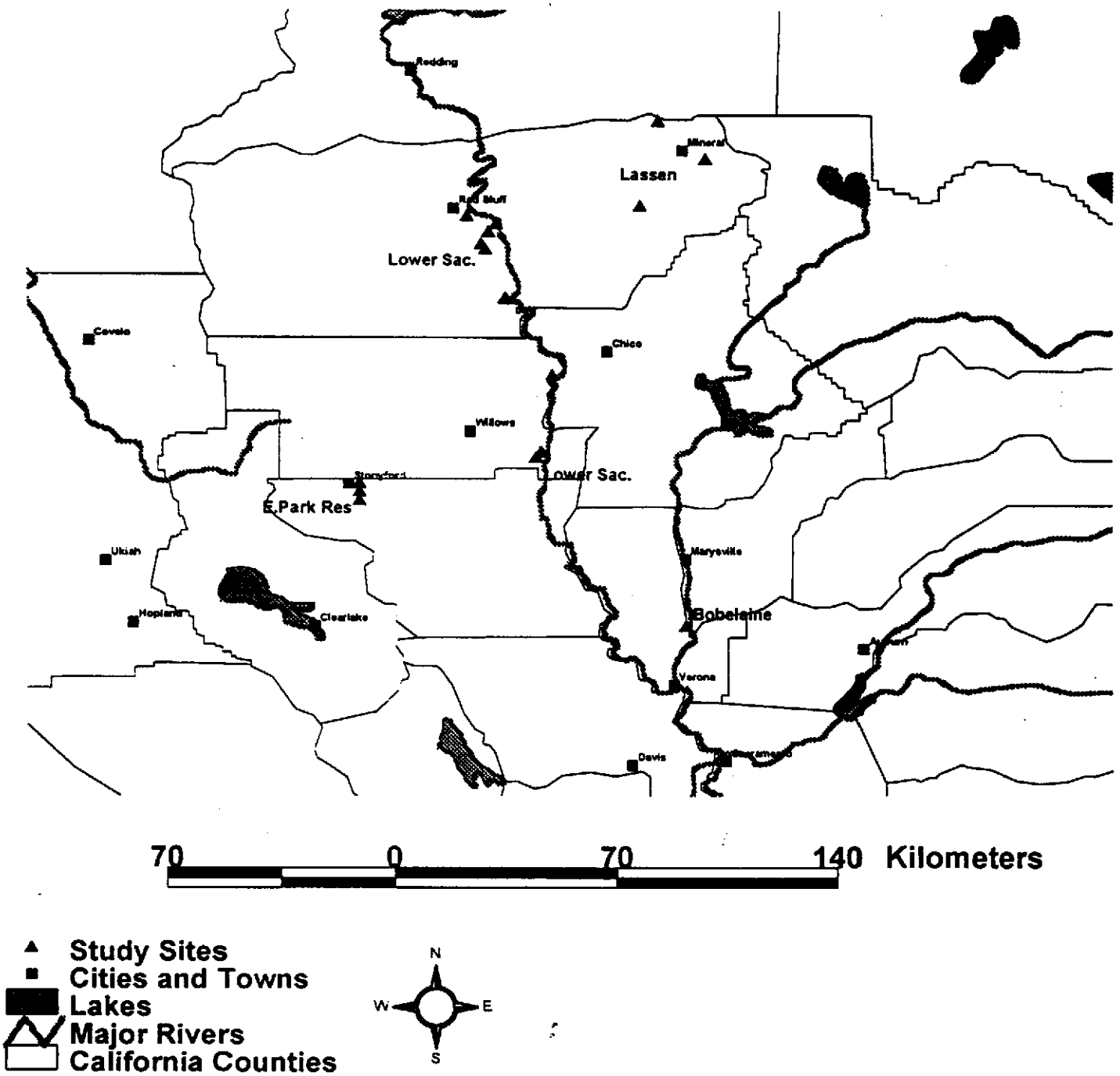

Figure 2. Map of project area. Extant monitoring sites are shown with triangles.

Agricultural Practices. This project will analyze data on effects of grazing on riparian birds directly and on riparian vegetation (which has an indirect effect on riparian birds), by comparing grazed and non-grazed sites from the same landscape. Riparian sites in the Lower Sacramento River exist in a nexus of agriculture; this project will continue to collect important information on the specific, quantifiable effects of agriculture on riparian birds.

Finally, the project addresses a stressor associated with "Floodplain and Marshplain Change"; that stressor is Habitat Fragmentation. All riparian habitat in the Sacramento River consists of fragmented habitat, but the deleterious effects of fragmentation remain to be established and characterized. We will compare bird populations in highly fragmented habitat with more contiguous habitat in the Upper Sacramento River, where additional studies have been carried out by the Point Reyes Bird Observatory.

d. Background and biological justification

The riparian areas of the Sacramento River have been identified as one of the most important habitats supporting songbirds in California, many of whose populations are declining (Miller 1951, Gaines 1974, Manly and Davidson 1993). In addition to providing important breeding habitat, riparian zones also support vital over-wintering areas, migration stop-over sites (Cogswell 1962, Gaines 1977), and corridors for dispersal. This habitat has been severely degraded by development, channelization, water diversion, vegetation removal, farming and grazing. In the past century the Sacramento River Valley, one of the largest riparian zones in Western North America, has lost over 95% of its riparian habitat (Gaines 1977). Thus it is not surprising that many of California's riparian birds are considered threatened, endangered, or species of management concern.

Birds have long been recognized as indicators of healthy and diverse ecosystems (Terborgh 1989, Temple and Weins 1987, Martin 1995). They are relatively common and easy to survey and monitor (Ralph et al 1993). They are taxonomically and ecologically diverse and are highly susceptible to environmental stressors (Martin 1995). Recent widespread declines of bird populations have triggered a unprecedented international effort to conserve and enhance remaining population (Finch and Stangel 1993, Martin and Finch 1995). However, monitoring population size of birds alone can provide a misleading indicator of habitat quality (Van Horn 1983, Ballie 1990). Current protocols measuring more sensitive primary demographic parameters (survival, fecundity, dispersal) have recently been developed and evaluated (DeSante and Geupel 1987, Bibby et al 1992, Ralph et al. 1993, Nur and Geupel 1993, Nur et al. in press a). The use of integrated protocols allows for verification of results and accurate assessment of bird response to habitat changes (Martin 1992, Nur and Geupel 1993, Nur et al. in press b).

PRBO in collaboration with numerous agencies and non-profit organizations is conducting an ongoing statewide riparian conservation program targeted at riparian bird communities. Currently, standardized baseline information on bird populations and associated plant communities is or has been collected at over 80 riparian sites in 15 different watersheds statewide. Nineteen of these sites are located in riparian zones of the project area, i.e., the Sacramento River between Keswick and Verona, and certain tributaries (Mill Creek, Deer Creek, Stony Creek, Feather River). This proposal asks for funding to carry out replicated, intensive surveys of all 19 sites, as well as 10 additional sites that have not been surveyed at all. Methods currently in use have been standardized across all sites and include integrated monitoring of primary and secondary population parameters of most riparian bird species.

Results to date have also shown that many riparian species that utilize the Sacramento River riparian ecosystem are locally extinct as breeding species, or occur in precariously low numbers. Preliminary demographic data from riparian habitat statewide suggest that many local populations are not able to sustain themselves over time and thus degraded riparian areas are acting as "sinks" (Johnson & Geupel 1996, Chase et al. 1997). Nest monitoring data reveal that most open-cup nesting species are experiencing exceptionally high rates of nest failure (about twice the national average) due to degraded habitats (resulting in poor nest cover), forest fragmentation and negative effects of surrounding land uses (including pesticide spraying, water diversion, and vegetation removal). Several of the extirpated species (e.g. Yellow Warbler, Song Sparrows, and Warbling Vireo) were plentiful along the lower and middle Sacramento River as recently as a decade ago and are still locally common on the upper Sacramento river and nearby tributaries (PRBO unpublished data). These results demonstrate that simply protecting remaining riparian habitat patches cannot assure healthy wildlife population. To restore viable populations we propose to guide ecosystem restoration efforts to include the best management practices for birds and other wildlife.

e. Scope of Work

The project will commence January 1998. Field activities will be conducted between April and October for the three years 1998, 1999 and 2000. Work plans for the coming field season will be submitted in January, identifying all sites and planned actives for each site. Collaborators and land holders will have 60 days for review and project plans will be modified accordingly. Financial reports will submitted quarterly. Programmatic progress reports will be submitted every six months with annual technical reports for the previous year submitted in February. Site specific evaluations, restoration guidelines and adaptive management recommendations will be produced at the end of three years. Predictive GIS models, watershed restoration guidelines, species and community management plans, and best management practices will be presented at bi-monthly and semi-annual regional and national meetings (e.g., PIF, CalSER, RHJV, TNC planning meetings, etc.) and published in scientific peer-reviewed journals.

f. Monitoring and data evaluation

Bird monitoring methodologies will be standardized across sites, replicated and integrated to allow evaluation as well as temporal and spatial comparisons. Values will be compared both regionally and nationally to evaluate and contrast the health of functioning riparian ecosystem. Results will be compared within California, with reference to collaborating scientists in the Riparian Habitat Joint Venture, and nationally, through the Partners in Flight Program.

g. Implementability

PRBO has built an extensive network of cooperators to implement this program. Success at implementing monitoring protocols has already been demonstrated, based on biological surveys dating back to 1993. Permits for all bird monitoring activities (USFWS banding permit #09316) are currently held by all principal staff of PRBO. Access to most federal and state lands has already been obtained. We will be working closely with TNC to access important private properties prior to any data collection. Monitoring will only occur on the land of cooperating landowners. Development of GIS models and dissemination of recommendations will be facilitated by the new statewide Riparian Habitat Joint Venture.

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IV. Costs and Schedule to Implement Proposed Project

a. Budget costs

PRBO is requesting a total of $204,742 from CALFED over three years primarily for continued data collection and restoration evaluation at 19 sites and an additional 10 sites where restoration activities are planned or healthy bird communities (reference sites) are identified; see **Budget Table** for details. Initial support for this project over the past years has been provided from now-expired grants and contracts from the US Fish and Wildlife Service, National Fish and Wildlife Foundation, The Nature Conservancy and various matching sources. CALFED funding is required to collect critical additional data, so as to meet project objectives. Current support (Hewlett and Packard Foundation) is mainly or entirely for GIS analysis and predictive modeling, with very modest support for biological data collection. We propose annual budgets of $68,247 for this project. Part-funding is already in place from Hewlett and Packard Foundations; a matching grant will be submitted 1 August to the National Fish & Wildlife Foundation for this project. This proposal, if funded will leverage additional funds from NFWF.

Total anticipated matching funds are $204,696 ($148,737 in hand and $55,959 in pending, matching funds). Additional in-kind cost-sharing will be provided through the GIS Lab of Prof. James Quinn (Information Center for the Environment, UC Davis), but we do not attempt to quantify that.

We anticipate no Operations and Management costs for this project. No permanent equipment is requested from CALFED; this will be obtained through the Packard Foundation grant.

The budget assumes a 29% overhead rate on all direct costs; this is PRBO's NSF-mandated overhead rate (NSF is PRBO's Federal cognizant agency).

b. Schedule Milestones

Task 1 (Data collection) will begin January 1998. Tasks 2 and 3 will begin later in 1998. All three tasks will continue during the three years of the project. Further detail is provided in "Scope of Work" (above). Payment will be requested on a semi-annual basis (after appropriate progress and financial reports are submitted and/or final technical report).

c. Third Party Impacts

We anticipate no negative third party impacts from this project. To the extent that this project can help improve riparian bird community health (abundance, diversity, etc.) this project can have a positive impact by encouraging recreational bird enthusiasts to visit these areas, which may have a favorable local economic impact.

Budget Table

Task: Data collection (3 years)

	Cal Fed	NFWF [1]	Hewlett [2]	Packard [3]
Labor hours	5500	744		750
salary	$110,000	$14,879		$15,000
service contracts	$0	$0		$0
Materials	$0	$0		$5,000
Misc (mileage, etc.)	$18,000	$1,000		$1,000
Overhead (29%)	$37,120	$4,605		$6,090
Total costs	$165,120	$20,484		$27,090

Task: Analysis and production of deliverables

	Cal Fed	NFWF	Hewlett	Packard
Labor hours	483	433	433	433
salary	$14,500	$13,000	$13,000	$13,000
service contracts	$0	$0	$0	$0
Materials	$0	$0	$0	$0
Misc (mileage, etc.)	$1,515	$1,000	$2,000	$1,000
Overhead (29%)	$4,644	$4,060	$4,350	$4,060
Total costs	$20,659	$18,060	$19,350	$18,060

Task: GIS evaluation and acquisition guidance

	Cal Fed	NFWF	Hewlett	Packard
Labor hours	417	417	1167	833
salary	$12,500	$12,500	$35,000	$25,000
service contracts	$0	$0	$0	$0
Materials	$0	$0	$0	$0
Misc (mileage, etc.)	$2,200	$1,000	$3,000	$2,300
Overhead (29%)	$4,263	$3,915	$11,020	$7,917
Total costs	$18,963	$17,415	$49,020	$35,217
Total requested	$204,742			
Total from other sources		$55,959	$68,370	$80,367

[1] Proposal due 8/1/97 (2 years)
[2] Funded April 1997 (3 years)
[3] Funded June 1997 (2 years)

V. Applicant Qualifications.

The Point Reyes Bird Observatory (PRBO) has been a leader in the scientific study of birds and their habitats since 1965. Its scientists are well-established and well-respected by their peers for their expertise in the study of bird populations. Government agencies and environmental groups have relied on the scientific research and recommendations of PRBO's scientific staff. PRBO is especially well qualified to implement this project. PRBO has successfully completed many projects of similar (and greater) scope, funded by federal and state agencies (e.g., CA Dept. of Fish & Game, US Fish & Wildlife Service, US Forest Service, National Biological Service, US Department of Defense), private organizations and the National Fish & Wildlife Foundation. PRBO's pioneering field work in riparian areas throughout Central and Northern California over the past six years has given it an extensive base of knowledge that will be applied in this project. The proposed project represents an important follow-up to work that began in 1993 under contract to The Nature Conservancy and the USDI Sacramento National Wildlife Refuge.

References are available from Tara Zimmerman (US Fish & Wildlife Service, Non-game biologist, Region 1, 911 NE 11th Ave., Portland, OR 97232), Jack Miller (CA Dept of Fish & Game, 2440 Athens Avenue, Redding CA 96001) and Bruce Deuel (CA Dept of Fish & Game, 2440 Athens Avenue, Redding CA 96001), for previous work by PRBO project scientists of similar scope. Additional references can be supplied on request.

PROJECT STAFFING

The following is a brief description of the key PRBO staff involved in the management and implementation of this project.

Geoffrey Geupel - Ornithologist and Director of Terrestrial Program, will be responsible for the collection and synthesis of all field data. He will also continue to work closely with land managers and other conservation biologists to develop project recommendations.

Geupel is a senior ornithologist with over eighteen years of experience studying migratory songbirds and their nesting behavior. As Director of PRBO's Terrestrial Program, Geupel supervises 12 different field studies and over 30 field biologists. He has participated in state, regional, and national Working Groups for Partners In Flight (PIF) and is currently chair of the inventory and monitoring committee of the Western Working Group. His recent publications and conference presentations have helped define standardized monitoring protocols for migratory landbirds throughout North America. Geupel has also helped in the design and promotion of standardized monitoring methods for Mexico and Central America. He has worked closely with state and federal agencies in California to assess the impact of land management practices and to establish long term monitoring programs. Geupel has also established a volunteer program to encourage the participation of amateur bird enthusiasts. Geupel also teaches regular technical courses on avian census methods for professional field biologists, including many state and federal biologists.

Nadav Nur, Ph.D. - Quantitative and Population Ecologist and Modeling Specialist. Dr. Nur will be responsible for the experimental design, statistical analysis of population and habitat data,

and the development of the predictive GIS models. He will apply his statistical background to develop the criteria for ranking and evaluating riparian areas.

Dr. Nur earned graduate degrees in Zoology (Duke University) and Biostatistics (University of Washington) and has over 19 years' experience conducting avian population studies. Dr. Nur specializes in understanding how various natural and anthropogenic factors, such as habitat fragmentation and habitat degradation, affect population parameters, and ultimately population stability. He has been lead investigator for PRBO's Upper Sacramento River Riparian Songbird project for five years. He is Principal Investigator for a study (initiated as part of the National Biological Service's "Species At Risk" program) of tidal marsh songbirds of San Francisco Bay. He is senior author of a monograph on "Statistical Handbook and Guide to Analysis and Design of Avian Population Monitoring Programs," in press as a Biological Report of the US Fish & Wildlife Service. He has carried out population viability analyses on several bird species for the National Biological Service. He has worked closely with the Marbled Murrelet and Snowy Plover Recovery Teams. Dr. Nur has also provided expert testimony on issues including impacts of oil spills and collisions with power lines on seabird populations, and the impact of environmental contamination on long term population trends of songbirds. He is active in the national PIF program, founding the National Research Working Group and organizing several international workshops on population ecology. Dr. Nur is author or co-author of over 40 peer-reviewed scientific papers and book chapters (published or in press) concerning avian population biology.

Grant Ballard - GIS specialist and data base manager. Ballard will continue to manage PRBO's data bases, compile PRBO data as well as data from other sources, and integrate the information into a GIS format to generate maps of habitat classifications. Ballard will continue to work with the GIS Center at UC Davis (Dr. James Quinn, Director; Dr. Karen Beardsley, GIS Coordinator).

Grant Ballard has over twelve years of experience with computers, programming, data base management and Geographical Information Systems. He is responsible for the management of PRBO's extensive data bases, which cover over 25 years of extensive observations. Ballard also formats and processes information from all of PRBO's on-going field studies. Ballard is knowledgeable of several GIS and remote sensed imagery software packages. He has worked on GIS analyses at the McMurdo Station, Antarctica, on an NSF-funded project.

Daniel Evans, Ph.D. - Executive Director & Policy Specialist. Dr. Evans will continue to advise member agencies of the Joint Venture regarding riparian conservation and management issues.

Dr. Evans, a systems ecologist and policy specialist, graduated from the internationally recognized Ecology program at U.C. Davis. He has over 13 years experience directing applied research and management projects for wildlife conservation. Dr. Evans helped initiate California's Riparian Habitat Joint Venture and has been working to promote riparian conservation since 1993. Prior to working at PRBO Dr. Evans was the Executive Director of the Charles Darwin Research Center in the Galapagos Islands, where he was a policy advisor to the Ecuadorian government and the Galapagos National Park Service.

VI. Compliance with standard terms and conditions

All terms and conditions outlined in the RFP are agreeable to the applicant. Attached is the Nondiscrimination Compliance Statement, as required by the RFP.

Item 8

NONDISCRIMINATION COMPLIANCE STATEMENT

COMPANY NAME POINT REYES BIRD OBSERVATORY

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 CONNIE BLACKSTONE

DATE EXECUTED 6/30/97

EXECUTED IN THE COUNTY OF MARIN

PROSPECTIVE CONTRACTOR'S SIGNATURE C. Blackstone

PROSPECTIVE CONTRACTOR'S TITLE CONTROLLER

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME POINT REYES BIRD OBSERVATORY

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 Point Reyes Bird Observatory entitled "**Ecosystem and Natural Process Restoration on the Sacramento River: Monitoring, Conserving and Restoring Riparian Bird Populations and their Habitats.**" The proposed project will provide data useful in targeting acquisition and restoration efforts 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: An Analysis of Conditions Required for Riparian Forest Establishment, submitted by the California Department of Water Resources (DWR);
- Ecosystem and Natural Process Restoration on the Sacramento River: A Meanderbelt Implementation Project, submitted by The Nature Conservancy; and
- 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

recycled paper

Information Center for the Environment
Division of Environmental Studies
University of California
Davis, California 95616-8576
Phone (916) 752-8027, FAX (916) 752-3350
email *jfquinn@ucdavis.edu*

July 25, 1997.

Dr. Nadav Nur
Point Reyes Bird Observatory

Dear Nadav:

This is to confirm the commitment of the Information Center for the Environment to work with you on the project that PRBO has proposed to CALFED. We will be able to supply the project with relevant GIS layers, including hydrography, actual and potential vegetation, Thematic Mapper and considerable amounts of aerial imagery, land use, and distributions of a variety of plant and vertebrate species, throughout the CALFED region. We also are prepared to assist Grant Ballard with the proposed geographic analyses, as needed, and to help present maps and other analyses through the CERES and ICE web sites.

I particularly look forward to working with you on developing predictive models for species occurrences and critical habitat areas. As you know, this has been one of my major reserarch interests for years. I look forward to coupling the approaches we have developed working with the Gap Analysis Program, Fish and Game, and a number of Department of Interior programs with the superb survey protocols and analyses you have developed with the Nature Conservancy, the Forest Service, and the Riparian Habitat Joint Venture initiative. I think the combination can produce the most advanced program for assessing habitat needs for bird conservation anywhere in the country.

Thank you for organizing this proposal. I strongly support it, and look forward to working with you.

Sincerely yours,

James F. Quinn
Professor