Comparative Review of Governance Structures for Ecosystem Management

Prepared for



The Blasker-Rose-Miah Fund
Grant #C-2005-00183

November 2006



The Conservation Biology Institute provides scientific expertise to support conservation and recovery of biological diversity in its natural state through applied research, education, planning, and community service.

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Introduction

Landscape-scale conservation planning and ecosystem management rely on integrative scientific assessments that capture the interrelationships among an ecosystem's main biotic and physical elements and natural processes and that also recognize the functions and values of individual pieces of the landscape. Planning and management of ecosystems must occur at large spatial and temporal scales to accommodate the dynamic and sometimes unpredictable nature of natural processes. Moreover, ecosystem management must be adaptive, i.e., it entails establishing baseline conditions, monitoring these conditions over time, adjusting or implementing management actions accordingly, and then monitoring ecosystem responses to management actions.

Public agencies, professional organizations, and community groups in the United States have embraced ecosystem management as a way to coordinate approaches to managing public lands (e.g., Beattie 1996, Christensen et al. 1996, Dombeck 1996, Goodman 1996, Interagency Ecosystem Management Task Force 1995, Thomas 1996). As a result, a plethora of regulatory and non-regulatory regional conservation programs, along with community-based open space districts and conservancies, were initiated in the late 1980s, through the 1990s, and into this millennium.

These multi-stakeholder ecosystem management programs have faced similar challenges in terms of planning, priority-setting, establishing organizational structures, and effective implementation—allocating authority, responsibilities, funding, peer review, specific habitat management and biological monitoring approaches, and public uses on both public and private lands. The issues are further complicated when regulatory permits for managing and monitoring endangered species and their habitats are also involved. These challenges have forced the development of more structured cooperation and collaboration in ecosystem conservation and management programs (Yaffee 1996).

This report summarizes the results of a comparative review of governance structures for ecosystem management initiatives across the country. This study was undertaken to help inform the development of a regionally coordinated biological monitoring and adaptive management program among conservation stakeholders in the San Diego region.

Background

In 1991 the State of California passed the Natural Community Conservation Planning (NCCP) Act which authorized a pilot program focusing on preserving the coastal sage scrub ecosystem of Southern California; the Act was amended in 2002 and became effective statewide. There are now 32 active NCCPs, which are typically integrated with federal Endangered Species Act Habitat Conservation Plans (HCP), covering more than 7 million acres, of which 10 programs have been approved and permitted. NCCP plans are intended to integrate adaptive management strategies that are periodically evaluated and modified based on information obtained from a



biological monitoring program to achieve their "no net loss of biological value" objectives (California Fish and Game Code 2820).

The San Diego region is at the forefront of planning for ecosystem management, with four large-scale NCCP programs underway. As a result of these planning efforts, it is projected that hundreds of thousands of acres will be conserved in San Diego County over the next decade and will require long-term management and monitoring to ensure their future viability. Approximately 200,000 acres already have been proposed for conservation as part of the Multiple Species Conservation Program (MSCP) and Multiple Habitats Conservation Program (MHCP), approved in 1997 and 2003, respectively. The North County and East County MSCPs are projected to more than double this total, making the total responsibility for regional habitat conservation, management, and monitoring 400,000-500,000 acres.

There is currently no integrated system for coordinating monitoring and adaptive management for these NCCP programs in the San Diego region. Each permit holder, and even the permitting agencies themselves—U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG)—are implementing management and monitoring on their lands independently of other land managers in the preserve system. Although standardized monitoring protocols are currently being developed, there has not been coordination or standardization of protocols among land managers, little regional priority-setting, and little strategic implementation of management objectives, relative to preserve-wide problems over the past 10 years. Consequently, scarce resources for management and monitoring have not been used as effectively and efficiently as possible. Finally, there has not been assimilation of data collected across the region to analyze status and trends in species populations and ecosystem threats or to guide management decisions.

In November 2004, San Diego voters approved Proposition A or TransNet, a local transportation initiative that requires and funds acquisition, management, and monitoring of lands conserved as mitigation for transportation projects. The TransNet ordinance and post-ordinance agreements specifically require the development of an infrastructure for coordinating biological monitoring and adaptive management efforts and a venue for independent scientific input, thus providing an opportunity to facilitate the development of a regional ecosystem monitoring and management infrastructure that could help to meet the obligations of NCCP stakeholders in the region for effective ecosystem conservation.

The NCCP program and the TransNet ordinance recognize that simply acquiring land and dedicating it to the preserve system is not enough. Without appropriate monitoring and adaptive management, the threats in our urbanized landscape, including habitat fragmentation, incompatible recreation, increasing urban and agricultural runoff, changing fire regimes, and nonnative species invasions, will ultimately change and possibly eliminate forever the resources we cherish as part of our regional quality of life. Lack of appropriate monitoring of protected lands, including integration and analysis of monitoring information from various regional land managers, will threaten our ability to effectively and efficiently prioritize management needs on a regional scale and conserve imperiled resources in the long-term. This situation jeopardizes the tremendous investments of money and other resources in the regional preserve system, in



addition to the natural resources themselves. The enormous challenge facing the San Diego region in the next few years is mobilization and coordination of resources to adequately manage and monitor a half-million acres of conserved habitats.

NCCP stakeholders in San Diego recognize the need for regional coordination of management and monitoring activities across our large county (4,260 square miles!), but have been debating for years the best institutional model for such an effort. The San Diego region supports a wealth of agency, academic, and other scientific expertise to draw from in collecting, analyzing, and interpreting biological data from the NCCP preserves. Given the large number of land managers in the county, regional coordination of the San Diego ecosystem management programs is needed to implement an effective, cost-efficient, and scientifically defensible structure for prioritizing and coordinating regional monitoring, analyzing and interpreting monitoring data, and recommending adaptive habitat and species management actions based on the analysis of monitoring data and changing conditions across the landscape.

The purpose of this report is to inform stakeholders in the region seeking to develop a regional ecosystem monitoring and management infrastructure by drawing on the experiences of similar programs in other parts of California and the U.S.

Objectives and Approach

The specific objectives of this study were:

- Review a cross-section of ecosystem management efforts across the United States, with a focus on institutional structures for administering conservation actions, both for programs involving endangered species permits, such as NCCP programs and other HCP programs, as well as for non-regulatory conservation programs. This review was not exhaustive but provides a representative sample of the largest programs in the U.S. for which information was readily available.
- Evaluate the composition, authority, and responsibilities of different partnerships formed to conserve, manage, and monitor preserve lands.
- Investigate the staffing, facilities, funding, and other resources required for successful ecosystem management programs.
- Describe how science is integrated into the implementation of ecosystem management programs.
- Identify problems or issues faced in implementation and how these have been addressed.
- Synthesize the results of this survey, identify pros and cons of individual institutional structures with respect to the above issues, and provide recommendations for San Diego stakeholders.

The emphasis of this project was a survey of existing institutions and programs conducting landscape-scale ecosystem monitoring and management. In fall 2005, the Conservation Biology Institute (CBI) received funding for this study from The San Diego Foundation and conducted a



competitive search for a local student to assist with researching governance structures and coordination processes for biological monitoring in California and elsewhere. Maxwell Harrington, a senior in the Urban Studies & Planning program at the University of California, San Diego, was hired as an intern for a 6-month period to research existing programs, review implementation structures, and conduct interviews with people involved in different conservation programs across the country.

Although there is a wealth of information published in the scientific literature on how to conduct ecosystem monitoring and management, we found very few public or private programs where structured monitoring and management programs had been implemented over a number of years, particularly programs dealing with landscapes comparable in size and complexity to San Diego County. Most of the conservation programs associated with regulatory permits, such as the NCCP program and other multiple species HCP programs, have only just completed their planning phases and are just now beginning to face the challenges associated with monitoring and management. Therefore, the majority of our research efforts were conducted by reviewing websites and documents available over the Internet and interviewing people involved in the programs themselves to gain an understanding of issues these programs are grappling with as they implement their program mandates and missions.

We reviewed 23 different conservation programs, selected largely based on the size of the program and the availability of information. We prioritized investigation of NCCP programs in California, and added others based on recommendations from stakeholders and people interviewed. These were organized according to four categories (Table 1):

- Regional HCP and NCCP programs (11)
- Regional (non-regulatory) open space programs (7)
- State-chartered conservancies in California (2)
- Other monitoring programs (3)

A standardized form was developed based on input by various San Diego and NCCP stakeholders and used to collect and present summary information for each of the programs studied (Table 2). As each of the programs is unique, some items on the form were not applicable to or could not be completed for all programs. Information was initially gathered from program-specific websites. We then followed up these web-based searches with telephone interviews where possible. Survey results for each organization are provided in Appendix A, entitled *Profiles of Conservation Programs Surveyed*.



Table 1. Ecosystem management programs reviewed

Regional HCPs/NCCPs	**Regional Open Space Preserves**	**State-Chartered Conservancies**	**Other Monitoring Programs**
Balcones Canyonlands MSCP, Texas	Chicago Wilderness, Illinois	San Diego River Conservancy, California	Glen Canyon Dam Adaptive Management Program, Arizona
CALFED Bay-Delta Program NCCP, California	Cosumnes River Preserve, California	Santa Monica Mntns. Conservancy California	San Francisco Bay Joint Venture, California
Central/Coastal Orange County NCCP, California	East Bay Parks, California		Sonoran Joint Venture, Arizona, California, Mexico
Clark County Desert MSHCP, Nevada	Mid-peninsula Regional Open Space District, California		
Coachella Valley MSHCP, California	Pacific Forest & Watershed Lands Stewardship Council, California		
Karner blue butterfly HCP, Wisconsin	San Dieguito River Park, California		
Metropolitan Bakersfield HCP, California	San Francisco Bay Area Conservancy Program, California		
Natomas Basin NCCP, California			
San Joaquin County MSCP, California			
Sonoran Desert Conservation Plan, Arizona			
Western Riverside County MSHCP, California			



Table 2. Program template

BACKGROUND	
History	*Why and how was the conservation program initiated?*
Mission/Purpose	*Stated mission or objectives of program.*
Type	*Governance structure (e.g., JPA, nonprofit, government agency, public-private partnership).*
Area	*Geographic area covered by the program / # acres conserved.*
Stakeholders	*Primary stakeholders in the program, permittees, etc.*
INSTITUTIONAL STRUCTURE—GOVERNANCE	
Authority	*Policy-making (governing) body.*
Duties & Responsibilities	*Stated responsibilities of policy-making body.*
Composition	*Composition of policy-making body as specified in by-laws or charter.*
Term of Appointment	*How long does each member of the policy-making body serve?*
Meeting Schedule	*How often does the policy-making body meet?*
Committees	*Are there specific committees or sub-committees of the policy-making body?*
Public Notice of Meetings	*Are meetings open to the public and, if so, how are they advertised?*
Voting Procedure	*What is the method of making decisions, ,e.g., by majority vote, consensus, etc.?*
Compensation	*Are members of the policy-making body paid?*
Start-up: Alternatives Considered	*Were alternative governance structures considered? Is so, why weren't they implemented?*
Legal Counsel	*Who provides legal advice to the policy-making body?*
Insurance	*Is the policy-making body covered by insurance?*
Reporting Requirements	*Are there requirements for regular reporting of actions, budget, accomplishments, etc.?*
STAFF AND FACILITIES	
Total Staff	*How many paid, full-time, staff work as part of a centralized governance structure?*
Executive Director	*Is there a paid Executive Director?*
Other Staff	*List other staff positions.*
Hierarchy	*What is the reporting structure for staff?*
Science Advisors	*Is there a formal independent science advisory panel or other process for soliciting science input in priority-setting and decision-making?*
Facilities Location	*Is there a separate, centralized office, or is the governing body co-located with a stakeholder?*



Table 2. Program template (continued)

Work done in-house or contracted out	*How much work is done inhouse vs. contracted out?*
Resource Requirements	*What resources does the governing body use/share/rent (e.g., vehicles, tools and equipment, structures, etc.)?*
FUNDING	
Start-up/ one-time costs	*Initial investments such as capital expenditures, baseline surveys, etc.*
Revenue/ Expenditures	*Sources and amount of revenue / items and amount expended.*
Annual Operating Budget	*For the centralized governing body, not all stakeholders.*
Endowment/ Capital Campaign	*Is there an endowment for any part of the operation? If so, how much, and what is it used for?*
OTHER	
Conservation partners or other relationships	*What organizations are integral to implementation of the program?*
Problems/issues with implementation	*What implementation issues can be related specifically to the governance structure (pros and cons)?*

SOURCES

CONTACT INFO

STAFF			
Position	**Name**	**Email**	**Phone**
ADDRESS			
General			
OTHER			
Email			
Phone			



Summary of Findings

Results of the survey were synthesized to examine trends in governance and staffing structure, approaches to integrating science, funding, problems with implementation, etc. Summary information by major program characteristics is provided in Table 3. The following summary of our findings is organized according to type of conservation program (Tables 1 and 3). For a number of survey questions—including Term of Appointment, Meeting Schedule, Public Notice of Meetings, Voting Procedure, Compensation, Start-up Alternatives, Legal Counsel, Insurance, Resource Requirements, Start-up Costs—there was either no or minimal information available. These survey questions are not treated any further in this report.

Regional HCPs/NCCPs

Type /Year—All 11 of these programs were initiated to address endangered species and other resources conservation, and all were established in the 1990s or after. Three of the programs reviewed are managed by a single jurisdiction, or management is shared by two jurisdictions; three formed Joint Powers Authorities (JPA); three formed nonprofit, nongovernmental organizations (NGOs), one is a public-private partnership (Karner blue butterfly HCP), and one is a new state agency (CALFED).

Authority—In all cases, decisions are made by a committee or Board of Directors.

Centralized Staff—All have dedicated, centralized staff, and all except Metropolitan Bakersfield use outside contractors on a regular basis. Generally, there are one or more dedicated *coordinator* or *Executive Director* positions to ensure that staff from different partner agencies are working consistently toward regional goals.

Science Advisors—All except Metropolitan Bakersfield and the Karner blue butterfly HCP use independent science advisors.

Funding Sources—Seven of the eleven programs reviewed use development impact fees; CALFED also uses fees from water users. A range of other public and private sources is used, including County General Funds.

Partners—Because of the endangered species permits issued as part of these programs, state and federal wildlife agencies are partners in the planning and implementation of all of them. Multiple state and federal land or water stewards are also involved. Multiple land use jurisdictions have been involved in all of the programs, although it appears that cooperation and coordination during the planning phases of some programs have not continued through implementation. Nonprofit environmental organizations have been involved as partners in all of the programs reviewed.



Table 3. Summary of governance structures for ecosystem management

Program Name	Type /Year	Area (acres)	Authority	Centralized Staff	Outside Contractors	Science Advisors	Funding Sources
Regional HCPs/NCCPs							
Balcones Canyonlands MSCP (Texas)	City-County partnership /1995	500,000	Coordinating Committee	City/County	Yes	Yes	Water utilities, County General Fund, development fees, property taxes
CALFED Bay-Delta Program (California)	State agency /2003	738,000	Executive Leadership Council	65 state, 15 federal	Yes	Yes	State/federal, water users
Central/Coastal Orange County NCCP (California)	NGO /1996	39,000	Nature Reserve of Orange Co. Board of Directors	2	Yes	Yes	Endowment
Clark County MSHCP (Nevada)	Clark County /2001	Clark County	County Commissioners	County	BRRC, UNReno	BRRC, UNReno	Development impact fees
Coachella Valley MSHCP (California)	JPA /2006	1.1 million	Conservation Commission	Conservation Commission	Yes	Yes	Endowment, development fees
Karner blue butterfly HCP (Wisconsin)	Public-private partnership /1999	250,000	Implementation Oversight Committee	1 state	Yes	Yes	Public and in-kind
Metropolitan Bakersfield HCP (CA)	City-County JPA /1992	4,000	Trust Group	1	No	No	Development impact fees
Natomas Basin NCCP (California)	NGO /1997	3,500	Natomas Basin Conservancy Board of Directors	3	Yes	Yes	Development fees, rice revenues
San Joaquin County MSCP (California)	NGO /2001	100,000	SJCOG, Inc. Board of Directors	2	Yes	Yes	Development impact fees
Sonoran Desert Conservation Plan (Arizona)	Pima County Board of Supervisors /2006	258,645	Science Conservation Commission	Tech. Advisory Teams	Yes	Univ. of Arizona	County General Fund
Western Riverside County MSHCP (California)	City-County JPA /2004	500,000	Board of Directors	8	Yes	UCRiverside	Development fees, regional infrastructure contribution, landfill tipping fees, density bonus fees



Program Name	Type /Year	Area (acres)	Authority	Centralized Staff	Outside Contractors	Science Advisors	Funding Sources
Regional Open Space Preserves							
Chicago Wilderness (Illinois)	Public-private partnership /1996	250,000	Steering Committee	7	Yes	Yes	Public, private, and in-kind
Cosumnes River Preserve (California)	Public-private partnership /1987	46,000	Board of Directors	3+	Yes	No	Public, private, and in-kind
East Bay Parks (California)	Special district, SFO Bay /1934	95,000	Board of Directors	596	No	Yes	Property tax, assessment district levies, bond issue
Mid-peninsula Regional Open Space District (CA)	Special district, SFO Bay /1972	50,000	Board of Directors	79	Yes	Yes	Property tax, federal/state grants
Pacific Forest & Watershed Lands Stewardship Council (CA)	NGO /2004	140,000	Board of Directors	8	Yes	Not yet	PG&E
San Dieguito River Park (California)	JPA /1989	80,000 (FPA)	JPA Board	9	Yes	No	Public, private membership, Del Mar Race Track
San Francisco Bay Area Conservancy Program (California)	Public-private partnership /1997	2 million	Executive Committee	4 + county coordinators	Yes	Yes	State bonds (Props. 12 & 40), state General Fund
State-Chartered Conservancies							
San Diego River Conservancy (California)	State agency /2002	1,450	Board of Directors	2 staff + 2 River Park staff	Yes	No	Public/private
Santa Monica Mountains Conservancy (California)	State agency /1980	>55,000	Board of Directors	6?	Yes	No	Public/private



Program Name	Type /Year	Area (acres)	Authority	Centralized Staff	Outside Contractors	Science Advisors	Funding Sources
Other Monitoring Programs							
Glen Canyon Dam Adaptive Management Program (Arizona)	Federal Advisory Committee /1995		Adaptive Management Work Group	24	Yes	Yes	Federal
San Francisco Bay Joint Venture (California)	NAWMP Joint Venture /1995	260,000	Executive Committee of Management Board	3 federal	Yes	Yes	Federal/state/local/private
Sonoran Joint Venture (CA, AZ, Mexico)	Joint Venture /1999	6 states in U.S. & MX	Executive Committee of Management Board	3 federal	Yes	Yes	Federal/state/local/private



Regional Open Space Preserves

Type /Year—The oldest of these programs (East Bay Parks and Mid-peninsula Regional Open Space District) were begun in 1934 and 1972, respectively, with the state formation of special districts in the San Francisco Bay Area. Three of the programs reviewed are public-private partnerships, one formed an NGO (Pacific Forest & Watershed Lands Stewardship Council), and one formed a JPA (San Dieguito River Park).

Authority—In all cases, decisions are made by a committee or Board of Directors; San Dieguito River Park has a JPA Board.

Centralized Staff—All have centralized staff dedicated to the preserve. East Bay Parks and Mid-peninsula Regional Open Space District have the largest number of staff (596 and 79, respectively) of any of the programs reviewed. All of the programs reviewed, except East Bay Parks, use outside contractors.

Science Advisors—Chicago Wilderness and the three San Francisco Bay Area programs all have independent science advisors. The other four programs do not have independent review by external scientists, but use science-informed decision-making.

Funding Sources—All have a variety of funding sources, including public, private, and in-kind sources. The two special districts also use property taxes and assessment district levies.

Partners—Of the programs reviewed, the Regional Open Space Preserves support the largest numbers of public and private partners and also have been more active in public outreach and education, as demonstrated by the number of publications, maps, and programs offered on their web sites.

State-Chartered Conservancies

The major land conservation goals of the nine state-chartered conservancies are to:

- Provide open space and recreational opportunities near population centers.
- Provide camping, hiking, and other outdoor recreational activities in remote locations.
- Ensure sustainability of agricultural land.
- Preserve wildlands for environmental and wildlife purposes.

Type /Year—All of the state-chartered conservancies are departments located within The California Resources Agency. The Santa Monica Mountains Conservancy, founded in 1980, is the second oldest of the state conservancies, after the Coastal Conservancy (1976).

Authority—Board of Directors comprised of state and local appointments.

Centralized Staff—For the relatively small number of staff at state conservancies, the organization incurs high administrative overhead costs and thus is often less cost-effective than other organizations. For this reason, state conservancies often partner with NGOs to implement conservation goals. Both of the programs reviewed use outside contractors.



Science Advisors—Conservancies regularly use scientists at partner organizations.

Funding Sources—State-chartered conservancies are able to utilize a variety of public and private funding sources for acquisition, leveraged by the annual state budget, some of which in the past has come from state general obligation bonds.

Partners—local jurisdictions, state parks, national parks and recreation areas, resource conservation districts, NGOs.

Other Monitoring Programs

Type /Year—These three programs—one Federal Advisory Committee and two Joint Ventures—were established by the federal government and hire federal employees.

Authority—All three programs are governed by a committee.

Centralized Staff—All have federal staff but work largely through partnerships.

Science Advisors—All three programs use independent science advisors.

Funding Sources—The Glen Canyon Dam program is funded almost solely with federal funds, while the Joint Ventures use multiple federal, state, local, and private sources of funds.

Partners—All three programs work with multiple jurisdictions, agencies, and NGOs.



Conclusions and Recommendations

Most of the programs surveyed for this study have recognized the need for a well-defined infrastructure to coordinate monitoring and adaptive management and for independent science review. The stakeholders in these programs have developed creative, yet often cumbersome structures of partnerships, both public and private, to accommodate site-specific implementation and funding needs and to satisfy the objectives of multiple partners. Sometimes this appears to have been at the expense of agility and cost-effectiveness in implementation.

The majority of these programs were instituted in the mid-1990s and later, with their initial efforts focused on land acquisition, rather than management and monitoring. So, in many cases, management and monitoring plans are still being developed, or there has been insufficient time to evaluate the effectiveness of their land management programs and infrastructure for their implementation. In some of the non-regulatory programs, land management has been geared more toward public use (e.g., trails and interpretative facilities), rather than biodiversity.

Therefore, it is difficult to make broad-based conclusions on the characteristics of an effective governance infrastructure based on the survey of these programs. However, the results of the survey do suggest some common issues and challenges faced by different governance structures:

1. Most of the programs reviewed have a large number of partners that are important for contributing in-kind services (staff and resources), as well as public and private funding.
2. This attempt to be inclusive can complicate the ability to be strategic and cost-effective due to differing priorities and inadequate interagency coordination and communication.
3. All have centralized staff dedicated to coordinating their programs, even if multiple stakeholders are involved. Those programs with an Executive Director who has been given authority for day-to-day decisions by the governing board appear to have better lines of communication for implementation.
4. *Adaptive management* has been touted as the answer to alleviating threats, as well as to inadequate preserve design (e.g., fragmentation), but with insufficient understanding of what it entails or if it is financially feasible.
5. Costs for management and monitoring were universally underestimated and, as a result of scant resources, these programs have been largely under-funded and inadequately staffed.
6. All but two of the programs use outside contractors, in addition to or in place of permanent staff. In some cases, use of outside contractors has created work delays (because of contract administration) and complicated coordination and interpretation of results. Programs that consistently use centralized staff and staff from partner organizations appear to be more flexible and effective in coordinating data collection and implementing management actions.
7. Nonprofit organizations are important to stewardship and public outreach components, perhaps more so in the non-regulatory programs, as well as in accessing private funds.



8. Data integration has been complicated by the use of outside contractors and lack of centralized data warehousing, because monitoring data becomes scattered in several different places. Many programs have not been in existence long enough for data interpretation to result in meaningful analysis of trends or management actions.

One of the NCCP programs—CALFED Bay-Delta—has been audited for its performance and effectiveness during the first 5 years of its implementation, as required by the Record of Decision for the Environmental Impact Statement. The Little Hoover Commission, California Department of Finance, and KPMG, LLP each published reports in 2005 that reviewed different aspects of CALFED implementation. The audit reports found problems in implementation of the Science Program over the first 5 years due to a lack of focus, inadequate staffing and organization, inadequate funding, philosophical conflicts between compliance monitoring and trends monitoring, disagreements between basic research and habitat management as funding priorities, inadequate coordination between funding decisions and milestone requirements, ineffective coordination of work contracted out to consultants, an overtone of politics instead of science, and bureaucratic delays and confusion on direction and priorities.

Former Secretary of Resources Douglas Wheeler said that CALFED was predicated on four principles:

1. Good communication and trans-boundary interactions
2. Active and effective involvement of stakeholders
3. Reliance on science to make decisions
4. Sustained and personal leadership

The Little Hoover Commission Report states that *Most of the current problems can be traced back to violations—even brief ones—of those principles.* The report goes on to explain that the program *has demonstrated the propensity for rudderless bureaucracies to get caught in inescapable eddies.*

Yaffee (1996) also reviewed the realities of ecosystem management and the importance of developing organizational structures with strong leadership and non-traditional decision-making processes that can successfully implement the scientific principles codified in ecosystem theory. He cites communication and coordination, development of effective management plans, and creation of new decision-making structures as the biggest challenges faced in ecosystem management, all of which require changes in human interactions and political relationships, changes in leadership control and organizational culture, and cross-jurisdictional, multidisciplinary problem-solving to yield ecological results.

In California, Pollak (2001) reviewed problems with NCCP implementation at the request of Senator Byron Sher. Pollak cited decentralization, lack of coordination, collaboration, and accountability, insufficient resources, and staff shortages as challenges facing NCCP programs in Southern California. Especially in cases such as these where regulatory permits are involved, failure to change the course of implementation could result in permit suspension or revocation and/or litigation.



The recommendations stemming from these reports and papers are appropriate for any institutional structure that expects to be effective over a large area and a long period of time. These recommendations include:

- Develop a realistic set of biological goals and priorities and a realistic assessment of the capabilities of adaptive management.
- Clearly define authority, organizational structure, and lines of accountability.
- Appoint a strong leader with delegated authority, instead of management by committee.
- Establish good communication and well-defined roles among stakeholders.
- Employ and monitor the use of science-based practices and adaptive management to meet conservation goals.
- Build public awareness and public involvement.

Recommendations for Coordinating Monitoring and Adaptive Management in the San Diego Region

Based on the results of this survey, the audit of the CALFED program, the Pollak (2001) research, and current discussions among San Diego region stakeholders, we provide the following general recommendations for an institutional structure for the San Diego region. Staffing recommendations are taken directly from the recommendations of the Management and Monitoring Subcommittee of the TransNet Environmental Mitigation Program (EMP) Working Group. It is assumed that centralized staffing is necessary for regional coordination of land managers across the county and that individual land managers will continue their land management and monitoring responsibilities (Figure 1). All aspects of a successful monitoring and management process must be transparent, from data collection, to analysis, to results. Finally, there is no alternative to success—at stake is a natural landscape at the epicenter of one of 25 hotspots of biodiversity in the world, which is imminently endangered as a result of population growth, habitat loss, and fragmentation.

Responsibilities of centralized coordination infrastructure

The following regional responsibilities are summarized from the Regional Preserve Implementation Assessment (aka, Needs Assessment) developed by the EMP Working Group:

- **Coordination of field data collection for biological monitoring**
    - Maintain master schedule of monitoring efforts, and annually identify monitoring priorities.
    - Develop and standardize field data collection forms and protocols, and prioritize equipment needs among preserves.
    - Train and coordinate with land managers and other field staff.
    - Coordinate implementation of monitoring plans.

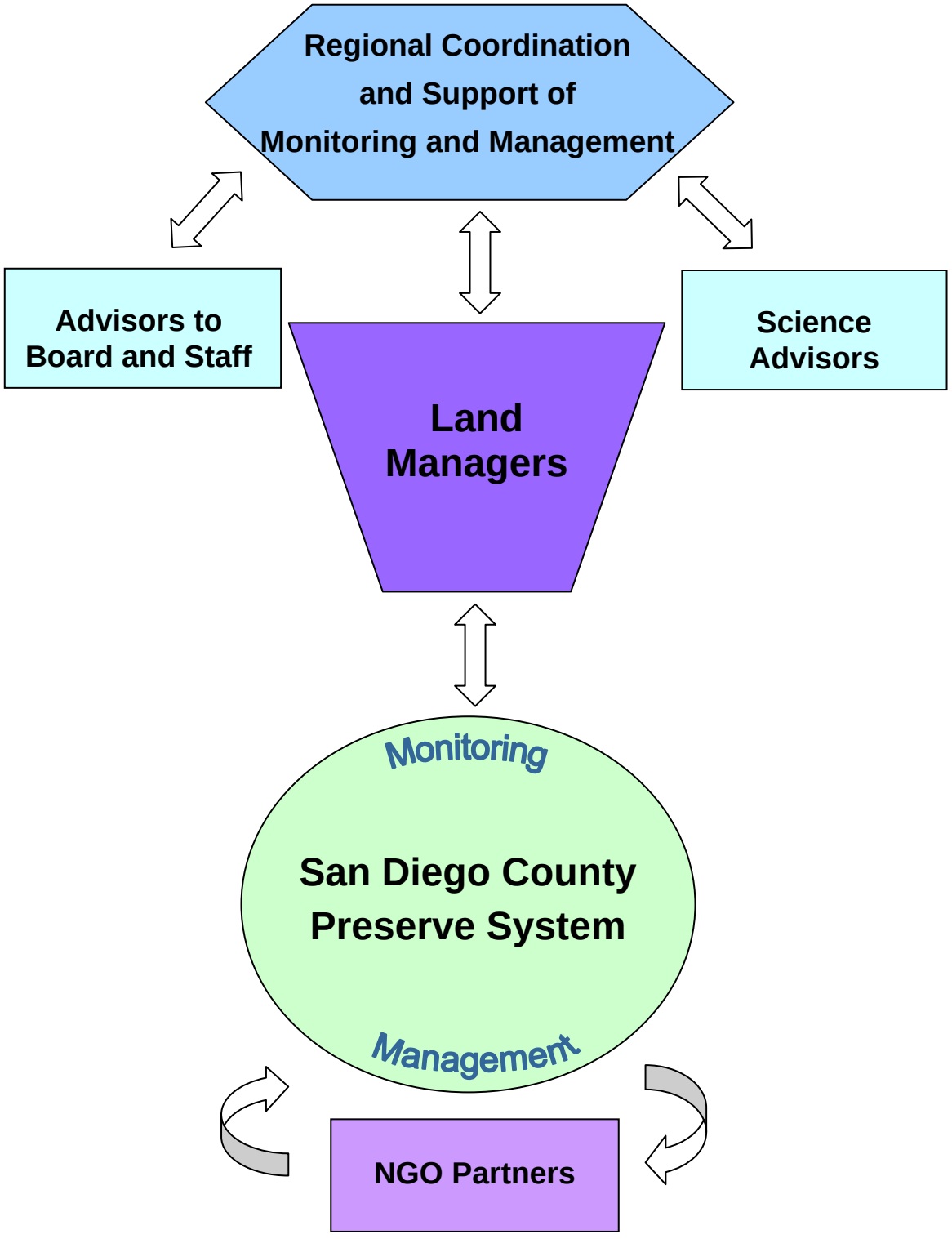


Figure 1. Proposed structure for coordinated preserve management and monitoring in San Diego County



- **Development and coordination of strategic plans for regional management issues**
  - Develop multi-year strategic plans, including budgets and schedules, to address regional management issues.
  - Work with advisor group, science advisors, land managers, public agencies, and stakeholders to allocate available funding for implementation. Review budgets.
  - Oversee and manage contracts for distribution of funds.
- **Annual maintenance and distribution of regional GIS databases**
  - Update regional conserved lands and ownership databases and maps.
  - Update subarea plan and regional habitat preserve planning area boundaries.
  - Update vegetation and fire history data.
  - Update covered and sensitive species databases.
  - Maintain database of management units and land managers.
  - Maintain monitoring locations database for all levels of monitoring.
- **Regional data management, analysis, and interpretation**
  - House regional monitoring data in a structure that can easily be transferred to BIOS in Sacramento.
  - Establish guidelines for data access, and make data accessible to agencies and permit holders.
  - Analyze data for population trends and effectiveness of management actions.
- **Summary reports and distribution**
  - Compile annual monitoring summaries from permit holders in a consistent format.
  - Prepare 3-year monitoring summaries.
  - Develop and maintain regional website, including current conserved lands maps, monitoring results, and management actions.
- **Independent review by Science Advisors**
  - Review and comment on monitoring protocols.
  - Provide technical input on short-term and long-term management and monitoring priorities.
  - Review and comment on monitoring reports.
  - Assist in identifying outside funding sources.
  - Based on monitoring results, recommend modifications to management policies.
  - Develop a process for compiling and analyzing data at the subregional and NCCP regional scales.
  - Contribute data from research projects, and direct students to research projects that contribute to the monitoring and management program.
  - Using a regional perspective, make recommendations regarding priorities for management and monitoring. These recommendations may form the basis for management directives issued by the wildlife agencies.



- Make recommendations for prioritizing funds for management and monitoring, consistent with the management and monitoring priorities above.
- Provide relevant information for the wildlife agencies and EMP Working Group committees to use in prioritizing land acquisitions.

Governance structure

Type—A private, nonprofit organization, or public-private partnership has several advantages over a public agency or JPA, as apparent in some of the start-up difficulties faced in various Southern California NCCP experiences:

- Access to both public and private funding sources with philanthropic interest in the success of ecosystem management and the NCCP program.
- Independence from potential political bias and committees not subject to the Brown Act.
- More freedom and potentially less bureaucracy in contract administration.
- Potentially less complex operating structure, with clearer lines of accountability.
- More robust system for assessing progress toward conservation objectives and the conservation of biodiversity in the region.
- Partnerships with public agencies may facilitate development of an infrastructure for Information Technology (IT) and other resources.
- Partnerships with community land trusts may facilitate public outreach, trust, education, and stewardship.

Authority—Board of Directors, with no monetary compensation for service and no local political affiliation. Day-to-day decision-making authority remains with the Executive Director and staff, who must be held accountable by the Board for their performance.

Composition of Board—community leaders, scientific community, environmental community, people with access to potential donors, people with experience in administration and private-sector fund-raising.

Duties & Responsibilities of Board—approve the annual budget and work program, developed by the Executive Director, for submittal to the wildlife agencies and permit holder staff, financial oversight, fund-raising, and performance review of Executive Director.

Advisors to Board and Staff—wildlife agencies, staff of permit holders, other stakeholders; input to annual budget, work program, and Board's performance review of the Executive Director and staff.

Reporting Requirements—annual reports and other relevant information available to public via dedicated website.

Operation by performance-based contract—The organization would perform the coordinating functions under a 3-5-year contract and scope of work, developed by the Executive Director and centralized staff, with input from Advisors, and approval by the Board of Directors. The 10a and NCCP permits would continue to function as guidelines for operation.



Centralized staff and facilities

Executive Director

- Administrative and development head of coordinating structure.
- Brief and take direction from Board of Directors.
- Represent the San Diego regional NCCP preserve system and its functions and objectives to the public.
- Hire and fire centralized staff.
- Coordinate with wildlife agencies, SANDAG, and jurisdictions regarding administration of coordinating structure.
- Write grants and seek private funding to support 1/4 of annual budget.
- Develop business plan and annual budgets.
- Supervise Monitoring Coordinator, Management Coordinator, and Administrative Assistant.
- Approve contracts and scopes of work for Science Advisors.
- Work with the academic community to focus research efforts in the preserve.

Monitoring Coordinator

- Coordinate the collection and analysis of monitoring data throughout San Diego County, with an emphasis on permitted jurisdictions within the MSCP and MHCP (and ultimately all NCCPs across San Diego County).
- Coordinate with the wildlife agencies on the preparation of triennial reports on the monitoring efforts in San Diego County, which include development of monitoring priorities and management directives.
- Coordinate with the wildlife agencies, other NCCP subregions, and jurisdictions on technical matters, including standardizing field protocols, monitoring locations, data collection protocols, etc.
- Coordinate and make recommendations for future grant proposals.
- Work with the wildlife agencies and Science Advisors to develop training workshops for field data collection efforts.
- Coordinate biological monitoring efforts to track progress through GIS and associated databases.
- Work with Science Advisors on data analysis and synthesis.

Management Coordinator

Years 1-5

- Establish or build off of existing weed advisor group to help identify regional invasive weed threats, prioritize weed species that are/or could be a regional threat to the preserve system, prioritize geographic areas for management, and establish weed management control techniques.
- Work with Advisors to Board and Staff and land managers to develop a multi-year strategic plan(s), including a budget, to address invasive weeds and other



management problems. Establish time frame for periodic review of the plan(s) to evaluate success.

- Develop role descriptions for land managers to coordinate and advise regional invasive control and management.
- Develop a regional GIS database of invasive species locations and management and restoration activities. Track efforts and evaluate success of invasive control efforts and other management actions.
- Work with Advisor group, Science Advisors, land managers, public agencies, and stakeholders within the watershed to allocate available funding for implementation. Review budgets annually.
- Oversee and manage contracts for fund distribution.
- Develop strategic plans for other management issues, such as habitat restoration, invasive animals, runoff and erosion control, grazing as a management tool, prevention and restoration of ORV impacts, fire management, etc.

Biologist

- Work in the field with land managers and monitors to ensure standard protocols are used and to identify and map monitoring locations.
- Work with the GIS Specialist to develop maps for field use.
- Work with the Database Specialist to coordinate and standardize data collection.
- Work with the Management and Monitoring Coordinators to prepare annual and triennial reports.
- Maintain an inventory of equipment, and coordinate equipment needs among jurisdictions and wildlife agencies.

GIS Specialist

- Obtain HabiTrak data from jurisdictions annually.
- Compile regional preserve map and database annually.
- Compile regional ownership map and database annually.
- Maintain and update regional preserve assembly and ownership databases and maps annually and distribute to jurisdictions, wildlife agencies, and SANDAG.
- Obtain updated vegetation maps and data from jurisdictions.
- Compile individual preserve vegetation maps and developed areas into regional database and distribute to jurisdictions, wildlife agencies, and SANDAG.
- Compile and maintain fire history data and distribute to jurisdictions, wildlife agencies, and SANDAG.
- Supervise GIS/Database Technician.

Database Specialist

- Coordinate with BIOS and other NCCP subregions on database standards and data entry procedures, and transfer all monitoring data to BIOS in Sacramento.
- Compile and maintain monitoring databases from all subareas in San Diego County.



- Provide data and analyses as requested by Science Advisors, permit holders, and wildlife agencies.
- Supervise GIS/Database Technician.

GIS/Database Technician

- Assist GIS Specialist and Database Specialist in data entry, database maintenance, map production, queries, and data analysis.

Administrative Assistant

- Report to Executive Director.
- Assist in office management duties and provide employee support.

Science Advisors

- Serve at the direction of Executive Director; paid under contract to implement specific scope of work developed by centralized staff with input from wildlife agencies, permit holders, and other stakeholders.
- Some permanent advisors to provide continuity; some issue-specific scientists on an as-needed basis.
- Review and advise on collection of monitoring data, review and advise on analysis and interpretation of monitoring data, make recommendations for changes in monitoring structures and for adaptive management. (Note: adaptive management directives remain the responsibility of the wildlife agencies.)
- Direct students to research projects that inform the monitoring and management programs.
- Any input received from the Science Advisors would be available to the wildlife agencies, permittees, and interested stakeholders.
- Qualified biologists from public agencies could serve as Science Advisors.

Facilities location—could be shared with an existing institution involved in monitoring and management [e.g., U.S. Geological Survey (USGS)] to maximize coordination and resource-sharing and to minimize costs.

Work contracted out—

- Any work that is contracted out, by the centralized staff as well as the land managers, must be under the direction of and reviewed by the Management Coordinator and/or Monitoring Coordinator.
- All data from work contracted out must be integrated into the centralized databases.
- All aspects of the process must be transparent, from data collection, to analysis, to results.

Funding for centralized staff

A dedicated funding source is critical to the success of monitoring and management (Pollak 2001). It is anticipated that private sector fund raising would produce up to (for example) 25% of funding needs, 50% from regional funding sources [jurisdictions, TransNet, and regional (Phase II) funding], and 25% from in-kind and direct support from USFWS, CDFG, USGS, and other partners.



Start-up/one-time costs—It is anticipated that start-up costs will be needed for the first several years. These could be minimized through sharing of office space and resources with an existing institution.

Expenditures—At full staffing level, it is expected that the annual operating budget will be approximately $1.1-$1.3 million (Table 4).

Endowment—Regional (Phase II or Quality of Life Initiative) funding could endow ongoing functions. We anticipate needing an endowment of $22-26 million to support the annual operating budget ($1.1-1.3 million) proposed in Table 4, assuming net interest revenue of 5% per year.

Table 4. Projected annual operating budget for centralized staff coordinating implementation*

Centralizad Staff	**Annual Cost (± 10%)**
Executive Director	$150,000
Monitoring Coordinator	$95,000
Management Coordinator	$95,000
Biologist	$75,000
Administrative Assistant	$45,000
GIS Specialist	$75,000
Database Specialist	$75,000
GIS/Database Technician	$60,000
Total Staff	$670,000
Indirect @ 65%	$435,500
Science Advisors (contract)	$80,000
TOTAL	**$1,185,500**

*Does not include budget for land managers and outside contractors.

Potential partnerships

Federal/State
U.S. Fish and Wildlife Service
California Department of Fish and Game
U.S. Geological Survey
U.S. Forest Service
U.S. Bureau of Land Management
California Department of Parks and Recreation
California Department of Forestry
CalTrans

Local jurisdictions
SANDAG
County of San Diego
City of San Diego and other incorporated cities

Academic institutions
San Diego Natural History Museum
Center for Research on Endangered Species
San Diego State University
University of California, San Diego
University of San Diego
Community Colleges

Conservation nonprofits
San Diego Conservation Resources Network
Conservation Biology Institute
The Nature Conservancy
The Trust for Public Lands

Other
Alliance for Habitat Conservation
Water districts



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