

City of Carlsbad Open Space Management Plan

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TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
1.0	Introduction: OSMP Process and Structure	1-
1.1	Process and Structure for Implementation of the Carlsbad OSMP	1-
1.1.1	Primary Entities Involved in Implementation	1-
1.1.2	Preserve Management Decision Authority	1-
1.1.3	Planning Documents to Guide Implementation	1-
1.1.4	Preserve Management Plan Preparation	1-
1.1.5	Mechanisms for Data Management and Updates	1-
1.1.6	Phasing of Implementation	1-
1.2	Application of Adaptive Management Concepts to Open Space Management	1-
1.3	Management of Threats and Impacts	1-
1.4	Recreational and Educational Opportunities	1-
2.0	Organization of OSMP Areas	2-
2.1	Management Units	2-
2.2	Subunits	2-
2.3	General Management Entities	2-
2.4	Levels of Open Space/Preserve Management and Monitoring	2-
2.4.1	Property Management	2-
2.4.2	Preserve Management	2-
2.4.3	Species Monitoring and Management	2-
2.4.4	Regional Monitoring	2-
3.0	Open Space Management Issues	3-
3.1	Key Issues of Open Space Management in Carlsbad	3-
3.1.1	Management Responsibilities	3-
	Issue 1: Wildlife Agency Management Responsibilities	3-
	Issue 2: Preserve Management on Existing Open Space on Private Lands	3-
3.1.2	Management Plans	3-
	Issue 3: Development of a Framework Monitoring and Management Plan	3-
	Issue 4: Preserve Management Plans and Area-Specific Management Directives	3-
3.1.3	Management Gaps	3-
	Issue 5: Funding to Close Management Gaps	3-
3.1.4	Fire Management Issues	3-
	Issue 6: Update of Fire Management Policies	3-
3.1.5	Edge Effects and Encroachment	3-
	Issue 7: Noise Impacts to Open Space	3-
	Issue 8: Lighting Impacts to Open Space	3-
	Issue 9: Landscaping and the Introduction of Nonnative Species	3-

TABLE OF CONTENTS (Continued)

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
3.1.6	Animal Species Interactions	3-
Issue 10:	Invasive Ants	3-
Issue 11:	Outdoor and Feral Animals	3-
Issue 12:	Alteration of Ecological Communities	3-
3.1.7	Public Access and Recreation	3-
Issue 13:	Off-road Vehicles	3-
Issue 14:	Illegal Dumping	3-
Issue 15:	Management of Recreational Uses	3-
Issue 16:	Enforcement	3-
Issue 17:	Itinerant Worker and Transient Camps.	3-
3.1.8	Biological Monitoring Responsibilities and Adaptive Management	3-
Issue 18:	Coordination of Monitoring and Management Responsibility	3-
Issue 19:	Trigger for Adaptive Management	3-
Issue 20:	Data Management	3-
Issue 21:	Coordination of Lagoon Management	3-
Issue 22:	Restoration	3-
Issue 23:	Erosion Control	3-
Issue 24:	Public Information, Education, and Beneficial Use of Open Space	3-
Issue 25:	Fencing and Signs	3-
Issue 26:	Preserve assembly and Integration with Habitrak	3-
4.0	List of Preparers and References	4-
4.1	List of Preparers	4-
4.2	References	4-

TABLE OF CONTENTS (Continued)

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
----------------	--------------	-------------

LIST OF FIGURES

1-1	Chain of Command and Decision Authority Among Entities Responsible for OSMP Implementation	1-
1-2	Generalize conceptual model of the Habitat Management Process within the NCCP Context	1-
1-3	Annual Cycle of OSMP Meetings and Reports	1-
1-4	Compliance Monitoring for Implementation of Development Projects	1-
1-4	Effectiveness Monitoring for of Biological Management of the Preserve System	1-
2-1	Areas Included in the OSMP	2-
2-2	Management Units in the OSMP	2-
2-3	General Management Entities and Associated Subunits in the OSMP	2-
3-1	Distribution of Open Space Management by General Management Entity	3-

LIST OF TABLES

1-1	Covered Species Under the Carlsbad HMP	1-
1-2	Matrix of Primary Threats and Potential Effects on Species and Habitats Managed in the OSMP Area	1-
2-1	Acres of Vegetation Occurring within Each Management Unit	2-
2-2	Acres of Vegetation Managed by Each General Management Entity	2-
3-1	Summary of OSMP Issues and Conclusions/Recommendations	3-
3-2	Existing Preserve Management Plans for Open Space in Carlsbad	3-

APPENDICES

APPENDIX A	City of Carlsbad OSMP Funding Analysis (Prepared by CNLM)	A-1
APPENDIX B	Invitation List for Open Space Workshop	B-1
APPENDIX C	The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California	C-1
APPENDIX D	Guide and Annotated Outline for Writing Preserve Management Plans	D-1

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CARLSBAD OPEN SPACE MANAGEMENT PLAN

1.0 INTRODUCTION: OSMP PROCESS AND STRUCTURE

The OSMP is the framework plan to implement the Carlsbad Habitat Management Plan (HMP) that was developed, along with the Multiple Habitat Conservation Plan (MHCP), with the input of the wildlife agencies, the Coastal Commission, and the public to establish a process, standards, guidelines, and conditions for long-term conservation and management of the sensitive species and habitats within the north coastal portions of San Diego County. These two documents (HMP and MHCP) provide a regulatory context with which the OSMP must maintain consistency. The purpose of the OSMP is:

1. To describe a process and structure for open space management and monitoring in the City of Carlsbad.
2. To identify and describe key open space management issues in the City.
3. To recommend strategies and solutions for effectively handling these open space management issues.
4. To quantify expected management and monitoring costs for implementation of the OSMP.

The information and analysis synthesized during the development of this plan was used to help quantify management and monitoring costs in the Open Space Management Funding Analysis, which is contained in Appendix A. This plan was developed with substantial input from the wildlife agencies, key City of Carlsbad staff (Planning Department, Parks Department, and Police Department), interest groups, and the general public. Appendix B includes a list of people and organizations invited to participate.

The MHCP is a comprehensive, multiple jurisdictional planning program designed to develop an ecosystem preserve in northwestern San Diego County. Implementation of the regional preserve system is intended to protect viable populations of key sensitive plant and animal species and their habitats, while accommodating continued economic development and quality of life for residents of this north county region. The MHCP is one of several large multiple jurisdictional habitat planning efforts in San Diego County each of which constitutes a subregional plan under the State of California's Natural Community Conservation Planning (NCCP) Act of 1991.

The current MHCP study area encompasses approximately 29,962 acres of natural habitat across seven incorporated cities in northwestern San Diego County (Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista). These jurisdictions will implement their respective portions of the MHCP plan through citywide "subarea" plans, which describe the specific implementing mechanisms each city will institute for the MHCP. The seven subarea plans will contribute collectively to the conservation of biological communities and species in the MHCP study area. In turn, the MHCP plan, in concert with other subregional plans, will contribute to continued ecosystem viability in southern coastal California. The Carlsbad HMP, which covers a total of 6,449 acres of open space (5,329 acres of natural habitat), is the MHCP subarea plan for the City of Carlsbad.

The specific biological and conservation objectives of the HMP are to:

- Conserve the full range of vegetation types remaining in the City, with a focus on rare and sensitive habitats.
- Conserve areas of habitat capable of supporting the HMP species in perpetuity.

- Maintain functional biological cores.
- Maintain functional wildlife corridors and habitat linkages within the City and to the region, including linkages that connect gnatcatcher populations and movement corridors for large mammals.
- Conserve rare vegetation communities.
- Conserve narrow endemic species and maintain populations of target species.
- Apply a “no net loss” policy to the conservation of wetlands, riparian and oak woodland habitats.

Implementation of OSMP will be a critical component necessary for achieving these goals and maintaining compliance with the Implementing Agreement and endangered species take permits for species covered by the HMP and the MHCP. Therefore, compliance with the MHCP and HMP requirements is the first and guiding priority of the OSMP. An MHCP-wide monitoring plan (MHCP Volume III) was developed to provide guidance and direction for management of covered species and their habitats in compliance with the conditions for coverage identified in the biological analysis of the MHCP (MHCP Volume II). The Carlsbad OSMP will need to be consistent with the monitoring and management requirements of the MHCP monitoring plan.

There are three major components to open space management in the City of Carlsbad, (1) monitoring and adaptive management of species, habitat condition, and ecological processes, (2) management of threats and impacts to species and habitats, and (3) creation and maintenance of recreational and educational opportunities. Each of these components raises a number of important open space management issues. Most of these issues are not unique to Carlsbad and have well-established open space management solutions; however, some of these issues will require further thought and consensus from the City, the wildlife agencies, the Coastal Commission, and the interested public before workable solutions can be implemented by this City-wide Open Space Management Plan (OSMP).

The issues addressed in this plan are organized and discussed as they apply across the City, but in practice they will be implemented in the biogeographic and preserve management context of Management Units and Subunits, as defined for the OSMP. Individual preserve managers will identify which management issues affect their particular subunit (preserve area) and will develop and implement area-specific management directives (ASMDs) as a part of their individual preserve management plans, but in coordination with related ASMDs and other management issues throughout the rest of the Management Unit. Note that many ASMDs already exist as they have been stipulated by the conditions for coverage in the MHCP conservation analysis and will be incorporated into individual preserve management plans.

There are three additional categories of land in the OSMP planning area that are not included in the areas identified as preserved within the HMP or MHCP, including other natural lands, developed parks, and drainage basins.

Other Natural Lands – The OSMP covers all of the natural lands in the City (7,345 acres). However, the HMP covers 5,329 acres of natural lands including all existing or proposed preserves (100% conserved) and standards areas (where a portion will be developed according to HMP/MHCP standards and the rest conserved). The remaining 2,015 acres of natural lands (mostly isolated smaller fragments of habitat) were not included in the HMP and MHCP primarily because they did not contribute significantly to the overall preserve design; however, they are included in the OSMP planning area and will continue to be managed as open space.

Developed Parks – Developed parks have been incorporated into the GIS Inventory so that City-wide management can be scheduled, tracked and analyzed in this database. This category includes existing parks as well as parks developed in the future.

Drainage Basins – The City’s drainage basin facilities were also incorporated into the GIS Inventory for the OSMP so that management can be scheduled, tracked and analyzed in this database. The drainage basin parcels are included as an overlay because they are sometimes covered by other categories and may overlap with the HMP/MHCP areas.

1.1 Process and Structure for Implementation of the Carlsbad OSMP

This section of the OSMP outlines the basic process and structure for implementation of the OSMP for monitoring, management, oversight, and reporting responsibility. Additionally, there is a description of the calendar of events to facilitate the coordination and timing of periodic meetings and reports, and guidelines for how data will be coordinated, managed and analyzed.

1.1.1 Primary Entities Involved in Implementation

There are six primary entities or general groups involved in implementation of the OSMP, including the City of Carlsbad, their Preserve Steward and Preserve Managers who have direct responsibility for on the ground implementation on a daily basis, and the wildlife agencies, California Coastal Commission, and the broader scientific community, environmental NGOs and the general public who have the responsibility for reviewing and commenting on the associated planning documents, ongoing implementation process, and analysis and reports. A brief description of the roles of these entities follows below.

1. Wildlife Agencies

The wildlife agencies include the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG). USFWS and CDFG are responsible for:

- Enforcing compliance by the City of Carlsbad with management and monitoring obligations of their Implementing Agreement and the Carlsbad HMP and MHCP.
- Reviewing Annual Reports and proposed annual work plans, three-year status summary reports, preserve management plans, and other associated management/research activities.

2. California Coastal Commission

The California Coastal Commission's primary mission is to plan for and regulate land and water uses in the coastal zone consistent with the policies of the Coastal Act. With respect to the MHCP and the Carlsbad HMP, the California Coastal Commission is responsible for:

- Overseeing development and HMP implementation in the Coastal Zone.
- Reviewing of Annual Reports.

3. City of Carlsbad

The City of Carlsbad is responsible for:

- Overseeing implementation and maintaining compliance.
- Tracking habitat gains/losses using Habitrak.
- Compliance monitoring (development project review and approval).

- Species and habitat monitoring via the preserve steward and preserve managers.
- Management and maintenance via the preserve steward and preserve managers.

4. HMP Preserve Steward:

The Preserve Steward is a new role and position that has evolved from the necessity for the City of Carlsbad to have a dedicated person with the necessary ecology, conservation biology, and statistics background to oversee the City-wide monitoring, management, and maintenance of the whole OSMP preserve system. The preserve steward will be a contracted consultant or City staff person responsible for:

- Taking a leadership role in the overseeing and coordination of City-wide preserve management, monitoring and reporting.
- Frequent communication with the preserve managers, the City, and the wildlife agencies.
- Providing science-based technical support to preserve managers for survey design, data collection and analysis.
- Supporting the City on compliance monitoring (review of predevelopment plans and post-construction conformance review) by training and updating City planning staff regarding development standards and guidelines required for development adjacent to preserve areas.

5. Preserve Manager

The Preserve Manager is the person with on the ground responsibility for management and monitoring of each preserve area. Preserve managers may be employees of the City, recognized professional third party biological management entities (e.g., Center for Natural Lands Management), a state or federal agency (e.g., CDFG), or another public/semi-public land management entity (e.g., North County Transit or San Diego Gas and Electric). The preserve manager is responsible for:

- Development of a preserve management plan for each preserve area and updating the plan on a three-year basis.
- Managing individual preserve areas according to their individual preserve management plans.
- Monitoring species, habitats, and management actions according to their preserve management plans.
- Coordinating with the preserve steward, other preserve managers, the City, and the wildlife agencies regarding open space management issues, management and monitoring.
- Collection of biological monitoring data according to MCHP-established protocols for preserve area, MHCP-level, and regional monitoring. Submittal of data to the preserve steward and wildlife agencies.

6. Scientific Community, Environmental NGOs and General Public

This last group includes the broader community of individuals and interest groups that play a role in the public process of open space planning and management within the NCCP context. The scientific community, environmental NGOs and general public have the opportunity and/or responsibility for:

- Reviewing Annual Reports.
- Observing actions and identifying issues in preserve areas.
- Providing input to the wildlife agencies, Coastal Commission, and the City as needs arise.

The structure for interaction of the several of these entities is shown in Figure 1-1.

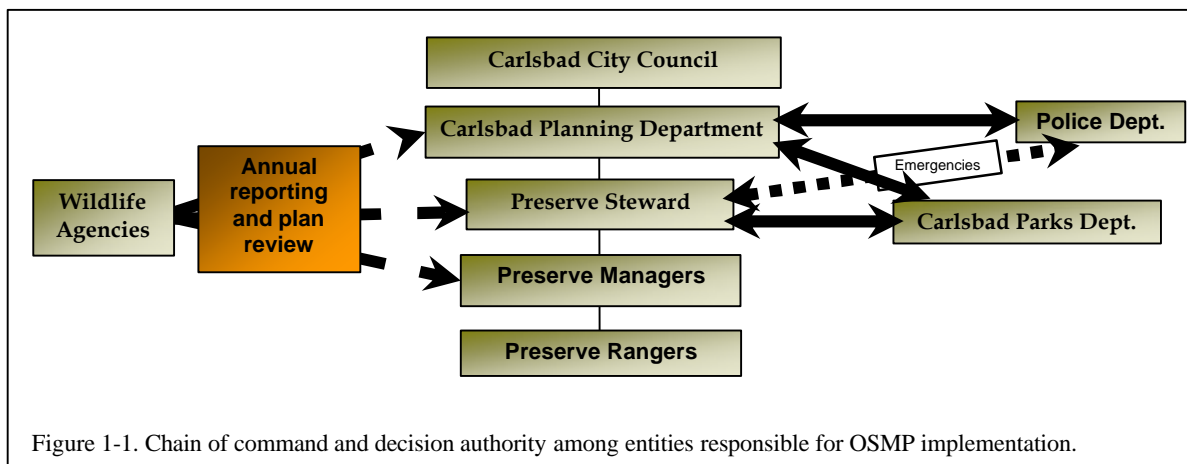


Figure 1-1. Chain of command and decision authority among entities responsible for OSMP implementation.

1.1.2 Preserve Management Decision Authority

Preserve managers will have full budget discretion, within the limits of their funding, to implement preserve management and monitoring on non-City owned properties according to the directives of their preserve management plans and annual work plans. Actions and expenditures not specifically identified in preserve management plans or work plans are allowed if required as a part of a reasonable adaptive management response or to address another emergency situation. However, such unknown future expenditures should be carefully determined since they will likely exceed annual budgets and may reduce funding for future years when funding is supported by an endowment.

For the City-owned land, budgets will be spent according to the directives of their preserve management plans and annual work plans; however, budget discretion would remain with the City for annual approval of these plans and for actions and expenditures not specifically identified in these plans for adaptive management response or to address another emergency situation beyond that covered by the annual budget for City-owned lands.

The preserve steward will assist preserve managers in making the decisions for actions and expenditures not identified in the preserve management plans or annual work plans and will be responsible for obtaining City approval for additional actions or expenditures when required.

If the preserve steward or the wildlife agencies determine that additional budget needs to be spent on a particular task, the preserve manager will comply with this decision. In general, the preserve manager will retain control of the budget and will be in charge of how it is spent.

Initially, the City Planning Department will work closely with the preserve managers and preserve steward to establish a chain of command and communication with the Police Department, Fire Department and other relevant City departments (see Figure 1-1). The Rangers that will be hired will go through an orientation process to understand the limits of their authority and to understand when they will need to call in the Police Department. Eventually, the chain of command and communication will become routine. Through the orientation process the rangers will also learn how to identify activities that are illegal or otherwise not permitted or acceptable uses in or near the OSMP preserve system.

If there is a conflict between the preserve management plans (MHCP, HMP, individual Preserve Management Plans, or annual work plans) and any other public need (such as a trail, sewer line, etc.) the City will evaluate and resolve the conflict as follows:

1. Is the public need a matter of health, safety and welfare, or is it a matter of convenience?
2. Was the project covered in the HMP as a project that would be permitted by the HMP, or is it a new project not previously addressed?
3. Is there a reasonable alternative that would avoid the impact?
4. Is the impact direct or indirect?
5. Is the impact temporary or permanent?
6. Would any covered species in the HMP be affected, directly or indirectly?
7. Can the impact be mitigated to less than significant?
8. Can the impact be mitigated by seasonal restrictions?
9. Would the impact cause an increase in costs or management effort by the preserve manager?

The City and preserve steward would consult with the wildlife agencies on these points and try to arrive at a consensus decision. The preserve steward would make recommendations to the City regarding the decision, but the City would be responsible for the final decision and will evaluate the impacts of this action on covered species or the resources they use in a timely and quantitative manner.

1.1.3 Planning Documents to Guide Implementation

There are several documents that City staff, the preserve steward, and preserve managers should be intimately familiar with. Because the permit duration for incidental take under the City's implementing agreement is for 50 years and because the preserve system will be conserved and managed in perpetuity, there will be new staff at all levels that will eventually be a part of the implementation process. All current and future staff should read and clearly understand the following documents, some of which will be updated and amended over the years:

1. The *Natural Community Conservation Planning Act* (NCCP) as a component of the *California Endangered Species Act*. This is the state-level legislation that dictates the guidelines for preparation and implementation of conservation plans that contribute to species recovery, such as the MHCP and Carlsbad HMP, and which provides a mechanism for legal incidental take of endangered, threatened, or otherwise sensitive species in California.
2. The *Federal Endangered Species Act* and *Habitat Conservation Planning Handbook*. Section 10(a) of this act and the associated handbook specify how habitat conservation

plans, including the MHCP and Carlsbad HMP, should be prepared and implemented to provide for the conservation and management of federally endangered or threatened species, while allowing actions that may take listed species without precluding their recovery.

3. The *MHCP subregional plan* includes policies and guidelines for coordinated implementation across the entire MHCP preserve system. The *MHCP Conservation Analysis* (volume II) includes species-specific conditions for conservation and management. The *MHCP Monitoring Plan* (volume III) includes MHCP-wide guidelines for monitoring and management along with sample standardized survey protocols and data collection sheets. Recommended and required survey protocols will continue to be updated over time; therefore, current survey protocols should be obtained from and confirmed with the wildlife agencies annually.
4. The *Carlsbad Habitat Management Plan* (HMP) and *Implementing Agreement* are the two documents that contain the specific policies, guidelines, and permit conditions for management, monitoring, and reporting of species and habitat status and condition.
5. The *Carlsbad Open Space Management Plan* (this document) provides detailed direction regarding the coordination of entities and individuals responsible for management and monitoring, describes the primary open space management issues and recommended approaches to address those issues, and analyzes the funding requirements for open space management City-wide.
6. Preserve managers will be required to complete an individual *Preserve Management Plan* for each of the preserve areas they manage within one year of the time at which the preserve area is officially dedicated and recorded into the preserve system. The preserve management plans are required to be updated every three years thereafter. A draft update (or initial) preserve management plan is due in November of every third year and will be distributed to the preserve steward, City, and wildlife agencies for review and comment. The final preserve management plan is due the following February. The specific contents of the preserve management plan are discussed in the next section.
7. Every year each preserve manager must submit an *Annual Work Plan* for each preserve area. A draft annual work plan is due each November to the preserve steward, City, and wildlife agencies for review and comment, and the final preserve management plan is due the following February. Each annual work plan should outline the planned monitoring and management actions for the year and include a prioritization of specific management needs and area-specific management directives (ASMDs) to be implemented in the adaptive management context.

1.1.4 Preserve Management Plan Preparation

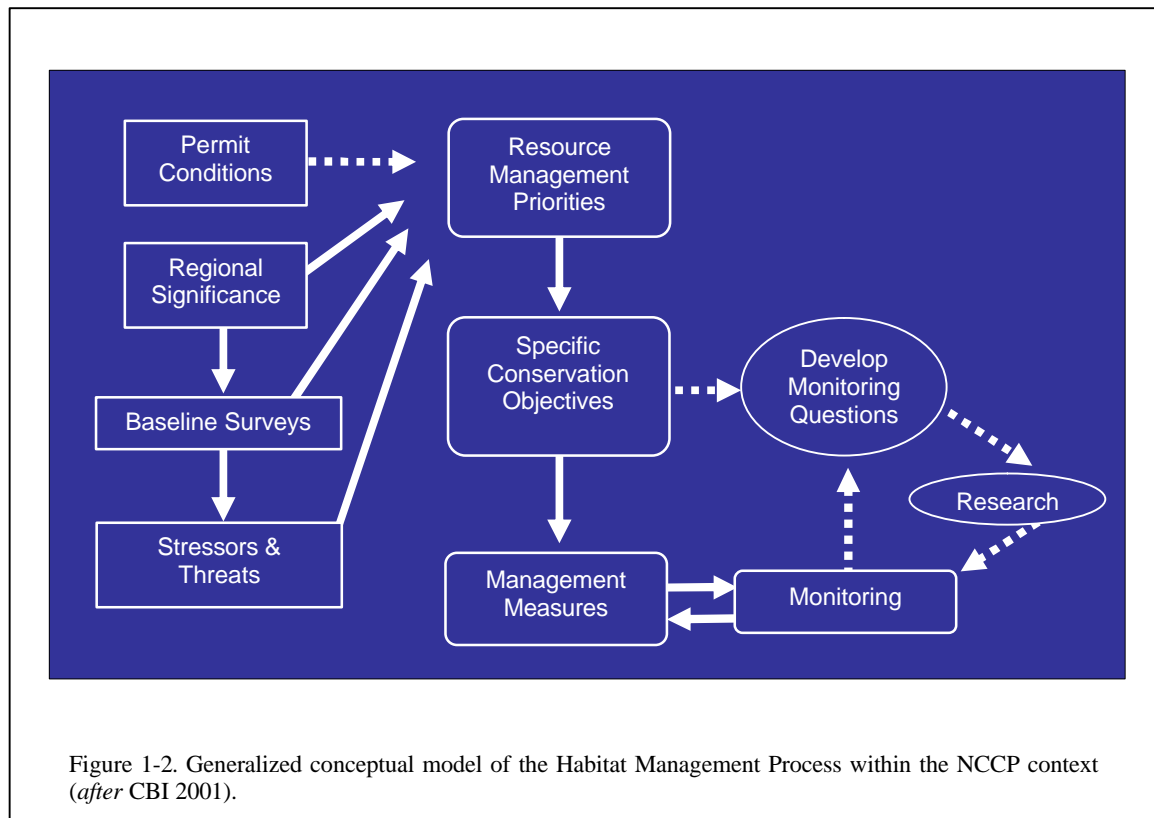
At a basic level, open space management within the NCCP context is a process of taking the permit conditions specified in the Implementing Agreement and associated documents (the MHCP and Carlsbad HMP in this case) and integrating them into a preserve specific management actions. Figure 1-2 is a conceptual model of how the essential elements of habitat management interact in the NCCP context.

Following the organization in Figure 1-2, each preserve manager should develop a preserve management plan that describes the regional biogeographic significance and context of the preserve, the baseline biological conditions, and the known or expected stressors and threats to the biological value of the preserve. This information creates the context in which the permit conditions apply to each individual preserve area.

The obligations established in the permit conditions along with the biological and management issues should be evaluated to set resource management priorities and specific conservation objectives in each

preserve management plan. These conservation objectives in turn should be used to develop management and monitoring Area-Specific Management Directives (ASMDs). The ASMDs should be paired with preserve management hypotheses (assumptions and expectations for the response or outcome of management actions), which should be stated in the preserve management plans along with the ASMDs and can be tested through monitoring of the results of management actions and of species and habitat status. The preserve management plan should be developed and applied using the principles of adaptive management, where monitoring results would in turn be used to refine future management actions to better attain conservation objectives.

Appendix D is an outline of the required format for preserve management plans developed in the OSMF area. The outline has been adapted from the California Department of Fish and Game's guide to preparation of land management plans (CDFG 2003). It is important to use a standardized format for the preserve management plan so that the City of Carlsbad and the wildlife agencies may easily review and confirm that the preserve management plan includes the necessary goals, objectives, actions, priorities, and area-specific management directives (ASMDs) to manage and monitor species and habitats within the context of the Carlsbad HMP and overall MHCP. Appropriately designed and developed preserve management plans will greatly facilitate the ability of the City of Carlsbad to maintain compliance with the permit conditions of its Implementing Agreement for the HMP. The CDFG land management plan format is being used for the CDFG lands within the City and provides a consistent template for the non-CDFG preserve areas.



The preserve management plan should accomplish the following:

1. Provide an overall vision of preserve area and its role in the City-wide preserve system.
2. Identify the covered species that occur or have the potential to occur in the preserve area. The list of species covered by the Carlsbad HMP (the City's subarea plan to the MHCP) is included in Table 1-1. List 1 in Table 1-1 is species independently covered by the HMP. List 2 is species for

**Table 1-1
Covered Species under the Carlsbad HMP**

List 1: Species Proposed for Coverage under the Carlsbad HMP

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<u>Brodiaea filifolia</u>	Thread-leaved brodiaea	FT/CE/NE	4-37
<i>Chorizanthe orcuttiana</i>	Orcutt's spineflower	FE/CE/NE	4-56
<i>Dudleya blochmaniae ssp. blochmaniae</i>	Blochman's dudleya	FSC	4-74
Euphorbia misera	Cliff spurge	None	4-101
<u>Hazardia orcuttii</u>	Orcutt's hazardia	FSC/NE	4-111
<i>Quercus dumosa</i>	Nuttall's scrub oak	FSC	4-159
Invertebrates			
<u>Panoquina errans</u>	Salt marsh skipper	FSC	4-202
<u>Euphyes vestris harbisoni</u>	Harbison's Dun Skipper	FSC/NE	4-196
Birds			
<u>Pelecanus occidentalis californicus</u>	California brown pelican	FE/SE	4-251
<i>Plegadis chihi</i>	White-faced ibis	FSC/SSC	4-256
<u>Accipiter cooperii</u>	Cooper's hawk	SSC	4-264
<i>Pandion haliaetus</i>	Osprey	SSC	4-269
<i>Falco peregrinus anatum</i>	American peregrine falcon	CE	4-280
<i>Rallus longirostris levipes</i>	Light-footed clapper rail	FE/CE/FP	4-285
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	FT/SSC	4-291
<i>Sterna elegans</i>	Elegant tern	FSC/SSC	4-299
<i>Sterna antillarum browni</i>	California least tern	FE/CE/FP	4-304
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	FE/CE	4-314
<i>Vireo bellii pusillus</i>	Least Bell's vireo	FE/CE	4-321
<u>Polioptila californica californica</u>	Coastal California gnatcatcher	FT/SSC	4-333
<i>Icteria virens</i>	Yellow-breasted chat	SSC	4-360
<i>Aimophila ruficeps canescens</i>	California rufous-crowned sparrow	FSC/SSC	4-366
<i>Passerculus sandwichensis beldingi</i>	Belding's savannah sparrow	FSC/CE	4-371
<i>Passerculus sanwicensis rostratus</i>	Large-billed savannah sparrow	FSC/SSC	4-377
Reptiles			
<i>Cnemidophorus hyperythrus beldingi</i>	Orange-throated whiptail	SSC	4-245

* See the "Key to Legal and Management Status" that follows List 4.

Table 1-1 (Continued)
Covered Species under the Carlsbad HMP

List 2: Species Coverage Contingent on Other MHCP Subarea Plans being Permitted

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<i>Acanthomintha ilicifolia</i>	San Diego thornmint **	FT/CE/NE	4-9
<u>Ambrosia pumila</u>	San Diego ambrosia	FE/NE	4-16
<i>Ceanothus verrucosus</i>	Wart-stemmed ceanothus **	FSC	4-50
<i>Dudleya viscida</i>	Sticky dudleya	FSC	4-89
<u>Ferocactus viridescens</u>	San Diego barrel cactus	FSC	4-106
<i>Quercus engelmannii</i>	Engelmann oak	None	4-165

See the “Key to Legal and Management Status” that follows List 4.

** Coverage for this species is also contingent on funding for management of conserved areas.

List 3: Species Coverage Contingent on Funding for Management of Conserved Areas

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<i>Arctostaphylos glandulosa</i> ssp. <i>crassifolia</i>	Del Mar manzanita	FE/NE	4-26
<i>Baccharis vanessae</i>	Encinitas baccharis	FT/CE/NE	4-32
<i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i>	Summer holly	FSC	4-63
<i>Corethrogyne filaginifolia</i> var. <i>linifolia</i>	Del Mar sand aster	None	4-68
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery **	FE/CE/NE	4-94
<u>Iva Hayesiana</u>	San Diego marsh elder ***	FSC	4-116
<u>Myosurus minimus</u> ssp. <u>Apus</u>	Little mouseltail **	FSC/NE	4-133
<i>Navarretia fossalis</i>	Spreading navarretia **	FT/NE	4-140
<i>Orcuttia californica</i>	California Orcutt grass **	FE/CE/NE	4-147
<i>Pinus torreyana</i> ssp. <i>torreyana</i>	Torrey pine	FSC	4-154
Invertebrates			
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp **	FE/NE	4-178
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp **	FE/NE	4-184

* See the “Key to Legal and Management Status” that follows List 4.

** Coverage for this species is also contingent on the City of Carlsbad receiving legal control over the protection, management, and monitoring of the vernal pools adjacent to the Poinsettia Train Station in Carlsbad.

*** Coverage for this species is also contingent on other MHCP subarea plans being permitted.

Table 1-1 (Continued)
Covered Species under the Carlsbad HMP

List 4: MHCP Species Not Covered under the Carlsbad HMP

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<i>Dudleya blochmaniae</i> ssp. <i>brevifolia</i>	Short-leaved dudleya	CE/NE	4-80
<i>Lotus nuttallianus</i>	Nuttall's lotus	FSC/NE	4-122
<i>Tetracoccus dioicus</i>	Parry's Tetracoccus	FSC	4-170
Invertebrates			
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	FE	4-211
Reptiles and Amphibians			
<i>Scaphiopus [Spea] hammondi</i>	Western spadefoot toad	SSC	4-215
<i>Bufo californicus</i>	Arroyo toad	FE/SSC	4-222
<i>Clemmys marmorata pallida</i>	Southwestern pond turtle	FSC/SSC	4-233
<i>Phrynosoma coronatum blainvillei</i>	San Diego horned lizard	FSC/SSC	4-238
Birds			
<i>Aquila chrysaetos</i>	Golden eagle	BEPA/SSC	4-274
<i>Campylorhynchus brunneicapillus cousei</i>	Coastal cactus wren	FSC/SSC/N E	4-328
<i>Sialia mexicana</i>	Western bluebird	None	4-355
<i>Amphispiza belli belli</i>	Bell's sage sparrow	FSC/SSC	4-380
Mammals			
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat	FE/ST	4-401
<i>Perognathus longimembris pacificus</i>	Pacific pocket mouse	FE/SSC/NE	4-407
<i>Chaetodipus fallax fallax</i>	Northwestern San Diego pocket mouse	FSC/SSC	4-416
<i>Lepus californicus bennetti</i>	San Diego black-tailed jackrabbit	FSC/SSC	4-421
<i>Felis concolor</i>	Mountain lion	SPM	4-425
<i>Odocoileus hemionus fuliginata</i>	Southern mule deer	RGS	4-431

Key to Legal and Management Status of Species in Lists 1 - 4

FE - Federally Endangered

FT - Federally Threatened

BEPA - Bald Eagle Protection Act

FSC - Federal Species of Concern (former Category 2 Candidate)

CE - State Endangered

CT - State Threatened

SSC - State Species of Special Concern SPM - State Special Protected Mammal

RGS - State Regulated Game Species

None - No Federal, State, or City status

NE - Narrow Endemic Species in the MHCP

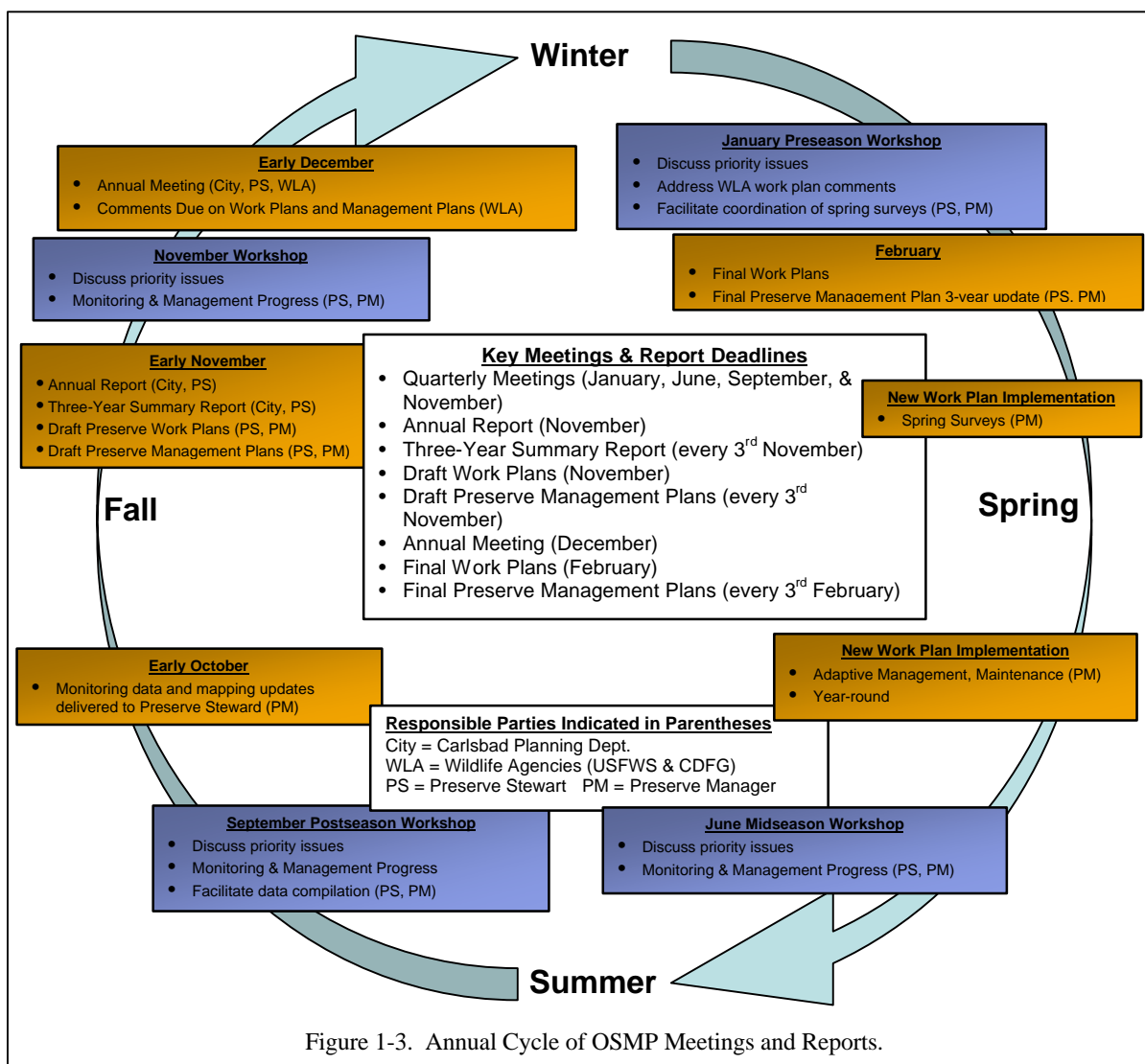
which coverage is contingent on other MHCP Cities subarea plans being permitted. List 3 is contingent on funding for management of conserved areas. List 4 is species that are not currently covered by the HMP.

3. Identify primary goals and objectives tied to the conditions of the HMP and Implementing Agreement as well as broader open space management goals.
4. Describe preserve-level and subregional monitoring activities.
5. Develop a comprehensive list of ASMDs for the preserve area.

Incorporate new information gained from adaptive management of the preserve and other nearby similar preserve areas, and new information contained in the MHCP Three-Year Status Summary Reports.

1.1.5 Communication to Coordinate Implementation

Effective and efficient implementation of the OSMP requires frequent communication among the primary entities involved in implementation (preserve managers, preserve steward, City, and wildlife agencies). The following section outlines the various reports, review periods, and meetings to coordinate this communication. The timing of these various modes of communication is critical for efficient implantation. Figure 1-3 shows the annual cycle of meetings and reporting.



The reports and meetings are briefly described with target time periods for completion in parentheses:

Annual Report (due early November) includes but not limited to:

- Information, data, and analysis from all preserve areas integrated and analyzed by the preserve steward.
- Update of gains/losses calculated via Habittrak
- Descriptive text, maps and a GIS data layer with associated GIS calculations showing the areas conserved that year and during previous years.
- Descriptive text, maps and a GIS data layer with associated GIS calculations showing how the boundary of the preserve (e.g., boundary adjustments, permitted development) has changed.
- Descriptive text, maps and data for updated baseline surveys (vegetation mapping and species surveys).
- Summaries of management actions undertaken during the past year with an assessment of the success and adaptive management strategy for next year for each action.
- Summaries of all monitoring activities and associated data and analysis on status and trends of populations of covered species and condition of habitats.
- Current status of each covered species compared to the status at the time the take permit was signed. If data was not collected that year for a given species, previous year's data should be presented. If no baseline data exists, baseline surveys should be a priority for the next year.
- A list of priority open space management issues, key problem areas, and City-wide and area-specific actions to address these issues.
- Information on public use of the preserve system.
- Budget summaries showing actual compared to planned budget, status of endowments, etc.

Annual Public Meeting (early December):

- Presentation of information contained in annual report.
- Opportunity for scientific community and public input, questions, and answers.
- Attendance should include the wildlife agencies, the Coastal Commission, City, Preserve Steward, Preserve Managers, and other interested groups or individuals.

Preserve Management Plans and Annual Work Plans (draft due early November (every third year for Preserve Management Plans), final due following February):

- See Section 1.1.4 and Appendix D for required content and format.
- 30 day review by wildlife agencies and preserve steward; available for public review and comment.

Three-Year Summary Reports (early November):

- Comprehensive monitoring report summarizing previous three years relative to status and trends, MHCP goals, City-wide effectiveness of plan implementation.

Quarterly Carlsbad OSMP Workshop:

- To facilitate coordination between preserve areas/managers.
- To share ideas, address common problems, identify funding/grant opportunities (coordination of Section 6 and NCCP local assistance applications), etc.
- Required attendance - Preserve Managers, Preserve Steward
- Invited attendance – City, Coastal Commission, Wildlife Agencies, and public (key City and Wildlife Agency staff may be required for certain issues)

Status Memo from Preserve Steward (Quarterly):

- Memo to City and Wildlife Agencies providing a brief summary of the ongoing issues and progress on the work plan at each preserve area and City-wide
- Meetings with City staff as needed to resolve management monitoring issues

Status Memos from Preserve Managers (Monthly):

- Brief memo to Preserve Steward reporting status of new/ongoing issues and progress on work plan
- Discussion of management/monitoring activities of previous month

Frequent communication between Preserve Steward and Preserve Managers (ongoing as needed):

- Phone, email, field as needed
- Emergency/critical issue reporting to City, Wildlife Agencies and/or Coastal Commission as needed (Preserve Manager and/or Steward to report depending on severity of issue)

The above schedule and process for meetings and reporting will provide the structure for compliance monitoring (Is the HMP and OSMP being implemented according to the Implementing Agreement and the conditions, policies, and guidelines established therein?) and effectiveness monitoring (Is the conservation and management of the preserve system conserving the species and habitats as expected?). Figure 1-4 and 1-5 show schematically how the primary preserve management entities and reporting mechanisms interact to achieve effective compliance monitoring and effectiveness monitoring, respectively.

1.1.5 Mechanisms for Data Management and Updates

Coordination of data management is important at every preserve management and monitoring level. Field data collected to monitor the success of management actions and other ASMDs need to be consistently organized and analyzed so that adaptive management lessons can be shared and applied to other preserve areas. Species and monitoring data must be collected, analyzed, and summarized with standardized methods so that data from individual preserves can be combined for City-wide analysis and reporting, as well as for integration into subregional and regional monitoring programs.

Data Management Process:

- Preserve managers must use consistent survey methods and protocols (MHCP Monitoring Plan, Wildlife Agency protocols, other scientific methods with review of Preserve Steward)
 - Data Compilation and Reporting for monitoring data including habitat based monitoring and species-specific surveys.
 - Using standardized data entry formats preserve managers will submit data to preserve steward upon collection so that it can be analyzed by the steward, or the steward can be assured that it was collected and that it will be analyzed and interpreted in a timely manner for integration into annual report. Summary data should be prepared according to a consistent format.
 - Resource mapping updates
 - Resource mapping updates (primarily vegetation mapping) should be compiled and submitted to the preserve steward and the City in GIS format.
 - Individual research projects by preserve managers or others
 - Data types and formats will vary project to project; however, researchers should attempt to use consistent protocols and format whenever possible.
 - Primary data types to be collected and summarized City-wide
 - GIS data
 - Tabular data
 - Data summary reports

Compliance Monitoring

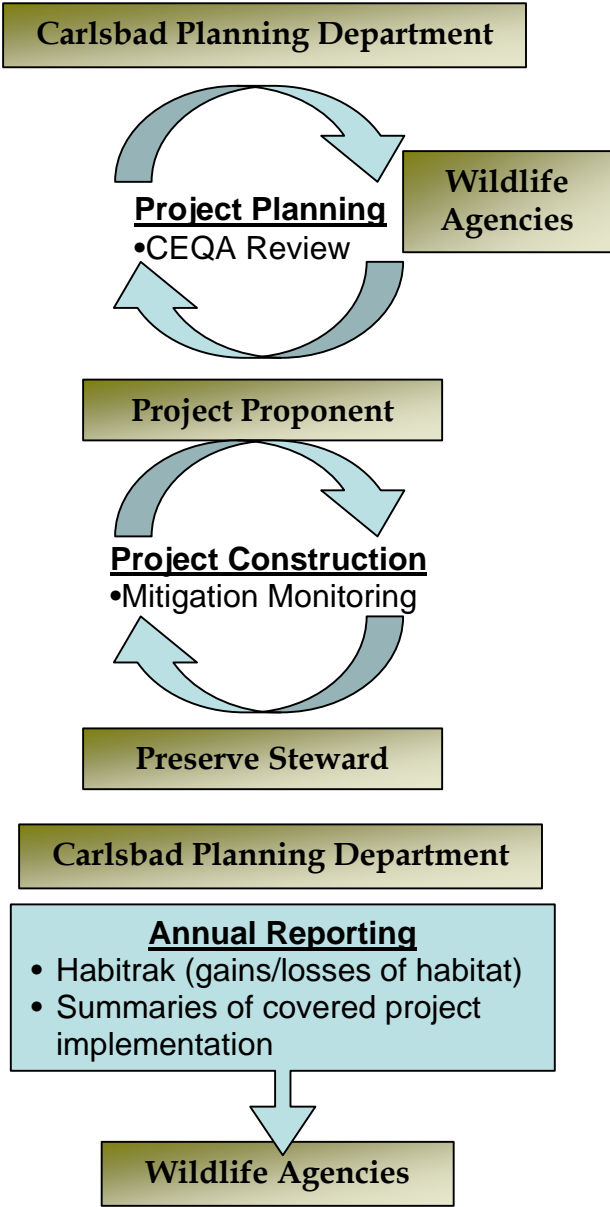


Figure 1-4. Compliance monitoring for implementation of development projects.

Effectiveness Monitoring

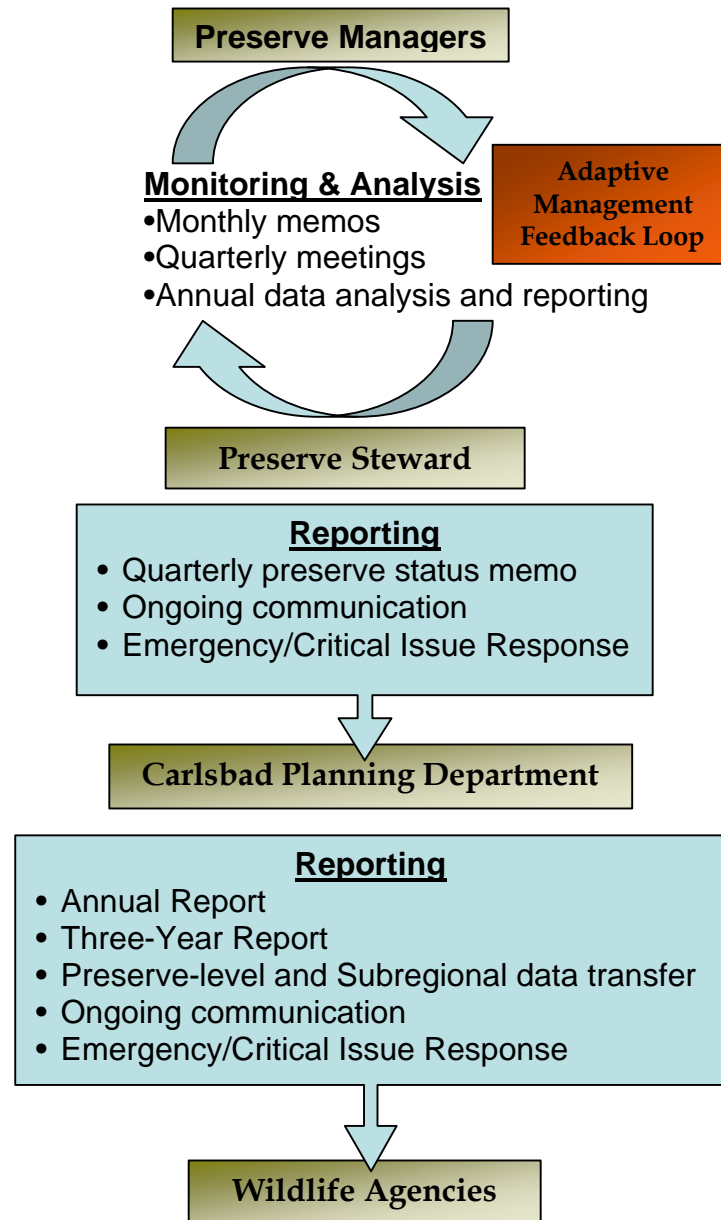


Figure 1-5. Effectiveness monitoring of biological management of the preserve system.

Ideally, data will be coordinated and managed with an Internet-based interface to make GIS mapping data accessible through the Internet. At a minimum, the City and preserve steward will provide preserve-level tabular data and pdf maps, along with preserve management plans, annual work plans, three-year summary reports and other general open space management information on City's web site.

1.1.6 Phasing of Implementation

There are two basic phases of implementation of the OSMP. The first phase is intended to establish the baseline for species status and habitat condition in the preserve areas. Phase I occurs within the first three years after signing of the implementing agreement or within the first year after a property is hardlined (dedicated and/or conservation easements recorded) into the preserve system. The second phase is the ongoing monitoring and management of the preserve system in perpetuity. Phase II starts once the baseline conditions have been established. The following outline identifies the key elements in each phase.

Phase I: Establish baseline database:

- Update vegetation maps where needed (as determined by the preserve steward and wildlife agencies).
- Conduct additional species baseline surveys where needed (as determined by the preserve steward and wildlife agencies).
- Preserve steward and the wildlife agencies determine and prioritize updates.
 - Priority 1 – Updates must be completed in first 1-2 years.
 - Priority 2 – Updates must be completed in first 3 years.
 - New preserves areas added to system – Updates, if needed, completed in first 1 year after adding to system.
- MHCP CSS Restoration Obligation –Subject to availability of regional funding or mitigation funding from other sources.

Phase II: Ongoing monitoring and management (in perpetuity):

- Regular surveys at preserve level and subregional level as prescribed by MHCP and HMP.
- Standard preserve management procedures.
- Baseline Surveys for new preserve areas (softline/standards areas) as they come online (see new preserve areas under Phase I).

1.2 Application of Adaptive Management Concepts to Open Space Management

The City and preserve managers in the OSMP area are responsible for managing individual preserve areas to ensure that conservation goals of the HMP/MHCP are met. The City expects that management and monitoring by preserve managers will occur through an adaptive management approach. The specific models for experiments, observational studies, and adaptive management will be developed by preserve managers in their preserve management plans to implement management actions and test a priori assumptions via purposeful science-based monitoring.

Monitoring at the preserve area scale needs to be focused on obtaining information for management purposes. In most instances, the array of threats or stressors of preserved habitats, their mechanisms of action, and the responses of the habitats and associated species are not completely understood at this time. Information gained through monitoring will inform management decisions through the adaptive

management process. Adaptive management acknowledges the lack of complete knowledge and understanding of a system at the outset of management actions. Adaptive management is a means to learn more about the system through the implementation of management actions and the monitoring of management results. Management actions can then be adapted to optimize management goals by incorporating new information gained through an iterative implementation and monitoring process.

There are six main steps in adaptive management:

- 1) Identification of the problem or management goal
- 2) Design of the management action or implementation plan
- 3) Implementation
- 4) Monitoring of management results
- 5) Evaluation of the results relative to the desired management goals, and
- 6) Adjustment of management actions.

The trigger for a change in the management approach/actions occurs when management results have not achieved the desired management goals. The assumptions underlying management goals must be stated explicitly and considered as hypotheses to be tested by carefully designed and implemented monitoring programs that are, in effect, management experiments. Ideally, management actions would be designed and implemented with experimental control sites and replication that would allow statistical interpretation of management results. At a minimum, careful measurement of key environmental and biological variables before and after the management action can provide some insight into the effects of management at that particular site.

1.3 Management of Threats and Impacts

This summary of threats and impacts to the species, habitats, and ecological processes in the OSMP area helps place the OSMP lands in the appropriate management context. The threats and impacts identified here are the main management issues that preserve managers in Carlsbad potentially will address on a day-to-day basis.

The terms threat and impact are value laden terms that change depending on context. Fire, for example is a natural ecological process that is necessary for many fire-adapted plant species to germinate, and for many animal species to maintain open habitat conditions to which they may be adapted. In a fully pristine and intact ecosystem fire is not a threat, per se, but only a natural ecological process that has an effect, but not necessarily a negative impact on the ecosystem. For habitats that exist in a matrix of suburban lands uses, however, fire is more often a threat. Fires that occur too frequently disrupt the natural regime of this ecological process and alter ecological communities. Activities associated with fire prevention and suppression, if not properly planned and implemented, can seriously impact protected habitats and populations.

Threats to habitats, species, and ecological processes may come from legal or illegal activities, and are numerous in suburbanized landscapes. Most threats come from the edges of preserves, the urban-wildlife interface, and are often categorized as edge effects. However, due to the highly fragmented configuration of open space in the City and the high edge-to-interior ratio, most portions of open space have the potential to be impacted by many of these threats. Therefore, these threats and their potential impacts will be a persistent management issue for preserve managers. Table 1-2 identifies the primary threats that have the potential to affect species, habitats, and ecological processes in the Carlsbad OSMP area.

TABLE 1-2.

**MATRIX OF PRIMARY THREATS AND POTENTIAL EFFECTS
ON SPECIES AND HABITATS MANAGED IN THE OSMP AREA**

Threats	Potential Effects	Habitat Loss	Habitat Conversion - seral or type conversion	Trampling of habitat and soils	Altered soil moisture	Increased erosion	Decreased water quality	Reduction in disturbance-sensitive species	Source of exotic species introduction	Increase in exotic ant invasion	Exotic species dispersal	Reduction in native species diversity	Reduction in native pollinators	Reduced function of wildlife corridors	Reduction of area-dependent species	Altered predator-prey relationships	Roadkill	Littering
<u>Public Use</u>																		
Off-road vehicles		X		X		X	X	X				X	X	X	X		X	X
Noise from off-road vehicles												X		X	X			
Mountain biking		X		X		X	X					X		X	X			X
Equestrian uses		X		X		X	X		X		X	X		X				X
Hiking		X		X		X						X		X	X			X
<u>Urban Edge</u>																		
Fuel breaks		X			X	X	X	X	X	X	X	X	X		X	X		
Landscaping		X			X			X	X	X	X	X	X		X	X		
Irrigation runoff		X	X		X	X	X	X	X	X	X	X	X		X	X		
Herbicides and pesticides		X					X				X	X	X			X		
Urban noise								X				X			X	X		
Lighting								X				X			X	X		
Unsupervised pets/children		X		X		X	X	X	X		X	X		X	X			X
<u>Habitat Fragmentation</u>																		
Roads/utility corridors		X			X	X	X	X			X	X		X	X		X	X
Suburban residential/commercial construction		X												X	X			
<u>Altered Ecological Processes</u>																		
Fire regime (too frequent)			X		X	X		X			X	X	X	X	X	X		
Hydrology (no flood/scour, altered water table)			X		X		X				X	X		X		X		
Drought (lower water table, disease resistance)			X		X							X	X			X		
Predator-Prey Relationships (mesopredator release)								X		X	X	X		X	X	X	X	
Host-Pollinator Relationships (germination, gene flow)				X	X		X	X	X		X	X	X	X	X			

1.4 Recreational and Educational Opportunities

To be successful, the OSMP must have the full support of the public. Public support occurs when it becomes clear that there is something of value that is being protected and managed by the plan. Recreational and educational opportunities are the two most important ways in which to create and maintain a sense of value in the protection and management of open space in the City. The importance of recreational opportunities is obvious. Hiking, biking, boating, and equestrian uses are integral to many people's perceptions of open space, and integration of these public uses into the OSMP will be important. Less obvious, though are the ways in which educational opportunities create value and contribute to long-term public support of open space protection. By creating and integrating public educational opportunities into the OSMP and day-to-day preserve management, the City will have better informed "neighbors" of the open space who are more willing and educated to minimize the activities that may negatively impact the natural values (e.g., improved landscaping and watering practices, better control of pets, etc.). Furthermore, establishment of a strong educational outreach program will provide important nature learning opportunities for the City's school children, an opportunity that is often lost for many children in suburban America. Finally, education and outreach will have the effect of recruiting members of the public that live near or recreate in the OSMP area to become partners in stewardship and to be the eyes and ears for the City and other preserve managers, so that management problems or illegal uses can be quickly identified and corrected. An education/outreach component is a necessary part of most of the solutions identified in the focused analysis of management issues below (Section 3.0).

2.0 ORGANIZATION OF OSMP AREAS

The study area, the open space covered by this management plan, has been hierarchically subdivided to facilitate organization and discussion of issues relative to the areas in which they are most applicable. The OSMP study area (Figure 2-1) includes existing open space, proposed open space, and standards areas (a significant portion of which will become future open space based on specific development and conservation standards).

2.1 Management Units

The open space areas shown in Figure 2-1 have been subdivided into Management Units based on the aggregation of remaining open space within the City and/or natural biogeographic boundaries (Figure 2-2). The management units are defined by grouping of semi-contiguous areas that would be most effectively managed if treated as a single unit. The subdivisions were created by grouping the parcels around lagoons and lagoon margin habitat (Buena Vista, Agua Hedionda, and Batiquitos Management Units), and by grouping larger contiguous blocks of upland habitat with other smaller nearby open space areas resulting in the creation of eight more management units capturing the canyon networks throughout the remainder of the City (Arroyo La Costa, Bressi/Carrillo, Buena Vista Creek, Calavera, Faraday, Los Monos, Poinsettia/Aviara, and Rancho La Costa Management Units.). Note that parcels were not split between management units. Table 2-1 shows the acreages of each habitat type in each management unit. Note that all calculations of vegetation acreages are based on the MHCP vegetation database maintained by SANDAG.

2.2 Subunits

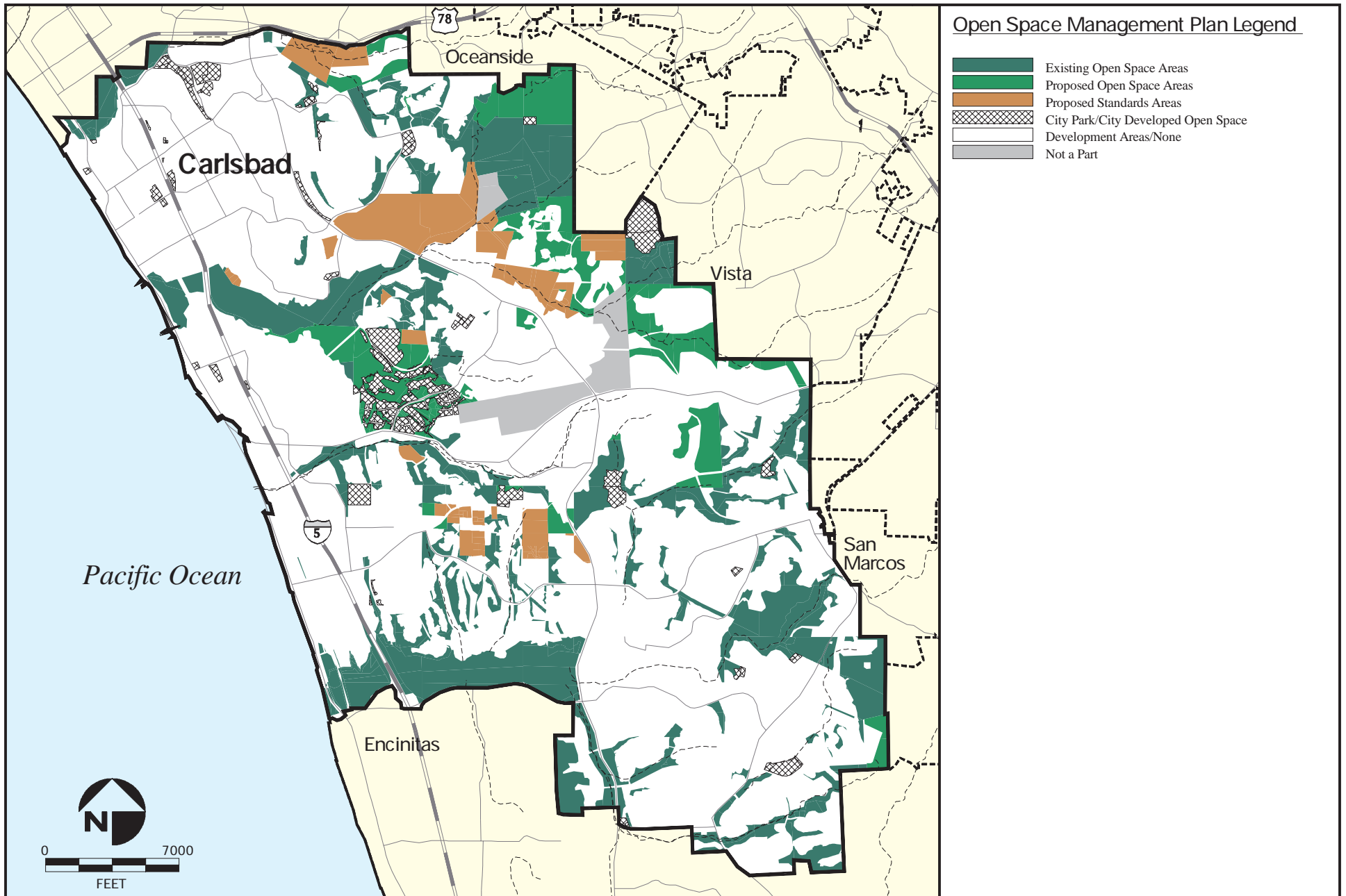
Management units were then further subdivided into Subunits based on ownership and current (or presumed future) management entity (see below). Multiple parcels that are under the stewardship of one management entity were included in the same subunit if they were in the same management unit and semi-contiguous (connected or near enough to each other to be effectively managed as a unit). There are 57 subunits within the OSMP (Figure 2-3). Some management units contain a small number of subunits (e.g., Bataquitos Lagoon M.U.), while other management units contain many subunits (e.g., Poinsettia/Aviara M.U.).

The purpose of subdividing the OSMP into management units is to identify cohesive units with similar management issues that would be best managed in a coordinated way. The purpose of further subdividing the management units into subunits is to recognize the diverse ownerships and management entities that have or may in the future have different preserve managers, management funding sources, and that will need to coordinate among themselves within a management unit. The Carlsbad OSMP Implementation Process and Structure specifies the mechanisms for coordination of these units.

Management entities are the organizations (public or private) that are responsible for maintaining and managing the open space values on the lands addressed by the OSMP. While the City of Carlsbad, to maintain compliance with the HMP and MHCP has the ultimate responsibility for open space management citywide, numerous other management entities have the day-to-day, on-the-ground responsibility for management.

2.3 General Management Entities

There are five general management entities (City, Other Public/Semi-Public, Wildlife Agencies, Third Party Biological Management Entities, and Private Land Owners) for open space management in Carlsbad (Table 2-2). The City is the general management entity for all lands that it owns in the OSMP, which includes approximately 600 acres of open space (natural areas plus developed parks). The other public/semi-public management entity group includes the areas managed by North County Transit District, SDG&E, Cabrillo Power, and State Parks lands, which total approximate 420 acres. California Department of Fish and Game (CDFG) is the only wildlife agency with managed lands in the City. CDFG manages



Areas Included in the OSMP

FIGURE

2-1

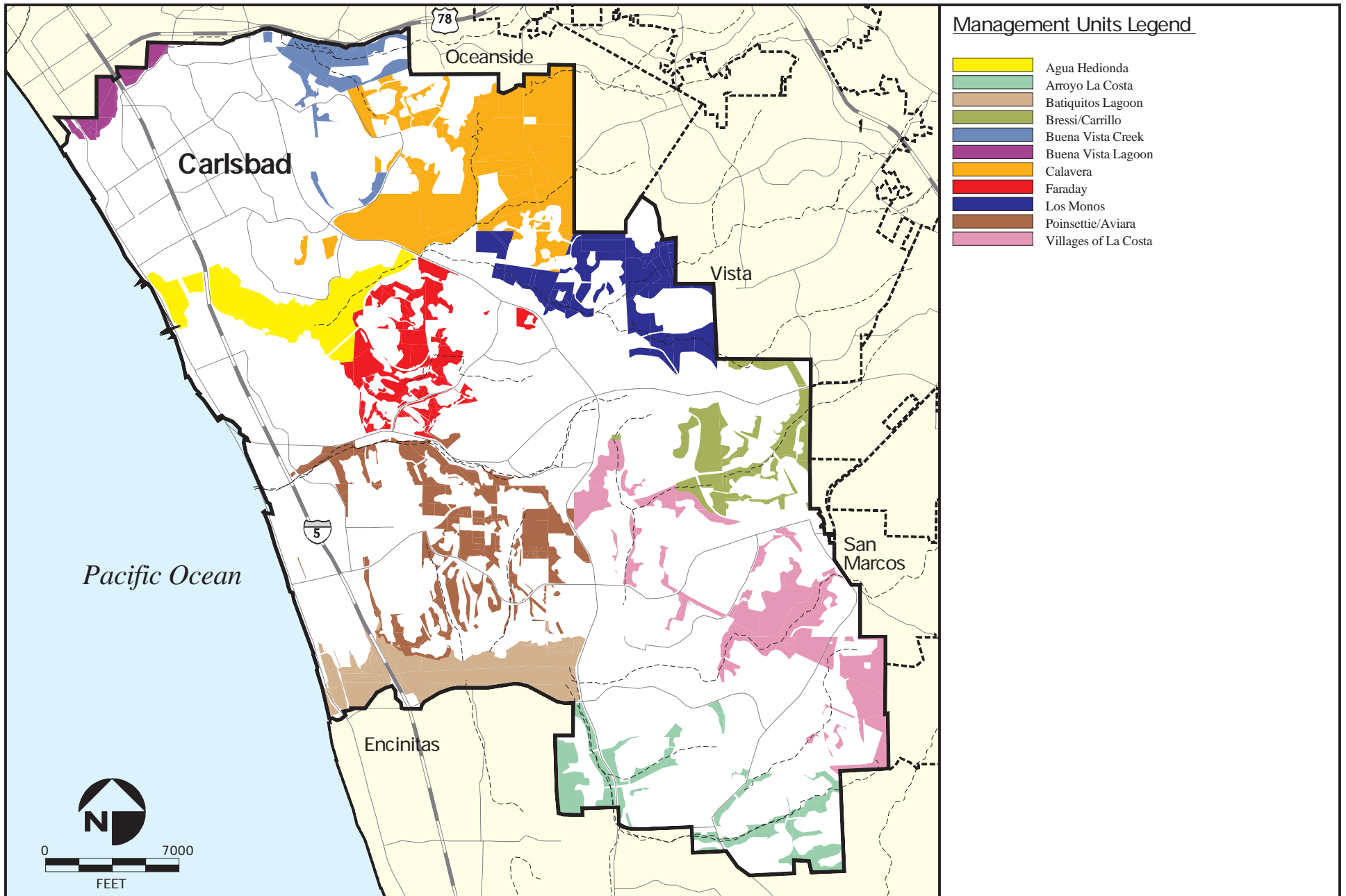
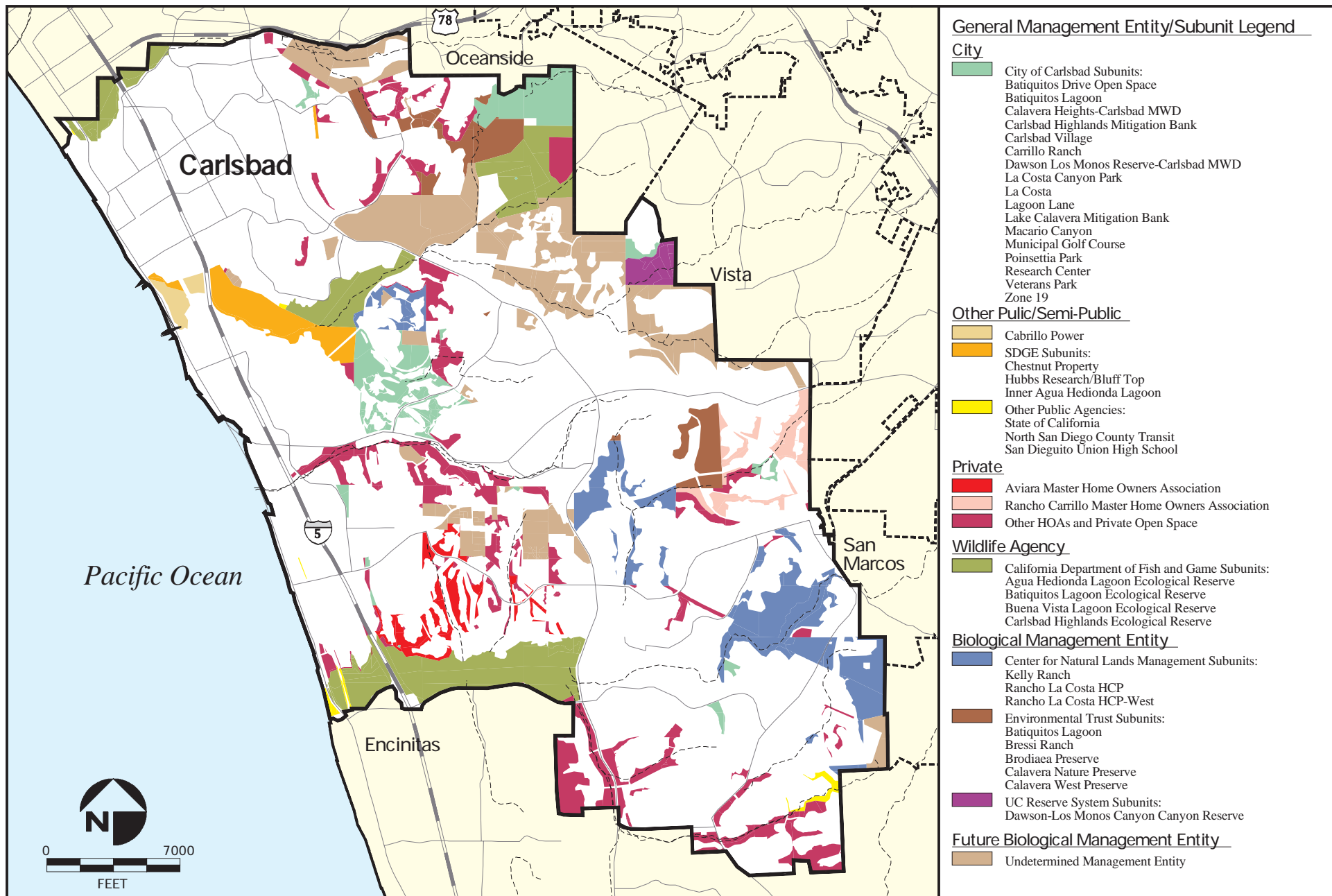


TABLE 2-1.
ACRES OF VEGETATION OCCURRING WITHIN EACH MANAGEMENT UNIT

Vegetation	Agua Hedionda	Arroyo La Costa	Batiquitos Lagoon	Bressi/ Carrillo	Buena Vista Creek	Buena Vista Lagoon	Calavera	Faraday	Los Monos	Poinsettia/ Aviara	Villages of La Costa	Grand Total
Coastal Sage Scrub	56.2	43.2	28.6	137.9	30.6	--	616.4	178.3	135.5	210.1	560.0	1,996.7
Coastal Sage Scrub/Chaparral	--	--	--	--	--	--	13.7	26.0	73.3	--	--	113.0
Chaparral	--	30.7	--	38.2	9.8	--	173.4	44.0	89.3	105.7	132.5	623.5
Southern Maritime Chaparral	--	139.9	--	--	--	--	--	25.4	6.3	128.7	80.8	381.1
Grassland	19.4	96.9	--	58.1	109.8	--	186.2	110.7	70.1	30.8	76.6	758.7
Oak Woodlands	--	--	--	3.3	--	--	11.3	--	2.6	8.9	0.4	26.4
Riparian Scrub/Woodland/Forest	67.0	75.8	17.6	27.2	70.5	--	41.7	37.7	99.7	13.5	43.6	494.4
Estuarine	263.7	--	430.6	--	--	76.9	--	--	--	--	--	771.2
Fresh Open Water	--	--	--	--	0.3	35.8	15.4	--	--	--	1.0	52.4
Meadow and Freshwater Marsh	49.0	19.0	73.9	4.4	27.8	20.8	32.3	11.4	7.7	30.8	11.2	288.2
Southern Coastal Salt Marsh	93.7	--	43.5	--	--	--	--	0.2	--	--	--	137.5
Eucalyptus Woodland	0.3	0.6	23.0	--	--	--	8.6	2.1	3.5	55.8	11.4	105.3
<i>Natural Habitats</i>	<i>549.3</i>	<i>406.1</i>	<i>617.2</i>	<i>269.2</i>	<i>248.7</i>	<i>133.4</i>	<i>1,098.9</i>	<i>435.9</i>	<i>487.9</i>	<i>584.3</i>	<i>917.7</i>	<i>5,748.7</i>
Agricultural Land	2.7	18.4	1.4	107.6	--	--	318.2	29.9	142.2	77.8	1.0	699.2
Disturbed Habitat	14.3	17.8	40.6	45.6	14.9	5.2	61.9	7.4	31.6	36.0	41.5	316.7
Developed/Urban	7.2	45.1	10.5	28.6	22.8	0.7	81.6	21.1	15.5	121.2	16.3	370.6
<i>Non-Habitat</i>	<i>24.3</i>	<i>81.3</i>	<i>52.5</i>	<i>181.9</i>	<i>37.7</i>	<i>5.9</i>	<i>461.7</i>	<i>58.3</i>	<i>189.2</i>	<i>234.9</i>	<i>58.8</i>	<i>1,386.5</i>
Grand Total	573.6	487.3	669.7	451.1	286.5	139.3	1,560.6	494.2	677.1	819.2	976.4	7,135.1



1,254 acres in the City (most of all three lagoons plus the Carlsbad Highlands Ecological Reserve). Third party biological management entities (including the Center for Natural Lands Management (CNLM), the Environmental Trust (TET), and the U.C. Reserve System) manage 1,413 acres of open space currently, and will eventually manage much of the 1,054 acres currently identified in the standards areas. Third party biological management entities are private, nonprofit organizations with specific expertise in the maintenance, management, and monitoring of natural open space. They are typically funded through large endowments that are established along with the establishment of the preserve areas they manage. The remaining open space (over 2,000 acres) is in private ownership of homeowners associations or other private parties, but is conserved in perpetuity by existing conservation easements, open space easements, or other similar land use agreements. While this land is dedicated to remain in open space, there are no current obligations to actively manage these areas for biological value.

TABLE 2-2.
ACRES OF VEGETATION MANAGED BY EACH GENERAL MANAGEMENT ENTITY

Vegetation	City	Other Public/ Semi- Public	Wildlife Agency	Biological Management Entity	Future Biological Management Entity*	Private/ HOA	Total
Coastal Sage Scrub	167.6	58.7	203.9	706.5	408.3	451.7	1,996.7
Coastal Sage Scrub/Chaparral	13.7	--	--	24.4	66.5	8.5	113.0
Chaparral	118.7	--	19.8	224.8	71.8	188.5	623.5
Southern Maritime Chaparral	9.1	--	--	92.7	79.9	199.4	381.1
Grassland	111.8	24.9	52.6	101.5	232.6	235.2	758.7
Oak Woodlands	1.2	--	6.7	0.4	14.8	3.3	26.4
Riparian Scrub/Woodland/Forest	52.0	6.0	86.3	74.6	159.5	116.1	494.4
Eucalyptus Woodland	2.3	--	23.1	12.8	7.5	59.6	105.3
Estuarine	--	265.1	504.4	--	1.3	0.4	771.2
Meadow and Freshwater Marsh	22.2	16.3	133.2	11.6	44.7	60.2	288.2
Southern Coastal Salt Marsh		19.5	116.1	0.4	--	1.4	137.5
Fresh Open Water	14.9		35.8	1.0	0.7	--	52.4
Natural Habitats	513.4	390.5	1,181.7	1,250.7	1,087.7	1,324.4	5,748.4
Agricultural Land	26.9	2.6	30.4	102.1	502.0	35.2	699.2
Disturbed Habitat	44.5	10.4	38.2	44.5	85.9	93.2	316.7
Developed/Urban	18.6	16.8	3.3	15.3	56.0	260.4	370.6
Non-Habitat	90.0	29.8	71.9	161.9	643.9	388.8	1,386.5
Total	603.6	420.4	1,253.6	1,412.6	1,731.7	1,713.3	7,135.1

*Future biological management entity(ies) will be identified to manage the future preserve areas established within the “standards” areas of the OSMP. These acres represent the total standards areas. The acres that will be managed by a future biological management entity will be less than shown here.

The prime management entity is the single largest (or only) management entity for a subunit (e.g., the City, CDFG, or a private preserve manager such as CNLM). All major open space management activities will be coordinated by the prime management entity. Secondary management entities are organizations that are responsible for some management activities on some parcels in the subunit (e.g., the Buena Vista Lagoon Foundation). There may be several secondary management entities in a subunit. The prime management entity will be responsible for preparing and updating preserve management plans for each subunit (or group of subunits) and for implementing the plan. All major open space management activities will be covered

by the plan including but not limited to restoration projects, species monitoring, fence and trail maintenance. The secondary management entity may sponsor a minor open space management activity such as a trash pick up day, or the installation of an interpretive sign. All management activities (major and minor) will be consistent with the preserve management plan and coordinated with the prime management entity. The Carlsbad OSMP Implementation Process and Structure specifies the mechanisms for coordination of the different management entities. All management entities will be required to participate.

2.4 Levels of Open Space/Preserve Management and Monitoring

Open space management (including monitoring) has many different components and occurs at many different levels depending on a number of factors including ownership, open space management funding, and intended purpose and uses of the open space. Four levels of open space management have been defined here to facilitate the discussion in this report, property management, preserve management, species monitoring and management, and regional (subregional) monitoring.

2.4.1 Property Management

Property management is the most basic level of open space management and is focused primarily on establishing and maintaining the property boundary barriers including fencing, gates, and signage. Trash collection is often, but not always an action on property-level managed open space. The MHCP includes property management activities in what it describes as “preserve area monitoring”.

2.4.2 Preserve Management

Preserve management includes all the property-level management actions, but also focuses on management to protect the natural open space character of the area and to provide opportunities for recreational uses. Preserve management includes but is not limited to general management of trails, public use facilities, control of erosion or invasive species, and occasionally restoration. The MHCP also includes preserve management activities in what it describes as “preserve area monitoring”.

2.4.3 Species Monitoring and Management

Species monitoring and management includes all of the property-level and preserve-level management actions, but also includes many species-specific (and habitat-specific) monitoring and management actions. Many of these species or habitat specific management activities are the ASMDs developed and applied through preserve management plans. Species monitoring and management includes but is not limited to species-specific surveys and habitat enhancement, often in coordination with or required by the resource agencies under existing mitigation agreements and as are required in the conditions for coverage established by the HMP/MHCP. While some aspects of preserve-level management can occur within the adaptive management context, all aspects of species monitoring and management will occur as adaptive management. The MHCP also includes species monitoring and management activities in what it describes as “preserve area monitoring”.

2.4.4 Regional Monitoring

Regional monitoring is primarily focused on the collection and evaluation of trends in data across the MHCP subregion and throughout southern California as a whole. Regional monitoring includes the maintenance of updated GIS data on vegetation type, species point data, and preserve management status (which areas are managed, at what level, and by whom). But most importantly, regional monitoring involves the synthesis of species and habitat data across the entire region (or subregion) that has been collected by consistent standardized methods and protocols so that meaningful evaluations of species and habitat status and trends can be conducted. While data collection will be the responsibility of the City and its preserve managers, the synthesis, evaluation, and interpretation of regional monitoring data will be accomplished by the state and federal resource agencies (i.e., CDFG, USFWS, and USGS). The MHCP includes regional monitoring activities in what it describes as “subregion and ecoregion monitoring”.

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3.0 OPEN SPACE MANAGEMENT ISSUES

A major goal of the OSMP was to identify the major management issues that the City and other preserve managers within the OSMP area will need to address as a part of open space, species, and habitat management and monitoring. Twenty-six often inter-related issues have been identified and are discussed below. Based on research, analysis, incorporation of requirements of the Carlsbad HMP and the MHCP, and consultation with City staff, preserve managers, resource agencies, and the Carlsbad Police department, background information has been provided on these issues along with conclusions and recommendations for how the City, the preserve steward, and preserve managers may be able to develop strategies to address these issues in individual preserve management plans and overall implementation of the OSMP. Table 3-1 lists these 26 issues and the conclusions/recommendations identified for each.

**TABLE 3-1.
SUMMARY OF OSMP ISSUES AND CONCLUSIONS/RECOMMENDATIONS**

Issues		Conclusions/Recommendations
Issue 1: (Key Issue)	Wildlife Agency Management Responsibilities	The City has the ultimate responsibility for all monitoring, management, and reporting on all OSMP lands covered by the HMP/MHCP except those owned and /or managed by the wildlife agencies as of the date of the Carlsbad HMP implementing agreement.
Issue 2: (Key Issue)	Preserve Management on Existing Open Space on Private Lands	Existing open space on private lands including existing HOA open space will be maintained by the HOA or property owner according to existing HOA guidelines and/or other agreements with the City or wildlife agencies. The HOA or private landowner will be responsible for controlling trash, fire, and illegal encampments. The City is not financially responsible for active biological monitoring on these lands. If a regional funding source is available the City will coordinate with private landowners and HOAs to use these funds to implement and oversee active biological management on these lands at the required HMP/MHCP level.
Issue 3: (Key Issue)	Development of a Framework Monitoring and Management Plan	The Carlsbad OSMP will be the City's framework management plan. The resource agencies, interested organizations, and members of the public have been included in the process for the development of the OSMP (see Appendix B), therefore scheduling issues and resource agency/public involvement in the development of the draft framework plan have been addressed through this OSMP development process.
Issue 4: (Key Issue)	Preserve Management Plans and Area-Specific Management Directives	Carlsbad will work with existing preserve managers, future preserve managers, and City open space management staff to ensure that ASMDs are incorporated from the HMP/MHCP into the individual preserve management plans; and the new ASMDs are developed and incorporated as needed. The City will coordinate submittal of the ASMDs and preserve management plans to the wildlife agencies according to the timetables established in the MHCP. ASMDs and preserve management plans will be updated on a 3 to 5 year basis as needed. Preserve managers will submit annual reports to the City and the City will submit summary reports to the wildlife agencies every three years, as required by the MHCP.

TABLE 3-1. (CONTINUED)
SUMMARY OF OSMP ISSUES AND CONCLUSIONS/RECOMMENDATIONS

Issues		Conclusions/Recommendations
Issue 5: (Key Issue)	Funding to Close Management Gaps	The City will fund the additional monitoring and management activities needed to close the management gaps on lands it manages through annual budget appropriations or establishment of an endowment. However, as determined in the MHCP, the additional monitoring and management funding needed on the private/HOA open space must come from a regional funding source. Until a regional funding source is available the City will inspect the HOA lands that are a part of the preserve system at least once annually to verify that property-level management is occurring. If a regional funding source is available the City will coordinate with private landowners and HOAs to use these funds to implement and oversee active biological management on these lands at the required HMP/MHCP level. Management gaps on public/semi-public lands will be closed through coordination between the wildlife agencies, the other public/semi-public entities, and the City. The City will work with existing third party biological managers to maximize efficiency in the use of current endowments, and will work with them to identify funding for any remaining management gaps (including application of the regional funding source once it is available). The wildlife agencies will retain responsibility for funding all management and monitoring on open space they currently manage. No management gaps are expected on preserve areas established in the future for management by third party biological management entities.
Issue 6: (Key Issue)	Update of Fire Management Policies	The City will address basic issues of fire management through a comprehensive update of City fire management policies and guidelines based on the recommendations of the MHCP monitoring plan and the Wildland/Urban Interface Task Force or the equivalent current accepted regional fire management guidelines document. Resource-specific fire management planning will be incorporated into each individual preserve area plan to coordinate and manage the protection of sensitive resources during and after a burn event.
Issue 7:	Noise Impacts to Open Space	The City will work with preserve managers to develop public outreach and educational materials regarding the responsibility of “neighbors” adjacent to preserves to minimize their contribution to edge effects including noise impacts. The City and preserve managers will address specific noise impact problems with the adjacent residential, commercial, or industrial noise source on a case-by-case basis. Possible solutions for attenuation of roadway noise will be investigated by preserve managers and the City where high noise levels appear to be substantially reducing the viability of habitat.
Issue 8:	Lighting Impacts to Open Space	The City will work with preserve managers to develop public outreach and educational materials regarding the responsibility of “neighbors” adjacent to preserve to minimize their contribution to edge effects including lighting impacts. The City will continue to require shielding of major light sources on new development projects, with particular emphasis on light sources near preserve areas. The City and preserve managers will address specific lighting problems on a case-by-case basis.

TABLE 3-1. (CONTINUED)
SUMMARY OF OSMP ISSUES AND CONCLUSIONS/RECOMMENDATIONS

Issues		Conclusions/Recommendations
Issue 9: (Key Issue)	Landscaping and the Introduction of Nonnative Species	The City will establish policies and ordinances to increase the use of best management practices in landscaping (irrigation, fertilizers, pesticides/herbicides) in the vicinity the OSMP area, and to reduce the frequency of the selling and planting of species listed as noxious weeds as identified on the CalEPPC list (Appendix C). The City will work with preserve managers to identify problem species/areas, to form a coordinated response, and to develop public outreach and educational materials regarding the responsibility of land uses adjacent to preserve to minimize their contribution to edge effects including, landscaping/invasive plant impacts. Individual preserve owner/managers will work with all property owners adjacent to the preserve to educate them regarding irrigation runoff and fertilizer use. The City would only become involved in more serious cases where problems are persistent. Monitor trails for invasive species and remove invasive species populations. The City and preserve managers will address specific problems on a case-by-case basis.
Issue10: (Key Issue)	Invasive Ants	The City will establish policies and ordinances to increase the use of best management practices in landscaping with respect to invasive ant species in the vicinity the OSMP area (e.g. see landscaping guideline provided by the MHCP, specifically with respect to minimization of irrigation runoff). The City and preserve managers will ensure that all landscaping materials used within the preserve for restoration or landscaping of facilities do not contain Argentine ants, fire ants, and any other invasive pests.
Issue 11: (Key Issue)	Outdoor and Feral Animals	The City and preserve managers will develop a focused public outreach and education program that emphasizes the need for residents to control their pets to minimize their impact on the preserve system. Feral animals will be removed from preserve areas if possible. The City needs to work with existing preserve managers to address the issue of effective enforcement and deterrent methods. The City will increase the frequency of ranger patrols at preserves to increase public compliance with leash laws.
Issue 12: (Key Issue)	Alteration of Ecological Communities	The City and preserve managers need to include area-specific directives in their preserve management plans to periodically monitor the native species that often become abundant in edge-effected habitat. Control and removal programs will be initiated for any of these species that are shown to be causing the decline in other sensitive species conserved and managed under the HMP/MHCP. The monitoring and control of these species will be implemented within an adaptive management context.
Issue 13: (Key Issue)	Off-road Vehicles	To better address illegal off-road vehicle use, the City and preserve managers will work with the (Off-road Law Enforcement) ORLE team to develop a coordinated response plan. The coordinated response plan will consist of regular communication between preserve owner/managers and the ORLE Team to identify problem areas and plan enforcement efforts. Since illegal off-road activity tends to shift from location to location depending on enforcement, the coordination efforts will identify new “hot spots” with the goal of eliminating all such activities from the preserve system. In addition, all preserve entrances will include signage prohibiting off-road vehicle activity and providing a non-emergency phone number for members of the public to directly notify the Carlsbad Police and ORLE team when illegal activity is observed. Public outreach and education will be an important part of the effort to reduce illegal off-road vehicle use.

TABLE 3-1. (CONTINUED)
SUMMARY OF OSMP ISSUES AND CONCLUSIONS/RECOMMENDATIONS

Issues	Conclusions/Recommendations
Issue 14: Illegal Dumping (Key Issue)	The City and preserve managers will ensure that potential dumpsites (relatively remote/hidden sites) in the OSMP area are inaccessible to vehicles through maintenance of gates and barriers. The City and preserve managers will establish an illegal dumping tipster hotline and post this phone number along with a non-emergency police number for real-time enforcement response. Substantial fines will be established, posted on signs, and enforced. The City and preserve managers foster a sense of community stewardship in the OSMP preserve system and “empower” the residents living near and using the open space to notify the City and law enforcement of any illegal activities including illegal dumping.
Issue 15: Management of (Key Issue) Recreational Uses	The City and preserve managers will incorporate the MHCP guidelines for recreational uses into each preserve management plan. The MHCP guidelines will be used to establish a consistent set of rules for the OSMP citywide, to avoid confusion for members of the public. The City trails team and preserve managers will review the compatibility of the Carlsbad Citywide Trails Program and update or realign trails as needed in the plan to meet the biological protection goals and guidelines of the HMP/MHCP.
Issue 16: Enforcement (Key Issue)	The City and preserve managers will pool their funding resources to hire five officer/rangers who will assist in preserve enforcement throughout the OSMP area. The City, preserve managers, and police department will establish a coordinated response plan to address these issues, and will work together and with local community groups on a public education program to explain goals and regulations as well as educate the public on the area’s resources. The City needs to work with existing preserve managers to address the issue of effective enforcement and deterrent methods. The City will increase the frequency of ranger patrols at preserves to increase public compliance with leash laws, trespassing, and other illegal activities.
Issue 17: Itinerant Worker and (Key Issue) Transient Camps.	The City will continue to work with local and regional agencies to find long-term solutions for housing of low-income itinerant workers and transients. The City will also work quickly to implement short-term solutions so that further habitat degradation is ceased. Note that a continued decline in habitat quality without active intervention from the City could result in the loss of one or more endangered species permits. The City will coordinate with all preserve managers to establish a protocol for reporting and handling illegal encampments to protect the health, safety, and legal rights of everyone involved. Preserve managers and rangers will notify the police department and the City when illegal encampments are discovered and will work with the City to remove structures and debris and revegetation the disturbed areas as necessary.

TABLE 3-1. (CONTINUED)
SUMMARY OF OSMP ISSUES AND CONCLUSIONS/RECOMMENDATIONS

Issues		Conclusions/Recommendations
Issue 18: (Key Issue)	Coordination of Monitoring and Management Responsibility	The process and structure for coordination and implementation of the OSMP is defined in detail in the introductory chapter of the OSMP. The City of Carlsbad will be responsible for coordinating with other cities in the MHCP to implement monitoring and management across the MHCP preserve network. The City will create the role of a Preserve Steward to oversee and support the science-based implementation of the OSMP. The preserve steward along with the USFWS and CDFG will provide oversight, including review of surveys, preserve management projects, and approval of results and reports generated by the monitoring program. The City of Carlsbad and its preserve steward and preserve managers are responsible for preserve level monitoring and management for the OSMP area, preparation of the preserve area plans specifying the monitoring and management activities for a given preserve area, and preparation of annual reports to the wildlife agencies summarizing monitoring and management actions and results.
Issue 19:	Trigger for Adaptive Management	The City of Carlsbad, the preserve steward and other preserve managers in the OSMP area will apply an adaptive management approach to all management activities. Corrective actions within an adaptive management context will be undertaken as soon as possible to prevent further degradation and more costly remedies later. If management targets (e.g., habitat condition, invasive species eradication, etc.) are rapidly deviating from desired goals, the preserve manager and/or City will contact the wildlife agencies and other issue experts to seek the best available advice as soon as possible.
Issue 20: (Key Issue)	Data Management	The City will require that preserve managers within the OSMP area adhere to all the MHCP established monitoring methods and use the standardized data collection formats. The City will investigate the development of a GIS database management tool that is accessible through the Internet and, if developed, will use this tool to efficiently maintain current data, coordinate management and monitoring, and provide information to the public.
Issue 21: (Key Issue)	Coordination of Lagoon Management	The City will work with the various lagoon management entities to coordinate dredging activities to meet the goals of hydrology/sediment management and biological conservation. The OSMP will be used as a tool to facilitate this coordination. CDFG will maintain the responsibility for species and habitat monitoring and management and the Southern California Caulerpa Action Team will continue to lead Caulerpa eradication efforts. The City will assist in monitoring and enforcement of the state ban on sale, transport, and possession of Caulerpa through periodic monitoring and informational outreach to pet stores and through educational outreach to the general public. The City will work with CDFG to improve enforcement of boating regulations on the lagoon areas where it is prohibited.
Issue 22:	Restoration	The City and preserve managers will need to incorporate restoration and enhancement into the individual preserve management plans. Additionally, detailed restoration management plans will need to be prepared for individual restoration projects for restoration required by project-specific mitigation, for the 104 acres of coastal sage scrub restoration through the OSMP area, and for additional restoration needs identified by preserve managers. Restoration management plans will be consistent with the guidelines provided in MHCP Volume III. The restoration of these 104 acres will occur once a regional funding source is available.

TABLE 3-1. (CONTINUED)
SUMMARY OF OSMIP ISSUES AND CONCLUSIONS/RECOMMENDATIONS

Issues		Conclusions/Recommendations
Issue 23:	Erosion Control	The City and preserve managers will need to incorporate erosion control plans into the individual preserve management plans. The City will assist in coordination and repair of severe erosion problems. Erosion control and management plans will be consistent with the guidelines provided in MHCP Volume III.
Issue 24: (Key Issue)	Public Information, Education, and Beneficial Use of Open Space	The City will develop a citywide public information and education program to comprehensively address the public education and information needs as described above. Local public outreach to the immediate neighbors or other public users of the preserve will be conducted by each preserve manager as needed. The preserve manager will solicit assistance from the City-wide program as necessary and vice versa.
Issue 25:	Fencing and Signs	Signage and fencing are the responsibility of the primary management entity for each preserve area. The City will work with each preserve manager to develop standardized signage and OSMIP rules and regulations to avoid confusion. Signage and fencing will be installed and/or maintained as described above and in the MHCP (Volume III).
Issue 26:	Preserve assembly and integration with Habitrak	The City will coordinate with preserve managers to establish a schedule and deadlines for reporting of data and project status with preserves so that citywide data are available to the City with sufficient time to update the Habitrak accounting system and prepare the City's annual reports.

3.1 Key Issues of Open Space Management in Carlsbad

There are several key issues for which the City and possibly the wildlife agencies and/or Coastal Commission will need to make policy and program decisions (e.g., how to deal with management gaps), or for which additional coordination and implementation mechanisms need to be developed (e.g., how to coordinate preserve enforcement with local law enforcement). This section highlights and outlines these key issues and makes recommendations for how best to proceed based on input received thus far in the OSMIP development process. Key issues are called out where they occur. In addition, there are several other important management issues that, while not key issues requiring policy or program decisions were important to review since they are integral to open space management in the City of Carlsbad.

3.1.1 Management Responsibilities

As specified in the MHCP and HMP, the City is ultimately responsible (either directly or through agreements with other agencies or organizations) for the management and biological monitoring of its own public lands (including those with conservation easements); lands obtained as mitigation (where those lands have been dedicated to the City of Carlsbad or a third party biological management entity in fee title or easement); and lands within the City that may in the future be acquired through a regional funding program. Similarly, the CDFG will manage and monitor their present land holdings, consistent with the HMP and MHCP plans.

Issue 1 (Key Issue): Wildlife Agency Management Responsibilities

To ensure uniformity in data gathering and analysis, the wildlife agencies will assume primary responsibility for coordinating the MHCP biological monitoring program (e.g., identifying appropriate data collection methods, survey protocols, survey schedules, and standardized data collection forms), analyzing data at a subregional and regional level, and providing information and technical assistance to the City of

Carlsbad and other preserve managers within the City. However, the wildlife agencies will not have the primary responsibility to implement monitoring and management. This is the responsibility of the City along with individual preserve managers. Data analysis City-wide and at individual preserves is also the responsibility of the City and individual preserve managers.

The wildlife agencies have full financial and stewardship responsibilities for all lands they currently own and manage, and the City will not be financially responsible for ensuring that HMP/MHCP monitoring and management standards are met on currently owned wildlife agency lands (ecological reserves at Buena Vista, Agua Hedionda, and Batiquitos lagoons; a part of the former Carlsbad Highlands Conservation Bank; and 94 acres of the Holly Springs property. CDFG also manages Caltrans mitigation sites in Carlsbad). However, as per agreement among the MHCP cities, future wildlife agency acquisitions of Priority 1 properties (defined as areas that are highly constrained by narrow endemic species, major or critical locations of MHCP species, or wildlife corridors) within the City of Carlsbad will be the funding responsibility of the City (W. Tippetts, CDFG, pers. com.).

Conclusion/Recommendation 1: The City has the ultimate responsibility for all monitoring, management, and reporting on all OSMP lands covered by the HMP/MHCP except those owned and /or managed by the wildlife agencies as of the date of the Carlsbad HMP implementing agreement.

Issue 2 (Key Issue): Preserve Management on Existing Open Space on Private Lands

As described in the MHCP, open space areas associated with existing residential developments and governed by homeowners associations (HOA) will be maintained according to HOA guidelines. The HOAs will be responsible for controlling trash, fire, and illegal encampments. HOA open space areas may receive active biological monitoring and management pursuant to the MHCP if there is a regional funding source for biological management activities and if there are no legal (i.e., HOA) impediments. New HOA open space conserved after the City's subarea plan implementing agreement is adopted will be managed and monitored according to the specifications in the HMP/MHCP, if it is part of the preserve system.

If land is used as mitigation for public or private project impacts, or if private land is purchased with public funds or voluntarily dedicated in fee title, habitat management will be required consistent with the HMP/MHCP and associated habitat management plans.

Private landowners within the preserve who are not third-party beneficiaries of the City's take authorizations will have no additional obligations as a result of the MHCP for management or biological monitoring of their lands. Private landowners who are third-party beneficiaries will be responsible for habitat management of preserve lands they choose to retain in private ownership to the extent required by the Carlsbad HMP and implementing regulations and as specified as conditions of development permits.

Conclusion/Recommendation 2: Existing open space on private lands including existing HOA open space will be maintained by the HOA or property owner according to existing HOA guidelines and/or other agreements with the City or wildlife agencies. The HOA or private landowner will be responsible for controlling trash, fire, and illegal encampments. The City is not financially responsible for active biological monitoring on these lands. If a regional funding source is available the City will coordinate with private landowners and HOAs to use these funds to implement and oversee active biological management on these lands at the required HMP/MHCP level.

3.1.2 Management Plans

Under the requirements of the MHCP, Carlsbad must prepare a framework monitoring and management plan as a condition of its implementing agreement with the resource agencies. The framework monitoring and management plan will provide general direction for all preserve management issues within the HMP boundaries and will reference the subregional MHCP Biological Monitoring and Management Plan.

Issue 3 (Key Issue): Development of a Framework Monitoring and Management Plan

The framework monitoring and management plan will identify and prioritize the specific species populations and vegetation communities to be managed, and will identify monitoring and management activities specific to individual regions, core areas, or linkages within Carlsbad that address specific covered species requirements and the City's preserve objectives. The framework management and monitoring plan will establish a process to develop area-specific management directives and describe how adaptive management will be undertaken based on new information on species and ecosystem needs. Existing preserve management plans will be incorporated by reference into the framework plan. Existing preserve management plans will be updated to address all the management and monitoring requirements of the HMP/MHCP as appropriate. This report is a part of the development of the Carlsbad OSMP, which will function as the City's Framework Management Plan.

Within 6 months of issuance of take authorizations the City is required to prepare a draft framework monitoring and management plan to submit to the wildlife agencies for review. The framework plan will be reviewed and approved by the wildlife agencies and finalized by the city within an additional 3 months. The development of the framework plan will also include a mechanism for public involvement.

Conclusion/Recommendation 3: The Carlsbad OSMP will be the City's framework management plan. The resource agencies, interested organizations, and members of the public have been included in the process for the development of the OSMP (see Appendix B), therefore scheduling issues and resource agency/public involvement in the development of the draft framework plan have been addressed through this OSMP development process.

Issue 4 (Key Issue): Preserve Management Plans and Area-Specific Management Directives

Carlsbad also will need to develop area-specific management directives (ASMDs) to address monitoring and management issues at the site-specific level. There is no minimum acreage for which area-specific monitoring and management directives must be prepared and all subunits of the OSMP that have been included in the HMP/MHCP must have area-specific directives. The ASMDs will be incorporated into the individual preserve management plans that will be prepared (or updated) for each subunit (e.g., Bataquitos Lagoon Ecological Reserve, Rancho La Costa Preserve, etc.) managed by a given management entity (e.g., the City, CDFG, CNLM, etc.). It will be the responsibility of the individual preserve managers to incorporate ASMDs identified in the HMP/MHCP into their preserve management plans and to submit those plans to the City and wildlife agencies for approval. The City will be responsible for developing ASMDs and preserve management plans for all open space areas it directly manages. Currently, preserve management plans have been developed for four preserve areas and four others are in various stages of preparation (Table 3-2).

TABLE 3-2.
EXISTING PRESERVE MANAGEMENT PLANS FOR OPEN SPACE IN CARLSBAD

Preserve Management Plan	Date
CNLM: Habitat Management Plan for the La Costa Preserve	Aug. 2001
CNLM: Habitat Management Plan for the Kelley Ranch Habitat Conservation Area	Nov. 2002
TET: Perpetual Land Management Plan for Calavera Nature Preserve	Sept. 2002
TET: Calavera Hills Phase II Final Habitat Management Plan	Oct. 2002
CDFG: Bataquitos Lagoon Ecological Reserve Management Plan	In Draft ¹
CDFG: Buena Vista Lagoon Ecological Reserve Management Plan	In Preparation ¹
CDFG: Agua Hedionda Lagoon Ecological Reserve Management Plan	In Preparation ¹
UC Reserve: Dawson/Los Monos Natural Reserve Management Plan	In Preparation ²

¹ T. Dillingham, CDFG (pers. com.)

² I. Kay, UC Natural Reserve System (pers. com.)

For most preserve areas the ASMDs should be incorporated into an overall preserve management plan and as a separately bound document (See Appendix D for guidelines on preserve management plan format and content). However, for some smaller, isolated open space areas (e.g., an isolated parcel with a critical location of a narrow endemic plant), the ASMD(s) may be submitted to the wildlife agencies as a brief form that includes the ASMD(s), a map of resources on the preserve property, describes site-specific threats to resources, and identifies site-specific management and monitoring actions to address these threats (a sample ASMD form is included in Appendix B.8 of the MHCP Vol. III).

ASMDs will be developed and implemented to address species and habitat management needs in a phased manner for individual parcels or project areas, once conserved as part of the preserve, including any species-specific management required as conditions of the take authorizations. The project CEQA document, when necessary, will include these area-specific management directives. Preserve management plans and associated ASMDs must be developed (or updated) and approved by the wildlife agencies for preserve lands within the first year after lands are dedicated to the preserve and implemented immediately upon approval of the preserve management plan or ASMD form.

Both the OSMP framework plan (generally) and preserve management plans and associated ASMDs (specifically) will address the following management and monitoring actions, as appropriate:

- | | |
|---------------------------------------|--------------------------------------|
| • fire management | • access road maintenance |
| • public access control | • domestic animal access control |
| • fencing and gates | • enforcement of property and/or |
| • ranger patrol | • homeowner requirements |
| • trail placement/creation evaluation | • removal of invasive species |
| • trail maintenance | • nonnative predator control |
| • visitor/interpretive services | • species monitoring |
| • volunteer services | • habitat restoration |
| • hydrological management | • management for diverse age classes |
| • signs and lighting | • use of herbicides and rodenticides |
| • trash and litter removal | • biological surveys |
| • access road maintenance | • species management conditions |

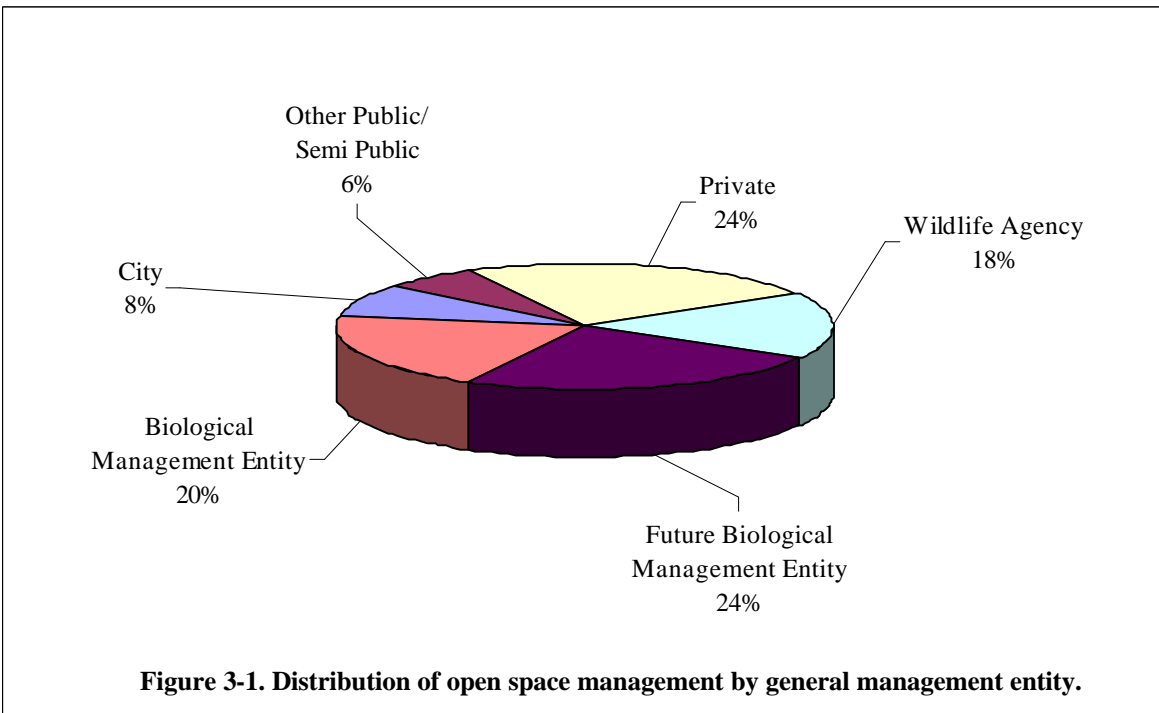
The preparation and implementation of the framework plan (OSMP), preserve management plans, and area-specific management directives will be coordinated among managers of the subunits within each management unit, across the City, and between subareas of the MHCP to ensure that the overall needs of species and habitats are met on a regional basis. Preserve managers will be required to review and update management plans on a three-year basis and associated ASMDs as necessary in the annual preserve work plans. Status reports shall be submitted annually to the City, and every 3 years to the wildlife agencies. The reports will summarize management activities, describe management priorities for the next 3-year period, discuss restoration activities, and evaluate funding and the ability to meet resource management goals.

Conclusion/Recommendation 4: Carlsbad will work with existing preserve managers, future preserve managers, and City open space management staff to ensure that ASMDs are incorporated from the HMP/MHCP into the individual preserve management plans; and the new ASMDs are developed and incorporated as needed. The City will coordinate submittal of the ASMDs and preserve management plans to the wildlife agencies according to the timetables established in the MHCP. ASMDs and preserve management plans will be updated on a 3 to 5 year basis as needed. Preserve managers will submit annual reports to the City and the City will submit summary reports to the wildlife agencies every three years, as required by the MHCP.

3.1.3 Management Gaps

Management gaps are defined as the difference between the current on the ground management that is being implemented today and the management and monitoring that is required by the HMP/ MHCP and will be implemented in the future. Management gaps are defined in terms of differences between current and future required management and monitoring activities. Therefore, it is important to understand the current levels of management that occur on existing open space throughout the City and the level of management and monitoring that will be required in the future, under the HMP/MHCP. Section 2.4 (Levels of Open Space/Preserve Management and Monitoring) describes the management level terms used here (property management, preserve management, species monitoring and management, and regional monitoring).

There are approximately 7,135 acres of open space included in the OSMP area (Figure 3-1 and Table 2-2). Currently, the managers of the largest amounts of open space in the City are the wildlife agencies, third party biological management entities, and private landowners including HOAs, which manage 18%, 20%, and 24% of the open space, respectively. The City currently manages 8% of the open space and other public/semi-public entities manage 6% of the area.



Issue 5 (Key Issue): Funding to Close Management Gaps

The 604 acres owned and managed by the City and the 1,713 acres on private land make up 32% of the open space, and generally only receive property-level management. There are a multitude of private owners of open space including many HOAs. The City does not have a comprehensive list of the point of contact and specific parcels covered by most of the HOAs (D. Rideout, Carlsbad Principal Planner pers. comm.), therefore, no attempt was made at this time to contact the persons responsible for management on these properties. Instead, it is assumed that property-level management on these properties includes management of fencing, signage, fire buffers, trash, and trespassing on an as needed basis.

The City has management responsibilities on a number of open space areas throughout the City including several large open space parcels (Lake Calavera, Municipal Golf Course property, and Veterans Memorial Park). The City also holds a long-term lease on Hub Park (owned by SDG&E), and currently manages the property. Property-level management activities on these City-managed parcels focus on maintaining existing habitat values, and include trash removal, basic access controls, and fire prevention (D. Duncanson, Carlsbad Public Works Manager, pers. com.). The HMP/MHCP requires that management on the City managed and privately managed open space include the full complement of property, preserve, species management and monitoring, and regional monitoring activities. Therefore, there are significant management gaps on these areas.

There are 420 acres (6%) of open space under the ownership and management of other public or semi-public entities (e.g., SDG&E, Caltrans, North County Transit District [NCTD], State Parks). All but approximately 65 acres are the SDG&E and Cabrillo Power portions of Agua Hedionda Lagoon. Most of these parcels are managed at a property-level only. The SDG&E parcels are monitoring and managed according to the SDG&E NCCP, which focuses primarily on minimizing and remediating impacts from SDG&E operations and maintenance activities. It is assumed that CDFG will include all of Agua Hedionda Lagoon in the management plan CDFG is preparing. The Pointsettia vernal pools are conserved on property owned and managed by the NCTD, which has specific management and monitoring agreements with the wildlife agencies. NCTD will retain management responsibility for this preserve area. The City will work with the remaining public and semi-public entities to coordinate funding and management for their small parcels in the OSMP. Management gaps will occur on these public/semi-public areas once the HMP/MHCP is implemented. It is assumed the CDFG will work with SDG&E to identify funding for management of the lagoon areas. The City will work with the other entities to coordinate funding and management.

The wildlife agencies and the biological management entities manage a significant amount (38%) of open space in Carlsbad (1,254 and 1,413 acres respectively). Both management entities implement a significant amount of preserve-level management as well as species monitoring and management, depending on the resources present at a given property. There has not been a coordinated effort to implement regional monitoring in these areas prior to the development of the MHCP. There are many additional monitoring and management requirements in the HMP/MHCP that are not currently addressed at the required levels/intensities/frequencies by the third party managers or wildlife agency managers. Therefore, the combination of these additional management and monitoring requirements and the need for regional monitoring creates a management gap on these properties. The wildlife agencies have accepted responsibility for funding the management of their currently owned and managed lands at the new HMP/MHCP level. Management gaps on open space managed by third party biological managers will be the funding responsibility of the City through the regional funding source, once it is established.

Approximately 1,732 acres (24%) are currently in the standards areas of the OSMP and are assumed to be managed in the future by third party biological management entities. A portion of these areas will be developed and the remainder will be set aside as permanent natural open space. The development and permitting agreements with the wildlife agencies and the City will ensure that sufficient open space conservation and management endowments are established in conjunction with the development of these properties to cover all aspects of full HMP/MHCP required monitoring and management for all resources on these properties in perpetuity. Therefore, there are no management gaps expected on the area to be managed by future third party biological management entities. The City will require that these areas are managed by a professional biological management entity with the ability and experience to effectively manage the preserve area and protect the species and habitat values in the preserves.

Note that a complete OSMP biological management and monitoring funding analysis has been prepared by CNLM and is contained in Appendix A of this document.

Conclusion/Recommendation 5: The City will fund the additional monitoring and management activities needed to close the management gaps on lands it manages through annual budget appropriations or establishment of an endowment. However, as determined in the MHCP, the additional monitoring and management funding needed on the private/HOA open space must

come from a regional funding source. Until a regional funding source is available the City will inspect the HOA lands that are a part of the preserve system at least once annually to verify that property-level management is occurring. If a regional funding source is available the City will coordinate with private landowners and HOAs to use these funds to implement and oversee active biological management on these lands at the required HMP/MHCP level. Management gaps on public/semi-public lands will be closed through coordination between the wildlife agencies, the other public/semi-public entities, and the City. The City will work with existing third party biological managers to maximize efficiency in the use of current endowments, and will work with them to identify funding for any remaining management gaps (including application of the regional funding source once it is available). The wildlife agencies will retain responsibility for funding all management and monitoring on open space they currently manage. No management gaps are expected on preserve areas established in the future for management by third party biological management entities.

3.1.4 Fire Management Issues

Fire management is a critical component of management efforts in natural landscapes. The HMP/MHCP requires that the City create one or more fire management plans for its natural open space areas. This plan(s) will include measures to avoid destruction of sensitive plant species populations, to create fire management zones, and to educate fire control personnel on how to minimize impacts to sensitive species during fire suppression activities. Development of a fire management plan is a condition for conservation and management of a number of sensitive species covered by the HMP/MHCP.

Fire is an important ecological process in southern California landscapes and biological resource goals recognize that fire is a natural process in ecosystems. Many vegetation communities in the City depend on a regular cycle of burning for maintaining a balance of species, seed viability, and reproduction. As an ecological process, however, it has been drastically altered by the many effects of suburban development. Fire recurrence intervals have been shortened considerably due to accidental ignition and arson. Additionally, the close proximity of property and structures to open space and fires that occur there requires immediate suppression activities from the fire department. The natural fire cycle is affected by human activities, both by increasing fire frequency in some locations and decreasing it in others through fire prevention measures.

As a necessity, fire management must focus on two different objectives: achievement of biological resource goals, and hazard reduction for humans and their property. Fire management for human safety will continue in a manner that is compatible with conservation of biological resources. Fire management for human hazard reduction involves reducing fuel loads in areas where fire may threaten human safety or property, suppressing fires once they have started, and providing access for fire suppression equipment and personnel.

The MHCP identifies the following fire management practices as important considerations for the City's Fire Management Plan(s):

- Identify potential fuel reduction zones or firebreak locations as well as access routes for fire equipment in the event of wildland fires that pose safety concerns.
- To the degree feasible, site fuel reduction zones, firebreaks, and access routes to avoid sensitive biological resources, preferably at the top or bottom of a slope rather than across a slope. Use existing firebreaks (e.g., natural ridge lines, roads, fire roads) where available.
- In smaller fragmented preserve areas, manage fuel loads primarily for human safety, using mechanical fuel control measures such as chopping, disking and chaining, removal, and herbicides. Additional methods of value in smaller areas include mowing, trimming, and hand clearing. In general, chopping is the recommended methods based on biological and fuel reduction values and safety concerns. Investigate the use of managed goat herds for vegetation and fuel reduction (goat herds were not specifically mentioned in the MHCP, but have been used for brush management elsewhere in California and locally, including along the urban/wildland

interface in the City of San Diego between the community of Tierrasanta and the Mission Trails Regional Park.

- In larger preserve areas, such as in northeast and southeast Carlsbad, manage both for biological resource needs and for safety considerations. Where chaparral or coastal sage scrub stands are more than 20 years old, evaluate the need for prescribed burning, where practical, given safety and cost considerations. Fire management practices will be based primarily on the risks of uncontrolled wild fire in proximity to developed areas.
- Emphasize the use of “fire-safe” native plants in landscaping along preserve edges. Prohibit the use of invasive exotics, and adopt an exotic plant control plan.

Where preserve areas are planned adjacent to existing developed areas, the fuel management zone may, if unavoidable for safety reasons, encroach into the preserve. However, any such expansion of fuel management zones would require additional mitigation. Where new development is planned, brush management will be incorporated within the development boundaries and will not encroach into the preserve. The landowner and/or management entity is responsible for brush management in the City of Carlsbad. Landowners will consult with the City planning staff and fire department prior to clearing of any natural vegetation to ensure that 1) the clearing is necessary as a fire control safety issue; and 2) that the clearing does not encroach in a preserve area and/or is consistent with the City’s wildlife and resource permits. All brush management activity adjacent to or in open space areas must be also be coordinated with the preserve manager for that area.

Issue 6 (Key Issue): Update of Fire Management Policies

The OSMP will address brush management and whether use of fire is necessary to manage the composition and age structure of vegetation communities. The small size of many OSMP preserve areas will make the use of fire difficult or impractical for biological management. The local fire department will be consulted so that both biological and safety goals are met. Brush management to reduce fuel and protect urban uses will occur where development is adjacent to the preserve. The City will develop a list of “fire-safe” plants and will encourage the use of “fire-safe” native plants in landscaping along preserve edges. Fire management will be consistent with the recommendations of the Wildland/Urban Interface Task Force (San Diego County Fire Chief’s Association 1997) or the equivalent current accepted regional fire management guidelines document.

When fire management objectives are focused on attaining biological goals the fire management issues and actions will be incorporated into the preserve management plans developed by each preserve manager. A comprehensive update of City fire management policies will be undertaken by the City to integrate the recommendations of the Wildland/Urban Interface Task Force (or equivalent updated recommendations) with the City’s own fire department policies and guidelines. Resource-specific fire management planning will be incorporated into each preserve area management plan that identifies the fire sensitive resources (habitat types and species locations) that must be addressed during and after a burn event. The City’s update of fire management policies will be reviewed by the wildlife agencies.

Conclusion/Recommendation 6: The City will address basic issues of fire management through a comprehensive update of City fire management policies and guidelines based on the recommendations of the MHCP monitoring plan and the Wildland/Urban Interface Task Force or the equivalent current accepted regional fire management guidelines document. Resource-specific fire management planning will be incorporated into each individual preserve area plan to coordinate and manage the protection of sensitive resources during and after a burn event.

3.1.5 Edge Effects and Encroachment

Effects on biological resources due to land uses at the edge of biological areas are commonly known as edge effects. Examples of things that cause edge effects associated with residential development include noise and lighting impacts, increased erosion or sedimentation and siltation, increased human intrusion,

exotic species invasion (plants and animals), and the disruption of the natural composition of native species (i.e., increasing human-adapted species at the expense of rarer and more sensitive species). The construction of access roads and utilities to serve residential development can also cause edge effects. Edge effects can affect vegetation communities, thus altering wildlife habitat and affect sensitive species.

Edge effects extend the human footprint beyond the area of development; however, they are more difficult to quantify because they often are not manifested in a change in the visual landscape, and often result in gradual change over a longer period of time. Furthermore, the types of edge effects are diverse and their effects are variable.

The edge zone is the area in which land uses adjacent to open space areas have an impact on the biological value of the habitats. The edge zone varies greatly depending on the type of edge effect and the species or habitats potentially affected; therefore, it is not possible to identify a single edge zone distance for all species and habitats in all cases. As a general rule, however, the smaller an area of open space, the greater the proportion that will be affected by a given edge effect. Because some edge effects can extend for thousands of feet, there are no areas in the OSMP that are not affected by at least one type of edge effect. The types of edge effects that are the most prevalent in Carlsbad include noise, outdoor lighting, introduction of nonnative species (plants and animals, including pets), and disruption of the natural ecological community.

Because edge effects and encroachment are arguably one of the most important management issues for the Carlsbad OSMP, the various sources and mechanisms of these indirect impacts are discussed in detail below. To the extent possible, the area or distance from the adjacent land use that is impacted by the edge effect is quantified based on available data and information. An estimated range of distances is given for each impact type. When data were not available, a reasonable estimate of the distances was made. It is recognized that there is no substantial body of knowledge that currently exist addressing these concepts and issues.

Issue 7: Noise Impacts to Open Space

Residential areas are generally not substantial noise producers relative to commercial, and industrial land uses. However, noise associated with any human activity (e.g., residential, commercial, industrial land uses, and vehicular traffic) that permeates adjacent habitat may be a deterrent to some wildlife species and therefore, is an indirect impact. The study of animal response to noise is a function of many variables including characteristics of the noise and duration, life history characteristics of the species, habitat type, season and current activity of the animal, sex and age, previous exposure and whether other physical stressors (e.g., drought) are present (Manci et al. 1988).

Most studies of noise impacts to wildlife have addressed aircraft or traffic noise. More studies are needed to determine the long-term effects of noise disturbance. Long-term studies have been difficult because of the effort required and the complexity of the variables affecting animal survivorship (National Park Service 1994). While data are unavailable regarding the effects of residential noises on wildlife, one can assume that louder, prolonged noise is more detrimental than quieter, short-term noise. There are a number of potential rural residential noise sources. Some of the louder possible sources include off-road vehicles (motorcycle, 88 A-weighted decibels, [dBA] at 30 feet [Truax 1999]), yard equipment such as lawn mowers or leaf blowers (90 - 110 dBA at 3 feet [Rabinowitz 2000]), and chain saws (approx. 117 dBA at 3 feet [Truax 1999]). Noise levels attenuate with distance, therefore, the effects of such loud noises would be greatest nearest the residence, but could be transmitted several hundred feet or more into the natural habitat.

A threshold of 60 dBA has been established as a guideline by the wildlife agencies for noise impacts to breeding sensitive bird species; however, there is no noise standard for other species. This standard is applied primarily for the California gnatcatcher, *Polioptila californica*, and the least Bell's vireo (*Vireo belli pusillus*) and was based on studies on the least Bell's vireo, an endangered riparian bird (SANDAG 1990). Similar studies have identified adverse affects of noise on several other species of breeding birds (Reijnen et al. 1997; Rieijnen and Foppen 1995). Noise attenuates at approximately 6 dBA per doubling of distance (MPCA 1982); therefore, the sample residential noise sources given above would attenuate to the

60 dBA standard for birds within a range of 96 feet (lawn mower) to 1,536 feet (chainsaw) from the source. These attenuation distances represent the upper limit to the impact distance and may be substantially reduced when the line-of-sight to the source is blocked by terrain or vegetation density is high.

Roadway noise is the most prevalent noise source impacting the habitat of the OSMP. Since many major roads and freeways cross or are adjacent to open space areas, roadway noise will continue to be an important and problematic issue. Roadway noise is best attenuated with the construction of noise barriers, however, noise barriers are very expensive and may preclude much of the wildlife movement and gene flow between open space areas. Therefore, construction of noise barriers is not a feasible noise control measure in most areas of the OSMP.

Most residential noise sources are likely to be intermittent and infrequent in comparison with the noise associated with roadway traffic. In the rare cases that residential noise is perceived as a persistent problem and impacts habitat values, the preserve manager will need to address the situation directly with the resident producing the noise and with the support of the police department as necessary. Education of residents adjacent to the preserve about edge effects in general through public outreach will be an important component to control residential noise sources.

Conclusion/Recommendation 7: The City will work with preserve managers to develop public outreach and educational materials regarding the responsibility of “neighbors” adjacent to preserves to minimize their contribution to edge effects including noise impacts. The City and preserve managers will address specific noise impact problems with the adjacent residential, commercial, or industrial noise source on a case-by-case basis. Possible solutions for attenuation of roadway noise will be investigated by preserve managers and the City where high noise levels appear to be substantially reducing the viability of habitat.

Issue 8: Lighting Impacts to Open Space

Outdoor lighting associated with residential and commercial land uses in the Carlsbad OSMP area has the potential to illuminate adjacent sensitive habitat. Lighting is of concern due to the effect on nocturnal wildlife activities. For example, outdoor lighting can inhibit wildlife movement through wildlife corridors such as creek beds if the lighting illuminates any portion of the corridor. The amount of habitat affected by lighting varies greatly depending upon surrounding terrain and vegetation, on the brightness of the lights, the direction the lights are pointed, and whether the lights are left on all night or only for short periods (e.g., triggered security lights). Outdoor lighting has the greatest potential to affect nocturnal animals, primarily mammals that forage and move through habitat corridors at night.

To minimize the effects of lighting on sensitive species, lighting will not be permitted in the preserve except where essential for roadways, facility use, and safety. Along preserve edges, major highway lighting will be limited to low pressure sodium sources directed away from preserve areas. The MHCP provides the following lighting guidelines and recommendations:

- Eliminate lighting in or adjacent to the preserve except where essential for roadway, facility use, and safety and security purposes.
- Require lighting use restrictions consistent with existing city lighting guidelines within 200 feet of the preserve. Direct lighting in adjacent areas away from the preserve.
- Use low-pressure sodium illumination sources. Do not use low voltage outdoor or trail lighting, spotlights, or bug lights. Shield light sources adjacent to the preserve so that the lighting is focused downward.
- Avoid excessive lighting in developments adjacent to linkages through appropriate placement and shielding of light sources.

The preserve manager will need to address the individual lighting problems directly with the resident producing the light and with the support of the City and police department as necessary. Education of the residences adjacent to the preserve about edge effects in general through public outreach will be an important component to control residential light sources.

Conclusion/Recommendation 8: The City will work with preserve managers to develop public outreach and educational materials regarding the responsibility of “neighbors” adjacent to preserve to minimize their contribution to edge effects including lighting impacts. The City will continue to require shielding of major light sources on new development projects, with particular emphasis on light sources near preserve areas. The City and preserve managers will address specific lighting problems on a case-by-case basis.

Issue 9 (Key Issue): Landscaping and the Introduction of Nonnative Species

Introduction of nonnative species is one of the most serious edge effects at the urban/wildlands interface (Alberts et al. 1991). Landscaping (i.e., the introduction of native or nonnative plant species around developed areas) may often be in direct conflict with biological objectives of open space management. Nonnative invasive plants invade native habitats by various means. Horticultural planting of nonnatives on land adjacent to native habitat facilitates invasion, and each residence or business adjacent to a preserve area can serve as a new epicenter for the dissemination of exotic plants into the adjacent natural vegetation (Harty 1986). While the presence of nonnative plant species adjacent to open space preserve provides the source for invasion, it is the physical disturbance of vegetation at habitat edges and the altered hydrological and moisture regimes that are the primary factors facilitating invasion of most nonnative plant species. Most nonnative invasive species are readily dispersed into these altered edge habitats as seeds or plant parts that are carried by wind, water, and humans.

The successful invasion of exotic species may alter habitats and lead to displacement or extinction of native species over time. For example, exotic invasions have been shown to alter hydrological and biochemical cycles and disrupt natural fire regimes (MacDonald et al. 1988; Usher 1988; Vitousek 1990; D’Antonio and Vitousek 1992; Alberts et al. 1993). Vitousek and Walker (1989) noted that aggressive nonnative species might displace native species by altering soil fertility. As native plants are displaced, animal species that rely on the plants for food and shelter may also disappear from the local ecological community. The degree to which nonnative plants are able to leave the landscaped areas and invade the natural landscape is generally a function of the amount of irrigation used, the invasive ability of the particular nonnative plant species used in the landscaping, and time. Nonnative plants can be dispersed substantial distances and may extend over one hundred feet into the habitat depending on irrigation practices (Alberts et al. 1993).

Invasive or potentially invasive weed species known or likely to occur in Carlsbad that may pose threats to native species include but are not limited to tamarisk (*Tamarix* spp.), Pampas grass (*Cortaderia selloana*), eucalyptus (*Eucalyptus* spp.), giant reed (*Arundo donax*), mustard (*Brassica* spp.), African fountain grass (*Pennisetum setaceum*), tocalote (*Centaurea melitensis*), purple false brome (*Brachypodium distachyon*), artichoke thistle (*Cynara cardunculus*), castor bean (*Ricinus communis*), fennel (*Foeniculum vulgare*), ice plant (*Mesembryanthemum chilensis*). These and other noxious weed species, as designated by the U.S. Department of Agriculture, are subject to federally funded prevention, eradication, or containment efforts (CalEPPC 1999). Legally, a noxious weed is any plant designated by federal, state, or local governments as injurious to public health, agriculture, recreation, wildlife, or property (BLM 1999, Sheley et al. 1999 in BLM 1999). The MHCP provides the following recommendations for control of invasive exotic plants:

- Prioritize areas for exotic species control based on aggressiveness of invasive species and degree of threat to the native vegetation (see CalEPPC list, Appendix C).
- Eradicate species based on biological desirability and feasibility.
- Use an integrated pest management approach, i.e., use the least biologically intrusive control methods, at the most appropriate period of the growth cycle, to achieve the desired goals.

- Consider both mechanical and chemical methods of control. Only herbicides compatible with biological goals will be used. Only licensed pest control advisers are permitted to make specific pest control recommendations.
- Properly dispose of all exotic plant materials that are removed from preserve lands (e.g., in offsite facilities).
- Revegetate exotic weed removal areas with species appropriate to biological goals.

The City will establish policies and ordinances that support the control of species invasions in the vicinity of the OSMP area. Policies and ordinances could include:

- Prohibiting the sale of noxious weed species (see CalEPPC list, Appendix C) at nurseries in the City.
- Establishing and enforcing penalties for landowners whose landscaping activities encroach on the OSMP areas (clearing, planting, species invasion, irrigation, or pesticide/herbicide use).
- Implementing a public outreach campaign to educate residents and businesses on the importance of using “best management practices” for landscaping near OSMP areas.

Preserve management plans developed for each preserve area will identify problem species/areas. Preserve managers will develop a timeline for scheduled exotic plant species removal and subsequent revegetation that minimizes the risk of run-off and erosion problems (i.e., avoid major removal projects during the rainy season and initiate revegetation quickly).

For maximum efficiency and effectiveness, the City and preserve managers will coordinate efforts among themselves and with state and regional efforts to eliminate the most problematic invasive species. For example, the City and preserve managers could coordinate with activities of the southern California “Team Arundo” on Arundo eradication. Team Arundo formed in Orange County in 1991 to control Arundo Donax along the Santa Ana River, and has since become a statewide program. Chapters exist in the Bay Area, San Luis Obispo and surrounding counties, Greater Los Angeles County, in addition to the Santa Ana River chapter, Team Arundo El Sereno, which covers San Diego County and the Santa Ana River (led by Judy Mitchell in Fallbrook). Arundo control in the City would be most effective if coordinated with the ongoing activities and experience of Team Arundo.

The City will work with preserve managers and City staff to ensure that ornamental/nonnative landscaping is absent or minimal in all areas of the OSMP designated as natural open space under the HMP/MHCP. However, where landscaping may be required (e.g., around parking areas or nature centers), or where problems are anticipated in preserve areas due to landscaping in nearby developed areas, the following guidelines have been provided in the MHCP and will be followed:

- Prohibit the use of nonnative, invasive plant species in landscaping palettes in the OSMP area or for new public projects within 200 feet of natural open space. This includes container stock and hydroseeded material.
- Revegetate areas of exotic species removal with species appropriate to the biological goals of the specific preserve area.
- Avoid genetic contamination of native plant species by prohibiting the introduction of cultivars or native species from different geographic regions. If these introductions are similar enough genetically to native species in the OSMP area, then cross-breeding or hybridization could occur. Native species proposed for landscaping or restoration onsite will be propagated from material collected in the vicinity. Special attention will be given to the elimination of native plant

landscaping cultivars of coastal sage scrub and chaparral species taken from central or northern California locations, or from islands off the coast of southern California.

Irrigation runoff alters conditions in natural areas that are adapted to xeric (dry) conditions, thereby promoting establishment of nonnative plants and displacement of native species. In addition, irrigation runoff can carry pesticides into natural areas, adversely affecting both plants and wildlife. The City and preserve managers must work with adjacent properties to control irrigation of landscaping material within 200 feet of the preserve boundary to prevent runoff into the preserve.

Fertilizers carrying excess nitrogen are often carried by irrigation and runoff into natural open space areas. Excess nitrogen is detrimental to plant mycorrhizal growth (essential for root development and nutrient uptake in many native plant species) and fosters exotic weed invasion. The City and preserve managers will need to monitor and limit, to the degree feasible, fertilization of ornamental plants on all areas draining into the preserve, to reduce excess nitrogen runoff to areas of native vegetation. Education of the residences adjacent to the preserve about edge effects in general through public outreach will be an important component to controlling all of these landscape-related edge effects. Preserve managers will need to address the specific landscaping and invasive plant species problems directly with the property owner where the problems are occurring.

Preserve managers will be responsible for monitoring the potential for spread of invasive species along trails. Where invasive species are spreading along official trails in the preserve system these areas will be targeted for eradication of the invasive species.

Conclusion/Recommendation 9: The City will establish policies and ordinances to increase the use of best management practices in landscaping (irrigation, fertilizers, pesticides/herbicides) in the vicinity the OSMP area, and to reduce the frequency of the selling and planting of species listed as noxious weeds as identified on the CalEPPC list (Appendix C). The City will work with preserve managers to identify problem species/areas, to form a coordinated response, and to develop public outreach and educational materials regarding the responsibility of land uses adjacent to preserve to minimize their contribution to edge effects including, landscaping/invasive plant impacts. Individual preserve owner/managers will work with all property owners adjacent to the preserve to educate them regarding irrigation runoff and fertilizer use. The City would only become involved in more serious cases where problems are persistent. Monitor trails for invasive species and remove invasive species populations. The City and preserve managers will address specific problems on a case-by-case basis.

3.1.6 Animal Species Interactions

The introduction of exotic species or nonnative predators often puts native species at a disadvantage, so special management measures are needed to control exotic species and nonnative predators. Nonnative plant and animal species have few natural predators or other ecological controls on their population sizes, and they thrive under conditions created by humans. These species may aggressively out-compete native species or otherwise harm sensitive species. When top predators are absent, intermediate predators multiply and increase predation on native bird species and their nests. Feral and domestic animals, particularly cats, also prey on small native wildlife species. Agricultural areas, livestock holding areas, and golf courses provide resources for increased populations of parasitic cowbirds, which adversely affect native songbird populations. Litter and food waste from migrant worker camps and picnickers can contribute to an increase in Argentinean ant populations, which out-compete native ants, the primary food resource of San Diego horned lizards. The next several issues discussed below are also types of edge effects; however these effects occur as a result of a change in the ecological dynamics of species interactions (introduction of nonnative species or alteration of species densities), rather than a direct physical change to the habitat (e.g., noise, light, irrigation).

Issue 10 (Key Issue): Invasive Ants

The Argentine ant (*Linepithema humile*) has become virtually ubiquitous with suburban development in southern California. It is spread to new areas through the movement of soil and plant materials, often associated with landscaping activity. The Argentine ant disrupts the ecosystem in natural open space areas because it competitively displaces other native ant species resulting in substantial decline or local extinction of those ant species (Suarez et al. 1998). Native ant species have many ecological roles in the habitats of San Diego County including as seed dispersers, as agents in soil development and turnover, and as a food source for several species including the San Diego horned lizard (*Phrynosoma coronatum blainvillii*), a rare and declining species in the City of Carlsbad.

When Argentine ants are introduced to an area, they can quickly spread into the natural habitat. Increased soil moisture created by irrigation of landscaping may facilitate the invasion of the Argentine ant (Suarez et al. 1998). Linear disturbances such as roads, trails, and fence lines may also facilitate their spread (De Kock and Giliomee 1989). Although Argentine ants competitively replace the native ants, they do not replace their role in the ecosystem. Therefore, the functions of seed dispersal, soil development, and food source for other species is lost. Without these ecological services provided by ants, plant communities and the associated habitat structure may eventually change potentially resulting in the disappearance of some animal species. Argentine ants can invade up to 1 km into natural habitat (e.g., Torrey Pines State Park [Suarez et al. 1998]). However, the strongest impacts from Argentine ants are likely to occur adjacent to (<200 m) commercial/residential areas.

Red fire ants (*Solenopsis invicta*) have recently been documented in San Diego County (at a property being landscaped in San Marcos). Although they have not yet become a problem in San Diego County, there is reason to be concerned and proactive to prevent red fire ant invasions. Certain types of wildlife, such as deer, ground-nesting birds, and reptiles, are especially affected by ants during and soon after birth or hatching. While the impact of fire ants on populations of wildlife are largely undocumented, they are a likely cause of the decline of many groups of species where they have become established.

The only effective management action currently known for Argentine ants and fire ants is preventing invasion of the preserve by controlling water runoff into the preserve and inspecting landscaping for ants prior to installation. Localized treatment with pesticides may be effective in isolated cases. However, pesticides should be used cautiously and as a last resort because they will also kill native ant species that may not recolonize the treated area as quickly as the nonnative ants, thus defeating the purpose of treatment.

The City will develop a policy and guidelines for landscaping contractors working in the City to control the spread of exotic ants pests by inspecting all planting stock before it is delivered to any property in or adjacent to open space areas. Both the Argentine ant and red fire ant are known to be transported in container planting stock. Any container stock to be imported into the OSMP area or property adjacent to a preserve area should be first inspected by qualified experts to detect Argentine ants, fire ants, and any other invasive pests. The City will strongly discourage (through public outreach and education of landscape contractors and nurseries) the use of infected stock within 300 feet of the preserve. Infected stock will be property treated or disposed of by qualified experts based on Best Management Practices.

Conclusion/Recommendation 10: The City will establish policies and ordinances to increase the use of best management practices in landscaping with respect to invasive ant species in the vicinity the OSMP area (e.g. see landscaping guideline provided by the MHCP, specifically with respect to minimization of irrigation runoff). The City and preserve managers will ensure that all landscaping materials used within the preserve for restoration or landscaping of facilities do not contain Argentine ants, fire ants, and any other invasive pests.

Issue 11 (Key Issue): Outdoor and Feral Animals

Predation on sensitive animal species by domestic pets (especially house cats) is an edge effect particularly associated with residential land uses. Predation by domestic cats may be limited by the presence of larger

predators such as coyotes and foxes because cats are likely to venture much shorter distances from the residences into open space areas, particularly at night when cats do the majority of their hunting (Spencer & Goldsmith 1994). Dogs allowed to run off the leash can disturb breeding birds, and may kill small mammals and reptiles (Kelly and Rotenberry 1993; Spencer and Goldsmith 1994). Unleashed, unattended dogs have been observed within reserves at a distance of greater than 325 ft from the edge, while cats have been observed within reserves more than 1 mile from human dwellings in Riverside County (Kelly and Rotenberry 1993).

The City and preserve managers can minimize the impacts on sensitive animal species by domestic pets primarily through public outreach and education to convince residents adjacent to preserves to keep pets indoors at all times (especially cats), limit hiding/stalking areas for cats near bird habitats such as feeders or other gathering places, spay and neuter pets to minimize the breeding of unwanted pets, and refrain from feeding stray cats or releasing unwanted cats into the wild. Some of these activities, such as spaying and neutering, are currently encouraged countywide and subsidized by the San Diego County Humane Society.

Leash laws will be designated and enforced in all natural open space areas. Currently, preserve managers have no ability to enforce leash laws other than through verbal reprimands and voluntary cooperation (T. Dillingham, CDFG pers. com.; M. Spiegelberg pers. com.). The City staff, police and preserve managers will investigate ways to improve enforcement of leash law in OSMP areas.

Preserve managers will document evidence of feral or domestic animal use in the preserve and fence areas between selected areas of the preserve and adjacent housing to keep pets out of particularly sensitive areas. Preserve managers will coordinate with the City and the County humane society to establish a feral animal removal program to be applied in areas where feral domestic animals are documented as a persistent problem.

Conclusion/Recommendation 11: The City and preserve managers will develop a focused public outreach and education program that emphasizes the need for residents to control their pets to minimize their impact on the preserve system. Feral animals will be removed from preserve areas if possible. The City needs to work with existing preserve managers to address the issue of effective enforcement and deterrent methods. The City will increase the frequency of ranger patrols at preserves to increase public compliance with leash laws.

Issue 12 (Key Issue): Alteration of Ecological Communities

In southern California, several native mammal species that are well adapted to areas around residential development are also major nest predators, including skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), and opossum (*Didelphis virginiana*) (Soulé et al. 1988). Other human-adapted bird species such as scrub jays (*Aphelocoma californica*), ravens (*Corvus corax*), and crows (*Corvus brachyrhynchos*) are also frequent nest predators. Even though these are native species, they become the agents for human-caused ecological disturbances because the presence of human activities may artificially increase their populations resulting in population decreases in other species. For example, as these species increase their population densities near residential development, the greater bird community suffers increased nest predation and subsequent population declines. Research has shown significantly higher density of many of these species in habitat nearer residential development (Odell and Knight 2001).

A second phenomenon known as mesopredator release (Soulé et al. 1988) occurs when patches of habitat become too small, fragmented and isolated to support larger carnivores such as coyotes (*Canis latrans*). Without the coyote, populations of the smaller nest predators increase significantly with a corresponding decrease in the abundance and breeding success of smaller vertebrates (birds, mammals, and reptiles). Crooks and Soulé (1999) documented this effect in coastal canyons of San Diego County where they found significantly higher predation rates by house cats in areas where coyotes were absent.

The MHCP includes the following recommendations to monitor and control native predators:

- Monitor population levels of selected native predators (bobcat, coyote).

- Institute an educational program to explain the role and necessity of large native predators within the ecosystem and the need to protect them from disturbance.
- If key native predator species (coyote, bobcat) are extirpated from the preserve, initiate a program to control mesopredators (gray fox, skunks, raccoon, and opossum).

The brown-headed cowbird (*Molothrus ater*) is also well adapted to human-altered environments including areas around residences. The brown-headed cowbird is another problematic species for native songbirds because it is a nest parasite that lays its eggs in the nests of host species. The cowbird chick displaces the young of the host species such that, in areas where cowbird parasitism is widespread, the populations of the host species can be significantly reduced. Cowbird parasitism has been a major problem for sensitive bird species in southern California (Kus 2000), including the endangered least Bell's vireo and southwestern willow flycatcher (*Empidonax traillii extimus*). MHCP requires that cowbird trapping be initiated if parasitism rates exceed 10% of monitored nests of native species. Preserve managers will include methods to monitor and document the extent of cowbird parasitism on target species nests in the preserve as an area-specific directive in preserve management plans.

Conclusion/Recommendation 12: The City and preserve managers need to include area-specific directives in their preserve management plans to periodically monitor the native species that often become abundant in edge-effected habitat. Control and removal programs will be initiated for any of these species that are shown to be causing the decline in other sensitive species conserved and managed under the HMP/MHCP. The monitoring and control of these species will be implemented within an adaptive management context.

3.1.7 Public Access and Recreation

Public access is appropriate in the OSMF area for passive recreational uses and to promote understanding and appreciation of the natural resources. Excessive or uncontrolled access, however, can result in habitat degradation through trampling and erosion (e.g., along trails) and disruption of breeding and other critical wildlife functions at certain times of the year.

Passive recreational activities (e.g., hiking, bird watching) are anticipated within the preserve and are generally compatible with HMP/MHCP conservation goals. In general, passive activities pose a significant threat to biological resources when the level of recreational use becomes too intense or in areas of sensitive resources. Active recreational activities such as picnicking, equestrian use, and mountain biking may also occur in or adjacent to the preserve, if restricted to selected areas. These activities are conditionally compatible with biological objectives of the MHCP.

The MHCP recommends that construction of new facilities to support recreational uses (including access roads, parking lots, service facilities, maintenance buildings, and landscaping) will be prohibited in the natural habitat within the HMP/MHCP. Construction of these facilities can cause further habitat fragmentation and can result in increased traffic, auto emissions, and petrochemical runoff; pesticide and fertilizer runoff; use of invasive nonnative plants in landscaping; use of outdoor lighting; and changes in local drainage patterns. These activities may have adverse impacts to air and water quality as well as wildlife use of the area and will not be sited within the preserve boundaries.

There may be some instances where construction of a well-planned facility (e.g., a trailhead, small parking area, education/information kiosk, and trash dumpsters) may eliminate other more destructive patterns of use (e.g., parking in habitat, creation of multiple trails, and littering) and will help educate the public on appropriate uses and good stewardship practices.

Issue 13 (Key Issue): Off-road Vehicles

Illegal off-road vehicle use has been a persistent and highly destructive activity in many of the larger open space areas of the City. Off-road vehicles are prohibited anywhere within city limits; however,

enforcement of existing laws has been difficult. Adverse impacts of off-road vehicle use include reductions in air quality due to automotive exhaust and creation of dust, soil erosion and sedimentation into local waters, noise, and habitat degradation. Disturbance from off-road vehicles can also disrupt breeding activities. For these reasons, off-road vehicle use is not compatible in the preserve. In addition to the severe impacts on native habitats, soil stability, and water quality, illegal off-road vehicle use is a safety hazard to other members of the public.

Illegal off-road vehicle use has occurred within the City's undeveloped areas for a long time; however, as areas become designated as preserve areas it has become increasingly important to regulate vehicle access and enforce existing laws. A number of newspaper articles in the North County Times have highlighted the problems associated with controlling off-road vehicle use in Carlsbad (e.g., NC Times 11/29/01, 8/4/02). As an example, the open space around Mount Calavera has had a number of problems with illegal vehicle activity in recent years. The Calavera Nature Preserve, managed by The Environmental Trust, has had repeated off-road vehicle damage to sensitive habitat restoration areas. The Carlsbad Highlands Ecological Reserve, managed by CDFG, has had perpetual problems with illegal vehicle use. CDFG cites limited manpower for enforcement and funding for signage, gate, and barrier repair/installation as the primary reasons the problems persist.

To address these problems, the City has established an Off-road Law Enforcement (ORLE) team to better monitor and respond to illegal activities in open space areas. ORLE team members, who ride off-road motorcycles, respond to complaints of illegal off-road activity and contact/cite the offenders. In addition to enforcement, ORLE officers frequently locate stolen and abandoned vehicles, trash dumpers, and coordinate with the fire department in the event of wild fires.

The City will investigate ways to design legal public use access from new developments that will prohibit illegal off-road vehicle access into the preserve system.

Conclusion/Recommendation 13: To better address illegal off-road vehicle use, the City and preserve managers will work with the (Off-road Law Enforcement) ORLE team to develop a coordinated response plan. The coordinated response plan will consist of regular communication between preserve owner/managers and the ORLE Team to identify problem areas and plan enforcement efforts. Since illegal off-road activity tends to shift from location to location depending on enforcement, the coordination efforts will identify new "hot spots" with the goal of eliminating all such activities from the preserve system. In addition, all preserve entrances will include signage prohibiting off-road vehicle activity and providing a non-emergency phone number for members of the public to directly notify the Carlsbad Police and ORLE team when illegal activity is observed. Public outreach and education will be an important part of the effort to reduce illegal off-road vehicle use.

Issue 14 (Key Issue): Illegal Dumping

Littering and illegal dumping are acts of improper disposal of trash. However, there are subtle differences. Litter is primarily small items that are scattered about, including items such as paper, food containers, beverage containers, convenience products, newspapers, vehicle debris and cardboard. Littering can be an intentional act or it can be accidental. While litter is often easy to remove, keeping an area litter free can be costly and time consuming.

Illegal dumping is always an intentional act and is done for many reasons – cost, convenience, ignorance, habit, profit, or to hide other illegal activities. Illegal dumping often involves large items or large quantities of small items, including appliances, tires, bags of daily trash, furniture, and other household wastes. Illegal dumpsites are often difficult and costly to clean up, and they take a greater toll on the environment and surrounding communities.

Illegal dumping in Carlsbad includes old appliances, abandoned vehicles, yard waste, construction waste, and miscellaneous household waste. The Off Road Vehicle Law Enforcement (ORLE)

team of the Carlsbad police department have the primary responsibility for identifying and reporting incidents (Sgt. J. Chapman, pers. comm.) along with other concerned members of the public. As the City has continued to develop and build out the extent of illegal dumping has decreased (due to the reduction in clandestine open space areas for dumping); however, a noticeable increase occurred with the closing of the San Marcos landfill in 1997, which left no convenient legal dumping location. Incidents of illegal dumping dropped again once the City opened a waste transfer station open to the public (Sgt. J. Chapman, pers. com.).

Illegal dumping in the Carlsbad OSMP area can have a number of negative effects:

- Pollute ground and surface water. Rain or runoff washes over trash and percolates into groundwater, and trash is often tossed directly into streams.
- Directly impact habitat.
- Injure wildlife directly through entanglement, etc. or indirectly through ingestion of toxic waste material or contaminated water.
- Introduce other human health and safety hazards.
- Decrease the value of the property that contains the trash and adjacent properties.
- Attract other crime. “If it’s safe to dump here, it’s safe to do other illegal activities here.”
- Discourage new residents and businesses.
- Take away tax dollars that could be better spent to serve the community.
- Decrease community worth, which further impacts other social aspects of an area.
- Spoil the beauty of the land.

Illegal dumping typically occurs in areas where the perpetrators think they are hidden from detection; therefore, prohibiting vehicle access to more remote areas of open space will limit the number of incidents. Signage with clearly posted fines for illegal dumping and a tipster hotline number will also act as a deterrent in other more accessible areas. Creation of a sense of personal responsibility and stewardship in the local residents adjacent to preserve areas through the education and outreach component of the HMP/MHCP and OSMP implementation can create a ‘neighborhood watch’ mentality that will increase the frequency of reporting tips along with the deterrent effects on likely polluters. As an example, The Escondido Creek Conservancy (TECC) has a Trash Hotline to report incidents of illegal dumping. Then the TECC schedules regular “Clean Up” days where local residents volunteer to help remove trash and debris.

Conclusion/Recommendation 14: The City and preserve managers will ensure that potential dumpsites (relatively remote/hidden sites) in the OSMP area are inaccessible to vehicles through maintenance of gates and barriers. The City and preserve managers will establish an illegal dumping tipster hotline and post this phone number along with a non-emergency police number for real-time enforcement response. Substantial fines will be established, posted on signs, and enforced. The City and preserve managers foster a sense of community stewardship in the OSMP preserve system and “empower” the residents living near and using the open space to notify the City and law enforcement of any illegal activities including illegal dumping.

Issue 15 (Key Issue): Management of Recreational Uses

The primary purpose of the open spaces is to meet the biological requirements of the HCP. Activities within the preserves will be those that are shown to not have a negative impact on the covered species. The location, type, timing, and frequency of activities (passive or active) in the preserve can all be modified to reduce or remove impacts and stressors to sensitive species. The impact of recreational activities will be evaluated through adaptive management and adjusted according to the monitoring data.

Passive and active recreational use in the OSMP area will be managed to accommodate the diversity of compatible recreational uses but must also be consistent with the protection and enhancement of biological resources. Passive recreation includes activities such as walking, jogging, hiking, and bird watching. Active recreation includes activities such as mountain biking, equestrian use, and picnicking (picnicking is

considered an active use due to the prolonged and repetitive impacts on focused areas (typically grasslands and meadows) used for picnicking). Existing recreational facilities will be managed to promote the maintenance of habitat value surrounding these facilities. Passive recreation will be encouraged within the preserve areas but must be managed and directed away from the sensitive resources. Additional future active recreation projects will be accommodated outside the preserve on land not required to meet covered species habitat needs.

The preserve management plans that will be developed/updated for each preserve area will include a recreation plan component that addresses recreational issues and allowable use areas. The City and preserve managers need to establish consistent rules for recreational use so that members of the public can be knowledgeable without being confused by rules that change depending on the preserve management entity. The MHCP includes the following guidelines for the recreation component of the preserve management plan:

- Determine appropriate levels of passive and selected active recreational activities within the preserve, depending on the resources to be protected, season, and successional stage of the vegetation.
- Prohibit recreational activities that require construction of new facilities or roads.
- Develop design standards for new trail construction that address the avoidance of sensitive species, unique habitats, wildlife corridors, erosion control, and access to major features.
- Establish a recreational area patrol to regulate use of the OSMP area.

Specific Recreational Activities

- Passive Uses
 - a. Limit or restrict passive uses in critical wildlife areas during the breeding season, as determined appropriate.
 - b. Minimize adverse effects of passive recreation, such as trampling vegetation and erosion.
 - c. Provide litter control measures, such as closed garbage cans and recycling bins, at access points in the OSMP area.
- Day Use
 - a. Site picnic areas at the edges of the preserve.
 - b. Collect garbage frequently and instruct day users not to feed wildlife.
- Equestrian Use

Trails may vary in width and surface material, depending on site-specific factors. Bicycles will generally be allowed on all trails except where specifically prohibited. Equestrian use of trails is generally prohibited, although there may be some future trails that will be designed for equestrian use. If and when the City determines that equestrian uses are allowed within the preserve, the following guidelines will apply:

- a. Prohibit horses in riparian areas. Construct trails away from riparian or other sensitive habitat. Provide alternative sources of water, where possible.

- b. Mulch trail surfaces to minimize erosion. Do not use materials for trail mulch that are a source of seed of invasive exotic species. Prohibit use of eucalyptus chips that could suppress native plant growth adjacent to trails.
 - c. Limit equestrian use to specified trails that are wider than foot trails (minimum 8 feet wide) to prevent trail edge disturbance and on grades no greater than 25%. If trails become degraded due to heavy use, rotate or limit use during certain seasons to minimize further degradation.
 - d. Prohibit corrals, arenas, stables, and other associated equestrian facilities within the preserve. Locate staging areas for trailheads adjacent to existing roads and away from sensitive resource areas.
- Mountain Biking
 - a. Limit mountain bike trails to areas not highly susceptible to erosion and out of wetlands and other sensitive areas.
 - b. Construct trails wider than foot trails (minimum 6 feet wide) to prevent trail edge disturbance and on grades no greater than 25%.
 - c. Rotate bike use by closing trails periodically to prevent trail degradation if a problem develops.
 - d. Construct barriers to restrict access to sensitive areas.

Public Access

- Ensure that public access to OSMP areas included in the HMP/MHCP is consistent with the protection and enhancement of biological resources. Monitor existing access areas to ensure that they do not degrade or inhibit biological values, and prioritize future access areas for protection of biological resources.
 - a. Seasonally restrict access to certain trails if deemed necessary to prevent disturbance of breeding activities.
 - b. Close unnecessary trails to minimize biological impacts. Abandon and revegetate steep eroding trails.
 - c. Locate new trails away from sensitive resources or restrict their use so that covered species are not adversely affected.
 - d. Construct trails to any prominent features or viewpoints that are likely to attract hikers, thereby preventing extensive trampling and compaction.
 - e. Install water breaks on steep trails to prevent accelerated runoff and erosion.
 - f. Establish patrols to identify trail maintenance needs, garbage, vandalism, and habitat degradation and to enforce land use restrictions.

The Carlsbad Citywide Trails Program was established to plan and develop the circulation element trails (trails intended to supplement roads, enabling pedestrians and bicyclists to travel around the city) and the City's plan for recreational trails throughout the OSMP. Eventually, there will be up to 68 miles of recreational trails throughout the City. The City and existing preserve managers will develop and maintain approximately 25 miles of trails, while developers will build the other 43 miles as a part of the open space easements associated with new development. The City's trails team is in the process of working with developers and homeowner's associations to get new trails built as development occurs. It will be

important for the City's trails team to coordinate with preserve managers and other City staff to ensure that the MHCP guidelines for recreational uses are adhered to when new trail alignments are identified and developed. The placement and use of trails will be planned, monitored and managed so that that the trails don't not adversely affect sensitive species. Trail placement and use will be consistent with other management activities in the preserves and will be evaluated with adaptive management.

Conclusion/Recommendation 15: The City and preserve managers will incorporate the MHCP guidelines for recreational uses into each preserve management plan. The MHCP guidelines will be used to establish a consistent set of rules for the OSMP citywide, to avoid confusion for members of the public. The City trails team and preserve managers will review the compatibility of the Carlsbad Citywide Trails Program and update or realign trails as needed in the plan to meet the biological protection goals and guidelines of the HMP/MHCP.

Issue 16 (Key Issue): Enforcement

Enforcement is a critical component of the OSMP and implementation of the HMP/MHCP. Enforcement programs are needed to ensure compliance with land use plans and restrictions, such as zoning, and to ensure that fire management and recreational uses are compatible with preserve goals. Enforcement has been an underlying part of the solution for many of the other issues discussed in this report (e.g., illegal off-road vehicles, illegal dumping, encroachment and some edge effects).

Enforcement of the City's laws and preserve and open space regulations falls into two categories of offences. First are the minor infractions, such as hiking on a closed trail, walking a dog off a leash, and over-watering the adjacent landscape. Minor infractions can be handled by the preserve manager through discussion and education of the offending party. The City and preserve managers will work together and with local community groups on a public education program to explain goals and regulations as well as educate the public on the area's resources. The City needs to work with existing preserve managers to address the issue of effective enforcement and deterrent methods.

Major infractions include illegal off-road vehicle use, illegal dumping, vandalism, and illegal encampments (itinerant workers and transients). Involvement of law enforcement officials will be necessary to address most all major infractions. Often the perpetrators of major infractions are not caught due to the delay in response time. However, more coordination and delineation of jurisdiction and enforcement authority may improve the frequency with which these perpetrators are caught and punished (creating a real deterrent for future infractions). The City, preserve managers, and police department will establish a coordinated response plan to address these issues.

The OSMP funding analysis (Appendix A of this document) identifies the need for one full-time supervising ranger/officer and four full-time rangers/officers with law enforcement training to effectively enforce applicable laws and safety in the OSMP area (as per conversations with and recommendations by Lt. Mike Ference, CDFG, and Supervising officer Dave Felt of the City of Carlsbad). The Rangers will coordinate with law enforcement agencies, including the City of Carlsbad's Sheriff's Department, Department of Fish and Game Wardens, and city police and parks officers. All staff vehicles will be equipped with radios and/or cellular telephones to report trespass and vandalism to security personnel or the Sheriff's Department. In addition to contributing to the species and habitat conservation goals of the HMP/MHCP, a strong security presence also enhances the experience of the public who are legally using the OSMP area and enhances the quality of life for residents of neighboring properties. The City of Carlsbad will work cooperatively with adjacent jurisdictions to establish and enforce consistent rules and regulations, and to cooperatively identify problem enforcement issues or repeat violators.

The ultimate level of enforcement of OSMP compliance with the HMP/MHCP lies in the implementing agreement with the wildlife agencies, because degradation of resources could result in loss or revocation of federal and state take authorizations. The City will maintain compliance with the HMP/MHCP permit conditions and the associated implementing agreement through the implementation of the OSMP and the actions of the City and other designated preserve managers. The annual reporting process will provide the wildlife agencies with the necessary management and monitoring data and preserve management status and

tracking data to evaluate compliance and/or the need for additional consultation and enforcement. In addition, the City and preserve managers will contact the wildlife agencies to resolve particular species and habitat issues on an as needed basis (e.g., to develop consensus on adaptive management strategies, to revise field survey protocols, to address a problematic invasive species problem, etc.).

Conclusion/Recommendation 16: The City and preserve managers will pool their funding resources to hire five officer/rangers who will assist in preserve enforcement throughout the OSMP area. The City, preserve managers, and police department will establish a coordinated response plan to address these issues, and will work together and with local community groups on a public education program to explain goals and regulations as well as educate the public on the area's resources. The City needs to work with existing preserve managers to address the issue of effective enforcement and deterrent methods. The City will increase the frequency of ranger patrols at preserves to increase public compliance with leash laws, trespassing, and other illegal activities.

Issue 17 (Key Issue): Itinerant Worker and Transient Camps.

Itinerant (agricultural) workers and transients sometimes maintain shelters and living areas illegally within habitat areas. Such living areas have a detrimental effect on native vegetation and wildlife use, including an increase in refuse, poaching of wildlife, increased fires, and raw sewage disposal that can pollute water resources. These camps often become an eyesore and reduce the aesthetic value of open space, and create a significant safety risk for preserve managers and others using hiking and biking trails. The volume of refuse generated attracts black rats, which contribute to the decline of native rodent populations. Although scattered living areas will be difficult to control, villages of transients are incompatible with the biological, open space, and recreational goals for the OSMP area and will be removed.

The major location that homeless transients set up illegal encampments is in the riparian and scrub habitat along the Buena Vista Creek near Haymar Drive and the Plaza Camino Real and Vons shopping centers (Sgt. J. Chapman, pers. com.). While not as numerous as the agricultural worker camps, the homeless transient camps cause considerable habitat damage due to the volume of material that these people bring into the natural habitat areas. The itinerant worker camps are established in a number of locations, generally near the agriculture areas in which they work, with one of the largest encampments occurring on the canyon slopes south of Agua Hedionda lagoon.

While the impacts to the habitat are significant and incompatible with open space goals, the social, economic and ethical issues regarding how best to solve this problem are complex. According to an article in the North County Times (2/5/02) the itinerant farm worker makes up the majority of the more than 700 homeless that live in Carlsbad. Carlsbad police estimated in this article that only about 20 individuals are homeless transients, leaving 97% of Carlsbad's homeless identified in as itinerant workers. The City has removed camps and their residents in the past; however, these actions are likely to result in even more damage to the open space because most of those who are evicted have no other alternative and eventually end up establishing a new camp elsewhere.

Illegal camps are established in the canyons throughout the City because those living there see no other alternative. The high cost of housing and the limited availability of beds in shelters (50 beds and room for only about 25 additional temporary cots according the 2/5/02 NC Times article) leave these low-paid workers with little option. Therefore, alternative housing options must be established before additional camps can be removed. Currently, La Posada de Guadalupe, a 50-bed men's homeless shelter intended for immigrant workers and run by the Catholic Charities in Carlsbad, is the only shelter directly addressing this issue. The City continues to provide significant financial support to this shelter; however, the need for shelter still far outweighs the supply, resulting in continued impacts to habitat and open space value.

The City has been working on developing solutions for this issue with the police department, the shelter operator, and the County's Regional Task Force on the Homeless, a partnership of agencies and public groups. Due to the complexities involved, it is unlikely that the problem of illegal encampments will be

permanently solved with long-term solutions in the near future. However, the City will work to implement short-term measures to minimize the further degradation of open space.

Because confrontation of residents of illegal encampments may involve a number of complex issues ranging from health and safety to legal and civil rights, preserve managers should not attempt to confront individuals alone. Instead, preserve managers and other members of the public will contact the City regarding the location of an illegal encampment and coordinate any action or response through the City, police, and other qualified entities.

Conclusion/Recommendation 17: The City will continue to work with local and regional agencies to find long-term solutions for housing of low-income itinerant workers and transients. The City will also work quickly to implement short-term solutions so that further habitat degradation is ceased. Note that a continued decline in habitat quality without active intervention from the City could result in the loss of one or more endangered species permits. The City will coordinate with all preserve managers to establish a protocol for reporting and handling illegal encampments to protect the health, safety, and legal rights of everyone involved. Preserve managers and rangers will notify the police department and the City when illegal encampments are discovered and will work with the City to remove structures and debris and revegetation the disturbed areas as necessary.

3.1.8 Biological Monitoring Responsibilities and Adaptive Management

Carlsbad must implement actions to ensure that conservation goals are met in the HMP portions of the OSMP area. The HMP/MHCP has established specific conservation goals and strategies to ensure the persistence or expansion of covered species, including key landscape or habitat attributes or ecosystem processes deemed necessary for long-term regional persistence (MHCP Volume II). Implementing actions to achieve the conservation goals or strategies by the City of Carlsbad is the basis for issuance of take authorizations under the HMP and MHCP plans. These implementing actions include monitoring and management of the preserve. The MHCP biological monitoring and management program has been structured to allow the wildlife agencies and the City (as a take authorization holder) to (1) evaluate compliance with HMP/MHCP conservation requirements (i.e., “compliance” or “implementation” monitoring) and (2) assess covered species population trends and additional key factors associated with species-specific conservation goals and strategies (i.e., “effects and effectiveness” monitoring) within the subregion and individual subareas.

Issue 18 (Key Issue): Coordination of Monitoring and Management Responsibility

The NCCP process and conservation guidelines require regular monitoring of covered species populations and their habitats. These surveys will supplement existing project-specific monitoring activities, such as that conducted by CDFG at Batiquitos Lagoon. The portions of the OSMP area included in the HMP/MHCP preserve must be monitored to assess the status and trends of resources within the preserve. Biological monitoring will evaluate whether the preserve system is meeting HMP/MHCP conservation targets for covered plant and animal species and their habitats, address specific questions regarding species population status and ecosystem functions, identify threats to covered species and their habitats, and help identify management needs. Monitoring will also identify issues requiring focused research to meet species-specific conservation goals and permitting conditions. The MHCP Biological Monitoring and Management Plan (MHCP Volume III) outlines the issues to be addressed by the long-term monitoring program. In addition, individual preserve management plans that include area-specific management directives will be prepared by preserve managers for individual preserve areas and will fully address preserve-level monitoring and management. It will be critical that monitoring and management is coordinated across the preserve system (across the OSMP area and the MHCP preserve network) for monitoring data to be collected and interpreted in a meaningful and useful way. As the permit holder under the HMP/MHCP, the City of Carlsbad has the responsibility to ensure that preserve managers coordinate among themselves (e.g., within a management unit), with monitoring and management in adjacent MHCP subareas, and with the wildlife agencies to efficiently monitor and manage species and habitats.

The introductory chapter of the OSMP addresses the process and structure by which the biological monitoring and management responsibilities will be distributed and coordinated among the City, preserve managers, and the wildlife agencies. The City will establish the role for a Preserve Steward, a City-contracted consultant or employee to oversee the City-wide monitoring, management, and maintenance of the preserve system. The preserve steward will be responsible for frequent communication with preserve managers, the City, and wildlife agencies, will provide science-based technical support to Preserve Managers for survey design, data collection and analysis, and will support the City in compliance monitoring (review of predevelopment plans and post-construction review).

As part of the annual reporting process, each preserve manager will be required to submit a Work Plan to the Preserve Manager and wildlife agencies for the coming year that identifies, describes, and prioritizes proposed surveys and adaptive management activities to be conducted in response to specified monitoring schedules or management circumstances. These work plans will be adjusted as needed in response to Preserve Steward and wildlife agency comments. For more urgent situations that cannot wait for inclusion in the annual work plan, ad hoc meetings with the Preserve Steward and wildlife agencies will be called.

A biological monitoring report will also be prepared every 3 years by the wildlife agencies to present data on the habitats and species monitored. To support this effort, every 3 years the managers of each preserve area will submit a report (including an updated preserve management plan) to the wildlife agencies that summarizes management activities, describes management priorities for the next 3-year period, reports on restoration activities, and evaluates funding and the ability to meet resource management goals.

In addition, coordination with other cities will be critical to the success of the preserves. The MHCP calls for creation of a subregional structure for coordination between the North County Cities. For this reason, it is planned that this first OSMP, as a “first step” for the MHCP, will become a model and template for other cities and will be refined and adjusted based on experience and the evolving subregional implementation structure.

Note that where the City is mentioned throughout the OSMP with respect to preserve monitoring and management it is implied that it is the City with the support of the Preserve Steward to provide science-based guidance and oversight to the OSMP implementation.

Conclusion/Recommendation 18: The process and structure for coordination and implementation of the OSMP is defined in detail in the introductory chapter of the OSMP. The City of Carlsbad will be responsible for coordinating with other cities in the MHCP to implement monitoring and management across the MHCP preserve network. The City will create the role of a Preserve Steward to oversee and support the science-based implementation of the OSMP. The preserve steward along with the USFWS and CDFG will provide oversight, including review of surveys, preserve management projects, and approval of results and reports generated by the monitoring program. The City of Carlsbad and its preserve steward and preserve managers are responsible for preserve level monitoring and management for the OSMP area, preparation of the preserve area plans specifying the monitoring and management activities for a given preserve area, and preparation of annual reports to the wildlife agencies summarizing monitoring and management actions and results.

Issue 19: Trigger for Adaptive Management

The City, the preserve steward, and preserve managers in the OSMP area are responsible for managing individual preserve areas to ensure that conservation goals of the HMP/MHCP are met. Monitoring at the preserve area scale needs to be focused on obtaining information for management purposes. Managers must monitor the status and trends of covered species and collect data on key environmental resources within preserve areas to select, prioritize, and measure the effectiveness of management activities. In most instances, the array of threats or stressors of preserved habitats, their mechanisms of action, and the responses of the habitats and associated species are not completely understood at this time. Therefore, individual preserve management plans must comprehensively address management and monitoring issues

for each preserve area. Information collected within the preserve areas will be aggregated for analysis at the MHCP subregion and ecoregion scales.

Information gained through monitoring will inform management decisions through the adaptive management process. Adaptive management acknowledges the lack of complete knowledge and understanding of a system at the outset of management actions. Adaptive management is a means to learn more about the system through the implementation of management actions and the monitoring of management results. Management actions can then be adapted to optimize management goals by incorporating new information gained through an iterative implementation and monitoring process. There are six main steps in adaptive management: (1) identification of the problem or management goal; (2) design of the management action or implementation plan; (3) implementation; (4) monitoring of management results; (5) evaluation of the results relative to the desired management goals; and (6) adjustment of management actions. The trigger for a change in the management approach/actions occurs when management results have not achieved the desired management goals. The assumptions underlying management goals must be stated explicitly and considered as hypotheses to be tested by carefully designed and implemented monitoring programs that are, in effect, management experiments. Ideally, management actions would be designed and implemented with experimental control sites and replication that would allow statistical interpretation of management results. This may be possible for some management actions in some preserve areas, but not a realistic expectation for all management actions across the whole OSMP area. At a minimum, careful measurement of key environmental and biological variables before and after the management action can provide some insight into the effects of management at that particular site.

For the OSMP area, an adaptive management approach will provide correcting actions where monitoring shows that (1) resources are threatened by land uses in and adjacent to the preserve, (2) current management activities are not adequate or effective, or (3) enforcement difficulties are identified. The preserve steward will work with preserve managers to identify specific adaptive management triggers for key management issues and target species to be addressed in the preserve management plans and area-specific management directives.

Conclusion/Recommendation 19: The City of Carlsbad, the preserve steward and other preserve managers in the OSMP area will apply an adaptive management approach to all management activities. Corrective actions within an adaptive management context will be undertaken as soon as possible to prevent further degradation and more costly remedies later. If management targets (e.g., habitat condition, invasive species eradication, etc.) are rapidly deviating from desired goals, the preserve manager and/or City will contact the wildlife agencies and other issue experts to seek the best available advice as soon as possible.

Issue 20 (Key Issue): Data Management

Data collected for preserve-level monitoring and management will, in most cases, be linked to a GIS database to facilitate adaptive management decisions and monitoring analysis. It will be important for some data types (i.e., species and habitat monitoring) to be collected using methods standardized across the MHCP subregion such that subregional trends in species populations and vegetation communities can be analyzed. Furthermore, data will be systematically collected to facilitate the City's annual reporting requirements. The MHCP Monitoring Plan (MHCP Volume III) includes many sample datasheets, species monitoring guidelines, and recommended vegetation mapping methods. Preserve managers will be required to use these standardized methods and data formats to facilitate integration and management of the data.

GIS data will be managed and maintained by City staff with a GIS technical background to ensure that the data are input and managed properly according to accepted GIS data standards (e.g., maintenance of metadata, updates, backups, and overall database structure). The City will investigate ways in which the OSMP GIS database can be efficiently linked to the data collected by preserve managers. If data and management results are frequently updated into the OSMP GIS database, the City's annual reporting and the wildlife agency subregional status and trends analyses will be made much easier. The OSMP GIS database could be linked to the Internet through an OSMP webpage enabling 1) the preserve managers to

“upload” their data and monitoring results, 2) the City to coordinate monitoring and management among preserve areas, and 3) the City to provide data and information to interested members of the public regarding OSMP monitoring and management activities.

Conclusion/Recommendation 20: The City will require that preserve managers within the OSMP area adhere to all the MHCP established monitoring methods and use the standardized data collection formats. The City will investigate the development of a GIS database management tool that is accessible through the Internet and, if developed, will use this tool to efficiently maintain current data, coordinate management and monitoring, and provide information to the public.

Issue 21 (Key Issue): Coordination of Lagoon Management

There are numerous ongoing lagoon management activities occurring in all three of Carlsbad’s lagoons (Batiquitos, Agua Hedionda, and Buena Vista Lagoons) including management of sediment transport and hydrology, species monitoring, exotic species control, and recreation. Although CDFG is the primary management entity of the majority of the lagoon habitat (essentially all of Buena Vista and Batiquitos and the eastern portion of Agua Hedionda; see Figure 2-3), it is still important for the OSMP to provide coordination and guidance for the secondary management entities (e.g., Buena Vista Lagoon Foundation) and other important lagoon managers (i.e., SDG&E/Cabrillo Power).

Dredging has become an important management tool at all three lagoons, either to remove accumulated sediment in the basin or to open the tidal channel to improve tidal flushing and water quality. Dredging has also been used to create beach/dune habitat for nesting birds including snowy plovers and least terns. Sedimentation within Buena Vista, Batiquitos, and Agua Hedionda lagoons accumulate sediment from their tributary creeks and from long-shore sand movement at the mouths of the lagoon. Future planning and implementation of dredging activities will be coordinated through the OSMP so that dredging objectives are met without interfering with other biological management responsibilities under the HMP/MCHP. Of particular importance in this respect is the desired future condition of Buena Vista Lagoon. If undertaken, dredging to restore tidal influence will have a major effect on the habitat and species composition as portions of the existing freshwater marsh system convert back to brackish or saltwater marsh.

Species monitoring and management at the lagoons will continue to be the primary responsibility of CDFG in areas where it is the primary management entity. The Ecological Reserve Management Plans for each of these three lagoons will include area-specific management directives and species monitoring protocols that are consistent with the requirements of the HMP/MHCP.

Generally, exotic species monitoring and control is an expected component of every preserve manager’s preserve management plan (e.g., Arundo control at Buena Vista Lagoon). Infrequently, however, an invasive species is introduced into an area and spreads (or has the potential to spread) so rapidly and destructively that the control and eradication of the species must be addressed with the highest urgency and priority. When *Caulerpa taxifolia*, a highly invasive and destructive seaweed, was found in Agua Hedionda lagoon, it was clear that immediate state and federal action was needed to address the problem.

Caulerpa has become a devastating invasive species in the Mediterranean Sea. Around 1984 this species apparently escaped or was released from an aquarium into Mediterranean waters. By 1997 it was reported to have blanketed more than 11,000 acres of the northern Mediterranean coastline and has recently been reported off northern Africa. In areas where the species has become well established, it has caused ecological and economic devastation by overgrowing and eliminating native seaweeds, seagrasses, reefs, and other communities. In the Mediterranean, it is reported to have harmed tourism and pleasure boating, devastated recreational diving, and had a costly impact on commercial fishing both by altering the distribution of fish as well as creating a considerable impediment to net fisheries.

Eradication efforts in southern California (Agua Hedionda Lagoon and Huntington Harbor, where it was also found) are currently underway under the direction of the Southern California Caulerpa Action Team, a broad-based task force assembled from federal and state resource and regulatory agencies and the City, exotic species experts and marine resource scientists. These scientists and managers are cautious, but

hopeful that complete eradication can be achieved with ongoing monitoring and treatment. Under State law (Assembly Bill 1334), the sale, possession, and transport of *Caulerpa taxifolia* was prohibited throughout California in September 2001.

Issues regarding dry land recreation activities at the lagoons are addressed under several other issues above (e.g., public access, trails, off road vehicles, and management of recreational uses). Aquatic recreation is prohibited in Batiquitos and Buena Vista Lagoons, but is allowed on the inner lagoon of Agua Hedionda. A youth camp, private marina and public boat launch on Agua Hedionda provide canoeing/kayaking and motorized water sports activities. Active aquatic recreation including kayaking is not allowed on Batiquitos or Buena Vista Lagoons, but is a frequent illegal activity according to Seth Schulberg of the Batiquitos Lagoon Foundation (N.C. Times, 3/16/01). The City and CDFG will investigate the need for additional signage regarding areas where aquatic recreation is prohibited, since it appears that the majority of violations are innocent misunderstandings (N.C. Times, 3/16/01).

The following assumptions were critical to the justification for conservation of lagoon species in the MHCP; and therefore need to be adopted and carried forward by the OSMP to maintain compliance with the HMP/MHCP:

- Maintain connections between coastal lagoons and inland habitats, primarily for coyote movement, as a specific element of the MHCP preserve design. It is assumed that this will allow top predators to control mesopredators in the lagoons systems, and nest predation on ground-nesting birds will be reduced.
- Maintain adequate buffer areas around salt marsh and mudflat habitats to minimize disturbances and edge effects and to help maintain water quality. Conserve and manage wetland habitats upstream from coastal wetlands to help maintain water quality.
- Manage newly created dredge spoil islands for the western snowy plover and least tern to provide cover materials, suppress weed growth, and control predation and human activity. Minimize human disturbance to increase the likelihood of elegant tern recolonization and breeding.

There are several lagoon-specific management actions recommended by the MHCP monitoring plan (MHCP Volume III) to address the issues identified above and to minimize potentially negative impacts, including:

- Establish boardwalks to protect habitat from trampling.
- Create or enhance protected beach areas, tidal creeks, or islands to provide breeding areas for covered bird species.
- Restore saltmarsh habitat and adjacent uplands.
- Provide shoreline stabilization to control erosion.
- Remove trash, including water-borne debris in breeding areas, during the non-breeding season.
- Dredge the mouth of the lagoon to keep it open.

Conclusion/Recommendation 21: The City will work with the various lagoon management entities to coordinate dredging activities to meet the goals of hydrology/sediment management and biological conservation. The OSMP will be used as a tool to facilitate this coordination. CDFG will maintain the responsibility for species and habitat monitoring and management and the Southern California Caulerpa Action Team will continue to lead Caulerpa eradication efforts. The City will assist in monitoring and enforcement of the state ban on sale, transport, and possession of Caulerpa through periodic monitoring and informational outreach to pet stores and through educational outreach to the general public. The City will work with CDFG to improve enforcement of boating regulations on the lagoon areas where it is prohibited.

Issue 22: Restoration

Restoration is the process of reestablishing or enhancing historic biological functions and values to degraded habitats. Restoration methods range from active revegetation to passive management. Generally, labor-intensive restoration methods involving active revegetation take less time to achieve biological goals but at greater cost than more passive management techniques, such as fencing to limit further disturbance.

Active revegetation and restoration projects rely on techniques that encourage natural regeneration or use intensive horticultural methods such as planting, seeding, transplanting, and salvaging. The source of seeds and plants used for such projects has tremendous genetic implications. Non-local planting stock can introduce novel, undesirable, or maladapted genotypes into the ecosystem. Use of non-local stock may also result in mortality or problems with growth and reproduction. Thus, active restoration programs will use propagules from sources close to the restoration site. Planting stock must also be inspected for invasive pests, such as Argentine and fire ants, and any infested stock must be removed from the vicinity of the OSMP area and properly treated or disposed.

In most OSMP areas there are ample opportunities for restoration and/or habitat enhancement. Therefore, restoration will be an important component of the area-specific management directives and goals of each preserve areas preserve management plan. For many preserve areas restoration may be prescribed on an as-needed basis to revegetated non-permanent trails and disturbed areas to enhance habitat quality and reduce the extent of nonnative seed sources within the OSMP area. There will be a larger and more focused restoration component for other preserve areas within the OSMP. A restoration component is often a part of the development and mitigation agreements that have established the preserve areas. For the four existing preserve management plans, Habitat Management Plan for the La Costa Preserve (CNLM), Habitat Management Plan for the Kelley Ranch Habitat Conservation Area (CNLM), Perpetual Land Management Plan for Calavera Nature Preserve (TET), and Calavera Hills Phase II Final Habitat Management Plan (TET), only the Calavera Hills Phase II has a focused restoration component (Area K abandoned easement restoration). A focused restoration plan was prepared to implement the Area K restoration project. The remaining areas of these four preserve management plans will be restored/enhanced on an as-needed basis.

The Batiquitos Lagoon Enhancement Project has been implemented and is in the restoration monitoring phase of the project. It is assumed that ongoing monitoring and management of this project will be addressed by the Batiquitos Lagoon Ecological Reserve Management Plan once it is completed.

There is a requirement under the HMP/MHCP for an additional 104 acres of coastal sage scrub to be restored within the City of Carlsbad to contribute to the recovery and conservation of the California gnatcatcher and other scrub habitat species. The HMP identifies six Local Facilities Management Zones (Zones 5, 8, 14, 15, 17, and 18) as areas where coastal sage scrub restoration is recommended. The City and preserve managers will need to incorporate coastal sage scrub restoration plans into the preserve management plans for these areas. The restoration of 104 acres will be funded through the regional funding source; therefore, it will not begin until after the regional funding mechanism is established.

Detailed restoration management plans will be prepared, as part of area-specific management directives, according to the MHCP guidelines for restoration within the MHCP preserve area (MHCP Volume III).

Conclusion/Recommendation 22: The City and preserve managers will need to incorporate restoration and enhancement into the individual preserve management plans. Additionally, detailed restoration management plans will need to be prepared for individual restoration projects for restoration required by project-specific mitigation, for the 104 acres of coastal sage scrub restoration through the OSMP area, and for additional restoration needs identified by preserve managers. Restoration management plans will be consistent with the guidelines provided in MHCP Volume III. The restoration of these 104 acres will occur once a regional funding source is available.

Issue 23: Erosion Control

Erosion is promoted by the combination of erodible soils, steep slopes, soils with low water-holding capacity, sparse to no vegetation, and hydrologic condition of the soils. Erosion can be aggravated by human disturbance and fire-control activities. Erosion hazards to biological resources include pollution and sedimentation of important water sources and the loss of vegetative cover from landslides.

Management and repair of erosion problem areas will generally be handled by individual preserve managers on a case-by-case basis. Preserve managers will develop and implement an erosion control plan for high priority erosion control areas as part of area-specific management directives in individual preserve management plans. In general, this will include establishing physical features to slow surface flow and dampen initial precipitation impact, and revegetation of eroded surfaces for long-term protection. In steep areas, rock areas, and areas of high storm flow, permanent rock or concrete revetments may be required to stabilize undesirable erosive forces. In most cases preserve managers will be able to control and/or eliminate erosion problems; however, severe erosion problems may occasionally occur (e.g., with a major storm event and/or slumping and slope failure). In these rare cases the City will need to coordinate emergency measures possibly with the assistance of other agencies (i.e., ACOE and USFWS) to repair major erosion damage.

The following guidelines are provided in the MHCP (Volume III) for erosion control within preserve areas.

Identify and Prioritize Areas for Erosion Control

- Identify areas of moderate to severe erosion within and adjacent to the preserve.
- Determine causes of erosion and current or potential adverse or beneficial effects on habitat within the preserve.
- Rank identified erosion areas according to threats to biological resources. Include an assessment of cost for erosion control measures.

Address Slope Stabilization and Surface Drainage

- Prepare contingency native seeding plans for highly erosive areas temporarily disturbed by fire.
- Prohibit bare surface grading for fire control on slopes. Ensure that all techniques implemented for fire control leave (or replace) adequate vegetation cover to prevent surface erosion.
- Ensure that all areas identified for revegetation are adequately stabilized by either a binder or straw cover after planting to minimize surface erosion.
- Ensure that no new surface drainage is directed into the preserve.

Conclusion/Recommendation 23: The City and preserve managers will need to incorporate erosion control plans into the individual preserve management plans. The City will assist in coordination and repair of severe erosion problems. Erosion control and management plans will be consistent with the guidelines provided in MHCP Volume III.

Issue 24 (Key Issue): Public Information, Education, and Beneficial Use of Open Space

Public support is essential for the successful long-term funding and management of the OSMP preserve system. City residents derive many beneficial uses of the open space that will be protected within the OSMP area, including trail use for hiking, biking, and bird watching or simply the enjoyment of the scenic beauty preserved in vistas from roadways and backyards. Public education is a critical issue for preserve management because a well-informed public is a good steward and partner in preserve protection.

Currently, the primary mechanisms for public information and education are handled voluntarily by the local environmental interest groups and secondary management entities (e.g., Preserve Calavera, Batiquitos Lagoon Conservancy, and Buena Vista Lagoon Conservancy). These groups provide information and education to the public about habitat protection and recreation (including recreation restrictions) as well as provide information to the City and wildlife agencies regarding open space management issues and violations (e.g., illegal off road vehicle use). These groups are each only focused on a specific portion of the OSMP and do not comprehensively address all of the public education and information needs (due to funding limitations and/or mission of organization). Additionally, signage and informational/educational kiosks provide supplemental sources of public information and are maintained at a number of the actively managed preserve areas.

The City of Carlsbad has a series of “Let’s Talk About...” flyers that address some of the important open space issues such as parks, trails, and open space. These flyers are available at the City offices and through the City website and provide a very good overview of some of the basic open space issues.

Most of the OSMP issues addressed in this report have an important public education/information component to the solution. Therefore, there is a substantial need for a comprehensive public education and information program to be established Citywide. This program will be managed and implemented by the City in coordination with the other preserve managers and the other environmental organizations, conservancies, and interest groups. This program will include, but not be limited to, the following tools to improve public knowledge, involvement, and cooperation with open space conservation:

- Expand the “Let’s Talk About...” series to include every issue addressed in this report that requires public outreach and education in the solutions (e.g., domestic pets in preserves, landscaping and irrigation, off road vehicle use, etc.).
- Public service announcements and public access/local television programs featuring open space issues in Carlsbad.
- Distribution of public outreach materials through HOAs, shopping centers, and service groups
- Establish an OSMP website with information on open space issues, management of each preserve area, links to GIS data in the OSMP Inventory, species and habitat information, and recreational information.
- A Carlsbad Open Space Schools program to educate school children about the open space in their neighborhoods and the species and habitats that are their “neighbors”.
- Signage and educational kiosks to inform those using the trail systems;
- Public outreach to encourage “best management practices” of residences living near preserves to control edge effects such as beneficial landscape practices and domestic pets allowed to roam in the preserves; and
- Volunteerism and involvement of school and community groups to foster a sense of stewardship in the preserves.
- Establish a “hotline” for members of the public to report violations in the preserve and other preserve-specific problems.

Conclusion/Recommendation 24: The City will develop a citywide public information and education program to comprehensively address the public education and information needs as described above. Local public outreach to the immediate neighbors or other public users of the preserve will be conducted by each preserve manager as needed. The preserve manager will solicit assistance from the City-wide program as necessary and vice versa.

Issue 25: Fencing and Signs

Fencing plays an important role in the use of the landscape by humans, domestic animals, and wildlife. Fencing can restrict grazing and control human access, particularly off-highway vehicles. Fencing can direct wildlife to road undercrossings and prevent road kills. However, fencing also can restrict normal wildlife movement, restrict access to food and water, and force wildlife onto roads.

The City and preserve managers will install and maintain fencing where it is needed to protect resources, but will remove existing fencing where it occurs within the OSMP area and has no obvious need or function.

Fencing will be used to funnel wildlife away from at-grade road crossings and toward undercrossings; fencing at wildlife undercrossings will be 6 feet high (10 feet high if mule deer and/or mountain lion have been identified in the area), use a mesh with openings no greater than 4 inches square, and will ideally be buried at least 12 inches below ground to prevent wildlife crawling or digging beneath the fence and to minimize management costs (e.g., due to erosion beneath the fence). To protect particularly sensitive species or habitats, the City and preserve managers will use perimeter fencing or between public access areas (e.g., trails) and sensitive resources (e.g., vernal pools).

For fencing designed to keep wildlife off roads, some design standards should be included for allowing escape routes in the event that large animals are trapped by the fence within the roadway corridor. Successful designs have included occasional dirt ramps or one-way gates.

Preserve managers will limit human access to designated trails using natural vegetation, topography, signs, and limited fencing, and will design and locate fences within the preserve so they do not impede wildlife movement.

Signs educate, provide direction, and promote the sensitive use and enjoyment of the OSMP area, but they can also inadvertently invite vandalism and other destructive behavior. Signs that explain the rules and restrictions of a preserve area are most effective at public entrance points. Signs for educational nature trails and on roads near wildlife corridors (to reduce road kills) also will be posted at appropriate locations.

The City and preserve managers will establish signs for access control and education at the periphery of the preserves that are open to human access. Signs will be posted to prohibit firearms and unleashed pets and for educational nature trails.

Signs will be limited at sensitive species locations so as not to attract attention to sensitive species; signage may invite disturbance of their habitat. Temporary signs will be used to indicate habitat restoration or erosion control areas, and barriers and informational signs will be used to discourage shortcuts.

The City and preserve managers will also provide educational brochures, interpretive centers, and signs to educate the public about the resources and goals of the OSMP, HMP and MHCP. This effort will be coordinated through the recommended citywide public information and education program.

Conclusion/Recommendation 25: Signage and fencing are the responsibility of the primary management entity for each preserve area. The City will work with each preserve manager to develop standardized signage and OSMP rules and regulations to avoid confusion. Signage and fencing will be installed and/or maintained as described above and in the MHCP (Volume III).

Issue 26: Preserve assembly and integration with Habitrak

It is assumed that the City will use *HabiTrak* for preparing annual reports of habitat development and preserve assembly for the wildlife agencies. The HMP/MHCP must be monitored over time to determine if the implementation measures are achieving the goals and objectives of the plan. Included in this monitoring is an accounting of the gains and losses of habitat as development proceeds and new open space is dedicated.

GIS accounting of the acreage, type, and location of habitat (vegetation communities) and covered species conserved and destroyed by permitted land uses and other activities, is required to be tabulated annually for the Carlsbad HMP area and every 3 years for the MHCP as a whole.

A committee of City of San Diego, County of San Diego, SANDAG, and wildlife agency staff has developed a GIS-based tool for this purpose (HabiTrak), which will be used for habitat accounting by the City of Carlsbad for the HMP. Carlsbad will be responsible for the annual accounting of the acreage, type, and location of vegetation communities and selected covered species conserved and destroyed by permitted land uses and other activities within its subarea. Habitat accounting will also be used to track conservation of vernal pools. Records will be maintained in ledger and digital map (GIS) format. This information will be submitted to the wildlife agencies as part of an annual public report to demonstrate compliance with the terms and conditions of the HMP, implementing agreement, and take authorization. Carlsbad will hold annual public workshops to brief interested citizens on the progress of preserve assembly.

The HabiTrak system is GIS based, therefore, it will be relatively straightforward to apply the HabiTrak system to the OSMP area if the City decides to develop the GIS database management tool for coordination of data and reports from all preserve managers.

Conclusion/Recommendation 26: The City will coordinate with preserve managers to establish a schedule and deadlines for reporting of data and project status with preserves so that citywide data are available to the City with sufficient time to update the HabiTrak accounting system and prepare the City's annual reports.

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APPENDIX A.

Carlsbad OSMP Funding Analysis

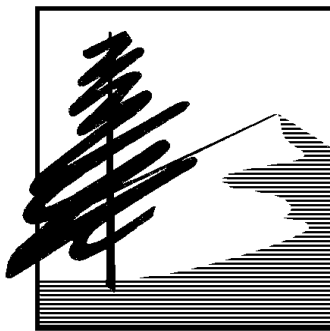
City of Carlsbad Open Space Management Plan Funding Analysis

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TABLE OF CONTENTS

I. Introduction	1
II. Assumption for Cost Analysis	1
III. Cost Justification	4
A. Capital Improvements	4
Fencing	4
Gates	5
Maintenance	5
B. Biological Monitoring	5
Vegetation Communities and Sensitive Plants	6
Reptile and Amphibian Monitoring	10
Bird Monitoring	12
Mammal Monitoring	17
Invertebrate Monitoring	17
Abiotic variables	20
Adaptive Management	20
C. Habitat Maintenance	20
Non-native plant removal and non-native animal control	21
Fire and Fuel Management	23
Erosion Control	23
Seed Banking	23
D. Public Services	24
Patrolling and Trespass Enforcement	24
Trail Maintenance	24
Signing	25
Public Outreach	25
E. Reporting	25
GIS/GPS/Database Management	25
Annual Reports	26

F. Office Maintenance	27
G. Field Equipment	27
H. Operations	29
IV. Labor Rate Assumptions	30
V. Results, Discussion and Conclusions	30
Total OSMP Preserve Management Cost	31
Breakdown by General Management Entity	32
Endowments	39
Discussion	40
Conclusions	41
References	42
VI. Appendices	43
Appendix 1. PAR for Carlsbad OSMP Preserve Management	44
Appendix 2. PAR for Biological Management Entities	45
Appendix 3. PAR for City of Carlsbad Properties	46
Appendix 4. PAR for Future Biological Management Entity	47
Appendix 5. PAR for Other Public or Semi-Public Entities	48
Appendix 6. PAR for Private Landowners (HOA)	49
Appendix 7. PAR for Wildlife Agencies (CDFG)	50

I. Introduction

The City of Carlsbad's Habitat Management Plan (HMP) is an ambitious effort to conserve viable populations of over 41 plant and wildlife species that represent Carlsbad's natural heritage. At the same time it provides a blueprint for both conservation and development for other jurisdictions nation-wide for the foreseeable future. The HMP is thus a critically important plan for the City of Carlsbad's economic well being and maintenance of quality of life for its residents. However, without successful implementation, the HMP is no more than an expensive planning exercise. Implementation involves both converting lands at risk into a conservation ownership, and managing those lands to insure the threats to their ability to provide habitat for native animals and plants are controlled in perpetuity. While acquiring land for conservation is an important milestone, it is just the first step. Ultimately the success of the HMP will be measured by how well those threats to the land's natural integrity are managed or eliminated. This will be the most challenging, and perhaps in the long term, most costly aspects of the HMP, especially depending on who implements this plan and how funds are managed. An accurate forecasting of the implementation costs is thus essential, and with out that forecast there is no way to develop funding programs to insure that the benefits of this plan are realized.

The Carlsbad HMP covers a total of 7,135 acres of open space (5,748 acres of natural habitat) and is the MHCP subarea plan for the City of Carlsbad. In this draft document the Center for Natural Lands Management (CNLM, the Center) provides a realistic estimate for the costs of implementing the biological monitoring and management components of the Open Space Management Plan (OSMP), which includes 100% of the HMP area plus an additional 1,805 acres not included in the HMP. These estimates are based on over a decade of experience CNLM has in managing natural areas in California, and using the Property Analysis Record (PAR) software the Center developed exactly for this purpose. The PAR itemizes costs in a manner that allows an objective analysis over the cost estimates and a cost/benefit analysis for each line item as a contribution to the success of the HMP. The PAR also allows for inflation and insures that the "buying power" of each line item is maintained through time. The cost estimates included here are constrained by assumptions that are detailed below. Knowing these assumptions insures that debate and cost comparisons are consistent (comparing apples with apples).

CNLM encourages an open dialogue with the City of Carlsbad, the public and wildlife agencies regarding the cost estimates and identified tasks delineated in this document. Through that dialogue we hope to come to a consensus regarding both assumptions and the outline of implementation strategies. With that consensus a final, defensible, cost estimate can be developed.

II. Assumptions for Cost Analysis

This cost analysis incorporates several assumptions that were discussed and agreed upon between the Center, TAIC and the City of Carlsbad (City). Public meetings were held to solicit

ideas and information useful to the cost analysis. Any changes to these assumptions would require a re-evaluation of the cost estimate.

Assumptions

Land Assumptions:

1. Total project acres: 7,135 acres of which 5,748 acres is considered natural.
2. Project Area: City owned open space + Biological management entity open space (e.g., CNLM) + Unassigned private open space + Portions of the standards areas of the HMP + Private open space (mainly HOA's) + State and Federal Wildlife Agency owned land.
3. 50 year permit- management in perpetuity
4. Taxes, district fees and other levies are the responsibility of the land owner and are not included in this analysis.
5. All stormwater conveyance structures will belong to the City, with open space managers having no responsibility of any kind for these structures.
6. Fuel management (Fire breaks between homes and preserve lands) is the responsibility of the developer/HOA/property owner and are not part of this analysis.

Funding Assumptions:

1. Funding will be through interest earned on endowments, grants and fees. City appropriations will be needed to fund management gaps.
2. Fuel management (Fire breaks between homes and preserve lands) costs are not included in analysis.
3. Management tasks and goals will follow the focused management issues report (TAIC), the MHCP, the final MHCP Monitoring and Management Plan and the Carlsbad HMP.
4. Cost analysis will be based on the General Management Entity level (of the focused management issues report).
5. Major lagoon management tasks, such as dredging, habitat restoration and creation, water quality analysis, sediment analysis or other such items is not included. Cost analysis focuses on monitoring tasks within this habitat community.

Biological Management and Monitoring Assumptions:

1. Monitoring guidelines based on Final MHCP Monitoring and Management Plan and the MHCP. Cost analysis based on the preserve level and sub-regional level of monitoring and management requirements of the NCCP.
2. Species included in the analysis include those proposed for coverage, those contingent on other MHCP Subarea Plans being Permitted and those Contingent on Funding for Management.
3. No wetlands will be created under this project, restoration is only a part of habitat enhancement.

3. Habitat enhancement includes fire, invasive exotic control and cowbird control.
4. The City is obligated to restore approximately 104 acres of coastal sage scrub habitat within the City; however, this restoration will be funded by the MHCP regional funding source and not undertaken until that funding source is established.
5. Annual reports will be provided to City by the individual management entities. The City will report to the wildlife agencies every three years.
6. Fencing and gating and their maintenance included in this analysis.
7. GIS coordination, data collection and analysis to be done by preserve staff. City and wildlife agencies are repository of data.
8. Habitat management requirements (as per PAR):
 - a. Capital improvements (fences and gates)
 - b. Biological monitoring
 - c. Habitat maintenance (erosion control, fire management, non-native plant and animal control, etc)
 - d. Public services (enforcement, outreach, recreation, etc)
 - e. Reporting

Recreation Assumptions:

1. Public trails will be created under the supervision of management entities and will be composed of dirt and/or decomposed granite.
2. No motorized vehicles will be allowed within preserve areas.
3. No hunting, shooting or paint-ball combat will be allowed.
4. A few informational kiosks/or “nature” centers may be necessary, but their funding is not part of this analysis.
5. Recreation will be considered “passive” only, and will include hiking and wildlife viewing and mountain bike riding only in designated areas.

III. Cost Justification

The following cost justification is based on the assumptions outlined in the previous sections. The cost breakdown is divided into sections which are termed Capital Improvements, Biological Monitoring, Habitat Maintenance, Public Services, Reporting, Field Equipments and Operations. The dollar amount required for management is based on the following analysis, with each section header matching the PAR spreadsheet.

A. Capital Improvements

This section deals with the cost analysis estimated for fencing and gating. Each management entity will be responsible for these costs.

Fencing

Fencing will be an important aspect of land management, since unauthorized use can destroy sensitive resources. Several assumptions have been made for the cost analysis. Fencing discussed in this section is limited to the perimeter of preserve areas. Interior fencing, such as post and cable to keep people out of sensitive areas, is covered and included under the category of "Trails Maintenance" in the Public Services section of this analysis. The total perimeter of all parcels is about 231 miles. However, the entire perimeter of each parcel will not need to be fenced as there may be steep topography, homes, etc. Therefore, this cost analysis assumes that about 1/10 of the entire perimeter, or about 23 miles (121,440 linear feet) will need to be fenced in some fashion. A combination of smooth and barbed wire fencing, chain link, 6 foot post and cable, and other methods of fencing will be required for the preserve. The following table summarizes the breakdown of each category:

Breakdown of Fencing Requirements (CNLM Cost)

% of Total Fencing	Type of Fence	Linear Feet	Cost per Linear Foot (Source)
60%	Wire fence: combo of barbed and smooth strand wire	72,864	\$2.45 (Atlas Fence)
10%	Chain link, not coated	12,144	\$9.85 (Atlas Fence)
20%	post and cable 6'-3 strand	24,288	\$12.00 (Atlas Fence)
10%	other (bollards, boulder, etc)	12,144	\$8.00 (Sustaaler)

Gates

Gates will be required to block necessary roads and allow access for the preserve managers and emergency services personnel. High quality pipe gates firmly planted into the ground are recommended since they are most resistant to vandalism and destruction. A typical pipe gate with one swinging arm that covers span of 16 feet will cost about \$2,500 including installation (source: Atlas Fence). It is estimated that about 50 gates will be required for this project. These gates will need to be serviced annually and replaced every 20 years.

Maintenance

In addition to initial infrastructure costs, this cost analysis assumes yearly maintenance costs of fences and gates. Maintenance can be handled by site Rangers and/or others by fence contractors. It is assumed that about 10% of all fences and gates will be vandalized per year and require maintenance.

B. Biological Monitoring

This section deals with each aspect of biological monitoring outlined in the MHCP Monitoring and Management Plan (Plan). It summarizes the objectives and requirements of each type of monitoring task (i.e. vegetation, birds etc.), and estimates the number of hours required by management staff. In order to minimize confusion, and to simplify monitoring efforts, this analysis assumes the following breakdown in tasks:

1. Vegetation Community
2. Vernal Pools
3. Plant Species Monitoring
4. Reptile and Amphibian Monitoring
5. Bird Monitoring
6. Mammal Monitoring
7. Invertebrate Monitoring
8. Abiotic Variables

Hourly estimates for each of the tasks discussed below is based on the field experience of CNLM preserve managers. Every attempt is made to be as accurate as possible. Data entry, analysis and reporting is assumed to take 25% of total field time for all tasks and is an estimate based on CNLM's experience.

NOTE: In some cases MHCP covered species are not known to occur within Carlsbad or only few individuals have been located. This cost analysis attempts to allow funding flexibility if unknown covered species or larger populations of known species are located in the future. Costs are either directly estimated within the task category, or can be taken from "adaptive management" or "contingency" funds.

Vegetation Community Monitoring

The MHCP Monitoring and Management Plan (Plan) calls for all vegetation communities to be mapped initially, and then every 5 years. The Plan does not identify more specific vegetation monitoring protocols in most vegetation communities. The Plan outlines vegetation monitoring for the riparian community; however, it directs these actions to specific locations in the MHCP area and none of these areas are within the City of Carlsbad. Therefore, this cost analysis includes the initial cost of mapping all vegetation communities and has this action repeated every 5 years. If we assume that 20 acres can be mapped per hour, then roughly 357 hours will be required every 5 years to map vegetation communities. The cost of acquiring new aerial photography every 5 years is included in the “Field Equipment” section of this document.

Vernal Pools

The MHCP Monitoring and Management Plan outlines monitoring protocols to measure hydrology and water quality variables within vernal pools (covered species monitoring cost justification provided in separate sections of this report). There are three vernal pool complexes in the Carlsbad area (Poinsetta Avenue, College Boulevard, and El Camino Real). The objectives of vernal pool monitoring are:

1. Monitor duration of inundation and develop a hydrograph of each pool.
2. Record area of inundation.
3. Record water quality variables including temperature, dissolved oxygen and conductivity in each pool.

This cost analysis assumes that it will require an average of six visits per vernal pool complex per year to monitor vernal pool variables (minimal monitoring required in low rain years, and more in heavy rain years.). Each visit will require 8 hours to measure all variables and note and report data (USFWS standard field forms are filled out in the field and can be attached to annual reports). Therefore, 144 hours per year (8 hours per visit X 6 visit/site X 3 sites) will be required to measure vernal pool variables in Carlsbad.

Vegetation Community Monitoring Summary of Personnel and Hours

Personnel/Tasks	Hours
Plant Ecologist / vegetation mapping every 5 years	357 hrs/ 5 years
Vernal Pool Biologist / measure vernal pool variables	144 hrs/ year
Plant Ecologist / data entry and reporting*	89 hrs/ year

*based on 25% of the total field hours.

Equipment required for vegetation monitoring and vernal pool water analysis includes aerial photographs, temperature gauges and water quality meter, depth rulers, transect tapes.

Plant Species Monitoring

Coastal Sage Scrub, Chaparral and Grassland Vegetation Communities

The following plant species are considered covered by the MHCP and/or the HMP and are found within the coastal sage scrub, chaparral and grassland communities:

San Diego thorn-mint	<i>Acanthomintha ilicifolia</i>
San Diego Ambrosia	<i>Ambrosia pumila</i>
Thread-leaved brodiaea	<i>Brodiaea filifolia</i>
Orcutt's spineflower	<i>Chorizanthe orcuttiana</i>
Del Mar Mesa Sand Aster	<i>Corethrogyne filaginifolia</i> var. <i>filaginifolia</i>
Short-leaved dudleya	<i>Dudleya blochmaniae</i> ssp. <i>blochmaniae</i>
Del Mar manzanita	<i>Arctostaphylos glandulosa</i> ssp. <i>crassifolia</i>
Encinitas baccharis	<i>Baccharis vanessae</i>
Wart-stemmed ceanothus	<i>Ceanothus verrucosus</i>
Summer holly	<i>Comarostaphylis diversifolia</i> spp. <i>diversifolia</i>
Sticky dudleya	<i>Dudleya viscida</i>
Cliff spurge	<i>Euphorbia misera</i>
San Diego barrel cactus	<i>Ferocactus viridescens</i>
Nuttall's scrub oak	<i>Quercus dumosa</i>
Torrey pine	<i>Pinus torreyana</i> ssp. <i>torreyana</i>
San Diego goldenstar	<i>Muilla clevelandii</i>

The distribution and abundance for each sensitive plant species as described in Carlsbad's HMP is taken into consideration to generate the necessary field hours to complete each monitoring task. In some cases, species have not been found within Carlsbad. The hourly estimates provided below should allow for sufficient time to monitor newly discovered populations or species. Additional funding can also be drawn from contingency or adaptive management allocations.

A. Covered plant species monitoring objectives include:

1. Annually track the distribution of the San Diego thornmint, San Diego Ambrosia, Orcutt's spineflower, and Del Mar mesa sand aster. Also, map and quantify population densities of these species.
2. Determine the distribution and abundance of Del Mar manzanita and Encinitas baccharis every 5 years.
3. Annually conduct presence-absence surveys for wart-stemmed ceanothus, summer holly, Blochman's dudleya, sticky dudleya, cliff spurge, San Diego barrel cactus, Nuttall's scrub oak and torrey pine. .

The MHCP Monitoring and Management Plan calls for annual monitoring for plant species listed in A1. The most common species within this list is the San Diego thornmint. The other species either are rare and may not occur in Carlsbad. This cost estimate estimates that 80 hours of field time will be required per year to quantify the population sizes of these plant species

The Plan outlines a simple inventory effort for plant species listed in A2. Each of these species is to be monitored every 5 years at which time each population size is estimated and their distribution is mapped. This cost estimate assumes that 40 hours every 5 years will be required for this task.

The Plan calls for annual presence-absence surveys for species listed in A3 that were not also listed in A1 or A2. Most of these plant species are perennial so there are few monitoring constraints. This cost analysis assumes 80 hours per year will be required for this task.

Riparian Vegetation Communities

The following plant species is considered covered by the MHCP and/or the HMP and are found within riparian vegetation communities:

San Diego Marsh-elder *Iva hayseiana*

A. Covered plant species monitoring objectives include:

1. Annually track the population of San Diego Marsh-elder.

This cost estimate assumes that 40 hours per year will be required to survey for San Diego Marsh-elder.

Oak Woodland

The following plant species is considered covered by the MHCP and/or the HMP and is found within the Oak Woodland community, but is not known to occur within Carlsbad: Surveys for this species will be included in this analysis because individuals may be found or reintroduced in the future.

Engelmann oak *Quercus engelmannii*

A. Covered plant species monitoring objectives include:

1. Annually monitor the populations of Engelmann oak.

This cost estimate assumes that 25 hours per year will be required to monitor Engelmann Oak.

Vernal Pools

The following plant species is considered covered by the MHCP and/or the HMP and is found within the Vernal Pool community:

Thread-leaved brodiaea	<i>Brodiaea filifolia</i>
San Diego button celery	<i>Eryngium aristulatum</i> var. <i>parishii</i>
Little mousetail	<i>Myosurus minimus</i> ssp. <i>apus</i>
Spreading navarretia	<i>Navarretia fossalis</i>
California Orcutt grass	<i>Oructtia californica</i>

A. Covered plant species monitoring objectives include:

1. Annually monitor the populations of covered and narrow endemic plant species within the vernal pool community.

The Plan requires annual monitoring of sensitive plant species found in vernal pools. There are only three vernal pool complexes in the Carlsbad area, which will not require a large monitoring effort. This cost analysis assumes that 80 hours per year will be required for vernal pool plant monitoring.

Equipment required for plant species monitoring includes transect tapes, and PVC pipe (for quadrats).

Plant species management and conservation

Although no specific plant management and conservation actions are detailed within the MHCP Monitoring and Management Plan or HMP, it is assumed that sensitive plant species populations will need to be enhanced created, and/or restored. These actions will require seed collection, plant propagation, site evaluations, planting and monitoring. This cost estimate assumes that 300 hours per year will be required for plant management and conservation. Weed maintenance costs of any enhancement activities is covered within the non-native plant removal section of this document. It is assumed that soils will be taken from existing preserve areas.

This cost analysis assumes that plant propagation will be contracted out to a plant nursery and assumes an average price of about \$4.00 per plant (as per RECON Environmental Inc, pers. comm.). An estimated 1000 plants will need to be propagated annually, or about \$4,000 (this cost is included in the "Habitat Maintenance" section of the PAR).

Seed banking is covered in the Habitat Maintenance section of this report.

Plant Monitoring Summary of Personnel and Hours

Personnel/Tasks	Hours
Botanist / Annual monitoring of covered species	345 hrs/ year
Botanist / monitoring of Encinitas Baccharis and Del Mar manzanita	40 hrs/ 5 years
Botanist / Plant species management and conservation	300 hrs/ year
Botanist (data analysis and reports)*	163 hrs/yr

*based on 25% of field time

Reptile and Amphibian Monitoring

Amphibians

The Carlsbad HMP list does not specify any covered amphibian species. The arroyo southwestern toad (*Bufo microscaphus californicus*) and southwestern pond turtle (*Clemmys marmorata pallida*) were originally considered, but both of these species are not known to occur in Carlsbad and thus were not covered. Another sensitive amphibian species, the western spadefoot toad (*Scaphiopus hammondi*), will not be covered by the HMP, but is mentioned in the MHCP Monitoring Plan as a species to be monitored. Western spadefoots have been found at Box Canyon, (Spiegelberg (CNLM), pers. comm.). This cost analysis assumes annual monitoring for only the western spadefoot toad and does not include the arroyo southwestern toad or southwestern pond turtle because they do not occur in Carlsbad and are unlikely to occur due to lack of suitable habitat.

The objective for the amphibian monitoring program is to:

1. Monitor vernal pool areas for the presence-absence of western spadefoot toads.

This cost analysis assumes that 60 hours per year will be required to survey Carlsbad's vernal pools for western spadefoot toads. Additional survey data for spadefoot toads is likely to be collected from the reptile arrays (see below). In addition, these reptile arrays should also capture non-covered amphibian species, such as salamanders and tree frogs.

Other amphibian species that will require monitoring are the non-native bullfrog, and African clawed frogs (see exotic species monitoring in MHCP monitoring Plan). The bullfrog is known from San Marcos Creek (CNLM, pers. comm.) and may occur elsewhere. These species will need to be removed if possible.

Equipment needed for spadefoot toad monitoring will include dip nets.

Reptiles

One reptile species is covered under the MHCP, the orange-throated whiptail. However, other reptile species that are considered sensitive may occur, such as the coast horned lizard, and thus will require some level of monitoring. The MHCP monitoring plan calls for mapping sensitive species as they are observed during surveys, and also to construct pit-fall arrays in certain locations in north county San Diego. Pit-arrays will not only capture sensitive species, but will address most of the reptile community.

A. Objectives for this monitoring and management program are to:

1. Monitor for herpetofauna at selected upland areas using pit-fall arrays (sub-regional monitoring and management).
2. Note the presence of sensitive or covered reptile species during other surveys (i.e. during bird surveys)

The MHCP Monitoring Plan calls for pit-fall arrays to be constructed at the La Costa/University Commons Area, the Calavera Lake/Carlsbad Highlands area in Carlsbad and “stepping stone” habitat in Carlsbad (A1). The Plan calls for a minimum of 10 pit-fall arrays at each location (stepping stone areas need to be determined and may be spread across the city). The Plan calls for two trapping periods to be conducted every other year. Each trapping period is 5 days in length. This cost analysis assumes that each set of ten arrays can be checked by two people in one day. Therefore, a total of 10 days per person per survey year will be required for each location, or 30 days per person per year (60 days for two people per year). A total of 480 hours will be required every other year for pit-fall array monitoring.

The cost analysis also includes the cost of installation and maintenance of the pit-fall arrays (see field equipment). The total labor involved in installation is estimated at about 5 days for 10 pit-fall arrays, or 15 days total for all arrays. This is equivalent to 120 hours. 40 hours per year are allocated for maintenance.

This cost analysis does not include additional time to note the presence-absence of sensitive reptile species (A2), as these hours will be covered by other monitoring actions (i.e. during bird surveys)

Reptile and Amphibian Monitoring Summary of Personnel and Hours

Personnel/Tasks	Hours
Herpetologist / Pit-fall arrays	480 hrs every 2 years
Pit-array installation, maintenance	120 hrs 1 st yr, 40 hrs/yr
Herpetologist / Spade-foot toad	60 hrs/yr

Herpetologist / data analysis and reporting*	75 hrs/yr
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* based on 25% of total field time

Field equipment required includes 5 gallon buckets, drift fencing, sponges (for each bucket) and miscellaneous array construction supplies.

Bird Monitoring

Seventeen bird species are identified in the HMP for inclusion as covered species. These species inhabit several different vegetation communities and are many times widespread across the proposed conservation area. Federally and state-listed species include the coastal California gnatcatcher (*Polioptila californica californica*), the least Bell's vireo (*Vireo bellii pusillus*), and the southwestern willow flycatcher (*Empidonax traillii extimus*). Other important species include the peregrine falcon (*Falco peregrinus anatum*) and Cooper's hawk (*Accipiter cooperii*). In general, birds fall into the categories of resident passerines, neo-tropical migrants, raptors and aquatic (open water, fresh water marsh etc) species.

The MHCP Monitoring and Management Plan outlines a strategy for avian monitoring based on single species and community level management. Therefore, bird surveys will include focused surveys for species such as the gnatcatcher and community level surveys for birds found in specific habitat types such as coastal sage scrub.

This cost analysis assumes that no additional funding will be required for the monitoring of other bird species that are not covered by the HMP, but are listed as covered by the MHCP. Many of the latter species can be located during monitoring efforts outlined below and no additional survey time will be required.

The following breakdown was used to calculate the number of hours needed to complete bird surveys.

Coastal California gnatcatcher, coastal cactus wren and the coastal sage scrub, chaparral, and grassland communities

A. Covered bird species monitoring objectives include:

1. Annually monitor for the presence of coastal California gnatcatchers and coastal Cactus wren (cactus wren is not covered by the HMP, but is included in this analysis).
2. Annually monitor for the presence of other covered species (i.e. rufous-crowned sparrow and golden eagle).

B. Avian coastal sage scrub community monitoring objectives include:

1. Monitor the avian bird community to determine species richness and changes over time, and to determine relative abundance at specific locations throughout the reserve.

The PAR budget assumes (as per the Plan) that monitoring for gnatcatchers and cactus wrens (A1) will include five site visits per year (as per USFWS 2004 HCP survey requirements) with at least a 7 day interval between visits. The PAR budget uses both the coastal sage scrub and coastal sage scrub/chaparral acreage, or about 2,109 acres for the analysis and that both species can be monitored concurrently (far fewer acres of cactus wren habitat than gnatcatcher habitat within Carlsbad's coastal sage scrub). The PAR budget assumes that each surveyor can cover about 100 acres of coastal sage scrub per survey day and that roughly 105 days/year will be required for these surveys (21 days/survey area X 5 survey areas/ year) which is equivalent to about 840 hours/year (8 hours/day X 105 days/year).

The PAR budget assumes that monitoring for other covered species (rufous-crowned sparrow and golden eagle) within the coastal sage scrub (A2) will occur concurrently with the gnatcatcher and cactus wren surveys, so no additional time will be required. However, additional time will be required for these species in the chaparral and grassland communities (chaparral, grassland, southern maritime chaparral) which include a total of 1,763 acres. The PAR budget assumes that each surveyor can cover about 150 acres of these habitat types per day and that roughly 36 days per year will be required for these surveys (12 days/survey area X 3 survey area/year) which is equivalent to about 288 hours per year (8 hours/day X 36 days/year). These hours should be sufficient regardless of what methodology is being used (i.e point counts, transects, etc)

For the avian community monitoring within coastal sage scrub (B2), the Plan specifically notes the La Costa Villages Management Unit, the Calavera Lake/Carlsbad Highlands area and "Stepping-stone coastal sage scrub habitat through Carlsbad" as target locations. The total acreage used for this analysis will be based on 560 acres for the La Costa Villages MU, 378 acres for the Calavera Lake/ Carlsbad Highlands area and 1/3 of the remaining coastal sage scrub areas or about 353 acres for "stepping stone" areas. This equates to a total of 1,291 acres of coastal sage scrub for "community monitoring." The PAR budget assumes that a point count methodology will be employed and that about 250 acres can be surveyed per day. This will require about 5 days of surveys per survey area and will be repeated five times per year within the spring months for a total of 25 survey days or about 200 hours/year.

California Gnatcatcher Dispersal

The Plan mentions the need to study dispersal of California gnatcatcher within several locations in north San Diego County, including the La Costa Villages, Calavera Hills and "stepping stone" locations in Carlsbad. Unfortunately, no detailed methodology is provided. Therefore, the following assumptions are made:

1. Banding efforts will include banding adults and fledglings (not nestlings) and will focus on the above listed areas (stepping stone areas to be determined).
2. Since all suitable gnatcatcher habitat will be surveyed annually, no additional survey time is required to find gnatcatcher pairs or to locate banded birds. However, extra time will be required to locate family groups and read color bands.
3. Banding efforts will continue for three years followed by three years of “re-location”. After a six-year period, banding efforts will continue for another three years followed again by three years of “re-location.” This cycle will repeat itself every six years.

Therefore it is assumed that about 100 days per year will be required for banding efforts, including time for locating family groups and reading color bands. This equates to about 800 hours per year (2,400 hours total over three years; 100 days/year X 3 years X 8 hours/day). (It is assumed that about 25 family groups will be banded).

Least Bell’s vireo, southwestern willow flycatcher, yellow-breasted chat, Cooper’s hawk and the riparian and oak woodland vegetation communities.

A. Covered bird species objectives within the riparian community include:

1. Annually monitor for the presence of least Bell’s vireo, southwestern willow flycatcher, yellow-breasted chat and Cooper’s hawk.
2. Nest monitor populations of least Bells’ vireo and southwester willow flycatcher to determine brown-headed cowbird parasitism rates.

The PAR budgets assumes (as per the Plan) that monitoring for covered riparian bird species (A1) will include three site visits per year with at least a 7 day interval between visits. The PAR budget uses the riparian scrub, woodland and forest, and oak woodland acreage, or about 520 acres for the analysis and that all species can be monitored concurrently. The PAR budget assumes that each surveyor can cover about 50 acres of riparian habitat per survey day and that roughly 30 days/year will be required for these surveys (10 days/survey area X 3 survey/year) which is equivalent to about 240 hours/year (8 hours/day X 30 days/year).

The Plan also discusses the need to study certain populations of covered riparian bird species, including detailed nest monitoring to study covered species population demographics and cowbird parasitism as well as vegetation change analysis. The Plan does not identify areas of study within the Carlsbad area for these types of study. However, the Plan specifies that cowbird trapping should be initiated if parasitism rates for the vireo and flycatcher exceed 10%. There are no recorded flycatcher locations in Carlsbad and only few vireo locations (2 pair reported as of 2001, B. Kus, USGS pers. comm.). Therefore, this analysis will assume that 15 pair of vireo (and any flycatchers) will be monitored annually for cowbird parasitism (since there is more potential habitat). Each pair will be visited twice per month from March 15 to July 15 (4 months), or about 8 visits total. Five pair of vireo (or flycatcher) will be visited per day. Therefore, about 24 days or 192 hours will be required annually to nest monitor vireos.

California least tern, western snowy plover, Belding's savannah sparrow, large-bill savannah sparrow, light footed clapper rail, and other covered species within the lagoon environment

A. Covered bird species objectives within the lagoon community include:

1. Annually conduct surveys for California least tern and western snowy plover.
2. Annually conduct surveys for Belding's savannah sparrow.
3. Annually conduct surveys for Large-billed savannah sparrow if species is found to be present
4. Annually conduct surveys for light-footed clapper rail.
5. Annually map the location and distribution of other covered (non-shorebird or waterfowl) avian species within the lagoon environment.
6. Annually survey for waterfowl and shorebirds in appropriate habitat.

The Plan calls for annual surveys in the month of April for California least terns and western snowy plovers (A1). Goals are to map locations of birds and record number of breeding pairs. Monitoring for nest productivity of these species is also outlined in the Plan, but only if funding is available. This cost analysis only covers annual surveys within the month of April. This cost analysis assumes that two surveyors can accomplish these goals with 12 visits each within the month of April, or 24 days total. This equates to 192 hours per year.

The Plan calls for annual surveys in the month of March to determine the number of breeding Belding's savannah sparrow (A2). There is approximately 137 acres of suitable habitat within Carlsbad for this species. This cost analysis assumes that two surveyors can monitor for the Belding's savannah sparrow with 8 visits each within the month of March, or a total of 16 days total. This equates to 256 hours per year.

The Plan calls for annual surveys for large-billed savannah sparrow (A3). If the species is found to be present, surveys will continue annually. This species occurs within the salt marsh habitat or about 137 acres within Carlsbad. Surveys occur in the month of January. This cost analysis assumes that two surveys can monitor for large-billed savannah sparrow with 8 visits each within the month of January, or a total of 16 days total. This equates to 256 hours per year.

The Plan calls for annual spring counts for clapper rails at each lagoon and appropriate habitat between March and May (A4). This species is found within the salt marsh habitat or about 137 acres within Carlsbad. This cost estimate assumes weekly visits to both the Agua Hedionda lagoon and the Batiquitos lagoon from March to May. Protocol surveys call for monitoring periods to include the early morning (two hours after sunrise) and late afternoon (two hours before sunset). This cost analysis assumes that both morning and afternoon surveys will be conducted requiring 6 hours per day. Therefore, a total of 12 visits per area will be required, or 72 hours per area for a total of 144 hours for clapper rail surveys per year.

The Plan does not specify monitoring protocols for other covered avian species within the lagoon community, such as the brown pelican, white-faced ibis and peregrine falcon (A5). Therefore, this cost analysis will make some assumptions for survey method and time required. It is assumed that 6 surveys per year (3 spring and 3 fall) per lagoon area will be required and that each lagoon will need to be broken down into two units for a total of 12 survey days per lagoon or 24 days total. Therefore, 192 hours per year will be required for these bird species.

The Plan calls for annual surveys once in the winter and once in late summer for shorebirds and waterfowl (A6). This cost analysis assumes that the Lagoons will be broken down into four units each with each unit requiring one day for surveys per period (winter and late summer). Therefore, 16 survey days will be required, or the equivalent of 128 hours per year for shorebird and waterfowl surveys.

The Plan also calls for estimating the mammalian and avian predator activity at each lagoon. This cost analysis assumes that these measures can be taken within the time periods allocated for all surveys. Therefore, no additional hours are required.

Bird Monitoring Summary of Personnel and Hours

Personnel	Hours
Ornithologist (CSS, chaparral and grassland)	1,328 hrs/year
Ornithologist (Riparian habitats and oak woodland)	240 hrs/year
Ornithologist (Vireo and flycatcher nest monitoring)	192 hrs/year
Ornithologist (Lagoons)	1,168 hrs/year
Ornithologist: (Data Management/Report Writing for non-banding field work)*	732 hrs/year
Ornithologist (banding studies)	2,400 hrs/ across three years
Ornithologist (Data Management/Report Writing for banding studies)**	240 hrs/year

*based on 25% of total monitoring hours; ** based on 10% of total banding hours

Equipment needs for bird surveys include handheld computers, GPS, tape player and binoculars.

Mammal Monitoring

There are no species of mammals that are considered covered under Carlsbad's HMP. Therefore, it is assumed that no focused surveys for regionally sensitive or MHCP Species will be required. However, the MHCP Monitoring Plan does call out for wildlife corridor studies, which are included in this analysis.

Wildlife Corridors

As per the Plan, each critical wildlife corridor "pinch-point" or underpass as outlined in the Plan will need to be monitored for wildlife movement. This would cover the mule deer and mountain lion (and of course many other species, such as bobcat, raccoon, skunk etc). Track stations and remotely triggered camera stations will be used at each station and sampled for two 5 day periods during each year. There are 8 "pinch-point" or underpass locations identified in the Plan as being located in Carlsbad. Therefore, 10 days per point will be required per year, or 80 days total. This is equivalent to 640 hours per year.

Total hours required for this effort is provided in the following table:

Mammal Monitoring Summary of Personnel and Hours

Personnel	Hours
Mammalogist (wildlife corridors)	640 hours/yr
Mammalogist Data Management/Report Writing*	160 hours/year

Based on 25% of wildlife corridor working hours

Equipment needs for mammal work includes small mammal traps, bait, remote cameras, and tracking station chalk.

Invertebrate Monitoring

Five invertebrate species are considered covered by Carlsbad's HMP, the Harbinson's dun skipper, the Hermes copper, the Riverside fairy shrimp, the San Diego fairy shrimp, and the salt marsh skipper. However, only three of the species, both fairy shrimp and the salt marsh skipper are known to occur and the others are not likely to occur (HMP, 1999). At this time, only the vernal pools on Poinsettia Lane are known to have San Diego and Riverside fairy shrimp, although the other vernal pool locations have the potential to support these species.

Objectives for invertebrate species include annual monitoring and habitat assessments. Habitat assessments for these species is included in the vegetation monitoring section of this document.

Fairy Shrimp

Management of fairy shrimp populations will focus on management of the vernal pool watersheds. Watershed management will include weed control and soil and water quality monitoring (see other sections for these details). All vernal pools will be sampled annually. USFWS protocols will be following for these surveys (i.e. includes measuring pool temperature, depth etc). This cost analysis assumes that 5 survey days will be required per pool complex each year, or a total of 15 days. This equates to 75 hours per year for fairy shrimp surveys.

Hermes Copper

Hermes Copper is not known or expected to occur in Carlsbad nor is there suitable habitat. Therefore, no funds are allocated to management of this species in Carlsbad.

Harbinson's dun skipper

There are no documented locations of Harbinson's dun skipper in the City of Carlsbad. However, suitable habitat is likely to occur. This species is found in riparian areas where its larval host plant San Diego sedge (*Carex spissa*) is present. Surveys for this species should begin with survey for its larval host plant. If the host plant is located, adult surveys should be initiated. Surveys for the dun skipper and its host plant are estimated to require about 60 hours per year.

Salt Marsh Skipper

The salt marsh skipper is likely to occur in the salt marsh areas of Carlsbad. Annual surveys for this species are required. There are 137 acres of salt marsh within the City. This cost estimate assumes that 3 surveys per year will be required per year and that a surveyor can cover 40 acres per day. Therefore, roughly 10 survey days will be required, or 80 hours per year.

Invertebrate Monitoring Summary of Personnel and Hours

Personnel	Hours/Year
Entomologist fairy shrimp surveys	75 hours/ year
Entomologist Salt marsh skipper and Harbinson's dun skipper	140 hours/ year
Entomologist (data analysis and reporting)*	54 hours/ year

*Assumed at 25% of total field time.

Equipment required for insect work includes dip net, vials, alcohol and hand lens.

Other Insects

Southern California has seen many harmful and potentially harmful non-native insects introduced during the past century. Two species that are most threatening to native species include the red imported fire ant and the Argentine ant. Both species are associated with human activities and are particularly problematic in the more urbanized areas. As the City of Carlsbad becomes more urbanized and much of the reserve lands effectively become islands within an urban matrix, the threats from these two ant species will grow. These ants are capable of eradicating native insect fauna, as well as causing severe negative impacts on reproductive success of ground and near-ground dwelling birds and reptiles. Monitoring for these ant species, in conjunction with monitoring the native ant fauna, will be used as one measure of the impacts of urbanization and habitat fragmentation on the ecosystem condition within the reserve system.

The MHCP calls for general visual surveys for the presence of non-native ants. However, these surveys should be coupled with some kind of formal survey method. Therefore, this cost analysis assumes that general visual surveys will be conducted in addition to more detailed sampling using pit-fall traps. Ants will be monitored using pitfall traps arranged in a subset of reserve parcels, concentrated in urbanized areas and large reserve systems. A total of 200 hours per year is dedicated to monitoring ant populations using general surveys and pit-fall traps.

Other Insect Work Summary of Personnel and Hours

Personnel	Hours
Entomologist (ant surveys)	200
Entomologist (data analysis and report writing)*	25

*based on 25% of the field time

Equipment required for insect work includes microscope (1), micro-dissection kit, alcohol, pins (500/year), vials (250/year), jars, and pitfall traps (250/year).

Abiotic Variables

Climate

The MHCP Monitoring Plan finds that no additional in field weather information will need to be collected and that data can be collected from existing weather stations in the area. However, some time will be needed for data analysis purposes. This cost estimate assumes that 50 hours per year will be required to assimilate and store weather data and to conduct appropriate analyses.

Adaptive Management

Inventory and monitoring are used to track the condition of targeted habitats and populations relative to the ecological goals that have been set for them. Adaptive management is a process whereby evaluation of monitoring results are compared to the goals or defined “measures of success” so that management practices can be changed or modified as needed.

There are several ways to establish a cost for adaptive management. CNLM has included adaptive management costs in two ways. CNLM has asked clients for a one time fee up front which is invested and held until needed, or has included the cost as a yearly fee that can be set aside or spent as necessary (both are considered different from “contingency” as contingency should be used for unforeseen costs while adaptive management is a crucial part of ongoing management). This cost analysis assumes a yearly adaptive management cost will be required and assumes that it will be 10% of the total cost of all ongoing biological monitoring.

Science Oversight

This cost analysis assumes 500 hours per year for Science Oversight by a Science Director or experienced ecology professional.

C. Habitat Maintenance

Habitat maintenance includes tasks that are associated with enhancing and protecting existing habitat within the preserve from threats such as non-native plants and animals and erosion. Habitat restoration, which is not part of this cost analysis, involves more tasks and work than maintenance and includes tasks such as plant propagation, irrigation, invasive control and monitoring. The following sections outlines a cost justification for non-native plant and animal control, cowbird trapping, and non-native ant control and management, as these threats are the most commons to the preserves and are outlines several times in the MHCP Monitoring Plan. This section also includes a seed banking provision, as seed banking will be an important management tool and is mentioned as a necessity in the MHCP and MHCP Monitoring and Management Plan.

Non-native plant removal and non-native animal control

Non-native plant removal

This cost analysis assumes that there will be many parcels with non-native plant disturbance, that many parcels will be invaded by non-native plant species in the future, and that non-native plant removal will most likely be a continual process in perpetuity. The common non-native plant species in the dominant habitats (coastal sage scrub, grassland and chaparral) are usually non-native grasses, mustard (*Brassica* spp), thistle (*Centaurea melintensis*) and of course, many others. Non-native plant species that are likely to occur in riparian areas include arundo (*Arundo donax*), pampas (*Cortaderia selloana*) and acacia (*Acacia* spp.).

Since non-native plants are likely to always be an issue to some degree, this PAR analysis assumes a upfront cost (I and C) and then ongoing maintenance (ongoing). This analysis assumes that a small staff of laborers will be needed either seasonally or full-time for the duration of management. Approximately 300 hours a year would need to be dedicated to a botanist or plant ecologist, who determines which areas need non-native plant removal work. This botanist would then have a staff of up to 5 laborers whose job is to remove the non-native species (8,900 hours total per year). Alternatively, the money needed for the laborers could be used to hire a non-native plant removal contractor. Regardless, the PAR budget reflects the need for a non-native plant removal staff. These laborers can also be used for other habitat maintenance tasks, such as planting sensitive plant species as part of the plant conservation plan or erosion control.

Non-natives are a particular problem for several listed plant species, such as the San Diego thornmint and thread-leaved brodiaea. These locations will require measurements of native vs. non-native cover and frequency and will involve very careful and surgical removal process. Time and cost required for cover analysis is described in the plant species monitoring and management section of this report.

This cost estimate does not include the removal of the non-native plant species *Caulurpa taxifolia* which is currently being removed from Agua Hedionda Lagoon and is known to be a large problem worldwide. Cost estimates for surveys of this species were estimated by Merkel and Associates for the Center and totaled about \$600,000 per year for presence-absence monitoring (per Lagoon). Maintenance and removal costs were estimated at \$10,000 per incidence. As per Merkel and Associates, the State Regional Water Quality Control Board and California Coastal Commission are providing removal grants and funding for this task.

Non-native Plant Removal Summary of Personnel and Hours

Personnel	Hours
Plant ecologist/Botanist (coordination)	300 hours/year
Technicians/laborers (3 full-time)	8,900 hours/year

Equipment needs for non-native removal include weed-whips, gardening tools, chain saws and other tools. The budget includes the rental of mowers for removal of non-native grasses.

Brown-headed cowbird trapping

Brown-headed cowbirds are known to cause declines in nesting success of many bird species. To counter this problem, biologists have created cowbird traps, which significantly reduce rates of parasitism. In San Diego County, cowbirds tend to flock around farmlands and agriculture and thus impact habitat areas near these human resources. It is very likely that cowbird trapping programs will be a necessary management tool during the bird breeding season for some locations within Carlsbad's reserve (i.e. Macario Canyon). The PAR assumes that approximately 10 will need to be purchased or constructed and replaced every 5 years (or about 1 trap per 50 acres of riparian habitat). The estimate assumes that these traps will need to be manned 7 days a week for up to 5 months out of the year, for a total of 1,120 hours (56 hours/week x 20 weeks= 1,120 hours) per person. The budget includes the cost of bait and other supplies needed for cowbird trapping.

Brown-headed Cowbird Trapping Summary of Personnel and Hours

Personnel	Hours
Ornithologist (supervision)	40 hours/year
Technicians/Assistant Preserve Managers	1,120 hours/year
Reporting	40 hours/ year

Non-native ant species

The cost justification for monitoring non-native ant species is covered in the Entomology section of this report. Once the distribution and abundance of non-native ant species is determined an eradication method will need to be employed. There are several methods, and most require killing ants with basic traps, poisons or manual removal. The labor

hours for such ant removal efforts can be drawn from the labor hours used for non-native plant control. Therefore, no additional hours are required.

Fire and Fuel Management

Fuel Management

As per the assumptions given to CNLM, no fuel management between preserve land and homes is part of this cost analysis.

Fire Management

Fire management is a critical component to all management efforts in natural landscapes. To be in compliance with the HMP, the City of Carlsbad will need to update fire management policies for its natural open space areas. Updated policies should include measures to avoid destruction of sensitive plant species populations, to create fire management zones, to educated fire control personnel, etc. This cost estimate includes the cost of renting heavy machinery to cut fire breaks (see equipment cost section), since it is likely that fuel breaks will be required in some portions of the preserve system. However, all costs associated with updating policies will be borne by the City and is not part of this analysis.

Erosion Control

Erosion control for this cost estimate is meant to cover relatively “small” erosion control problems. For example, erosion repairs along degraded habitat or near unused or old trails. It does not include the construction of erosion control devices, such as cement berms or culverts, or any measures that would require permits, engineering and major contracting. This cost estimate assumes that most erosion control measures will include sand bags or similar erosion control measures and will require the work or equivalent cost of about 1 full-time person (1,780 hours)

Seed Banking

The MHCP and MHCP Monitoring and Management Plan briefly state the need for seed banking as part of an overall plant conservation and management strategy. The cost for seed banking will depend on the number of species and seeds collected per species. The cost for long term (indefinite) seed storage at the Zoological Society of San Diego’s Botanical Conservation Center is \$2500 per accession. This cost estimate assumes that 4 accessions will be required in the first 10 years of management and then 1 accession per 15 years will be required in perpetuity. The cost includes seed viability testing and initial processing, but assumes that staff biologists will collect all seed material in the field.

D. Public Services

Patrolling, Trespass and Recreation Enforcement

The most prominent and deleterious threats to the natural resources in the City of Carlsbad is the direct impacts of human activities, particularly illegal off-highway vehicle (OHV) trespass. To a lesser extent, direct impacts from off-trail activities by otherwise legal public users of the reserve lands threaten the integrity of the habitats and sensitive species that rely on those habitats. Negative impacts from these activities have the potential to cause significant drains on financial resources intended for management of the biotic resources if the illegal activities are not prevented and controlled. Fences and signs alone will not deter trespass. Prevention will require a highly visible presence of a security force. In addition to contributing to the species and habitat conservation goals of the MHCP, a strong security presence also enhances the experience of the public legally using the reserve system and enhances the quality of life for residents of neighboring properties.

This cost analysis accounts for one full-time supervising officer and four full-time rangers/officers with law enforcement training to effectively enforce applicable state laws and safety in the various lagoons and open spaces in Carlsbad (as per conversation with and recommendation by Lt. Mike Ference, CDFG, and Supervising officer Dave Felt of the City of Carlsbad). The Rangers will coordinate with law enforcement agencies, including the City of Carlsbad's Sheriff's Department, Department of Fish and Game Wardens, and city police and parks officers. All staff vehicles will be equipped with radios and/or cellular telephones to report trespass and vandalism to security personnel or the Sheriff's Department.

The Security staff will also be responsible for directing maintenance crews to points of illegal entry, and will coordinate the language on boundary signs. Rangers will have the responsibility to coordinate with the City Parks Department to identify multi-use areas and associated restrictions. These restrictions will be preserve area-specific and in some cases will be seasonal around periods of sensitive species activity. Rangers will work with the GIS and database management staff to maintain accurate overlays and information files that identify and distinguish between public-accessible and public-inaccessible areas.

Trail Maintenance

The cost analysis assumes that 68 miles of trail exist or are planned within the City of Carlsbad's reserve system (as per "Carlsbad Avenue" brochure published by City of Carlsbad). This cost analysis assumes that maintenance of unimproved trails will cost about \$4,000/mile (quote as per Fred Burnell, City of Carlsbad Parks Supervisor) and that 20% of the trails will be maintained annually.

Signing

Various signs will be needed for access control, public information and education. Small (24 inches by 24 inches), general signs such as “Habitat Conservation Area”, “No Motorcycles”, and “No Trespassing” will be required for almost all preserves. Larger, or more prominent preserves will require larger redwood signs for the public benefit. The number of signs required per site will vary on access limitations and proximity to urban areas. Small sites near homes may require many signs along the perimeter, while larger sites far from urban areas will likely only need a few signs at main access points, or along fence lines. This analysis assumes that some general signage (i.e. “Habitat Conservation Area” etc) will be needed of the total perimeter of all the parcels (231 miles) and at every 300 foot intervals. This would result in needing about 4,065 signs. This analysis also estimates that 1000 miscellaneous signs (“no motorcycles”, “no dumping”) will be required and that 50 larger redwood signs will be required for the more prominent preserves.

Public Outreach

Public outreach is an important aspect of land management. Neighbors and visitors need to know what permitted activities are allowed, where trails are located, what resources are present, and how they can participate in assisting in management activities. A public outreach coordinator for all of Carlsbad’s open space would be ideal. This individual can coordinate the dissemination of pamphlets and mailers, nature walks and other public education activities. This cost analysis assumes that a full-time public outreach coordinator will be required (1780 hours).

E. Reporting

GIS / GPS / Database Management

A Geographic Information System (GIS) and its accompanying Global Positioning System (GPS) will be used for two principal purposes: 1) the mapping of resources (e.g. study sites, boundaries, roads, fires & fire management units, adjacent properties, acquisitions, habitats & restoration efforts, water resources, infrastructure, sensitive species’ locations, human impacts, public use areas, sensitive soils’ locations, wildlife movement); and 2) habitat change analyses. The data generated for the geospatial analyses required under the MHCP, along with the large data sets gathered during biological inventory and monitoring efforts will require a half-time (890 hours) GIS/Database Manager. This position will also be responsible for gathering and maintaining data sets from external sources, such as weather station data, standardizing data for transfer from field biologists to archives, and transferring data to the central CDFG archive. The materials and labor hours needed by field personnel to collect geospatial data are embedded within the biological monitoring budgets.

Equipment and software will include:

1. Latest microcomputer platform running an OS that is compatible with ArcGIS/ArcINFO.
2. Production hardware: color laser printer capable of printing on legal size paper, large format plotter, and a binder.
3. Color, high-resolution, single-pass color scanner, with software.
4. ArcGIS/ArcINFO GIS system software with accompanying extensions for 3-D analysis. High-end graphics software (e.g. Adobe Illustrator), and similar photo manipulation software (e.g. Corel PhotoPaint, Adobe PhotoShop).
5. Database software
- 6 Digital aerial imagery

GIS equipment costs are included in the Office Maintenance and Field Equipment sections of the PAR.

Annual Reports

Annual reports detailing all management activities and a financial summary is required under the MHCP program. Annual reports are submitted to the appropriate wildlife, other public agencies and interested parties.

Annual reporting and data analysis is built into the hourly estimates for each biological monitoring activity. However, there will be a need for someone to compile and review all the information needed for the final yearly reports. In addition, there is a need for hours to be allocated for updated management plans, annual plans and general correspondence.

A project coordinator will be required for oversight of the management of the Preserve, its employees, and to coordinate reports, meetings and other activities. This cost analysis assumes that 250 hours per year will be required for the principal manager of the preserve system for reporting and coordination.

A summary of hours required for Reporting is tabulated below:

Reporting Summary of Personnel and Hours

Personnel	Hours per Year
GIS / GPS / Database Management Specialist	890 hrs/yr
Project Manager (Reporting and coordination)	250 hrs/yr

F. Office Maintenance

The cost to maintain a field office is included in this cost estimate and assumes an office space, computers and peripherals, and general office supplies.

G. Field Equipment

A summary of field equipment needed to perform management and monitoring requirements under the HMP and MHCP Monitoring Plan is provided in the previous sections. This information was used to compile the following tables, which detail all equipment needed to complete biological monitoring, equipment cost, and a source to justify that cost.

FIELD EQUIPMENT COST ANALYSIS

	Total Cost/Year	Cost (\$)	per	Frequency (years)	Quantity	Activity	Source
Entomology							
pit cups	\$15.00	0.15	each	3	300	pitfalls for ants	estimate
insect pins	\$80.00	0.08	each	1	1000	curating	Forestry Suppliers, Inc
micro-dissection kit	\$1.60	16.00	each	10	1	curating	Forestry Suppliers, Inc
specimen cabinet with drawers	\$17.16	429.00	each	25	1	specimen storage	Forestry Suppliers, Inc
hand lens	\$1.07	5.35	each	10	2	field sampling	Forestry Suppliers, Inc
alcohol	\$13.75	13.75	gallon	1	1	curating	BioQuip
ethyl acetate	\$8.15	8.15	quart	1	1	field sampling	BioQuip
Plastic vials	\$11.50	5.75	Dozen	5	10	Field sampling	Forestry Suppliers, Inc
Sampling net	\$17.00	8.50	Each	2	4	Vernal Pools	Forestry Suppliers, Inc

FIELD EQUIPMENT COST ANALYSIS (continued)

	Total Cost/Year	Cost (\$)	per	Frequency (years)	Quantity	Activity	Source
Ornithology							
cowbird traps	\$1,000.00	500.00	each	5	10	species survey	Varanus Bio estimate
cowbird bait	\$50.00	50.00	each	1	1		Ben Meadows estimate
binoculars	\$90.00	150.00	each	5	3		
tape player	\$20.00	20.00	each	5	5		
Botany/Weed Control							
Skip loader rental	\$1,500.00	300.00	day	1	5	fire breaks /roads/ mowing	Coyote Rentals
mower rental	\$1,500.00	150.00	day	1	10	exotics removal	Coyote Rentals
chainsaw	\$99.60	249.00	each	5	2	exotics removal	Forestry Suppliers, Inc
weed whip (manual)	\$6.40	16.00	each	5	2	exotics removal	Ben Meadows
weed whacker (gas)	\$149.40	249.00	each	5	3	exotics/ brush removal	Home Depot
assorted hand tools	\$100.00	100.00	each	1	1	exotics removal	estimated
Roundup	\$3,240.00	108.00	gallon	1	30	exotics removal	Home Depot
backpack sprayer	\$55.00	55.00	each	3	3	exotics removal	Home Depot
plant press	\$52.95	52.95	each	10	1	sampling	Forestry Suppliers, Inc
Aerial photographs	\$400.00	2,000	Each	5	1	Vegetation mapping	estimate
Mammals							
Sherman trap	\$725.00	14.50	each	5	250	trapping	Sherman estimate
bait	\$360.00	360.00	season	1	1	trapping	Forestry Suppliers, Inc.
Remote cameras	\$175.60	439.00	each	5	2		
Herpetology							
snake hook	\$21.50	21.50	each	5	5	snakes	Forestry Suppliers, Inc
power auger	\$75.00	600.00	each	8	1	pitfall installation	Coyote Rentals
pitfall array	\$1,200	200.00	each	5	30	pitfall traps	estimated
General Biology							
flagging stakes	\$250.00	10.00	bundle	1	25	field sampling	Ben Meadows
ribbon flagging	\$19.50	1.30	roll	1	15	field sampling	Ben Meadows
notebooks	\$200.00	10.00	each	1	20	field sampling	Ben Meadows

FIELD EQUIPMENT COST ANALYSIS (continued)

	Total Cost/Year	Cost (\$)	per	Frequency (years)	Quantity	Activity	Source
GPS	\$1,600.00	4,000.00	each	5	2	mapping	ASC Scientific
hand-held computer	\$300.00	300.00	each	5	5	field	Office Depot
50m tape	\$22.77	37.95	each	5	3	sampling	Forestry Suppliers, Inc
100m tape	\$236.85	78.95	each	5	3	field	Forestry Suppliers, Inc
tree tags	\$87.00	4.35	50	1	20	sampling	Forestry Suppliers, Inc
PVC pipe	\$4	20	Total	5	1	perennial monitoring Relevé sampling	Estimate
Water Quality							
Water meter	\$155.80	779.00	each	5	1	vernal pools	Forestry Suppliers, Inc
depth meter	\$8.99	89.95	each	10	1	vernal pools	Forestry Suppliers, Inc
TOTAL ANNUAL COST =	\$13,870.59						

The total equipment cost is \$34,495.7 for all supplies if purchased in the first year. The yearly cost is \$13,870.59.

Field equipment also includes the cost of vehicles used for Rangers/Officers and for field biology staff. This cost estimate assumes 5 vehicles for Rangers/Officers and 4 field vehicles for all other staff. Each vehicle is a Toyota 4X4 extra-cab. It is assumed that each vehicle will travel 8,000 miles per year and that each vehicle makes 18 miles/gallon, or a total of 444 gallons of fuel per year.

H. Operations

Contingency and Administration

As a final budget item, the Center includes a provision for contingencies at a rate of 10% of the budgeted expenses to provide a cushion for extra and unforeseen costs. There is also a provision for administrative overhead of 24% Administrative overhead costs include costs of maintaining and renting an office, office supplies, and costs of operation including legal work, financial work, insurance, endowment management, annual financial reports and tax filing. Administrative costs are considered separate from “field office” costs.

IV. Labor Rate Assumptions

The following table summarizes the labor rate assumptions used for this cost analysis. These costs usually vary from organization to organization which should be considered during discussion of this cost analysis.

Summary of Labor Rates

Position	Salary	Hourly Rate**
Science Director	\$75,000	\$50.73
Preserve Manager	\$65,000	\$44.51
Assistant Preserve Manager	\$45,000	\$32.08
Supervising Ranger	\$50,000	\$35.19
Ranger	\$45,000	\$32.08
Public Outreach Coordinator	\$45,000	\$32.08
Labor	\$30,000	\$22.76
Technical Support	\$30,000	\$22.76
GIS Specialist	\$50,000	\$35.19

** Includes benefits, including health care, 3% matching in a 401k, vacation (120 days), sick (96 hours) and holiday (84 hours) time that an employee of the Center is entitled to at the current time.

V. Results and Conclusions

Results

At this time there are many different organizations within the City that own land that is part of the City's natural open space. Organizations include non-profit land managers, homeowners associations (HOA), the State and the City. Some organizations are already funded and are currently conducting management activities and others have yet to participate.

The following funding analysis was determined by generating a total cost to manage the entire OSMP preserve area (7,135 acres) and then breaking down this total cost into 6 separate sub-totals based on the landowners organizational type, referred to as "General Management Entity (GME)". Examples of general management entities include non-profit, non-governmental organizations such as the Center, state agencies, such as CDFG and home owners associations. The 6 general management entities and the percent of open space they are responsible for are:

- 1) Biological Management Entity (20% - 1,413 acres), such as the Center,;
- 2) The City of Carlsbad (9% - 604 acres);

- 3) Future Biological Management Entity (i.e. unassigned properties) (24% - 1,732 acres);
- 4) Other public or semi-public entities, such as Cabrillo Power (5% - 420 acres);
- 5) Private owners, such as Home Owners Associations (24% - 1,713 acres);
- 6) Wildlife agencies, such as CDFG (18% - 1,254 acres).

The total Preserve Management Cost and Cost by Category, and the Labor Hours Summary is provided in the following three tables and is based on the PAR found in Appendix 1. The total number of individuals required to manage the open space included in the City's OSMP preserve system is estimated to be approximately 12 personnel. Biological monitoring and rangers require the most time for management activities.

Total OSMP Preserve Management Cost

The following cost summary is based on the entire 7,135 acres in the Carlsbad OSMP preserve system taken as one unit and is based on a capitalization rate of 4.5%:

Funding Requirements	
Initial & Capital Costs	\$4,172,200
Ongoing yearly costs	\$1,882,398
Annual Stewardship on a per acre basis (current dollars)	\$263

Total OSMP Preserve Management Cost by Category

Cost Category	Initial and Capital (\$)	Ongoing (\$)
Site Construction/Maintenance	811,743	102,394
Biological Surveys	435,724	319,319
Habitat Maintenance	610,575	299,806
Public Services	705,741	409,581
General Maintenance	4,000	4,000
Reporting	128,099	122,165
Office Maintenance	78,172	47,674
Field Equipment	278,176	68,551
Operations	6,564	6,564
Contingency and Administration	1,113,402	502,340
Total	4,172,200	1,882,398

Labor Hours Summary

Position	Yearly Hours*	Number of Personnel Required**
Preserve Manager	8,596	4.8
Assistant Preserve Manager	1,160	0.7
GIS Specialist	890	0.5
Science Coordinator	500	0.3
Public Outreach Coordinator	1,780	1.0
Ranger Supervisor	1,780	1.0
Rangers	7,120	4.0
Habitat Maintenance Laborers	10,680	6.0
Total:	32,506	18.3

*Termed "Ongoing" within the PAR.

**Typical hours per year for one individual is about 1,780. Does not include overhead staff.

Breakdown by General Management Entity

The following tables summarize the cost by General Management Entity. This cost is generated in several ways. For the most part, all tasks itemized in the Total Preserve Management Cost (Appendix 1) are divided by the acreage of habitat found in each General Management Entity. For example, if a GME has 20% of the coastal sage scrub found in Carlsbad, and a task is determined by the acreage of coastal sage scrub, then that GME will receive 20% of the cost. The following categories and the tasks within them (in parenthesis) are broken down by percent acreage of habitat type within each GME, or percent of total acreage within each GME:

1. Site Construction and Maintenance (all tasks)
2. Biological Surveys (tasks based on acreage which are required for all GME's).
3. Habitat Maintenance (all tasks)
4. Public Services (all tasks)
5. General Maintenance (all tasks)
6. Reporting (all tasks)
7. Office Maintenance (all tasks)
8. Field Equipment (all tasks)

If a task is not determined by acreage of habitat then the cost proportion is determined by the number of estimated hours required within a GME. All of these types of cost breakdowns occur within the Biological Survey category. An example of such a break down is Reptile Pit-array monitoring. The MHCP Monitoring and Management Plan calls for reptile Pit-arrays within certain specified regions of Carlsbad which requires that the cost is proportioned into the GME's that fall in these regions.

All endowment costs are based on a capitalization rate of 4.5%.

The entire cost breakdown (each PAR) by task for GME's 1 through 6 can be found in Appendices 2 through 7.

1. Biological Management Entity (1,413 acres)

Funding Requirements	
Initial & Capital Costs	\$878,993
Ongoing yearly costs	\$368,667
Annual Stewardship on a per acre basis (current dollars)	\$261

Breakdown by category

Cost Category	Initial and Capital (\$)	Ongoing (\$)
Site Construction/Maintenance	162,348	20,478
Biological Surveys	121,605	67,472
Habitat Maintenance	120,318	1,042
Public Services	141,148	81,916
General Maintenance	800	800
Reporting	25,619	24,433
Office Maintenance	15,634	9,117
Field Equipment	55,635	13,710
Operations	1,312	1,312
Contingency and Administration	234,570	98,383
Total	878,993	368,667

Labor Hours Summary

Position	Yearly Hours*	Number of Personnel Required**
Preserve Manager	1,791	1.0
Assistant Preserve Manager	188	0.1
GIS Specialist	178	0.1
Public Outreach Coordinator	356	0.2
Ranger Supervisor	356	0.2
Rangers	1,424	0.8
Habitat Maintenance Laborers	1,851	1.0
Total:	6,144	3.4

*Termed "Ongoing" within the PAR.

**Typical hours per year for one individual is about 1,780. Does not include overhead staff.

2. City of Carlsbad (604 acres)

Funding Requirements	
Initial & Capital Costs	\$396,992
Ongoing yearly costs	\$180,625
Annual Stewardship on a per acre basis (current dollars)	\$300

Breakdown by category

Cost Category	Initial and Capital (\$)	Ongoing (\$)
Site Construction/Maintenance	73,056	9,215
Biological Surveys	51,021	36,397
Habitat Maintenance	58,904	27,729
Public Services	63,516	36,862
General Maintenance	360	360
Reporting	11,528	10,994
Office Maintenance	7,035	4,102
Field Equipment	25,035	6,169
Operations	590	590
Contingency and Administration	105,942	48,201
Total	396,992	180,625

Labor Hours Summary

Position	Yearly Hours*	Number of Personnel Required**
Preserve Manager	944	0.5
Assistant Preserve Manager	229	0.1
GIS Specialist	80	0.1
Public Outreach Coordinator	160	0.05
Ranger Supervisor	160	0.05
Rangers	640	0.4
Habitat Maintenance Laborers	833	0.5
Total:	3,048	1.7

*Termed "Ongoing" within the PAR.

**Typical hours per year for one individual is about 1,780. Does not include overhead staff.

3. Future Biological Management Entity (1,732 acres)

Funding Requirements	
Initial & Capital Costs	\$953,837
Ongoing yearly costs	\$411,650
Annual Stewardship on a per acre basis (current dollars)	\$238

Breakdown by category

Cost Category	Initial and Capital (\$)	Ongoing (\$)
Site Construction/Maintenance	194,818	24,575
Biological Surveys	69,757	56,265
Habitat Maintenance	146,538	63,407
Public Services	169,377	98,299
General Maintenance	960	960
Reporting	30,743	29,319
Office Maintenance	18,761	10,941
Field Equipment	66,762	16,452
Operations	1,575	1,575
Contingency and Administration	254,543	109,853
Total	953,837	411,649

Labor Hours Summary

Position	Yearly Hours*	Number of Personnel Required**
Preserve Manager	1,609	0.9
Assistant Preserve Manager	272	0.15
GIS Specialist	213	0.12
Public Outreach Coordinator	427	0.24
Ranger Supervisor	427	0.24
Rangers	1,708	1.0
Habitat Maintenance Laborers	2,221	1.3
Total:	6,880	4.0

*Termed "Ongoing" within the PAR.

**Typical hours per year for one individual is about 1,780. Does not include overhead staff.

4. Other Public or Semi-Public Organization (420 acres)

Funding Requirements	
Initial & Capital Costs	\$233,607
Ongoing yearly costs	\$123,618
Annual Stewardship on a per acre basis (current dollars)	\$294

Breakdown by category

Cost Category	Initial and Capital (\$)	Ongoing (\$)
Site Construction/Maintenance	40,587	5,119
Biological Surveys	41,908	41,273
Habitat Maintenance	28,732	11,413
Public Services	35,287	20,479
General Maintenance	200	200
Reporting	6,405	6,108
Office Maintenance	3,908	2,279
Field Equipment	13,908	3,427
Operations	328	328
Contingency and Administration	62,340	32,988
Total	233,607	123,617

Labor Hours Summary

Position	Yearly Hours*	Number of Personnel Required**
Preserve Manager	999	0.56
Assistant Preserve Manager	56	0.03
GIS Specialist	44	0.03
Public Outreach Coordinator	89	0.05
Ranger Supervisor	89	0.05
Rangers	356	0.20
Habitat Maintenance Laborers	462	0.25
Total:	2,041	1.2

*Termed "Ongoing" within the PAR.

**Typical hours per year for one individual is about 1,780. Does not include overhead staff.

5. Private/HOA (1,713 acres)

Funding Requirements	
Initial & Capital Costs	\$939,810
Ongoing yearly costs	\$397,174
Annual Stewardship on a per acre basis (current dollars)	\$232

Breakdown by category

Cost Category	Initial and Capital (\$)	Ongoing (\$)
Site Construction/Maintenance	194,818	24,574
Biological Surveys	59,472	45,653
Habitat Maintenance	146,538	63,407
Public Services	169,377	98,299
General Maintenance	960	960
Reporting	30,743	29,319
Office Maintenance	18,761	10,941
Field Equipment	66,762	16,452
Operations	1,575	1,575
Contingency and Administration	250,799	105,990
Total	939,810	397,174

Labor Hours Summary

Position	Yearly Hours*	Number of Personnel Required**
Preserve Manager	1,371	0.77
Assistant Preserve Manager	272	0.15
GIS Specialist	213	0.12
Public Outreach Coordinator	427	0.24
Ranger Supervisor	427	0.24
Rangers	1,708	1.0
Habitat Maintenance Laborers	2,221	1.24
Total:	6,642	3.73

*Termed "Ongoing" within the PAR.

**Typical hours per year for one individual is about 1,780. Does not include overhead staff.

6. Wildlife Agency (CDFG) (1,254 acres)

Funding Requirements	
Initial & Capital Costs	\$768,960
Ongoing yearly costs	\$349,247
Annual Stewardship on a per acre basis (current dollars)	\$279

Breakdown by category

Cost Category	Initial and Capital (\$)	Ongoing (\$)
Site Construction/Maintenance	146,113	18,430
Biological Surveys	91,960	72,258
Habitat Maintenance	109,544	47,196
Public Services	127,033	73,724
General Maintenance	720	720
Reporting	23,057	21,989
Office Maintenance	14,070	8,205
Field Equipment	50,071	12,339
Operations	1,181	1,181
Contingency and Administration	205,206	93,200
Total	768,960	349,246

Labor Hours Summary

Position	Yearly Hours*	Number of Personnel Required**
Preserve Manager	1,879	1.1
Assistant Preserve Manager	197	0.11
GIS Specialist	160	0.10
Public Outreach Coordinator	320	0.18
Ranger Supervisor	320	0.18
Rangers	1,281	0.72
Habitat Maintenance Laborers	1,666	0.94
Total:	5,825	3.33

*Termed "Ongoing" within the PAR.

**Typical hours per year for one individual is about 1,780. Does not include overhead staff.

Endowments

The Center receives its funding through “non-wasting” endowments provided by the landowner at the time a preserve is created. The City of Carlsbad may choose to create an endowment to fund its reserve management in perpetuity. The following tables provide the endowment requirements for the City owned land under two scenarios: 1) if the City holds the endowment and assumes a 2.5% capitalization rate and 2) if a non-governmental organization holds the endowment and assumes a 4.5% capitalization rate.

1. Endowment required for City owned land assuming City holds endowment (2.5% capitalization rate):

Funding Requirements	
Initial & Capital Costs	\$396,992
Ongoing yearly costs	\$180,625
Annual Stewardship on a per acre basis (current dollars)	\$300
Endowment	\$7,225,000
Total	\$7,621,625

2. Endowment required for City owned land assuming non-governmental organization holds endowment (4.5% capitalization rate):

Funding Requirements	
Initial & Capital Costs	\$396,992
Ongoing yearly costs	\$180,625
Annual Stewardship on a per acre basis (current dollars)	\$300
Endowment	\$4,013,889
Total	\$4,410,881

Discussion

The cost analysis provided above can be compared to the costs that existing management entities are using to manage dedicated natural open space areas. The Center for Natural Lands Management owns and manages the Kelly Ranch Habitat Conservation Area and the La Costa Villages (Rancho La Costa) Habitat Conservation Area. The Center spends about \$212 per acre per year at Kelly Ranch and about \$70 per acre at La Costa Villages. It is common to have a higher cost per acre for smaller properties than for larger.

Comparisons with Existing Funding Sources

Management Entity	Preserve Name (acreage)	Existing Annual Expenditures per acres	Funding Analysis Estimate	Shortfall () or Windfall
CNLM	Kelly Ranch (55)	\$269	\$263	\$8
CNLM	Ranch La Costa East (622)	62	263	(201)
CNLM	Rancho La Costa West (438)	61	263	(202)
TET	Batiquitos (0.7)	161	263	(102)
TET	Bressi Ranch (185)	98	263	(65)
TET	Brodiaea Preserve (1.0)	225	263	(38)
TET	Calavera Nature Preserve (107)	239	263	(24)
TET	Calavera West Nature Preserve (137)	180	263	(83)

Comparison by Category for Rancho La Costa (CNLM)

Cost Category	CNLM Funding per acre per year	Funding Analysis per acre per year	Shortfall () or Windfall
Site Construction/Maintenance	4.2	14.5	(10.3)
Biological Surveys	18.6	47.8	(29.2)
Habitat Maintenance	3.6	36.1	(32.5)
Public Services	8.1	58.0	(49.9)
General Maintenance	0.1	0.1	0
Reporting	4.5	17.3	(12.8)
Office Maintenance	1.2	6.5	(5.3)
Field Equipment	2.2	9.7	(6.5)
Contingency and Administration	20.1	69.7	(49.6)

The annual cost for La Costa Villages is about 1/4 that was estimated by this cost analysis (GME 1). This is for several reasons. First, the cost for several tasks, such as fencing, public outreach and patrolling, was based on higher numbers than what the Center received for La Costa Villages. Second, the MHCP Monitoring and Management Plan (Pan) was finalized after the Center reached a financing agreement for La Costa Villages. The Plan includes tasks, such as bird banding studies and cowbird trapping, which were not part of the Center's cost and turn out to be quite costly. Lastly, this cost analysis includes a yearly trail maintenance cost (under Public Services) that contributes considerably to the overall costs. The Center did not receive a large amount of funds for trails maintenance.

In sum, this cost analysis reflects realistic and complete cost estimate for managing land in the City of Carlsbad. The Center attempts to achieve this goal during negotiations with land developers, but many times is forced to cut back on certain items such as trail maintenance and public outreach in the end as these are important but not necessarily "required" monitoring and management items (i.e. biological monitoring of covered species is required and easily justified). If the cost of cowbird trapping and gnatcatcher dispersal studies is removed from this cost analysis, the amount of money received for biological surveys for Rancho La Costa is very comparable with this cost analysis.

Conclusions

This document presents a cost justification and budget for the City of Carlsbad's natural open space preserve areas. The budget is intended to provide a basis for decision-making, but should be viewed as preliminary. The City should be aware that this cost analysis is based on the Center's financial model which differs from other groups in the area. Therefore, costs could be higher or lower depending on each organization's costing and financial structure. In addition, the endowment figures provided assume a 4.5% capitalization rate, which is higher than the 2.5% rate that would be required if the state or City held the endowment funds, which would result in higher endowment requirements.

The Center's analysis was constrained by use of assumed site conditions and some assumed monitoring and management guidelines. At the completion of reserve build out, the actual site conditions, division of responsibility and cost framework may differ from those envisioned by planners at the early stage in establishment of the Preserve. However, the MHCP Biological Monitoring and Management Plan, and the proposed management scenario in this document, are designed with the flexibility to meet those changes.

The time lag between this cost estimate and the actual establishment of the Reserve will influence the final management cost. Inflationary adjustments to the costs presented here will need to be included in the final contribution.

References

Habitat Management Plan for Natural Communities in the City of Carlsbad. December, 1999, with addendum.

MHCP Biological Monitoring and Management Plan. March, 2003.

Multiple Habitat Conservation Program Volume II.

VI. Appendices (PARs)

Appendix 1.

PAR for Carlsbad OSMP Preserve Management

Section 8 = Initial and Capital Funds Required

Section 9 = Ongoing Funds Required

Section 10 = Cost Summary

Section 8 - Initial & Capital Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Budget: PAR

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	24,288.00	12.00	291,456.00	1.0	291,456.00
Fence - Installed	Chain Link 6'	Lin. Ft.	12,144.00	9.85	119,618.40	1.0	119,618.40
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	72,864.00	2.45	178,516.80	1.0	178,516.80
Gate	16" arm swing	Item	50.00	2,500.00	125,000.00	1.0	125,000.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	12,144.00	8.00	97,152.00	1.0	97,152.00
Sub-Total							811,743.20

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	300.00	44.51	13,353.00	1.0	13,353.00
Plant Ecologist	Vegetation Mapping	L. Hours	357.00	44.51	15,890.07	1.0	15,890.07
Plant Ecologist	Vernal Pool Measure variables	L. Hours	144.00	44.51	6,409.44	1.0	6,409.44
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	345.00	44.51	15,355.95	1.0	15,355.95
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	40.00	44.51	1,780.40	1.0	1,780.40
Plant Ecologist	Spec:management &	L. Hours	300.00	44.51	13,353.00	1.0	13,353.00
Entomologist	Fairy Shrimp surveys	L. Hours	75.00	44.51	3,338.25	1.0	3,338.25
Entomologist	Skipper surveys	L. Hours	140.00	44.51	6,231.40	1.0	6,231.40
Entomologist	Ant surveys	L. Hours	200.00	44.51	8,902.00	1.0	8,902.00
Herpetologist	Vernal Pool/Spadefoot monitor	L. Hours	60.00	44.51	2,670.60	1.0	2,670.60
Herpetologist	Pit-array monitoring	L. Hours	480.00	44.51	21,364.80	1.0	21,364.80
Herpetologist	Pit-array installation/maint	L. Hours	120.00	32.08	3,849.60	1.0	3,849.60
Mammalogist	Wildlife Corridors	L. Hours	640.00	44.51	28,486.40	1.0	28,486.40
Ornithologist	CSS, Chap, and grassland	L. Hours	1,328.00	44.51	59,109.28	1.0	59,109.28
Ornithologist	Riparian	L. Hours	240.00	44.51	10,682.40	1.0	10,682.40
Ornithologist	LBV,WIFL nest monitoring	L. Hours	192.00	44.51	8,545.92	1.0	8,545.92
Ornithologist	Lagoons	L. Hours	1,168.00	44.51	51,987.68	1.0	51,987.68
Ornithologist	CAGN dispersal studies	L. Hours	2,400.00	44.51	106,824.00	1.0	106,824.00
Science Director	Planning and Review	L. Hours	500.00	50.73	25,365.00	1.0	25,365.00
Monitor Climate	Analyze data	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Other	Adaptive management	Item	1.00	30,000.00	30,000.00	1.0	30,000.00
Sub-Total							435,724.69

HABITAT MAINTENANCE

Erosion Control	Labor	L. Hours	1,780.00	22.76	40,512.80	1.0	40,512.80
Seed Collection	Seed Banking	Accession	4.00	2,500.00	10,000.00	1.0	10,000.00
Plant Procurement	Plant nursery prop. \$4/plant	Item	1,000.00	4.00	4,000.00	1.0	4,000.00
Exotic Plant Control	Supervision by botanist	L. Hours	300.00	44.51	13,353.00	1.0	13,353.00
Exotic Plant Control	Up-front control	Item	1.00	500,000.00	500,000.00	1.0	500,000.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	40.00	44.51	1,780.40	1.0	1,780.40
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	1,120.00	32.08	35,929.60	1.0	35,929.60
Exotic Animal Control	Cowbird Traps	Item	10.00	500.00	5,000.00	1.0	5,000.00
Sub-Total							610,575.80

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	1,780.00	35.19	62,638.20	1.0	62,638.20
Patrolling	4 rangers/ officers	L. Hours	7,120.00	32.08	228,409.60	1.0	228,409.60
Trail	Maintenance	Mile	68.00	4,000.00	272,000.00	1.0	272,000.00
Sign	Misc	Item	1,000.00	3.25	3,250.00	1.0	3,250.00
Sign	Boundary 8" X 13.5"	Item	4,065.00	5.25	21,341.25	1.0	21,341.25
Sign	Sign posts u-channel	Item	1,000.00	11.00	11,000.00	1.0	11,000.00
Sign, Redwood	Interpretive 4'X 6'	Item	50.00	1,000.00	50,000.00	1.0	50,000.00
Community Outreach	Public outreach coordinator	L. Hours	1,780.00	32.08	57,102.40	1.0	57,102.40
Sub-Total							705,741.45
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	100.00	40.00	4,000.00	1.0	4,000.00
Sub-Total							4,000.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	1,538.00	44.51	68,456.38	1.0	68,456.38
GIS/CAD Management	Data Management	L. Hours	890.00	44.51	39,613.90	1.0	39,613.90
Annual Reports	Reporting coordination	L. Hours	250.00	44.51	11,127.50	1.0	11,127.50
Management Plan	Initial Report	L. Hours	200.00	44.51	8,902.00	1.0	8,902.00
Sub-Total							128,099.78
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	500.00	44.51	22,255.00	1.0	22,255.00
Preserve Office	Office rent	Sq. Ft.	2,000.00	1.70	3,400.00	1.0	3,400.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	2,000.00	1.00	2,000.00	1.0	2,000.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	12.00	720.00	8,640.00	1.0	8,640.00
Office Supplies, Year	Supplies	Person	10.00	250.00	2,500.00	1.0	2,500.00
Furniture	Desk	Item	10.00	250.00	2,500.00	1.0	2,500.00
Furniture	Chair	Item	10.00	150.00	1,500.00	1.0	1,500.00
Furniture	Bookcase, 3'x5'	Item	2.00	150.00	300.00	1.0	300.00
Furniture	File cabinet	Item	5.00	400.00	2,000.00	1.0	2,000.00
Copier	Copier, 15-18 ppm	Item	1.00	2,500.00	2,500.00	1.0	2,500.00
Fax Machine	Standard	Item	1.00	250.00	250.00	1.0	250.00
Telephone	Touch-tone	Item	10.00	55.00	550.00	1.0	550.00
E-Mail	Services	Year	1.00	500.00	500.00	1.0	500.00
Computer, PC & Monitor	Computers	Item	10.00	2,100.00	21,000.00	1.0	21,000.00
Computer software	Microsoft Office Pkg	Item	8.00	450.00	3,600.00	1.0	3,600.00
Computer software	ArcGIS	Item	1.00	1,500.00	1,500.00	1.0	1,500.00
Laser Printer	600 DPI	Item	2.00	840.00	1,680.00	1.0	1,680.00
Deskjet Printer	Color printer	Item	3.00	499.00	1,497.00	1.0	1,497.00
Sub-Total							78,172.00

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	9.00	24,000.00	216,000.00	1.0	216,000.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	3,996.00	2.00	7,992.00	1.0	7,992.00
Vehicle	Maintenance	Year	1.00	5,000.00	5,000.00	1.0	5,000.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	1.00	14,688.80	14,688.80	1.0	14,688.80
Other	all supplies 1st yr, see text	Item	1.00	34,495.70	34,495.70	1.0	34,495.70
Sub-Total							278,176.50
OPERATIONS							
Audit	CPA Audit	Acre	7,135.00	0.55	3,924.25	1.0	3,924.25
Insurance	Liability/Fee	Acres	7,135.00	0.37	2,639.95	1.0	2,639.95
Sub-Total							6,564.20
CONTINGENCY & ADMINISTRATION							
Contingency							305,879.76
Administration							807,522.57
Sub-Total							1,113,402.33
Total							4,172,199.95

Section 9 - Ongoing Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Budget: PAR

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	24,288.00	12.00	291,456.00	25	11,658.24
Fence, 4' X 6' X 6'	Post & 3/4" Cable Maintenance	Lin. Ft.	2,428.80	12.00	29,145.60	1	29,145.60
Fence - Installed	Chain Link 6'	Lin. Ft.	12,144.00	9.85	119,618.40	25	4,784.74
Fence - Installed	Chain Link 6' Mainenance	Lin. Ft.	1,214.40	9.85	11,961.84	1	11,961.84
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	72,864.00	2.45	178,516.80	25	7,140.67
Fence - Installed	Barbed-wire, 4 strd.Maintain	Lin. Ft.	7,286.40	2.45	17,851.68	1	17,851.68
Gate	16" arm swing	Item	50.00	2,500.00	125,000.00	20	6,250.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	12,144.00	8.00	97,152.00	25	3,886.08
Vehicle Barrier	Concrete Bollard maintain	Lin. Ft	1,214.40	8.00	9,715.20	1	9,715.20
Sub-Total							102,394.05

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	300.00	44.51	13,353.00	1	13,353.00
Plant Ecologist	Vegetation Mapping	L. Hours	357.00	44.51	15,890.07	5	3,178.01
Plant Ecologist	Vernal Pool Measure variables	L. Hours	144.00	44.51	6,409.44	1	6,409.44
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	345.00	44.51	15,355.95	1	15,355.95
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	40.00	44.51	1,780.40	5	356.08
Plant Ecologist	Spec:management &	L. Hours	300.00	44.51	13,353.00	1	13,353.00
Entomologist	Fairy Shrimp surveys	L. Hours	75.00	44.51	3,338.25	1	3,338.25
Entomologist	Skipper surveys	L. Hours	140.00	44.51	6,231.40	1	6,231.40
Entomologist	Ant surveys	L. Hours	200.00	44.51	8,902.00	1	8,902.00
Herpetologist	Vernal Pool/Spadefoot monitor	L. Hours	60.00	44.51	2,670.60	1	2,670.60
Herpetologist	Pit-array monitoring	L. Hours	480.00	44.51	21,364.80	2	10,682.40
Herpetologist	Pit-array installation/maint	L. Hours	120.00	32.08	3,849.60	3	1,283.20
Mammalogist	Wildlife Corridors	L. Hours	640.00	44.51	28,486.40	1	28,486.40
Ornithologist	CSS, Chap, and grassland	L. Hours	1,328.00	44.51	59,109.28	1	59,109.28
Ornithologist	Riparian	L. Hours	240.00	44.51	10,682.40	1	10,682.40
Ornithologist	LBV,WIFL nest monitoring	L. Hours	192.00	44.51	8,545.92	1	8,545.92
Ornithologist	Lagoons	L. Hours	1,168.00	44.51	51,987.68	1	51,987.68
Ornithologist	CAGN dispersal studies	L. Hours	2,400.00	44.51	106,824.00	6	17,804.00
Science Director	Planning and Review	L. Hours	500.00	50.73	25,365.00	1	25,365.00
Monitor Climate	Analyze data	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Other	Adaptive management	Item	1.00	30,000.00	30,000.00	1	30,000.00
Sub-Total							319,319.51

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
HABITAT MAINTENANCE							
Erosion Control	Labor	L. Hours	1,780.00	22.76	40,512.80	1	40,512.80
Seed Collection	Seed Banking	Accession	4.00	2,500.00	10,000.00	15	666.67
Plant Procurement	Plant nursery prop. \$4/plant	Item	1,000.00	4.00	4,000.00	1	4,000.00
Exotic Plant Control	Supervision by botanist	L. Hours	300.00	44.51	13,353.00	1	13,353.00
Exotic Plant Control	Laborers (5)	L. Hours	8,900.00	22.76	202,564.00	1	202,564.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	40.00	44.51	1,780.40	1	1,780.40
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	1,120.00	32.08	35,929.60	1	35,929.60
Exotic Animal Control	Cowbird Traps	Item	10.00	500.00	5,000.00	5	1,000.00
Sub-Total							299,806.47
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	1,780.00	35.19	62,638.20	1	62,638.20
Patrolling	4 rangers/ officers	L. Hours	7,120.00	32.08	228,409.60	1	228,409.60
Trail	Maintenance	Mile	68.00	4,000.00	272,000.00	5	54,400.00
Sign	Misc	Item	1,000.00	3.25	3,250.00	7	464.29
Sign	Boundary 8" X 13.5"	Item	4,065.00	5.25	21,341.25	10	2,134.13
Sign	Sign posts u-channel	Item	1,000.00	11.00	11,000.00	10	1,100.00
Sign, Redwood	Interpretive 4'X 6'	Item	50.00	1,000.00	50,000.00	15	3,333.33
Community Outreach	Public outreach coordinator	L. Hours	1,780.00	32.08	57,102.40	1	57,102.40
Sub-Total							409,581.95
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	100.00	40.00	4,000.00	1	4,000.00
Sub-Total							4,000.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	1,538.00	44.51	68,456.38	1	68,456.38
GIS/CAD Management	Data Management	L. Hours	890.00	44.51	39,613.90	1	39,613.90
Annual Reports	Reporting coordination	L. Hours	250.00	44.51	11,127.50	1	11,127.50
Management Plan	Initial Report	L. Hours	200.00	44.51	8,902.00	3	2,967.33
Sub-Total							122,165.11
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	500.00	44.51	22,255.00	1	22,255.00
Preserve Office	Office rent	Sq. Ft.	2,000.00	1.70	3,400.00	1	3,400.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	2,000.00	1.00	2,000.00	1	2,000.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	12.00	720.00	8,640.00	1	8,640.00
Office Supplies, Year	Supplies	Person	10.00	250.00	2,500.00	1	2,500.00
Furniture	Desk	Item	10.00	250.00	2,500.00	10	250.00
Furniture	Chair	Item	10.00	150.00	1,500.00	5	300.00
Furniture	Bookcase, 3'x5'	Item	2.00	150.00	300.00	8	37.50
Furniture	File cabinet	Item	5.00	400.00	2,000.00	10	200.00
Copier	Copier, 15-18 ppm	Item	1.00	2,500.00	2,500.00	8	312.50
Fax Machine	Standard	Item	1.00	250.00	250.00	5	50.00
Telephone	Touch-tone	Item	10.00	55.00	550.00	5	110.00
E-Mail	Services	Year	1.00	500.00	500.00	1	500.00

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
Computer, PC & Monitor	Computers	Item	10.00	2,100.00	21,000.00	4	5,250.00
Computer software	Microsoft Office Pkg	Item	8.00	450.00	3,600.00	4	900.00
Computer software	ArcGIS	Item	1.00	1,500.00	1,500.00	5	300.00
Laser Printer	600 DPI	Item	2.00	840.00	1,680.00	4	420.00
Deskjet Printer	Color printer	Item	3.00	499.00	1,497.00	6	249.50
Sub-Total							47,674.50
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	9.00	24,000.00	216,000.00	8	27,000.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	3,996.00	2.00	7,992.00	1	7,992.00
Vehicle	Maintenance	Year	1.00	5,000.00	5,000.00	1	5,000.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	1.00	14,688.80	14,688.80	1	14,688.80
Other	all supplies, see text	Item	1.00	13,870.59	13,870.59	1	13,870.59
Sub-Total							68,551.39
OPERATIONS							
Audit	CPA Audit	Acre	7,135.00	0.55	3,924.25	1	3,924.25
Insurance	Liability/Fee	Acres	7,135.00	0.37	2,639.95	1	2,639.95
Sub-Total							6,564.20
CONTINGENCY & ADMINISTRATION							
Contingency							138,005.72
Administration							364,335.10
Sub-Total							502,340.82
Total							1,882,398.00

Section 10 - Financial Summary

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

PAR(70 ac.)

	Rate %	Total \$
INITIAL FINANCIAL REQUIREMENTS		
I & C Revenue		0
I & C Management Costs		3,058,797
I & C Contingency Expense	10.00	305,880
Total I & C Management Costs		3,364,677
I & C Administrative Costs of Total I & C Management Costs	24.00	807,523
Total I & C Costs		4,172,200
Net I & C Management and Administrative Costs		4,172,200
ANNUAL ONGOING FINANCIAL REQUIREMENTS		
Ongoing Costs		1,380,057
Ongoing Contingency Expense	10.00	138,006
Total Ongoing Management Costs		1,518,063
Ongoing Administrative Costs of Total Ongoing Management costs	24.00	364,335
Total Ongoing Costs		1,882,398
ENDOWMENT REQUIREMENTS FOR ONGOING STEWARDSHIP		
Endowment to Provide Income of \$1,882,398		41,831,067
Endowment per Acre is \$ 5,862.		
Ongoing Management Costs Based on 4.50% of Endowment per Year.		
Ongoing Management Funding is \$1,882,398 per Year Resulting in \$263 per Acre per Year.		
TOTAL CONTRIBUTION		46,003,267

Appendix 2.

PAR for Biological Management Entities

Section 8 = Initial and Capital Funds Required

Section 9 = Ongoing Funds Required

Section 10 = Cost Summary

Section 8 - Initial & Capital Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Budget: Phase Budget 001 Biological

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	4,857.60	12.00	58,291.20	1.0	58,291.20
Fence - Installed	Chain Link 6'	Lin. Ft.	2,428.80	9.85	23,923.68	1.0	23,923.68
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	14,572.80	2.45	35,703.36	1.0	35,703.36
Gate	16" arm swing	Item	10.00	2,500.00	25,000.00	1.0	25,000.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,428.80	8.00	19,430.40	1.0	19,430.40
Sub-Total							162,348.64

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	71.40	44.51	3,178.01	1.0	3,178.01
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	54.66	44.51	2,433.02	1.0	2,433.02
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	12.80	44.51	569.73	1.0	569.73
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Entomologist	Skipper surveys	L. Hours	9.00	44.51	400.59	1.0	400.59
Entomologist	Ant surveys	L. Hours	40.00	44.51	1,780.40	1.0	1,780.40
Herpetologist	Pit-array monitoring	L. Hours	240.00	44.51	10,682.40	1.0	10,682.40
Herpetologist	Pit-array installation/maint	L. Hours	60.00	32.08	1,924.80	1.0	1,924.80
Mammalogist	Wildlife Corridors	L. Hours	160.00	44.51	7,121.60	1.0	7,121.60
Ornithologist	CSS, Chap, and grassland	L. Hours	479.07	44.51	21,323.41	1.0	21,323.41
Ornithologist	Riparian	L. Hours	36.00	44.51	1,602.36	1.0	1,602.36
Ornithologist	LBV,WIFL nest monitoring	L. Hours	28.80	44.51	1,281.89	1.0	1,281.89
Ornithologist	CAGN dispersal studies	L. Hours	1,200.00	44.51	53,412.00	1.0	53,412.00
Science Director	Planning and Review	Hours	100.00	50.73	5,073.00	1.0	5,073.00
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1.0	370.92
Other	Adaptive management	Item	0.20	30,000.00	6,000.00	1.0	6,000.00
Sub-Total							121,605.13

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	356.00	22.76	8,102.56	1.0	8,102.56
Seed Collection	Seed Banking	Accession	0.80	2,500.00	2,000.00	1.0	2,000.00
Plant Procurement	Rooted cuttings	Item	200.00	4.00	800.00	1.0	800.00
Exotic Plant Control	Supervision by botanist	L. Hours	60.00	44.51	2,670.60	1.0	2,670.60
Exotic Plant Control	Up-front control	Item	0.20	500,000.00	100,000.00	1.0	100,000.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	8.00	44.51	356.08	1.0	356.08
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	168.00	32.08	5,389.44	1.0	5,389.44
Exotic Animal Control	Cowbird Traps	Item	2.00	500.00	1,000.00	1.0	1,000.00
Sub-Total							120,318.68

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	356.00	35.19	12,527.64	1.0	12,527.64
Patrolling	4 rangers/ officers	L. Hours	1,424.00	32.08	45,681.92	1.0	45,681.92
Trail	Maintenance	Mile	13.60	4,000.00	54,400.00	1.0	54,400.00
Sign	Misc	Item	200.00	3.25	650.00	1.0	650.00
Sign	Boundary 8" X 13.5"	Item	813.00	5.25	4,268.25	1.0	4,268.25
Sign	Sign posts u-channel	Item	200.00	11.00	2,200.00	1.0	2,200.00
Sign, Redwood	Interpretive 4'X 6'	Item	10.00	1,000.00	10,000.00	1.0	10,000.00
Community Outreach	Public outreach coordinator	L. Hours	356.00	32.08	11,420.48	1.0	11,420.48
Sub-Total							141,148.29
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	20.00	40.00	800.00	1.0	800.00
Sub-Total							800.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	307.60	44.51	13,691.28	1.0	13,691.28
GIS/CAD Management	Data Management	L. Hours	178.00	44.51	7,922.78	1.0	7,922.78
Annual Reports	Reporting coordination	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Management Plan	Initial Report	L. Hours	40.00	44.51	1,780.40	1.0	1,780.40
Sub-Total							25,619.96
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	100.00	44.51	4,451.00	1.0	4,451.00
Preserve Office	Janitorial	Sq. Ft.	400.00	1.70	680.00	1.0	680.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	400.00	1.00	400.00	1.0	400.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.40	720.00	1,728.00	1.0	1,728.00
Office Supplies, Year	Supplies	Person	2.00	250.00	500.00	1.0	500.00
Furniture	Desk	Item	2.00	250.00	500.00	1.0	500.00
Furniture	Chair	Item	2.00	150.00	300.00	1.0	300.00
Furniture	Bookcase, 3'x5'	Item	0.40	150.00	60.00	1.0	60.00
Furniture	File cabinet	Item	1.00	400.00	400.00	1.0	400.00
Copier	Copier, 15-18 ppm	Item	0.20	2,500.00	500.00	1.0	500.00
Fax Machine	Standard	Item	0.20	250.00	50.00	1.0	50.00
Telephone	Touch-tone	Item	2.00	55.00	110.00	1.0	110.00
E-Mail	Services	Year	0.20	500.00	100.00	1.0	100.00
Computer, PC & Monitor	133 MHz Pentium	Item	2.00	2,100.00	4,200.00	1.0	4,200.00
Computer software	Microsoft Office Pkg	Item	1.60	450.00	720.00	1.0	720.00
Computer software	Consulting	Hour	0.20	1,500.00	300.00	1.0	300.00
Laser Printer	600 DPI	Item	0.40	840.00	336.00	1.0	336.00
Deskjet Printer	HP DeskJet 895	Item	0.60	499.00	299.40	1.0	299.40
Sub-Total							15,634.40

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	1.80	24,000.00	43,200.00	1.0	43,200.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	799.20	2.00	1,598.40	1.0	1,598.40
Vehicle	Maintenance	Year	0.20	5,000.00	1,000.00	1.0	1,000.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.20	14,688.80	2,937.76	1.0	2,937.76
Other	all supplies 1st yr, see text	Item	0.20	34,495.70	6,899.14	1.0	6,899.14
Sub-Total							55,635.30
OPERATIONS							
Audit	CPA Audit	Acre	1,427.00	0.55	784.85	1.0	784.85
Insurance	Liability/Fee	Acres	1,427.00	0.37	527.99	1.0	527.99
Sub-Total							1,312.84
CONTINGENCY & ADMINISTRATION							
Contingency							64,442.32
Administration							170,127.74
Sub-Total							234,570.06
Total							878,993.30

Section 9 - Ongoing Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Budget: Phase Budget 001 Biological

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	4,857.60	12.00	58,291.20	25	2,331.65
Fence, 4' X 6' X 6'	Post & 3/4" Cable Maintenance	Lin. Ft.	485.76	12.00	5,829.12	1	5,829.12
Fence - Installed	Chain Link 6'	Lin. Ft.	2,428.80	9.85	23,923.68	25	956.95
Fence - Installed	Chain Link 6' Mainenance	Lin. Ft.	242.88	9.85	2,392.37	1	2,392.37
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	14,572.80	2.45	35,703.36	25	1,428.13
Fence - Installed	Barbed-wire, 4 strd.Maintain	Lin. Ft.	1,457.28	2.45	3,570.34	1	3,570.34
Gate	16" arm swing	Item	10.00	2,500.00	25,000.00	20	1,250.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,428.80	8.00	19,430.40	25	777.22
Vehicle Barrier	Concrete Bollard maintain	Lin. Ft	242.88	8.00	1,943.04	1	1,943.04
Sub-Total							20,478.82

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	71.40	44.51	3,178.01	5	635.60
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	54.66	44.51	2,433.02	1	2,433.02
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	12.80	44.51	569.73	5	113.95
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Entomologist	Skipper surveys	L. Hours	9.00	44.51	400.59	1	400.59
Entomologist	Ant surveys	L. Hours	40.00	44.51	1,780.40	1	1,780.40
Herpetologist	Pit-array monitoring	L. Hours	240.00	44.51	10,682.40	2	5,341.20
Herpetologist	Pit-array installation/maint	L. Hours	60.00	32.08	1,924.80	3	641.60
Mammalogist	Wildlife Corridors	L. Hours	160.00	44.51	7,121.60	1	7,121.60
Ornithologist	CSS, Chap, and grassland	L. Hours	479.07	44.51	21,323.41	1	21,323.41
Ornithologist	Riparian	L. Hours	36.00	44.51	1,602.36	1	1,602.36
Ornithologist	LBV,WIFL nest monitoring	L. Hours	28.80	44.51	1,281.89	1	1,281.89
Ornithologist	CAGN dispersal studies	L. Hours	1,200.00	44.51	53,412.00	6	8,902.00
Science Director	Planning and Review	Hours	100.00	50.73	5,073.00	1	5,073.00
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1	370.92
Other	Adaptive management	Item	0.20	30,000.00	6,000.00	1	6,000.00
Sub-Total							67,472.54

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	356.00	22.76	8,102.56	5	1,620.51
Seed Collection	Seed Banking	Accession	0.80	2,500.00	2,000.00	15	133.33
Plant Procurement	Rooted cuttings	Item	200.00	4.00	800.00	5	160.00
Exotic Plant Control	Supervision by botanist	L. Hours	60.00	44.51	2,670.60	1	2,670.60
Exotic Plant Control	Laborers (5)	L. Hours	1,780.00	22.76	40,512.80	1	40,512.80
Exotic Animal Control	Supervise cowbird removal	L. Hours	8.00	44.51	356.08	1	356.08
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	168.00	32.08	5,389.44	1	5,389.44
Exotic Animal Control	Cowbird Traps	Item	2.00	500.00	1,000.00	5	200.00
Sub-Total							51,042.76

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	356.00	35.19	12,527.64	1	12,527.64
Patrolling	4 rangers/ officers	L. Hours	1,424.00	32.08	45,681.92	1	45,681.92
Trail	Maintenance	Mile	13.60	4,000.00	54,400.00	5	10,880.00
Sign	Misc	Item	200.00	3.25	650.00	7	92.86
Sign	Boundary 8" X 13.5"	Item	813.00	5.25	4,268.25	10	426.83
Sign	Sign posts u-channel	Item	200.00	11.00	2,200.00	10	220.00
Sign, Redwood	Interpretive 4'X 6'	Item	10.00	1,000.00	10,000.00	15	666.67
Community Outreach	Public outreach coordinator	L. Hours	356.00	32.08	11,420.48	1	11,420.48
Sub-Total							81,916.40
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	20.00	40.00	800.00	1	800.00
Sub-Total							800.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	307.60	44.51	13,691.28	1	13,691.28
GIS/CAD Management	Data Management	L. Hours	178.00	44.51	7,922.78	1	7,922.78
Annual Reports	Reporting coordination	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Management Plan	Initial Report	L. Hours	40.00	44.51	1,780.40	3	593.47
Sub-Total							24,433.03
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	100.00	44.51	4,451.00	1	4,451.00
Preserve Office	Janitorial	Sq. Ft.	400.00	1.70	680.00	30	22.67
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	400.00	1.00	400.00	1	400.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.40	720.00	1,728.00	1	1,728.00
Office Supplies, Year	Supplies	Person	2.00	250.00	500.00	1	500.00
Furniture	Desk	Item	2.00	250.00	500.00	10	50.00
Furniture	Chair	Item	2.00	150.00	300.00	5	60.00
Furniture	Bookcase, 3'x5'	Item	0.40	150.00	60.00	8	7.50
Furniture	File cabinet	Item	1.00	400.00	400.00	10	40.00
Copier	Copier, 15-18 ppm	Item	0.20	2,500.00	500.00	8	62.50
Fax Machine	Standard	Item	0.20	250.00	50.00	5	10.00
Telephone	Touch-tone	Item	2.00	55.00	110.00	5	22.00
E-Mail	Services	Year	0.20	500.00	100.00	1	100.00
Computer, PC & Monitor	133 MHz Pentium	Item	2.00	2,100.00	4,200.00	4	1,050.00
Computer software	Microsoft Office Pkg	Item	1.60	450.00	720.00	4	180.00
Computer software	Consulting	Hour	0.20	1,500.00	300.00	1	300.00
Laser Printer	600 DPI	Item	0.40	840.00	336.00	4	84.00
Deskjet Printer	HP DeskJet 895	Item	0.60	499.00	299.40	6	49.90
Sub-Total							9,117.57

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	1.80	24,000.00	43,200.00	8	5,400.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	799.20	2.00	1,598.40	1	1,598.40
Vehicle	Maintenance	Year	0.20	5,000.00	1,000.00	1	1,000.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.20	14,688.80	2,937.76	1	2,937.76
Other	all supplies, see text	Item	0.20	13,870.59	2,774.12	1	2,774.12
Sub-Total							13,710.28
OPERATIONS							
Audit	CPA Audit	Acre	1,427.00	0.55	784.85	1	784.85
Insurance	Liability/Fee	Acres	1,427.00	0.37	527.99	1	527.99
Sub-Total							1,312.84
CONTINGENCY & ADMINISTRATION							
Contingency							27,028.42
Administration							71,355.04
Sub-Total							98,383.46
Total							368,667.70

Section 10 - Financial Summary

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Phase Budget 001 Biological Management Entity (1412 ac.)		Rate %	Total \$
INITIAL FINANCIAL REQUIREMENTS			
I & C Revenue			0
I & C Management Costs			644,423
I & C Contingency Expense	10.00		64,442
Total I & C Management Costs			708,865
I & C Administrative Costs of Total I & C Management Costs	24.00		170,128
Total I & C Costs			878,993
Net I & C Management and Administrative Costs			878,993
ANNUAL ONGOING FINANCIAL REQUIREMENTS			
Ongoing Costs			270,284
Ongoing Contingency Expense	10.00		27,028
Total Ongoing Management Costs			297,312
Ongoing Administrative Costs of Total Ongoing Management costs	24.00		71,355
Total Ongoing Costs			368,667
ENDOWMENT REQUIREMENTS FOR ONGOING STEWARDSHIP			
Endowment to Provide Income of \$368,667			8,192,600
Endowment per Acre is \$ 5,802.			
Ongoing Management Costs Based on 4.50% of Endowment per Year.			
Ongoing Management Funding is \$368,667 per Year Resulting in \$261 per Acre per Year.			
TOTAL CONTRIBUTION			9,071,593

Appendix 3.

PAR for City of Carlsbad Properties

Section 8 = Initial and Capital Funds Required

Section 9 = Ongoing Funds Required

Section 10 = Cost Summary

Section 8 - Initial & Capital Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Budget: Phase Budget 002 City of Carlsbad

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	2,185.92	12.00	26,231.04	1.0	26,231.04
Fence - Installed	Chain Link 6'	Lin. Ft.	1,092.96	9.85	10,765.66	1.0	10,765.66
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	6,557.76	2.45	16,066.51	1.0	16,066.51
Gate	16" arm swing	Item	4.50	2,500.00	11,250.00	1.0	11,250.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	1,092.96	8.00	8,743.68	1.0	8,743.68
Sub-Total							73,056.89

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	32.13	44.51	1,430.11	1.0	1,430.11
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	22.40	44.51	997.14	1.0	997.14
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	5.20	44.51	231.45	1.0	231.45
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Entomologist	Skipper surveys	L. Hours	7.00	44.51	311.57	1.0	311.57
Entomologist	Ant surveys	L. Hours	18.00	44.51	801.18	1.0	801.18
Herpetologist	Pit-array monitoring	L. Hours	62.40	44.51	2,777.42	1.0	2,777.42
Herpetologist	Pit-array installation/maint	L. Hours	15.60	32.08	500.45	1.0	500.45
Mammalogist	Wildlife Corridors	L. Hours	256.00	44.51	11,394.56	1.0	11,394.56
Ornithologist	CSS, Chap, and grassland	L. Hours	125.23	44.51	5,573.90	1.0	5,573.90
Ornithologist	Riparian	L. Hours	26.40	44.51	1,175.06	1.0	1,175.06
Ornithologist	LBV,WIFL nest monitoring	L. Hours	48.00	44.51	2,136.48	1.0	2,136.48
Ornithologist	CAGN dispersal studies	L. Hours	312.00	44.51	13,887.12	1.0	13,887.12
Science Director	Planning and Review	Hours	45.00	50.73	2,282.85	1.0	2,282.85
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1.0	370.92
Other	Adaptive management	Item	0.09	30,000.00	2,700.00	1.0	2,700.00
Sub-Total							51,021.21

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	160.20	22.76	3,646.15	1.0	3,646.15
Seed Collection	Seed Banking	Accession	0.36	2,500.00	900.00	1.0	900.00
Plant Procurement	Rooted cuttings	Item	90.00	4.00	360.00	1.0	360.00
Exotic Plant Control	Supervision by botantist	L. Hours	27.00	44.51	1,201.77	1.0	1,201.77
Exotic Plant Control	Up-front control	Item	0.09	500,000.00	45,000.00	1.0	45,000.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	3.60	44.51	160.24	1.0	160.24
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	224.00	32.08	7,185.92	1.0	7,185.92
Exotic Animal Control	Cowbird Traps	Item	0.90	500.00	450.00	1.0	450.00
Sub-Total							58,904.08

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	160.20	35.19	5,637.44	1.0	5,637.44
Patrolling	4 rangers/ officers	L. Hours	640.80	32.08	20,556.86	1.0	20,556.86
Trail	Maintenance	Mile	6.12	4,000.00	24,480.00	1.0	24,480.00
Sign	Misc	Item	90.00	3.25	292.50	1.0	292.50
Sign	Boundary 8" X 13.5"	Item	365.85	5.25	1,920.71	1.0	1,920.71
Sign	Sign posts u-channel	Item	90.00	11.00	990.00	1.0	990.00
Sign, Redwood	Interpretive 4'X 6'	Item	4.50	1,000.00	4,500.00	1.0	4,500.00
Community Outreach	Public outreach coordinator	L. Hours	160.20	32.08	5,139.22	1.0	5,139.22
Sub-Total							63,516.73
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	9.00	40.00	360.00	1.0	360.00
Sub-Total							360.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	138.42	44.51	6,161.07	1.0	6,161.07
GIS/CAD Management	Data Management	L. Hours	80.10	44.51	3,565.25	1.0	3,565.25
Annual Reports	Reporting coordination	L. Hours	22.50	44.51	1,001.48	1.0	1,001.48
Management Plan	Initial Report	L. Hours	18.00	44.51	801.18	1.0	801.18
Sub-Total							11,528.98
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	45.00	44.51	2,002.95	1.0	2,002.95
Preserve Office	Janitorial	Sq. Ft.	180.00	1.70	306.00	1.0	306.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	180.00	1.00	180.00	1.0	180.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	1.08	720.00	777.60	1.0	777.60
Office Supplies, Year	Supplies	Person	0.90	250.00	225.00	1.0	225.00
Furniture	Desk	Item	0.90	250.00	225.00	1.0	225.00
Furniture	Chair	Item	0.90	150.00	135.00	1.0	135.00
Furniture	Bookcase, 3'x5'	Item	0.18	150.00	27.00	1.0	27.00
Furniture	File cabinet	Item	0.45	400.00	180.00	1.0	180.00
Copier	Copier, 15-18 ppm	Item	0.09	2,500.00	225.00	1.0	225.00
Fax Machine	Standard	Item	0.09	250.00	22.50	1.0	22.50
Telephone	Touch-tone	Item	0.90	55.00	49.50	1.0	49.50
E-Mail	Services	Year	0.09	500.00	45.00	1.0	45.00
Computer, PC & Monitor	133 MHz Pentium	Item	0.90	2,100.00	1,890.00	1.0	1,890.00
Computer software	Microsoft Office Pkg	Item	0.72	450.00	324.00	1.0	324.00
Computer software	Consulting	Hour	0.09	1,500.00	135.00	1.0	135.00
Laser Printer	600 DPI	Item	0.18	840.00	151.20	1.0	151.20
Deskjet Printer	HP DeskJet 895	Item	0.27	499.00	134.73	1.0	134.73
Sub-Total							7,035.48

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	0.81	24,000.00	19,440.00	1.0	19,440.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	359.64	2.00	719.28	1.0	719.28
Vehicle	Maintenance	Year	0.09	5,000.00	450.00	1.0	450.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.09	14,688.80	1,321.99	1.0	1,321.99
Other	all supplies 1st yr, see text	Item	0.09	34,495.70	3,104.61	1.0	3,104.61
Sub-Total							25,035.88
OPERATIONS							
Audit	CPA Audit	Acre	642.15	0.55	353.18	1.0	353.18
Insurance	Liability/Fee	Acres	642.15	0.37	237.60	1.0	237.60
Sub-Total							590.78
CONTINGENCY & ADMINISTRATION							
Contingency							29,105.00
Administration							76,837.21
Sub-Total							105,942.21
Total							396,992.24

Section 9 - Ongoing Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Budget: Phase Budget 002 City of Carlsbad

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	2,185.92	12.00	26,231.04	25	1,049.24
Fence, 4' X 6' X 6'	Post & 3/4" Cable Maintenance	Lin. Ft.	218.59	12.00	2,623.08	1	2,623.08
Fence - Installed	Chain Link 6'	Lin. Ft.	1,092.96	9.85	10,765.66	25	430.63
Fence - Installed	Chain Link 6' Mainenance	Lin. Ft.	109.30	9.85	1,076.61	1	1,076.61
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	6,557.76	2.45	16,066.51	25	642.66
Fence - Installed	Barbed-wire, 4 strd.Maintain	Lin. Ft.	655.78	2.45	1,606.66	1	1,606.66
Gate	16" arm swing	Item	4.50	2,500.00	11,250.00	20	562.50
Vehicle Barrier	Concrete Bollard	Lin. Ft	1,092.96	8.00	8,743.68	25	349.75
Vehicle Barrier	Concrete Bollard maintain	Lin. Ft	109.30	8.00	874.40	1	874.40
Sub-Total							9,215.53

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	32.13	44.51	1,430.11	5	286.02
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	22.40	44.51	997.14	1	997.14
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	5.20	44.51	231.45	5	46.29
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Entomologist	Skipper surveys	L. Hours	7.00	44.51	311.57	1	311.57
Entomologist	Ant surveys	L. Hours	18.00	44.51	801.18	1	801.18
Herpetologist	Pit-array monitoring	L. Hours	62.40	44.51	2,777.42	2	1,388.71
Herpetologist	Pit-array installation/maint	L. Hours	15.60	32.08	500.45	3	166.82
Mammalogist	Wildlife Corridors	L. Hours	256.00	44.51	11,394.56	1	11,394.56
Ornithologist	CSS, Chap, and grassland	L. Hours	125.23	44.51	5,573.90	1	5,573.90
Ornithologist	Riparian	L. Hours	26.40	44.51	1,175.06	1	1,175.06
Ornithologist	LBV,WIFL nest monitoring	L. Hours	48.00	44.51	2,136.48	1	2,136.48
Ornithologist	CAGN dispersal studies	L. Hours	312.00	44.51	13,887.12	6	2,314.52
Science Director	Planning and Review	Hours	45.00	50.73	2,282.85	1	2,282.85
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1	370.92
Other	Adaptive management	Item	0.09	30,000.00	2,700.00	1	2,700.00
Sub-Total							36,397.02

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	160.20	22.76	3,646.15	5	729.23
Seed Collection	Seed Banking	Accession	0.36	2,500.00	900.00	15	60.00
Plant Procurement	Rooted cuttings	Item	90.00	4.00	360.00	5	72.00
Exotic Plant Control	Supervision by botanist	L. Hours	27.00	44.51	1,201.77	1	1,201.77
Exotic Plant Control	Laborers (5)	L. Hours	801.00	22.76	18,230.76	1	18,230.76
Exotic Animal Control	Supervise cowbird removal	L. Hours	3.60	44.51	160.24	1	160.24
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	224.00	32.08	7,185.92	1	7,185.92
Exotic Animal Control	Cowbird Traps	Item	0.90	500.00	450.00	5	90.00
Sub-Total							27,729.92

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	160.20	35.19	5,637.44	1	5,637.44
Patrolling	4 rangers/ officers	L. Hours	640.80	32.08	20,556.86	1	20,556.86
Trail	Maintenance	Mile	6.12	4,000.00	24,480.00	5	4,896.00
Sign	Misc	Item	90.00	3.25	292.50	7	41.79
Sign	Boundary 8" X 13.5"	Item	365.85	5.25	1,920.71	10	192.07
Sign	Sign posts u-channel	Item	90.00	11.00	990.00	10	99.00
Sign, Redwood	Interpretive 4'X 6'	Item	4.50	1,000.00	4,500.00	15	300.00
Community Outreach	Public outreach coordinator	L. Hours	160.20	32.08	5,139.22	1	5,139.22
Sub-Total							36,862.38
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	9.00	40.00	360.00	1	360.00
Sub-Total							360.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	138.42	44.51	6,161.07	1	6,161.07
GIS/CAD Management	Data Management	L. Hours	80.10	44.51	3,565.25	1	3,565.25
Annual Reports	Reporting coordination	L. Hours	22.50	44.51	1,001.48	1	1,001.48
Management Plan	Initial Report	L. Hours	18.00	44.51	801.18	3	267.06
Sub-Total							10,994.86
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	45.00	44.51	2,002.95	1	2,002.95
Preserve Office	Janitorial	Sq. Ft.	180.00	1.70	306.00	30	10.20
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	180.00	1.00	180.00	1	180.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	1.08	720.00	777.60	1	777.60
Office Supplies, Year	Supplies	Person	0.90	250.00	225.00	1	225.00
Furniture	Desk	Item	0.90	250.00	225.00	10	22.50
Furniture	Chair	Item	0.90	150.00	135.00	5	27.00
Furniture	Bookcase, 3'x5'	Item	0.18	150.00	27.00	8	3.38
Furniture	File cabinet	Item	0.45	400.00	180.00	10	18.00
Copier	Copier, 15-18 ppm	Item	0.09	2,500.00	225.00	8	28.13
Fax Machine	Standard	Item	0.09	250.00	22.50	5	4.50
Telephone	Touch-tone	Item	0.90	55.00	49.50	5	9.90
E-Mail	Services	Year	0.09	500.00	45.00	1	45.00
Computer, PC & Monitor	133 MHz Pentium	Item	0.90	2,100.00	1,890.00	4	472.50
Computer software	Microsoft Office Pkg	Item	0.72	450.00	324.00	4	81.00
Computer software	Consulting	Hour	0.09	1,500.00	135.00	1	135.00
Laser Printer	600 DPI	Item	0.18	840.00	151.20	4	37.80
Deskjet Printer	HP DeskJet 895	Item	0.27	499.00	134.73	6	22.46
Sub-Total							4,102.92

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	0.81	24,000.00	19,440.00	8	2,430.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	359.64	2.00	719.28	1	719.28
Vehicle	Maintenance	Year	0.09	5,000.00	450.00	1	450.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.09	14,688.80	1,321.99	1	1,321.99
Other	all supplies, see text	Item	0.09	13,870.59	1,248.35	1	1,248.35
Sub-Total							6,169.62
OPERATIONS							
Audit	CPA Audit	Acre	642.15	0.55	353.18	1	353.18
Insurance	Liability/Fee	Acres	642.15	0.37	237.60	1	237.60
Sub-Total							590.78
CONTINGENCY & ADMINISTRATION							
Contingency							13,242.30
Administration							34,959.68
Sub-Total							48,201.98
Total							180,625.01

Section 10 - Financial Summary

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

04/29/2004

Phase Budget 002 City of Carlsbad	(603 ac.)	Rate %	Total \$
INITIAL FINANCIAL REQUIREMENTS			
I & C Revenue			0
I & C Management Costs			291,050
I & C Contingency Expense	10.00		29,105
Total I & C Management Costs			320,155
I & C Administrative Costs of Total I & C Management Costs	24.00		76,837
Total I & C Costs			396,992
Net I & C Management and Administrative Costs			396,992
ANNUAL ONGOING FINANCIAL REQUIREMENTS			
Ongoing Costs			132,423
Ongoing Contingency Expense	10.00		13,242
Total Ongoing Management Costs			145,665
Ongoing Administrative Costs of Total Ongoing Management costs	24.00		34,960
Total Ongoing Costs			180,625
ENDOWMENT REQUIREMENTS FOR ONGOING STEWARDSHIP			
Endowment to Provide Income of \$180,625			4,013,889
Endowment per Acre is \$ 6,657.			
Ongoing Management Costs Based on 4.50% of Endowment per Year.			
Ongoing Management Funding is \$180,625 per Year Resulting in \$300 per Acre per Year.			
TOTAL CONTRIBUTION			4,410,881

Appendix 4.

PAR for Future Biological Management Entity

Section 8 = Initial and Capital Funds Required

Section 9 = Ongoing Funds Required

Section 10 = Cost Summary

Section 8 - Initial & Capital Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 003 Future Bio

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	5,829.12	12.00	69,949.44	1.0	69,949.44
Fence - Installed	Chain Link 6'	Lin. Ft.	2,914.56	9.85	28,708.42	1.0	28,708.42
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	17,487.36	2.45	42,844.03	1.0	42,844.03
Gate	16" arm swing	Item	12.00	2,500.00	30,000.00	1.0	30,000.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,914.56	8.00	23,316.48	1.0	23,316.48
Sub-Total							194,818.37

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	85.68	44.51	3,813.62	1.0	3,813.62
Plant Ecologist	Vernal Pool Measure variables	L. Hours	72.00	44.51	3,204.72	1.0	3,204.72
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	93.19	44.51	4,148.10	1.0	4,148.10
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	6.00	44.51	267.06	1.0	267.06
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Entomologist	Fairy Shrimp surveys	L. Hours	50.03	44.51	2,226.84	1.0	2,226.84
Entomologist	Skipper surveys	L. Hours	19.00	44.51	845.69	1.0	845.69
Entomologist	Ant surveys	L. Hours	48.00	44.51	2,136.48	1.0	2,136.48
Herpetologist	Vernal Pool/Spadefoot monitor	L. Hours	40.02	44.51	1,781.29	1.0	1,781.29
Herpetologist	Pit-array monitoring	L. Hours	48.00	44.51	2,136.48	1.0	2,136.48
Herpetologist	Pit-array installation/maint	L. Hours	12.00	32.08	384.96	1.0	384.96
Mammalogist	Wildlife Corridors	L. Hours	64.00	44.51	2,848.64	1.0	2,848.64
Ornithologist	CSS, Chap, and grassland	L. Hours	247.54	44.51	11,018.18	1.0	11,018.18
Ornithologist	Riparian	L. Hours	76.80	44.51	3,418.37	1.0	3,418.37
Ornithologist	LBV,WIFL nest monitoring	L. Hours	61.44	44.51	2,734.69	1.0	2,734.69
Ornithologist	CAGN dispersal studies	L. Hours	240.00	44.51	10,682.40	1.0	10,682.40
Science Director	Planning and Review	Hours	120.00	50.73	6,087.60	1.0	6,087.60
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1.0	370.92
Other	Adaptive management	Item	0.24	30,000.00	7,200.00	1.0	7,200.00
Sub-Total							69,757.04

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	427.20	22.76	9,723.07	1.0	9,723.07
Seed Collection	Seed Banking	Accession	0.96	2,500.00	2,400.00	1.0	2,400.00
Plant Procurement	Rooted cuttings	Item	240.00	4.00	960.00	1.0	960.00
Exotic Plant Control	Supervision by botanist	L. Hours	72.00	44.51	3,204.72	1.0	3,204.72
Exotic Plant Control	Up-front control	Item	0.24	500,000.00	120,000.00	1.0	120,000.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	9.60	44.51	427.30	1.0	427.30
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	268.80	32.08	8,623.10	1.0	8,623.10
Exotic Animal Control	Cowbird Traps	Item	2.40	500.00	1,200.00	1.0	1,200.00
Sub-Total							146,538.19

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	427.20	35.19	15,033.17	1.0	15,033.17
Patrolling	4 rangers/ officers	L. Hours	1,708.80	32.08	54,818.30	1.0	54,818.30
Trail	Maintenance	Mile	16.32	4,000.00	65,280.00	1.0	65,280.00
Sign	Misc	Item	240.00	3.25	780.00	1.0	780.00
Sign	Boundary 8" X 13.5"	Item	975.60	5.25	5,121.90	1.0	5,121.90
Sign	Sign posts u-channel	Item	240.00	11.00	2,640.00	1.0	2,640.00
Sign, Redwood	Interpretive 4'X 6'	Item	12.00	1,000.00	12,000.00	1.0	12,000.00
Community Outreach	Public outreach coordinator	L. Hours	427.20	32.08	13,704.58	1.0	13,704.58
Sub-Total							169,377.95
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	24.00	40.00	960.00	1.0	960.00
Sub-Total							960.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	369.12	44.51	16,429.53	1.0	16,429.53
GIS/CAD Management	Data Management	L. Hours	213.60	44.51	9,507.34	1.0	9,507.34
Annual Reports	Reporting coordination	L. Hours	60.00	44.51	2,670.60	1.0	2,670.60
Management Plan	Initial Report	L. Hours	48.00	44.51	2,136.48	1.0	2,136.48
Sub-Total							30,743.95
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	120.00	44.51	5,341.20	1.0	5,341.20
Preserve Office	Janitorial	Sq. Ft.	480.00	1.70	816.00	1.0	816.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	480.00	1.00	480.00	1.0	480.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.88	720.00	2,073.60	1.0	2,073.60
Office Supplies, Year	Supplies	Person	2.40	250.00	600.00	1.0	600.00
Furniture	Desk	Item	2.40	250.00	600.00	1.0	600.00
Furniture	Chair	Item	2.40	150.00	360.00	1.0	360.00
Furniture	Bookcase, 3'x5'	Item	0.48	150.00	72.00	1.0	72.00
Furniture	File cabinet	Item	1.20	400.00	480.00	1.0	480.00
Copier	Copier, 15-18 ppm	Item	0.24	2,500.00	600.00	1.0	600.00
Fax Machine	Standard	Item	0.24	250.00	60.00	1.0	60.00
Telephone	Touch-tone	Item	2.40	55.00	132.00	1.0	132.00
E-Mail	Services	Year	0.24	500.00	120.00	1.0	120.00
Computer, PC & Monitor	133 MHz Pentium	Item	2.40	2,100.00	5,040.00	1.0	5,040.00
Computer software	Microsoft Office Pkg	Item	1.92	450.00	864.00	1.0	864.00
Computer software	Consulting	Hour	0.24	1,500.00	360.00	1.0	360.00
Laser Printer	600 DPI	Item	0.48	840.00	403.20	1.0	403.20
Deskjet Printer	HP DeskJet 895	Item	0.72	499.00	359.28	1.0	359.28
Sub-Total							18,761.28

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	2.16	24,000.00	51,840.00	1.0	51,840.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	959.04	2.00	1,918.08	1.0	1,918.08
Vehicle	Maintenance	Year	0.24	5,000.00	1,200.00	1.0	1,200.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.24	14,688.80	3,525.31	1.0	3,525.31
Other	all supplies 1st yr, see text	Item	0.24	34,495.70	8,278.97	1.0	8,278.97
Sub-Total							66,762.36
OPERATIONS							
Audit	CPA Audit	Acre	1,712.40	0.55	941.82	1.0	941.82
Insurance	Liability/Fee	Acres	1,712.40	0.37	633.59	1.0	633.59
Sub-Total							1,575.41
CONTINGENCY & ADMINISTRATION							
Contingency							69,929.46
Administration							184,613.76
Sub-Total							254,543.22
Total							953,837.77

Section 9 - Ongoing Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 003 Future Bio

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	5,829.12	12.00	69,949.44	25	2,797.98
Fence, 4' X 6' X 6'	Post & 3/4" Cable Maintenance	Lin. Ft.	582.91	12.00	6,994.92	1	6,994.92
Fence - Installed	Chain Link 6'	Lin. Ft.	2,914.56	9.85	28,708.42	25	1,148.34
Fence - Installed	Chain Link 6' Mainenance	Lin. Ft.	291.46	9.85	2,870.88	1	2,870.88
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	17,487.36	2.45	42,844.03	25	1,713.76
Fence - Installed	Barbed-wire, 4 strd.Maintain	Lin. Ft.	1,748.74	2.45	4,284.41	1	4,284.41
Gate	16" arm swing	Item	12.00	2,500.00	30,000.00	20	1,500.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,914.56	8.00	23,316.48	25	932.66
Vehicle Barrier	Concrete Bollard maintain	Lin. Ft	291.46	8.00	2,331.68	1	2,331.68
Sub-Total							24,574.63

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	85.68	44.51	3,813.62	5	762.72
Plant Ecologist	Vernal Pool Measure variables	L. Hours	72.00	44.51	3,204.72	1	3,204.72
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	93.19	44.51	4,148.10	1	4,148.10
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	6.00	44.51	267.06	5	53.41
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Entomologist	Fairy Shrimp surveys	L. Hours	50.03	44.51	2,226.84	1	2,226.84
Entomologist	Skipper surveys	L. Hours	19.00	44.51	845.69	1	845.69
Entomologist	Ant surveys	L. Hours	48.00	44.51	2,136.48	1	2,136.48
Herpetologist	Vernal Pool/Spadefoot monitor	L. Hours	40.02	44.51	1,781.29	1	1,781.29
Herpetologist	Pit-array monitoring	L. Hours	48.00	44.51	2,136.48	2	1,068.24
Herpetologist	Pit-array installation/maint	L. Hours	12.00	32.08	384.96	3	128.32
Mammalogist	Wildlife Corridors	L. Hours	64.00	44.51	2,848.64	1	2,848.64
Ornithologist	CSS, Chap, and grassland	L. Hours	247.54	44.51	11,018.18	1	11,018.18
Ornithologist	Riparian	L. Hours	76.80	44.51	3,418.37	1	3,418.37
Ornithologist	LBV,WIFL nest monitoring	L. Hours	61.44	44.51	2,734.69	1	2,734.69
Ornithologist	CAGN dispersal studies	L. Hours	240.00	44.51	10,682.40	6	1,780.40
Science Director	Planning and Review	Hours	120.00	50.73	6,087.60	1	6,087.60
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1	370.92
Other	Adaptive management	Item	0.24	30,000.00	7,200.00	1	7,200.00
Sub-Total							56,265.61

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	427.20	22.76	9,723.07	5	1,944.61
Seed Collection	Seed Banking	Accession	0.96	2,500.00	2,400.00	15	160.00
Plant Procurement	Rooted cuttings	Item	240.00	4.00	960.00	5	192.00
Exotic Plant Control	Supervision by botanist	L. Hours	72.00	44.51	3,204.72	1	3,204.72
Exotic Plant Control	Laborers (5)	L. Hours	2,136.00	22.76	48,615.36	1	48,615.36
Exotic Animal Control	Supervise cowbird removal	L. Hours	9.60	44.51	427.30	1	427.30
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	268.80	32.08	8,623.10	1	8,623.10
Exotic Animal Control	Cowbird Traps	Item	2.40	500.00	1,200.00	5	240.00

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
Sub-Total							63,407.09
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	427.20	35.19	15,033.17	1	15,033.17
Patrolling	4 rangers/ officers	L. Hours	1,708.80	32.08	54,818.30	1	54,818.30
Trail	Maintenance	Mile	16.32	4,000.00	65,280.00	5	13,056.00
Sign	Misc	Item	240.00	3.25	780.00	7	111.43
Sign	Boundary 8" X 13.5"	Item	975.60	5.25	5,121.90	10	512.19
Sign	Sign posts u-channel	Item	240.00	11.00	2,640.00	10	264.00
Sign, Redwood	Interpretive 4'X 6'	Item	12.00	1,000.00	12,000.00	15	800.00
Community Outreach	Public outreach coordinator	L. Hours	427.20	32.08	13,704.58	1	13,704.58
Sub-Total							98,299.67
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	24.00	40.00	960.00	1	960.00
Sub-Total							960.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	369.12	44.51	16,429.53	1	16,429.53
GIS/CAD Management	Data Management	L. Hours	213.60	44.51	9,507.34	1	9,507.34
Annual Reports	Reporting coordination	L. Hours	60.00	44.51	2,670.60	1	2,670.60
Management Plan	Initial Report	L. Hours	48.00	44.51	2,136.48	3	712.16
Sub-Total							29,319.63
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	120.00	44.51	5,341.20	1	5,341.20
Preserve Office	Janitorial	Sq. Ft.	480.00	1.70	816.00	30	27.20
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	480.00	1.00	480.00	1	480.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.88	720.00	2,073.60	1	2,073.60
Office Supplies, Year	Supplies	Person	2.40	250.00	600.00	1	600.00
Furniture	Desk	Item	2.40	250.00	600.00	10	60.00
Furniture	Chair	Item	2.40	150.00	360.00	5	72.00
Furniture	Bookcase, 3'x5'	Item	0.48	150.00	72.00	8	9.00
Furniture	File cabinet	Item	1.20	400.00	480.00	10	48.00
Copier	Copier, 15-18 ppm	Item	0.24	2,500.00	600.00	8	75.00
Fax Machine	Standard	Item	0.24	250.00	60.00	5	12.00
Telephone	Touch-tone	Item	2.40	55.00	132.00	5	26.40
E-Mail	Services	Year	0.24	500.00	120.00	1	120.00
Computer, PC & Monitor	133 MHz Pentium	Item	2.40	2,100.00	5,040.00	4	1,260.00
Computer software	Microsoft Office Pkg	Item	1.92	450.00	864.00	4	216.00
Computer software	Consulting	Hour	0.24	1,500.00	360.00	1	360.00
Laser Printer	600 DPI	Item	0.48	840.00	403.20	4	100.80
Deskjet Printer	HP DeskJet 895	Item	0.72	499.00	359.28	6	59.88
Sub-Total							10,941.08

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	2.16	24,000.00	51,840.00	8	6,480.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	959.04	2.00	1,918.08	1	1,918.08
Vehicle	Maintenance	Year	0.24	5,000.00	1,200.00	1	1,200.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.24	14,688.80	3,525.31	1	3,525.31
Other	all supplies, see text	Item	0.24	13,870.59	3,328.94	1	3,328.94
Sub-Total							16,452.33
OPERATIONS							
Audit	CPA Audit	Acre	1,712.40	0.55	941.82	1	941.82
Insurance	Liability/Fee	Acres	1,712.40	0.37	633.59	1	633.59
Sub-Total							1,575.41
CONTINGENCY & ADMINISTRATION							
Contingency							30,179.55
Administration							79,674.00
Sub-Total							109,853.55
Total							411,649.00

Section 10 - Financial Summary

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Phase Budget 003 Future Bio Management Entity (1731 ac.)		Rate %	Total \$
INITIAL FINANCIAL REQUIREMENTS			
I & C Revenue			0
I & C Management Costs			699,294
I & C Contingency Expense	10.00		69,929
Total I & C Management Costs			769,223
I & C Administrative Costs of Total I & C Management Costs	24.00		184,614
Total I & C Costs			953,837
Net I & C Management and Administrative Costs			953,837
ANNUAL ONGOING FINANCIAL REQUIREMENTS			
Ongoing Costs			301,795
Ongoing Contingency Expense	10.00		30,180
Total Ongoing Management Costs			331,975
Ongoing Administrative Costs of Total Ongoing Management costs	24.00		79,674
Total Ongoing Costs			411,650
ENDOWMENT REQUIREMENTS FOR ONGOING STEWARDSHIP			
Endowment to Provide Income of \$411,650			9,147,778
Endowment per Acre is \$ 5,285.			
Ongoing Management Costs Based on 4.50% of Endowment per Year.			
Ongoing Management Funding is \$411,650 per Year Resulting in \$238 per Acre per Year.			
TOTAL CONTRIBUTION			10,101,615

Appendix 5.

PAR for Other Public or Semi-public Entities

Section 8 = Initial and Capital Funds Required

Section 9 = Ongoing Funds Required

Section 10 = Cost Summary

Section 8 - Initial & Capital Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 004 Other public entities

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	1,214.40	12.00	14,572.80	1.0	14,572.80
Fence - Installed	Chain Link 6'	Lin. Ft.	607.20	9.85	5,980.92	1.0	5,980.92
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	3,643.20	2.45	8,925.84	1.0	8,925.84
Gate	16" arm swing	Item	2.50	2,500.00	6,250.00	1.0	6,250.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	607.20	8.00	4,857.60	1.0	4,857.60
Sub-Total							40,587.16

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	17.85	44.51	794.50	1.0	794.50
Plant Ecologist	Vernal Pool Measure variables	L. Hours	72.00	44.51	3,204.72	1.0	3,204.72
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	52.87	44.51	2,353.25	1.0	2,353.25
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Entomologist	Fairy Shrimp surveys	L. Hours	24.98	44.51	1,111.86	1.0	1,111.86
Entomologist	Skipper surveys	L. Hours	12.00	44.51	534.12	1.0	534.12
Entomologist	Ant surveys	L. Hours	10.00	44.51	445.10	1.0	445.10
Herpetologist	Vernal Pool/Spadefoot monitor	L. Hours	19.98	44.51	889.31	1.0	889.31
Mammalogist	Wildlife Corridors	L. Hours	160.00	44.51	7,121.60	1.0	7,121.60
Ornithologist	CSS, Chap, and grassland	L. Hours	34.95	44.51	1,555.51	1.0	1,555.51
Ornithologist	Riparian	L. Hours	2.40	44.51	106.82	1.0	106.82
Ornithologist	LBV,WIFL nest monitoring	L. Hours	1.92	44.51	85.46	1.0	85.46
Ornithologist	Lagoons	L. Hours	362.08	44.51	16,116.18	1.0	16,116.18
Science Director	Planning and Review	Hours	25.00	50.73	1,268.25	1.0	1,268.25
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1.0	370.92
Other	Adaptive management	Item	0.05	30,000.00	1,500.00	1.0	1,500.00
Sub-Total							41,908.60

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	89.00	22.76	2,025.64	1.0	2,025.64
Seed Collection	Seed Banking	Accession	0.20	2,500.00	500.00	1.0	500.00
Plant Procurement	Rooted cuttings	Item	50.00	4.00	200.00	1.0	200.00
Exotic Plant Control	Supervision by botantist	L. Hours	15.00	44.51	667.65	1.0	667.65
Exotic Plant Control	Up-front control	Item	0.05	500,000.00	25,000.00	1.0	25,000.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	2.00	44.51	89.02	1.0	89.02
Exotic Animal Control	Cowbird Traps	Item	0.50	500.00	250.00	1.0	250.00
Sub-Total							28,732.31

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	89.00	35.19	3,131.91	1.0	3,131.91
Patrolling	4 rangers/ officers	L. Hours	356.00	32.08	11,420.48	1.0	11,420.48
Trail	Maintenance	Mile	3.40	4,000.00	13,600.00	1.0	13,600.00
Sign	Misc	Item	50.00	3.25	162.50	1.0	162.50
Sign	Boundary 8" X 13.5"	Item	203.25	5.25	1,067.06	1.0	1,067.06
Sign	Sign posts u-channel	Item	50.00	11.00	550.00	1.0	550.00
Sign, Redwood	Interpretive 4'X 6'	Item	2.50	1,000.00	2,500.00	1.0	2,500.00
Community Outreach	Public outreach coordinator	L. Hours	89.00	32.08	2,855.12	1.0	2,855.12
Sub-Total							35,287.07
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	5.00	40.00	200.00	1.0	200.00
Sub-Total							200.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	76.90	44.51	3,422.82	1.0	3,422.82
GIS/CAD Management	Data Management	L. Hours	44.50	44.51	1,980.70	1.0	1,980.70
Annual Reports	Reporting coordination	L. Hours	12.50	44.51	556.38	1.0	556.38
Management Plan	Initial Report	L. Hours	10.00	44.51	445.10	1.0	445.10
Sub-Total							6,405.00
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	25.00	44.51	1,112.75	1.0	1,112.75
Preserve Office	Janitorial	Sq. Ft.	100.00	1.70	170.00	1.0	170.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	100.00	1.00	100.00	1.0	100.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	0.60	720.00	432.00	1.0	432.00
Office Supplies, Year	Supplies	Person	0.50	250.00	125.00	1.0	125.00
Furniture	Desk	Item	0.50	250.00	125.00	1.0	125.00
Furniture	Chair	Item	0.50	150.00	75.00	1.0	75.00
Furniture	Bookcase, 3'x5'	Item	0.10	150.00	15.00	1.0	15.00
Furniture	File cabinet	Item	0.25	400.00	100.00	1.0	100.00
Copier	Copier, 15-18 ppm	Item	0.05	2,500.00	125.00	1.0	125.00
Fax Machine	Standard	Item	0.05	250.00	12.50	1.0	12.50
Telephone	Touch-tone	Item	0.50	55.00	27.50	1.0	27.50
E-Mail	Services	Year	0.05	500.00	25.00	1.0	25.00
Computer, PC & Monitor	133 MHz Pentium	Item	0.50	2,100.00	1,050.00	1.0	1,050.00
Computer software	Microsoft Office Pkg	Item	0.40	450.00	180.00	1.0	180.00
Computer software	Consulting	Hour	0.05	1,500.00	75.00	1.0	75.00
Laser Printer	600 DPI	Item	0.10	840.00	84.00	1.0	84.00
Deskjet Printer	HP DeskJet 895	Item	0.15	499.00	74.85	1.0	74.85
Sub-Total							3,908.60

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	0.45	24,000.00	10,800.00	1.0	10,800.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	199.80	2.00	399.60	1.0	399.60
Vehicle	Maintenance	Year	0.05	5,000.00	250.00	1.0	250.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.05	14,688.80	734.44	1.0	734.44
Other	all supplies 1st yr, see text	Item	0.05	34,495.70	1,724.79	1.0	1,724.79
Sub-Total							13,908.83
OPERATIONS							
Audit	CPA Audit	Acre	356.75	0.55	196.21	1.0	196.21
Insurance	Liability/Fee	Acres	356.75	0.37	132.00	1.0	132.00
Sub-Total							328.21
CONTINGENCY & ADMINISTRATION							
Contingency							17,126.58
Administration							45,214.17
Sub-Total							62,340.75
Total							233,606.53

Section 9 - Ongoing Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 004 Other public entities

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	1,214.40	12.00	14,572.80	25	582.91
Fence, 4' X 6' X 6'	Post & 3/4" Cable Maintenance	Lin. Ft.	121.44	12.00	1,457.28	1	1,457.28
Fence - Installed	Chain Link 6'	Lin. Ft.	607.20	9.85	5,980.92	25	239.24
Fence - Installed	Chain Link 6' Mainenance	Lin. Ft.	60.72	9.85	598.09	1	598.09
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	3,643.20	2.45	8,925.84	25	357.03
Fence - Installed	Barbed-wire, 4 strd.Maintain	Lin. Ft.	364.32	2.45	892.58	1	892.58
Gate	16" arm swing	Item	2.50	2,500.00	6,250.00	20	312.50
Vehicle Barrier	Concrete Bollard	Lin. Ft	607.20	8.00	4,857.60	25	194.30
Vehicle Barrier	Concrete Bollard maintain	Lin. Ft	60.72	8.00	485.76	1	485.76
Sub-Total							5,119.69
BIOTIC SURVEYS							
Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	17.85	44.51	794.50	5	158.90
Plant Ecologist	Vernal Pool Measure variables	L. Hours	72.00	44.51	3,204.72	1	3,204.72
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	52.87	44.51	2,353.25	1	2,353.25
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Entomologist	Fairy Shrimp surveys	L. Hours	24.98	44.51	1,111.86	1	1,111.86
Entomologist	Skipper surveys	L. Hours	12.00	44.51	534.12	1	534.12
Entomologist	Ant surveys	L. Hours	10.00	44.51	445.10	1	445.10
Herpetologist	Vernal Pool/Spadefoot monitor	L. Hours	19.98	44.51	889.31	1	889.31
Mammalogist	Wildlife Corridors	L. Hours	160.00	44.51	7,121.60	1	7,121.60
Ornithologist	CSS, Chap, and grassland	L. Hours	34.95	44.51	1,555.51	1	1,555.51
Ornithologist	Riparian	L. Hours	2.40	44.51	106.82	1	106.82
Ornithologist	LBV,WIFL nest monitoring	L. Hours	1.92	44.51	85.46	1	85.46
Ornithologist	Lagoons	L. Hours	362.08	44.51	16,116.18	1	16,116.18
Science Director	Planning and Review	Hours	25.00	50.73	1,268.25	1	1,268.25
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1	370.92
Other	Adaptive management	Item	0.05	30,000.00	1,500.00	1	1,500.00
Sub-Total							41,273.00
HABITAT MAINTENANCE							
Erosion Control	Slope Stabilization	L. Hours	89.00	22.76	2,025.64	5	405.13
Seed Collection	Seed Banking	Accession	0.20	2,500.00	500.00	15	33.33
Plant Procurement	Rooted cuttings	Item	50.00	4.00	200.00	5	40.00
Exotic Plant Control	Supervision by botanist	L. Hours	15.00	44.51	667.65	1	667.65
Exotic Plant Control	Laborers (5)	L. Hours	445.00	22.76	10,128.20	1	10,128.20
Exotic Animal Control	Supervise cowbird removal	L. Hours	2.00	44.51	89.02	1	89.02
Exotic Animal Control	Cowbird Traps	Item	0.50	500.00	250.00	5	50.00
Sub-Total							11,413.33

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	89.00	35.19	3,131.91	1	3,131.91
Patrolling	4 rangers/ officers	L. Hours	356.00	32.08	11,420.48	1	11,420.48
Trail	Maintenance	Mile	3.40	4,000.00	13,600.00	5	2,720.00
Sign	Misc	Item	50.00	3.25	162.50	7	23.21
Sign	Boundary 8" X 13.5"	Item	203.25	5.25	1,067.06	10	106.71
Sign	Sign posts u-channel	Item	50.00	11.00	550.00	10	55.00
Sign, Redwood	Interpretive 4'X 6'	Item	2.50	1,000.00	2,500.00	15	166.67
Community Outreach	Public outreach coordinator	L. Hours	89.00	32.08	2,855.12	1	2,855.12
Sub-Total							20,479.10
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	5.00	40.00	200.00	1	200.00
Sub-Total							200.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	76.90	44.51	3,422.82	1	3,422.82
GIS/CAD Management	Data Management	L. Hours	44.50	44.51	1,980.70	1	1,980.70
Annual Reports	Reporting coordination	L. Hours	12.50	44.51	556.38	1	556.38
Management Plan	Initial Report	L. Hours	10.00	44.51	445.10	3	148.37
Sub-Total							6,108.27
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	25.00	44.51	1,112.75	1	1,112.75
Preserve Office	Janitorial	Sq. Ft.	100.00	1.70	170.00	30	5.67
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	100.00	1.00	100.00	1	100.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	0.60	720.00	432.00	1	432.00
Office Supplies, Year	Supplies	Person	0.50	250.00	125.00	1	125.00
Furniture	Desk	Item	0.50	250.00	125.00	10	12.50
Furniture	Chair	Item	0.50	150.00	75.00	5	15.00
Furniture	Bookcase, 3'x5'	Item	0.10	150.00	15.00	8	1.88
Furniture	File cabinet	Item	0.25	400.00	100.00	10	10.00
Copier	Copier, 15-18 ppm	Item	0.05	2,500.00	125.00	8	15.63
Fax Machine	Standard	Item	0.05	250.00	12.50	5	2.50
Telephone	Touch-tone	Item	0.50	55.00	27.50	5	5.50
E-Mail	Services	Year	0.05	500.00	25.00	1	25.00
Computer, PC & Monitor	133 MHz Pentium	Item	0.50	2,100.00	1,050.00	4	262.50
Computer software	Microsoft Office Pkg	Item	0.40	450.00	180.00	4	45.00
Computer software	Consulting	Hour	0.05	1,500.00	75.00	1	75.00
Laser Printer	600 DPI	Item	0.10	840.00	84.00	4	21.00
Deskjet Printer	HP DeskJet 895	Item	0.15	499.00	74.85	6	12.48
Sub-Total							2,279.41

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	0.45	24,000.00	10,800.00	8	1,350.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	199.80	2.00	399.60	1	399.60
Vehicle	Maintenance	Year	0.05	5,000.00	250.00	1	250.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.05	14,688.80	734.44	1	734.44
Other	all supplies, see text	Item	0.05	13,870.59	693.53	1	693.53
Sub-Total							3,427.57
OPERATIONS							
Audit	CPA Audit	Acre	356.75	0.55	196.21	1	196.21
Insurance	Liability/Fee	Acres	356.75	0.37	132.00	1	132.00
Sub-Total							328.21
CONTINGENCY & ADMINISTRATION							
Contingency							9,062.86
Administration							23,925.95
Sub-Total							32,988.81
Total							123,617.39

Section 10 - Financial Summary

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Phase Budget 004 Other public entities	(420 ac.)	Rate %	Total \$
INITIAL FINANCIAL REQUIREMENTS			
I & C Revenue			0
I & C Management Costs			171,265
I & C Contingency Expense		10.00	17,127
Total I & C Management Costs			188,392
I & C Administrative Costs of Total I & C Management Costs		24.00	45,214
Total I & C Costs			233,607
Net I & C Management and Administrative Costs			233,607
ANNUAL ONGOING FINANCIAL REQUIREMENTS			
Ongoing Costs			90,628
Ongoing Contingency Expense		10.00	9,063
Total Ongoing Management Costs			99,692
Ongoing Administrative Costs of Total Ongoing Management costs		24.00	23,926
Total Ongoing Costs			123,618
ENDOWMENT REQUIREMENTS FOR ONGOING STEWARDSHIP			
Endowment to Provide Income of \$123,618			2,747,067
Endowment per Acre is \$ 6,541.			
Ongoing Management Costs Based on 4.50% of Endowment per Year.			
Ongoing Management Funding is \$123,618 per Year Resulting in \$294 per Acre per Year.			
TOTAL CONTRIBUTION			2,980,674

Appendix 6.

PAR for Private Landowners (HOA)

Section 8 = Initial and Capital Funds Required

Section 9 = Ongoing Funds Required

Section 10 = Cost Summary

Section 8 - Initial & Capital Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 005 Private

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	5,829.12	12.00	69,949.44	1.0	69,949.44
Fence - Installed	Chain Link 6'	Lin. Ft.	2,914.56	9.85	28,708.42	1.0	28,708.42
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	17,487.36	2.45	42,844.03	1.0	42,844.03
Gate	16" arm swing	Item	12.00	2,500.00	30,000.00	1.0	30,000.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,914.56	8.00	23,316.48	1.0	23,316.48
Sub-Total							194,818.37

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	85.68	44.51	3,813.62	1.0	3,813.62
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	53.77	44.51	2,393.13	1.0	2,393.13
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	15.20	44.51	676.55	1.0	676.55
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Entomologist	Skipper surveys	L. Hours	15.00	44.51	667.65	1.0	667.65
Entomologist	Ant surveys	L. Hours	48.00	44.51	2,136.48	1.0	2,136.48
Herpetologist	Pit-array monitoring	L. Hours	48.00	44.51	2,136.48	1.0	2,136.48
Herpetologist	Pit-array installation/maint	L. Hours	12.00	32.08	384.96	1.0	384.96
Ornithologist	CSS, Chap, and grassland	L. Hours	329.09	44.51	14,647.69	1.0	14,647.69
Ornithologist	Riparian	L. Hours	55.20	44.51	2,456.95	1.0	2,456.95
Ornithologist	LBV,WIFL nest monitoring	L. Hours	30.72	44.51	1,367.35	1.0	1,367.35
Ornithologist	CAGN dispersal studies	L. Hours	240.00	44.51	10,682.40	1.0	10,682.40
Science Director	Planning and Review	Hours	120.00	50.73	6,087.60	1.0	6,087.60
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1.0	370.92
Other	Adaptive management	Item	0.24	30,000.00	7,200.00	1.0	7,200.00
Sub-Total							59,472.78

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	427.20	22.76	9,723.07	1.0	9,723.07
Seed Collection	Seed Banking	Accession	0.96	2,500.00	2,400.00	1.0	2,400.00
Plant Procurement	Rooted cuttings	Item	240.00	4.00	960.00	1.0	960.00
Exotic Plant Control	Supervision by botanist	L. Hours	72.00	44.51	3,204.72	1.0	3,204.72
Exotic Plant Control	Up-front control	Item	0.24	500,000.00	120,000.00	1.0	120,000.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	9.60	44.51	427.30	1.0	427.30
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	268.80	32.08	8,623.10	1.0	8,623.10
Exotic Animal Control	Cowbird Traps	Item	2.40	500.00	1,200.00	1.0	1,200.00
Sub-Total							146,538.19

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	427.20	35.19	15,033.17	1.0	15,033.17
Patrolling	4 rangers/ officers	L. Hours	1,708.80	32.08	54,818.30	1.0	54,818.30
Trail	Maintenance	Mile	16.32	4,000.00	65,280.00	1.0	65,280.00
Sign	Misc	Item	240.00	3.25	780.00	1.0	780.00
Sign	Boundary 8" X 13.5"	Item	975.60	5.25	5,121.90	1.0	5,121.90
Sign	Sign posts u-channel	Item	240.00	11.00	2,640.00	1.0	2,640.00
Sign, Redwood	Interpretive 4'X 6'	Item	12.00	1,000.00	12,000.00	1.0	12,000.00
Community Outreach	Public outreach coordinator	L. Hours	427.20	32.08	13,704.58	1.0	13,704.58
Sub-Total							169,377.95
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	24.00	40.00	960.00	1.0	960.00
Sub-Total							960.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	369.12	44.51	16,429.53	1.0	16,429.53
GIS/CAD Management	Data Management	L. Hours	213.60	44.51	9,507.34	1.0	9,507.34
Annual Reports	Reporting coordination	L. Hours	60.00	44.51	2,670.60	1.0	2,670.60
Management Plan	Initial Report	L. Hours	48.00	44.51	2,136.48	1.0	2,136.48
Sub-Total							30,743.95
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	120.00	44.51	5,341.20	1.0	5,341.20
Preserve Office	Janitorial	Sq. Ft.	480.00	1.70	816.00	1.0	816.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	480.00	1.00	480.00	1.0	480.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.88	720.00	2,073.60	1.0	2,073.60
Office Supplies, Year	Supplies	Person	2.40	250.00	600.00	1.0	600.00
Furniture	Desk	Item	2.40	250.00	600.00	1.0	600.00
Furniture	Chair	Item	2.40	150.00	360.00	1.0	360.00
Furniture	Bookcase, 3'x5'	Item	0.48	150.00	72.00	1.0	72.00
Furniture	File cabinet	Item	1.20	400.00	480.00	1.0	480.00
Copier	Copier, 15-18 ppm	Item	0.24	2,500.00	600.00	1.0	600.00
Fax Machine	Standard	Item	0.24	250.00	60.00	1.0	60.00
Telephone	Touch-tone	Item	2.40	55.00	132.00	1.0	132.00
E-Mail	Services	Year	0.24	500.00	120.00	1.0	120.00
Computer, PC & Monitor	133 MHz Pentium	Item	2.40	2,100.00	5,040.00	1.0	5,040.00
Computer software	Microsoft Office Pkg	Item	1.92	450.00	864.00	1.0	864.00
Computer software	Consulting	Hour	0.24	1,500.00	360.00	1.0	360.00
Laser Printer	600 DPI	Item	0.48	840.00	403.20	1.0	403.20
Deskjet Printer	HP DeskJet 895	Item	0.72	499.00	359.28	1.0	359.28
Sub-Total							18,761.28

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	2.16	24,000.00	51,840.00	1.0	51,840.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	959.04	2.00	1,918.08	1.0	1,918.08
Vehicle	Maintenance	Year	0.24	5,000.00	1,200.00	1.0	1,200.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.24	14,688.80	3,525.31	1.0	3,525.31
Other	all supplies 1st yr, see text	Item	0.24	34,495.70	8,278.97	1.0	8,278.97
Sub-Total							66,762.36
OPERATIONS							
Audit	CPA Audit	Acre	1,712.40	0.55	941.82	1.0	941.82
Insurance	Liability/Fee	Acres	1,712.40	0.37	633.59	1.0	633.59
Sub-Total							1,575.41
CONTINGENCY & ADMINISTRATION							
Contingency							68,901.03
Administration							181,898.72
Sub-Total							250,799.75
Total							939,810.04

Section 9 - Ongoing Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 005 Private

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	5,829.12	12.00	69,949.44	25	2,797.98
Fence, 4' X 6' X 6'	Post & 3/4" Cable Maintenance	Lin. Ft.	582.91	12.00	6,994.92	1	6,994.92
Fence - Installed	Chain Link 6'	Lin. Ft.	2,914.56	9.85	28,708.42	25	1,148.34
Fence - Installed	Chain Link 6' Mainenance	Lin. Ft.	291.46	9.85	2,870.88	1	2,870.88
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	17,487.36	2.45	42,844.03	25	1,713.76
Fence - Installed	Barbed-wire, 4 strd.Maintain	Lin. Ft.	1,748.74	2.45	4,284.41	1	4,284.41
Gate	16" arm swing	Item	12.00	2,500.00	30,000.00	20	1,500.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,914.56	8.00	23,316.48	25	932.66
Vehicle Barrier	Concrete Bollard maintain	Lin. Ft	291.46	8.00	2,331.68	1	2,331.68
Sub-Total							24,574.63

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	85.68	44.51	3,813.62	5	762.72
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	53.77	44.51	2,393.13	1	2,393.13
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	15.20	44.51	676.55	5	135.31
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Entomologist	Skipper surveys	L. Hours	15.00	44.51	667.65	1	667.65
Entomologist	Ant surveys	L. Hours	48.00	44.51	2,136.48	1	2,136.48
Herpetologist	Pit-array monitoring	L. Hours	48.00	44.51	2,136.48	2	1,068.24
Herpetologist	Pit-array installation/maint	L. Hours	12.00	32.08	384.96	3	128.32
Ornithologist	CSS, Chap, and grassland	L. Hours	329.09	44.51	14,647.69	1	14,647.69
Ornithologist	Riparian	L. Hours	55.20	44.51	2,456.95	1	2,456.95
Ornithologist	LBV,WIFL nest monitoring	L. Hours	30.72	44.51	1,367.35	1	1,367.35
Ornithologist	CAGN dispersal studies	L. Hours	240.00	44.51	10,682.40	6	1,780.40
Science Director	Planning and Review	Hours	120.00	50.73	6,087.60	1	6,087.60
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1	370.92
Other	Adaptive management	Item	0.24	30,000.00	7,200.00	1	7,200.00
Sub-Total							45,653.76

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	427.20	22.76	9,723.07	5	1,944.61
Seed Collection	Seed Banking	Accession	0.96	2,500.00	2,400.00	15	160.00
Plant Procurement	Rooted cuttings	Item	240.00	4.00	960.00	5	192.00
Exotic Plant Control	Supervision by botantist	L. Hours	72.00	44.51	3,204.72	1	3,204.72
Exotic Plant Control	Laborers (5)	L. Hours	2,136.00	22.76	48,615.36	1	48,615.36
Exotic Animal Control	Supervise cowbird removal	L. Hours	9.60	44.51	427.30	1	427.30
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	268.80	32.08	8,623.10	1	8,623.10
Exotic Animal Control	Cowbird Traps	Item	2.40	500.00	1,200.00	5	240.00
Sub-Total							63,407.09

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	427.20	35.19	15,033.17	1	15,033.17
Patrolling	4 rangers/ officers	L. Hours	1,708.80	32.08	54,818.30	1	54,818.30
Trail	Maintenance	Mile	16.32	4,000.00	65,280.00	5	13,056.00
Sign	Misc	Item	240.00	3.25	780.00	7	111.43
Sign	Boundary 8" X 13.5"	Item	975.60	5.25	5,121.90	10	512.19
Sign	Sign posts u-channel	Item	240.00	11.00	2,640.00	10	264.00
Sign, Redwood	Interpretive 4'X 6'	Item	12.00	1,000.00	12,000.00	15	800.00
Community Outreach	Public outreach coordinator	L. Hours	427.20	32.08	13,704.58	1	13,704.58
Sub-Total							98,299.67
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	24.00	40.00	960.00	1	960.00
Sub-Total							960.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	369.12	44.51	16,429.53	1	16,429.53
GIS/CAD Management	Data Management	L. Hours	213.60	44.51	9,507.34	1	9,507.34
Annual Reports	Reporting coordination	L. Hours	60.00	44.51	2,670.60	1	2,670.60
Management Plan	Initial Report	L. Hours	48.00	44.51	2,136.48	3	712.16
Sub-Total							29,319.63
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	120.00	44.51	5,341.20	1	5,341.20
Preserve Office	Janitorial	Sq. Ft.	480.00	1.70	816.00	30	27.20
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	480.00	1.00	480.00	1	480.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.88	720.00	2,073.60	1	2,073.60
Office Supplies, Year	Supplies	Person	2.40	250.00	600.00	1	600.00
Furniture	Desk	Item	2.40	250.00	600.00	10	60.00
Furniture	Chair	Item	2.40	150.00	360.00	5	72.00
Furniture	Bookcase, 3'x5'	Item	0.48	150.00	72.00	8	9.00
Furniture	File cabinet	Item	1.20	400.00	480.00	10	48.00
Copier	Copier, 15-18 ppm	Item	0.24	2,500.00	600.00	8	75.00
Fax Machine	Standard	Item	0.24	250.00	60.00	5	12.00
Telephone	Touch-tone	Item	2.40	55.00	132.00	5	26.40
E-Mail	Services	Year	0.24	500.00	120.00	1	120.00
Computer, PC & Monitor	133 MHz Pentium	Item	2.40	2,100.00	5,040.00	4	1,260.00
Computer software	Microsoft Office Pkg	Item	1.92	450.00	864.00	4	216.00
Computer software	Consulting	Hour	0.24	1,500.00	360.00	1	360.00
Laser Printer	600 DPI	Item	0.48	840.00	403.20	4	100.80
Deskjet Printer	HP DeskJet 895	Item	0.72	499.00	359.28	6	59.88
Sub-Total							10,941.08

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	2.16	24,000.00	51,840.00	8	6,480.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	959.04	2.00	1,918.08	1	1,918.08
Vehicle	Maintenance	Year	0.24	5,000.00	1,200.00	1	1,200.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.24	14,688.80	3,525.31	1	3,525.31
Other	all supplies, see text	Item	0.24	13,870.59	3,328.94	1	3,328.94
Sub-Total							16,452.33
OPERATIONS							
Audit	CPA Audit	Acre	1,712.40	0.55	941.82	1	941.82
Insurance	Liability/Fee	Acres	1,712.40	0.37	633.59	1	633.59
Sub-Total							1,575.41
CONTINGENCY & ADMINISTRATION							
Contingency							29,118.36
Administration							76,872.47
Sub-Total							105,990.83
Total							397,174.43

Section 10 - Financial Summary

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Phase Budget 005 Private		(1713 ac.)	Rate %	Total \$
INITIAL FINANCIAL REQUIREMENTS				
I & C Revenue				0
I & C Management Costs				689,010
I & C Contingency Expense			10.00	68,901
Total I & C Management Costs				757,911
I & C Administrative Costs of Total I & C Management Costs			24.00	181,899
Total I & C Costs				939,810
Net I & C Management and Administrative Costs				939,810
ANNUAL ONGOING FINANCIAL REQUIREMENTS				
Ongoing Costs				291,183
Ongoing Contingency Expense			10.00	29,118
Total Ongoing Management Costs				320,302
Ongoing Administrative Costs of Total Ongoing Management costs			24.00	76,872
Total Ongoing Costs				397,174
ENDOWMENT REQUIREMENTS FOR ONGOING STEWARDSHIP				
Endowment to Provide Income of \$397,174				8,826,089
Endowment per Acre is \$ 5,152.				
Ongoing Management Costs Based on 4.50% of Endowment per Year.				
Ongoing Management Funding is \$397,174 per Year Resulting in \$232 per Acre per Year.				
TOTAL CONTRIBUTION				9,765,899

Appendix 7.

PAR for Wildlife Agencies (CDFG)

Section 8 = Initial and Capital Funds Required

Section 9 = Ongoing Funds Required

Section 10 = Cost Summary

Section 8 - Initial & Capital Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 006 Wildlife Agency

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	4,371.84	12.00	52,462.08	1.0	52,462.08
Fence - Installed	Chain Link 6'	Lin. Ft.	2,185.92	9.85	21,531.31	1.0	21,531.31
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	13,115.52	2.45	32,133.02	1.0	32,133.02
Gate	16" arm swing	Item	9.00	2,500.00	22,500.00	1.0	22,500.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,185.92	8.00	17,487.36	1.0	17,487.36
Sub-Total							146,113.77

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	64.26	44.51	2,860.21	1.0	2,860.21
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	68.10	44.51	3,031.30	1.0	3,031.30
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	0.80	44.51	35.61	1.0	35.61
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1.0	2,225.50
Entomologist	Skipper surveys	L. Hours	78.00	44.51	3,471.78	1.0	3,471.78
Entomologist	Ant surveys	L. Hours	36.00	44.51	1,602.36	1.0	1,602.36
Herpetologist	Pit-array monitoring	L. Hours	81.60	44.51	3,632.02	1.0	3,632.02
Herpetologist	Pit-array installation/maint	L. Hours	20.40	32.08	654.43	1.0	654.43
Ornithologist	CSS, Chap, and grassland	L. Hours	112.12	44.51	4,990.59	1.0	4,990.59
Ornithologist	Riparian	L. Hours	43.20	44.51	1,922.83	1.0	1,922.83
Ornithologist	LBV,WIFL nest monitoring	L. Hours	21.12	44.51	940.05	1.0	940.05
Ornithologist	Lagoons	L. Hours	805.92	44.51	35,871.50	1.0	35,871.50
Ornithologist	CAGN dispersal studies	L. Hours	408.00	44.51	18,160.08	1.0	18,160.08
Science Director	Planning and Review	Hours	90.00	50.73	4,565.70	1.0	4,565.70
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1.0	370.92
Other	Adaptive management	Item	0.18	30,000.00	5,400.00	1.0	5,400.00
Sub-Total							91,960.38

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	320.40	22.76	7,292.30	1.0	7,292.30
Seed Collection	Seed Banking	Accession	0.72	2,500.00	1,800.00	1.0	1,800.00
Plant Procurement	Rooted cuttings	Item	180.00	4.00	720.00	1.0	720.00
Exotic Plant Control	Supervision by botantist	L. Hours	54.00	44.51	2,403.54	1.0	2,403.54
Exotic Plant Control	Up-front control	Item	0.18	500,000.00	90,000.00	1.0	90,000.00
Exotic Animal Control	Supervise cowbird removal	L. Hours	7.20	44.51	320.47	1.0	320.47
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	190.40	32.08	6,108.03	1.0	6,108.03
Exotic Animal Control	Cowbird Traps	Item	1.80	500.00	900.00	1.0	900.00
Sub-Total							109,544.34

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	320.40	35.19	11,274.88	1.0	11,274.88
Patrolling	4 rangers/ officers	L. Hours	1,281.60	32.08	41,113.73	1.0	41,113.73
Trail	Maintenance	Mile	12.24	4,000.00	48,960.00	1.0	48,960.00
Sign	Misc	Item	180.00	3.25	585.00	1.0	585.00
Sign	Boundary 8" X 13.5"	Item	731.70	5.25	3,841.43	1.0	3,841.43
Sign	Sign posts u-channel	Item	180.00	11.00	1,980.00	1.0	1,980.00
Sign, Redwood	Interpretive 4'X 6'	Item	9.00	1,000.00	9,000.00	1.0	9,000.00
Community Outreach	Public outreach coordinator	L. Hours	320.40	32.08	10,278.43	1.0	10,278.43
Sub-Total							127,033.47
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	18.00	40.00	720.00	1.0	720.00
Sub-Total							720.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	276.84	44.51	12,322.15	1.0	12,322.15
GIS/CAD Management	Data Management	L. Hours	160.20	44.51	7,130.50	1.0	7,130.50
Annual Reports	Reporting coordination	L. Hours	45.00	44.51	2,002.95	1.0	2,002.95
Management Plan	Initial Report	L. Hours	36.00	44.51	1,602.36	1.0	1,602.36
Sub-Total							23,057.96
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	90.00	44.51	4,005.90	1.0	4,005.90
Preserve Office	Janitorial	Sq. Ft.	360.00	1.70	612.00	1.0	612.00
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	360.00	1.00	360.00	1.0	360.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.16	720.00	1,555.20	1.0	1,555.20
Office Supplies, Year	Supplies	Person	1.80	250.00	450.00	1.0	450.00
Furniture	Desk	Item	1.80	250.00	450.00	1.0	450.00
Furniture	Chair	Item	1.80	150.00	270.00	1.0	270.00
Furniture	Bookcase, 3'x5'	Item	0.36	150.00	54.00	1.0	54.00
Furniture	File cabinet	Item	0.90	400.00	360.00	1.0	360.00
Copier	Copier, 15-18 ppm	Item	0.18	2,500.00	450.00	1.0	450.00
Fax Machine	Standard	Item	0.18	250.00	45.00	1.0	45.00
Telephone	Touch-tone	Item	1.80	55.00	99.00	1.0	99.00
E-Mail	Services	Year	0.18	500.00	90.00	1.0	90.00
Computer, PC & Monitor	133 MHz Pentium	Item	1.80	2,100.00	3,780.00	1.0	3,780.00
Computer software	Microsoft Office Pkg	Item	1.44	450.00	648.00	1.0	648.00
Computer software	Consulting	Hour	0.18	1,500.00	270.00	1.0	270.00
Laser Printer	600 DPI	Item	0.36	840.00	302.40	1.0	302.40
Deskjet Printer	HP DeskJet 895	Item	0.54	499.00	269.46	1.0	269.46
Sub-Total							14,070.96

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Times Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	1.62	24,000.00	38,880.00	1.0	38,880.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	719.28	2.00	1,438.56	1.0	1,438.56
Vehicle	Maintenance	Year	0.18	5,000.00	900.00	1.0	900.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.18	14,688.80	2,643.98	1.0	2,643.98
Other	all supplies 1st yr, see text	Item	0.18	34,495.70	6,209.23	1.0	6,209.23
Sub-Total							50,071.77
OPERATIONS							
Audit	CPA Audit	Acre	1,284.30	0.55	706.37	1.0	706.37
Insurance	Liability/Fee	Acres	1,284.30	0.37	475.19	1.0	475.19
Sub-Total							1,181.56
CONTINGENCY & ADMINISTRATION							
Contingency							56,375.42
Administration							148,831.11
Sub-Total							205,206.53
Total							768,960.74

Section 9 - Ongoing Tasks and Costs

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Budget: Phase Budget 006 Wildlife Agency

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
SITE CONSTRUCTION/MAINT.							
Fence, 4' X 6' X 6'	Post & 3/4" Cable	Lin. Ft.	4,371.84	12.00	52,462.08	25	2,098.48
Fence, 4' X 6' X 6'	Post & 3/4" Cable Maintenance	Lin. Ft.	437.18	12.00	5,246.16	1	5,246.16
Fence - Installed	Chain Link 6'	Lin. Ft.	2,185.92	9.85	21,531.31	25	861.25
Fence - Installed	Chain Link 6' Mainenance	Lin. Ft.	218.59	9.85	2,153.11	1	2,153.11
Fence - Installed	Barbed-wire, 4 strd.	Lin. Ft.	13,115.52	2.45	32,133.02	25	1,285.32
Fence - Installed	Barbed-wire, 4 strd.Maintain	Lin. Ft.	1,311.55	2.45	3,213.30	1	3,213.30
Gate	16" arm swing	Item	9.00	2,500.00	22,500.00	20	1,125.00
Vehicle Barrier	Concrete Bollard	Lin. Ft	2,185.92	8.00	17,487.36	25	699.49
Vehicle Barrier	Concrete Bollard maintain	Lin. Ft	218.59	8.00	1,748.72	1	1,748.72
Sub-Total							18,430.83

BIOTIC SURVEYS

Project Management	Supervise/coordinate	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Plant Ecologist	Vegetation Mapping	L. Hours	64.26	44.51	2,860.21	5	572.04
Plant Ecologist	Sensitive Plant Species Survey	L. Hours	68.10	44.51	3,031.30	1	3,031.30
Plant Ecologist	Monit. Enc Bacc & DM	L. Hours	0.80	44.51	35.61	5	7.12
Plant Ecologist	Spec:management &	L. Hours	50.00	44.51	2,225.50	1	2,225.50
Entomologist	Skipper surveys	L. Hours	78.00	44.51	3,471.78	1	3,471.78
Entomologist	Ant surveys	L. Hours	36.00	44.51	1,602.36	1	1,602.36
Herpetologist	Pit-array monitoring	L. Hours	81.60	44.51	3,632.02	2	1,816.01
Herpetologist	Pit-array installation/maint	L. Hours	20.40	32.08	654.43	3	218.14
Ornithologist	CSS, Chap, and grassland	L. Hours	112.12	44.51	4,990.59	1	4,990.59
Ornithologist	Riparian	L. Hours	43.20	44.51	1,922.83	1	1,922.83
Ornithologist	LBV,WIFL nest monitoring	L. Hours	21.12	44.51	940.05	1	940.05
Ornithologist	Lagoons	L. Hours	805.92	44.51	35,871.50	1	35,871.50
Ornithologist	CAGN dispersal studies	L. Hours	408.00	44.51	18,160.08	6	3,026.68
Science Director	Planning and Review	Hours	90.00	50.73	4,565.70	1	4,565.70
Monitor Climate	Analyze data	L. Hours	8.33	44.51	370.92	1	370.92
Other	Adaptive management	Item	0.18	30,000.00	5,400.00	1	5,400.00
Sub-Total							72,258.02

HABITAT MAINTENANCE

Erosion Control	Slope Stabilization	L. Hours	320.40	22.76	7,292.30	5	1,458.46
Seed Collection	Seed Banking	Accession	0.72	2,500.00	1,800.00	15	120.00
Plant Procurement	Rooted cuttings	Item	180.00	4.00	720.00	5	144.00
Exotic Plant Control	Supervision by botanist	L. Hours	54.00	44.51	2,403.54	1	2,403.54
Exotic Plant Control	Laborers (5)	L. Hours	1,602.00	22.76	36,461.52	1	36,461.52
Exotic Animal Control	Supervise cowbird removal	L. Hours	7.20	44.51	320.47	1	320.47
Exotic Animal Control	Cowbird trap checks-labor	L. Hours	190.40	32.08	6,108.03	1	6,108.03
Exotic Animal Control	Cowbird Traps	Item	1.80	500.00	900.00	5	180.00
Sub-Total							47,196.02

Task list	Specificaton	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
PUBLIC SERVICES							
Patrolling	Supervising officer	L. Hours	320.40	35.19	11,274.88	1	11,274.88
Patrolling	4 rangers/ officers	L. Hours	1,281.60	32.08	41,113.73	1	41,113.73
Trail	Maintenance	Mile	12.24	4,000.00	48,960.00	5	9,792.00
Sign	Misc	Item	180.00	3.25	585.00	7	83.57
Sign	Boundary 8" X 13.5"	Item	731.70	5.25	3,841.43	10	384.14
Sign	Sign posts u-channel	Item	180.00	11.00	1,980.00	10	198.00
Sign, Redwood	Interpretive 4'X 6'	Item	9.00	1,000.00	9,000.00	15	600.00
Community Outreach	Public outreach coordinator	L. Hours	320.40	32.08	10,278.43	1	10,278.43
Sub-Total							73,724.75
GENERAL MAINTENANCE							
Hauling, Truck	Truckload of trash	Item	18.00	40.00	720.00	1	720.00
Sub-Total							720.00
REPORTING							
Database Management	Data analysis and reporting	L. Hours	276.84	44.51	12,322.15	1	12,322.15
GIS/CAD Management	Data Management	L. Hours	160.20	44.51	7,130.50	1	7,130.50
Annual Reports	Reporting coordination	L. Hours	45.00	44.51	2,002.95	1	2,002.95
Management Plan	Initial Report	L. Hours	36.00	44.51	1,602.36	3	534.12
Sub-Total							21,989.72
OFFICE MAINTENANCE							
Administrative	Operations	L. Hours	90.00	44.51	4,005.90	1	4,005.90
Preserve Office	Janitorial	Sq. Ft.	360.00	1.70	612.00	30	20.40
Utilities, Annual	Elec., Gas, Water	Sq. Ft.	360.00	1.00	360.00	1	360.00
Telephone Charges, Annual	Cell Phone Charges 8 phones	Year	2.16	720.00	1,555.20	1	1,555.20
Office Supplies, Year	Supplies	Person	1.80	250.00	450.00	1	450.00
Furniture	Desk	Item	1.80	250.00	450.00	10	45.00
Furniture	Chair	Item	1.80	150.00	270.00	5	54.00
Furniture	Bookcase, 3'x5'	Item	0.36	150.00	54.00	8	6.75
Furniture	File cabinet	Item	0.90	400.00	360.00	10	36.00
Copier	Copier, 15-18 ppm	Item	0.18	2,500.00	450.00	8	56.25
Fax Machine	Standard	Item	0.18	250.00	45.00	5	9.00
Telephone	Touch-tone	Item	1.80	55.00	99.00	5	19.80
E-Mail	Services	Year	0.18	500.00	90.00	1	90.00
Computer, PC & Monitor	133 MHz Pentium	Item	1.80	2,100.00	3,780.00	4	945.00
Computer software	Microsoft Office Pkg	Item	1.44	450.00	648.00	4	162.00
Computer software	Consulting	Hour	0.18	1,500.00	270.00	1	270.00
Laser Printer	600 DPI	Item	0.36	840.00	302.40	4	75.60
Deskjet Printer	HP DeskJet 895	Item	0.54	499.00	269.46	6	44.91
Sub-Total							8,205.81

Task list	Specifcation	Unit	Number of Units	Cost / Unit	Annual Cost	Divide Years	Total Cost
FIELD EQUIPMENT							
Vehicle	Toyota extra-cab 4X4	Item	1.62	24,000.00	38,880.00	8	4,860.00
Vehicle	Fuel (444 gallons/vehicle/year	Gallons	719.28	2.00	1,438.56	1	1,438.56
Vehicle	Maintenance	Year	0.18	5,000.00	900.00	1	900.00
Vehicle Insurance	Insurance (9 x \$1,632/yr))	Year	0.18	14,688.80	2,643.98	1	2,643.98
Other	all supplies, see text	Item	0.18	13,870.59	2,496.71	1	2,496.71
Sub-Total							12,339.25
OPERATIONS							
Audit	CPA Audit	Acre	1,284.30	0.55	706.37	1	706.37
Insurance	Liability/Fee	Acres	1,284.30	0.37	475.19	1	475.19
Sub-Total							1,181.56
CONTINGENCY & ADMINISTRATION							
Contingency							25,604.60
Administration							67,596.13
Sub-Total							93,200.73
Total							349,246.69

Section 10 - Financial Summary

Property Title: Carlsbad Funding Analysis

Dataset: CA004

PAR ID: RO61FIN

05/05/2004

Phase Budget 006 Wildlife Agency	(1253 ac.)	Rate %	Total \$
INITIAL FINANCIAL REQUIREMENTS			
I & C Revenue			0
I & C Management Costs			563,754
I & C Contingency Expense		10.00	56,375
Total I & C Management Costs			620,129
I & C Administrative Costs of Total I & C Management Costs		24.00	148,831
Total I & C Costs			768,960
Net I & C Management and Administrative Costs			768,960
ANNUAL ONGOING FINANCIAL REQUIREMENTS			
Ongoing Costs			256,045
Ongoing Contingency Expense		10.00	25,605
Total Ongoing Management Costs			281,651
Ongoing Administrative Costs of Total Ongoing Management costs		24.00	67,596
Total Ongoing Costs			349,247
ENDOWMENT REQUIREMENTS FOR ONGOING STEWARDSHIP			
Endowment to Provide Income of \$349,247			7,761,044
Endowment per Acre is \$ 6,194.			
Ongoing Management Costs Based on 4.50% of Endowment per Year.			
Ongoing Management Funding is \$349,247 per Year Resulting in \$279 per Acre per Year.			
TOTAL CONTRIBUTION			8,530,004

APPENDIX B.

Invitation List for Open Space Workshop

Appendix B.

INVITATION LIST FOR OPEN SPACE WORKSHOP MARCH 20, 2003

Interested Citizens	Gary Hill, GIA, 5345 Armada Dr, Carlsbad 92008 Kevin Skjei,
Preserve Calavera	Diane Nygaard, 5020 Nighthawk Way, Oceanside
The Environmental Trust	John Burke, Simeon Baldwin 7879 El Cajon Blvd. La Mesa 91941
Calif. Dept. of Fish and Game	Bill Tippets, Nancy Frost, Kim McKee 4949 Viewridge Avenue San Diego, CA 92123
U.S. Fish and Wildlife Service	LeeAnn Carranza, John Martin 6010 Hidden Valley Road Carlsbad, CA 92009
Batiquitos Lagoon Foundation	Seth Schulberg, P.O. Box 130491, Carlsbad 92013
Agua Hedionda Lagoon Foundation	Kent Bricker, P.O. Box 4004, Carlsbad 92108
Buena Vista Lagoon Foundation/JPC	Regg Antle, P.O. Box 4516, Carlsbad 92008 Ron Wootton, P.O. Box 520, Vista, 92085
Buena Vista Audubon	Dennis Wysong
Native Plant Society	Carolyn Martus, 3685 Harding St, Carlsbad CA 92008
Coastal Commission	Keri Akers 7575 Metropolitan Drive Suite 103 San Diego, CA 92108
City of Oceanside	Jerry Hittleman, 300 N. Coast Highway, Oceanside
City of Encinitas	Gary Barberio, 505 S. Vulcan Av, Encinitas
City of San Marcos	Jerry Backoff, 1 Civic Center Drive, San Marcos
City of Vista	Jon Conley, 600 Eucalyptus Av, Vista
Planning Consultants	Bob Ladwig, Bill Hofman, Jack Henthorn, Paul Klukas,
State Parks Dept.	Richard Dennison, 9609 Waples St, San diego 92121
Other Environmental Organizations	David Hogan, P.O. Box 7745, SD 92167
Endangered Habitats League	Dan Silver, 8424-A Santa Monica Blvd. #592, LA 90069-4267
City of Escondido	Barbara Redlitz, 201 N. Broadway, Escondido
SANDAG	Janet Fairbanks, Sue Carnevale, 401 B Street, Suite 800, San Diego, 92101-4231
Master Plan Developers	Christine Zortman, Lennar Homes; Brian Milich, McMillin Homes; Fred Arbuckle, Morrow Development
CITY STAFF	
Citywide Trails Team	Ken Price, Liz Ketabian, Joe Garuba, Joe Hasenauer, Fred Brunell
Carlsbad Fire Dept.	Karyn Vaudreuil
Carlsbad GIS	Karl von Schlieder
City Manager and City Council	FYI Only
TAIC	Scott Fleury, Pat Atchison, Debbie Turner 3655 Ruffin Road, Suite 200 San Diego, CA 92123
Center for Natural Lands Management	Sherry Teresa, Markus Spiegelberg, 425 E. Alvarado St, Suite H, Fallbrook, CA 92028-2960
Conservation Biology Institute	Wayne Spencer, 815 Madison Av, San Diego 92116

APPENDIX C.

The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California

The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California

October, 1999

The CalEPPC list is based on information submitted by our members and by land managers, botanists and researchers throughout the state, and on published sources. The list highlights non-native plants that are serious problems **in wildlands** (natural areas that support native ecosystems, including national, state and local parks, ecological reserves, wildlife areas, national forests, BLM lands, etc.).

List categories include:

List A: Most Invasive Wildland Pest Plants; documented as aggressive invaders that displace natives and disrupt natural habitats. Includes two sub-lists; List A-1: Widespread pests that are invasive in more than 3 Jepson regions (see page 3), and List A-2: Regional pests invasive in 3 or fewer Jepson regions.

List B: Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be widespread or regional.

Red Alert: Pest plants with potential to spread explosively; infestations currently small or localized. If found, alert CalEPPC, County Agricultural Commissioner or California Department of Food and Agriculture.

Need More Information: Plants for which current information does not adequately describe nature of threat to wildlands, distribution or invasiveness. Further information is requested from knowledgeable observers.

Annual Grasses: New in this edition; a preliminary list of annual grasses, abundant and widespread in California, that pose significant threats to wildlands. Information is requested to support further definition of this category in next List edition.

Considered But Not Listed: Plants that, after review of status, do not appear to pose a significant threat to wildlands.

Plants that fall into the following categories are not included in the List:

- Plants found mainly or solely in disturbed areas, such as roadsides and agricultural fields.
- Plants that are established only sparingly, with minimal impact on natural habitats.



1999 List Review Committee:

Dr. Lars W.J. Anderson,
Research Leader
U.S. Dept. of Agriculture-ARS
Aquatic Weed Research Lab.

Dr. Joe DiTomaso,
Extension Weed Ecologist
Weed Science Program
Department of Vegetable Crops
University of California, Davis

Dr. G. Fred Hrusa,
Senior Plant Systematist
Plant Pest Diagnostics Center
California Department of Food & Agriculture

Dr. Marcel Rejmánek,
Professor of Plant Ecology
Section of Evolution and Ecology
University of California, Davis

CalEPPC List Committee:

Ann Howald, Instructor
Santa Rosa Junior College

Dr. John Randall,
Invasive Weed Specialist
The Nature Conservancy

Jake Sigg, President
California Native Plant Society

Ellie Wagner, Botanist
California Dept. of Transportation

Peter Warner,
Restoration Coordinator
Golden Gate National Parks
Association

The CalEPPC list is updated regularly. Please use the form provided to send comments, suggestions or new information to: **Peter Warner, 555 Magnolia Avenue, Petaluma, CA, 94952-2080**, or via email at **peterjwarner@earthlink.net**

Thanks to all those who submitted comments for the 1999 list.

The California Exotic Pest Plant Council

List A-1: Most Invasive Wildland Pest Plants; Widespread

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Ammophila arenaria</i>	European beach grass	Coastal dunes	SCo,CCo,NCo
<i>Arundo donax</i>	giant reed, arundo	Riparian areas	cSNF,CCo,SCo,SnGb,D,GV
<i>Bromus tectorum</i>	cheat grass, downy brome	Sagebrush, pinyon-juniper, other desert communities; increases fire frequency	GB,D
<i>Carpobrotus edulis</i>	iceplant, sea fig	Many coastal communities, esp. dunes	SCo,CCo,NCo,SnFrB
<i>Centaurea solstitialis</i> ^C	yellow starthistle	Grasslands	CA-FP (uncommon in SoCal)
<i>Cortaderia jubata</i>	Andean pampas grass, jubatagrass	Horticultural; many coastal habitats, esp. disturbed or exposed sites incl. logged areas	NCo,NCoRO,SnFrB,CCo,WTR,SCo
<i>Cortaderia selloana</i>	pampas grass	Horticultural; coastal dunes, coastal scrub, Monterey pine forest, riparian, grasslands; wetlands in ScV; also on serpentine	SnFrB,SCo,CCo,ScV
<i>Cynara cardunculus</i> ^B	artichoke thistle	Coastal grasslands	CA-FP, esp. CCo,SCo
<i>Cytisus scoparius</i> ^C	Scotch broom	Horticultural; coastal scrub, oak woodlands, Sierra foothills	NW,CaRF,SNF,GV,SCo,CW
<i>Eucalyptus globulus</i>	Tasmanian blue gum	Riparian areas, grasslands, moist slopes	NCoRO,GV,SnFrB,CCo,SCoRO,SCo,nChI
<i>Foeniculum vulgare</i>	wild fennel	Grasslands; esp. SoCal, Channel Is.; the cultivated garden herb is not invasive	CA-FP
<i>Genista monspessulana</i> ^C	French broom	Horticultural; coastal scrub, oak woodlands, grasslands	NCoRO,NCoRI,SnFrB,CCo,SCoRO,sChI,WTR,PR
<i>Lepidium latifolium</i> ^B	perennial pepperweed, tall whitetop	Coastal, inland marshes, riparian areas, wetlands, grasslands; potential to invade montane wetlands	CA (except KR,D)
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	Horticultural; lakes, ponds, streams, aquaculture	SnFrB,SnJV,SNH(?); prob. CA
<i>Pennisetum setaceum</i>	fountain grass	Horticultural; grasslands, dunes, desert canyons; roadsides	Deltaic GV,CCo,SCo,SnFrB
<i>Rubus discolor</i>	Himalayan blackberry	Riparian areas, marshes, oak woodlands	CA-FP
<i>Senecio mikanioides</i> (= <i>Delairea odorata</i>)	Cape ivy, German ivy	Coastal, riparian areas, also SoCal (south side San Gabriel Mtns.)	SCo,CCo,NCo,SnFrB,SW
<i>Taeniatherum caput-medusae</i> ^C	medusa-head	Grasslands, particularly alkaline and poorly drained areas	NCoR,CaR,SNF,GV,SCo
<i>Tamarix chinensis</i> , <i>T. gallica</i> , <i>T. parviflora</i> & <i>T. ramosissima</i>	tamarisk, salt cedar	Desert washes, riparian areas, seeps and springs	SCo,D,SnFrB,GV,sNCoR,sSNF,Teh,SCoRI,SNE,WTR
<i>Ulex europaeus</i> ^B	gorse	North, central coastal scrub, grasslands	NCo,NCoRO,CaRF,n&cSNF,SnFrB,CCo

¹Noxious Weed Ratings

- F: Federal Noxious Weed, as designated by the USDA; targeted for federally-funded prevention, eradication or containment efforts.
- A: CA Dept. of Food & Agriculture, on “A” list of Noxious Weeds; agency policies call for eradication, containment or entry refusal.
- B: CA Dept. of Food & Agriculture, on “B” list of Noxious Weeds; includes species that are more widespread, and therefore more difficult to contain; agency allows county Agricultural Commissioners to decide if local eradication or containment is warranted.
- C: CA Dept. of Food & Agriculture, on “C” list of Noxious Weeds; includes weeds that are so widespread that the agency does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.
- Q: CA Dept. of Food & Agriculture’s designation for temporary “A” rating pending determination of a permanent rating.

For most species nomenclature follows *The Jepson Manual: Higher Plants of California* (Hickman, J., Ed., 1993).

Exotic Pest Plants of Greatest Ecological Concern in California

List A-2: Most Invasive Wildland Pest Plants; Regional

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Ailanthus altissima</i>	tree of heaven	Riparian areas, grasslands, oak woodlands, esp. GV, SCo	CA-FP
<i>Atriplex semibaccata</i>	Australian saltbush	SoCal, coastal grasslands, scrub, "high marsh" of coastal salt marshes	CA (except CaR,c&sSN)
<i>Brassica tournefortii</i>	Moroccan or African mustard	Washes, alkaline flats, disturbed areas in Sonoran Desert	SW,D
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome	Widespread; contributing to SoCal scrub, desert scrub type conversions; increases fire frequency	CA
<i>Cardaria draba</i> ^B	white-top, hoary cress	Riparian areas, marshes of central coast; also ag. lands, disturbed areas	Problem only in CCo
<i>Conicosia pugioniformis</i>	narrow-leaved iceplant, roundleaf iceplant	Coastal dunes, sandy soils near coast; best documented in San Luis Obispo and Santa Barbara cos.	CCo
<i>Cotoneaster pannosus</i> , <i>C. lacteus</i>	cotoneaster	Horticultural; many coastal communities; esp. North Coast, Big Sur; related species also invasive	CCo,SnFrB,NW
<i>Cytisus striatus</i>	striated broom	Often confused with <i>C. scoparius</i> ; coastal scrub, grassland	SnFrB,CCo,SCo,PR
<i>Egeria densa</i>	Brazilian waterweed	Streams, ponds, sloughs, lakes; Sacramento-San Joaquin Delta	n&sSNF,SnJV,SnFrB,SnJt,SNE
<i>Ehrharta calycina</i>	veldt grass	Sandy soils, esp. dunes; rapidly spreading on central coast	CCo,SCoRO,WTR
<i>Eichhornia crassipes</i>	water hyacinth	Horticultural; established in natural waterways, esp. troublesome in Sacramento-San Joaquin Delta	GV,SnFrB,SCo,PR
<i>Elaeagnus angustifolia</i>	Russian olive	Horticultural; interior riparian areas	SnJV,SnFrB,SNE,DMoj
<i>Euphorbia esula</i> ^A	leafy spurge	Rangelands in far no. CA, also reported from Los Angeles Co.	eKR,NCo,CaR,MP,SCo
<i>Ficus carica</i>	edible fig	Horticultural; Central Valley, foothill, South Coast and Channel Is. riparian woodlands	nSNF,GV,SnFrB,SCo
<i>Lupinus arboreus</i>	bush lupine	Native to SCo, CCo; invasive only in North Coast dunes	SCo,CCo,NCo
<i>Mentha pulegium</i>	pennyroyal	Santa Rosa Plain (Sonoma Co.) and Central Valley vernal pools; wetlands elsewhere	NW,GV,CW,SCo
<i>Myoporum laetum</i>	myoporum	Horticultural; coastal riparian areas in SCo	SCo,CCo
<i>Saponaria officinalis</i>	bouncing bet	Horticultural; meadows, riparian habitat in SNE, esp. Mono Basin	NW,CaRH,nSNF,SnFrB,SCoRO,SCo,PR,MP,SNE,GV
<i>Spartina alterniflora</i>	Atlantic or smooth cordgrass	S.F. Bay salt marshes; populations in Humboldt Bay believed extirpated	CCo(shores of S.F. Bay)

²Distribution by geographic subdivisions per the Jepson Manual

CA=California	GV=Great Valley	ScV=Sacramento Valley
CA-FP=California Floristic Province	KR=Klamath Ranges	SnJV=San Joaquin Valley
CaR=Cascade Ranges	MP=Modoc Plateau	SN=Sierra Nevada
CaRF=Cascade Range Foothills	NCo=North Coast	SNE=East of SN
CCo=Central Coast	NCoRI=Inner NCo Ranges	SNF=SN Foothills
ChI=Channel Islands	NCoRO=Outer NCo Ranges	SNH=High SN
CW=Central Western CA	NW=Northwestern CA	SnFrB=San Francisco Bay Area
D=Deserts	PR=Peninsular Ranges	SnGb=San Gabriel Mtns
DMoj=Mojave Desert	SCo=South Coast	SW=Southwestern CA
DSon=Sonoran Desert	SCoRI=Inner SCo Ranges	Teh=Tehachapi Mtns
GB=Great Basin	SCoRO=Outer SCo Ranges	WTR=Western Transverse Ranges

The California Exotic Pest Plant Council

List B: Wildland Pest Plants of Lesser Invasiveness

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Ageratina adenophora</i> ^f	eupatory	Horticultural; coastal canyons, coastal scrub, slopes, Marin to San Diego Co; San Gabriel Mtns.	CCo,SnFrB,SCo,SCoRO
<i>Bassia hyssopifolia</i>	bassia	Alkaline habitats	CA (except NW,SNH)
<i>Bellardia trixago</i>	bellardia	Grasslands, on serpentine, where a threat to rare natives	NCoRO,CCo,SnFrB
<i>Brassica nigra</i>	black mustard	Coastal communities, esp. fog-belt grasslands; disturbed areas	CA-FP
<i>Cardaria chalapensis</i> ^B	lens-podded white-top	Wetlands of Central Valley	CA
<i>Carduus pycnocephalus</i> ^C	Italian thistle	Grasslands, shrublands, oak woodlands	sNCo,sNCoR,SNF,CW,SCo,ScV
<i>Centaurea calcitrapa</i> ^B	purple starthistle	Grasslands	NW,sCaRF,SNF,GV,CW,SW
<i>Centaurea melitensis</i>	tocalote, Malta starthistle	Widespread; sometimes misidentified as <i>C. solstitialis</i> ; perhaps a more serious invader than currently recognized	CA-FP,D
<i>Cirsium arvense</i> ^B	Canada thistle	Especially troublesome in riparian areas	CA-FP
<i>Cirsium vulgare</i>	bull thistle	Riparian areas, marshes, meadows	CA-FP,GB
<i>Conium maculatum</i>	poison hemlock	Mainly disturbed areas but may invade wildlands; known to poison wildlife; early expanding stage in many areas, esp. San Diego Co. riparian, oak understory	CA-FP
<i>Crataegus monogyna</i>	hawthorn	Horticultural; recent invader, colonizing healthy native forest around Crystal Springs reservoir on S.F. peninsula	SnFrB,CCo,NCo,NCoR
<i>Ehrharta erecta</i>	veldt grass	Wetlands, moist wildlands; common in urban areas; potential to spread rapidly in coastal, riparian, grassland habitats	SnFrB,CCo,SCo
<i>Erechtites glomerata</i> , <i>E. minima</i>	Australian fireweed	Coastal woodlands, scrub, NW forests, esp. redwoods	NCo,NCoRO,CCo,SnFrB,SCoRO
<i>Festuca arundinacea</i>	tall fescue	Horticultural (turf grass); coastal scrub, grasslands in NCo, CCo	CA-FP
<i>Hedera helix</i>	English ivy	Horticultural; invasive in coastal forests, riparian areas	CA-FP
<i>Holcus lanatus</i>	velvet grass	Coastal grasslands, wetlands in No. CA	CA exc. Dson
<i>Hypericum perforatum</i> ^C	Klamathweed, St. John's wort	Redwood forests, meadows, woodlands; invasion may occur due to lag in control by established biocontrol agents	NW,CaRH,n&cSN,ScV,CCo,SnFrB,PR
<i>Ilex aquifolium</i>	English holly	Horticultural; coastal forests, riparian areas	NCoRO,SnFrB,CCo
<i>Iris pseudacorus</i>	yellow water iris, yellow flag	Horticultural; riparian, wetland areas, esp. San Diego, Los Angeles cos.	SnFrB,CCo,sSnJV,SCo
<i>Leucanthemum vulgare</i>	ox-eye daisy	Horticultural; invades grassland, coastal scrub	KR,NCoRO,n&cSNH,SnFrB,WTR,PR
<i>Mesembryanthemum crystallinum</i>	crystalline iceplant	Coastal bluffs, dunes, scrub, grasslands; concentrates salt in soil	NCo,CCo,SCo,ChI
<i>Myriophyllum aquaticum</i>	parrot's feather	Horticultural; streams, lakes, ponds	NCo,CaRF,CW,SCo
<i>Olea europaea</i>	olive	Horticultural and agricultural; reported as invasive in riparian habitats in Santa Barbara, San Diego	NCoR,NCoRO,CCo,SnFrB,SCoRO,SCo
<i>Phalaris aquatica</i>	Harding grass	Coastal sites, esp. moist soils	NW,cSNF,CCo,SCo
<i>Potamogeton crispus</i>	curlyleaf pondweed	Scattered distribution in ponds, lakes, streams	NCoR,GV,CCo,SnFrB,SCo,ChI,SnGb,SnBr,DMoj
<i>Ricinus communis</i>	castor bean	SoCal coastal riparian habitats	GV,SCo,CCo
<i>Robinia pseudoacacia</i>	black locust	Horticultural; riparian areas, canyons; native to eastern U.S.	CA-FP,GB
<i>Schinus molle</i>	Peruvian pepper tree	Horticultural; invasive in riparian habitats in San Diego, Santa Cruz Is.	SNF,GV,CW,SW,Teh

Exotic Pest Plants of Greatest Ecological Concern in California

List B: Continued

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Schinus terebinthifolius</i>	Brazilian pepper	Horticultural; riparian areas	sSCo
<i>Senecio jacobaea</i> ^B	tansy ragwort	Grasslands; biocontrol agents established	NCo,wKR,s&wCaR, nSNF, nScV,SW
<i>Spartium junceum</i>	Spanish broom	Coastal scrub, grassland, wetlands, oak woodland, NW forests, esp. redwoods; also roadcuts	NCoRO,ScV,SnFrB, SCoRO,SCo,sChI,WTR
<i>Verbascum thapsus</i>	woolly or common mullein	SNE meadows, sagebrush, pinyon-juniper woodlands; shores of Boggs Lake (Lake Co.)	CA
<i>Vinca major</i>	periwinkle	Horticultural; riparian, oak woodland, other coastal habitats	NCoRO,SnFrB, CCo, sSCoRO,SCo

Red Alert: Species with potential to spread explosively; infestations currently restricted

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Alhagi pseudalhagi</i> ^A	camel thorn	Noxious weed of arid areas; most infestations in California have been eradicated	GV,sSNE,D
<i>Arctotheca calendula</i> ^A	Capeweed	Seed-producing types are the problem; most are vegetative only	NCo,SnFrB,CCo
<i>Centaurea maculosa</i> ^A	spotted knapweed	Riparian, grassland, wet meadows, forest habitats; contact CA Food & Ag if new occurrences found	CaR,SN,nScV,nCW,MP, nSNE,sPR,NW
<i>Crupina vulgaris</i> ^{F,A}	bearded creeper, common crupina	Aggressively moving into wildlands, esp. grassland habitats	NCoR (Sonoma Co.),MP
<i>Halogeton glomeratus</i> ^A	halogeton	Noxious weed of Great Basin rangelands; report locations to CA Food & Ag; goal is exclusion from CA	GB
<i>Helichrysum petiolare</i>	licorice plant	North coastal scrub; one population on Mt. Tamalpais, w. Marin Co.	Not in Jepson
<i>Hydrilla verticillata</i> ^{E,A}	hydrilla	Noxious water weed; report locations to CA Food & Ag; eradication program in place; found in Clear Lake (Lake Co.) in 1994	NCoRI,n&cSNF,ScV,SCo,D
<i>Lythrum salicaria</i> ^B	purple loosestrife	Horticultural; noxious weed of wetlands, riparian areas	sNCo,NCoRO,nSNF,ScV, SnFrB,nwMP
<i>Ononis alopecuroides</i> ^Q	foxtail restharrow	Eradication efforts underway in San Luis Obispo Co.; to be looked for elsewhere in CA	CCo; not in Jepson
<i>Retama monosperma</i>	bridal broom	First noted at Fallbrook Naval Weapons Station, San Diego Co; could rival other invasive brooms	San Diego Co.; not in Jepson
<i>Salvinia molesta</i> ^F	giant waterfern	Ponds, lakes, reservoirs, canals	Napa, Sonoma cos., lower Colorado River; not in Jepson
<i>Sapium sebiferum</i>	Chinese tallow tree	Horticultural; riparian, wetland habitats, open areas and understory	ScV,SnFrB; not in Jepson
<i>Sesbania punicea</i>	scarlet wisteria tree	Horticultural; riparian areas; American River Parkway, Sacramento Co., Suisun Marsh, San Joaquin River Parkway	ScV,SnJV; not in Jepson
<i>Spartina anglica</i>	cord grass	Scattered in S.F. Bay	Not in Jepson
<i>Spartina densiflora</i>	dense-flowered cord grass	Scattered in S.F. Bay, Humboldt Bay salt marshes	CCo,NCo
<i>Spartina patens</i>	salt-meadow cord grass	One site in S.F. Bay, also Siuslaw Estuary, OR and Puget Sound, WA	CCo

The California Exotic Pest Plant Council

Need More Information

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Acacia dealbata</i>	silver wattle	Aggressive in natural areas?	SnFRB,SCoRO,SCoRI,CCo
<i>Acacia decurrens</i>	green wattle	Sometimes confused with <i>A. dealbata</i> ; aggressive in natural areas?	Unknown
<i>Acacia melanoxylon</i>	blackwood acacia	Reported from S.F. Bay area, central coast, Santa Cruz Is.; spreads slowly; other areas?	SnFrB,SCoRO,SCo,CCo
<i>Aeschynomene rudis</i> ^B	rough jointvetch	Princeton area, Colusa Co.; pest of rice crops; potential threat to riparian, wetland habitats?	ScV
<i>Agrostis avenacea</i>	Pacific bentgrass	Invading vernal pools in San Diego area; attempts at manual eradication unsuccessful so far; problem in other areas?	sNCo,sNCoR,SNF, GV,CW,nSCo
<i>Aptenia cordifolia</i>	red apple	Habitats where invasive?	CCo,SCo,sChI
<i>Asphodelus fistulosus</i>	asphodel	Common in SCo highway rights-of-way, other disturbed sites; threats to wildlands?	sSnJV,SCo
<i>Carduus acanthoides</i> ^A	giant plumeless thistle	Threatens wildlands?	NCoRI,nSN,SnFrB, nSCoRO,MP
<i>Cistus ladanifer</i>	gum cistus	Horticultural; invades coastal sage scrub, chaparral; areas where problematic?	sCCo,SnGb
<i>Cordyline australis</i>	New Zealand cabbage	Infestation at Salt Point State Park; bird-dispersed; other problem areas?	Not in Jepson
<i>Cotoneaster</i> spp. (exc. <i>C. pannosus</i> , <i>C. lacteus</i>)	cotoneaster	Horticultural; bird-distributed; which species are problems in wildlands?	Unknown
<i>Cupressus macrocarpa</i>	Monterey cypress	Native only to Monterey Peninsula; planted and naturalized CCo, NCo; threat to wildlands?	CCo
<i>Descurainia sophia</i>	flixweed, tansy mustard	Entering Mojave wildlands through washes; threat to wildlands?	CA
<i>Dimorphotheca sinuata</i>	African daisy, Cape marigold	Horticultural; reported as invasive in w. Riverside Co., Ventura Co.; problem elsewhere?	SnJV,SCoRO,SCo,PR
<i>Echium candicans</i> , <i>E. pininana</i>	pride of Madeira, pride of Teneriffe	Horticultural; riparian, grassland, coastal scrub communities; spreads by seed	CCo,SnFrB,SCo,sNCo
<i>Ehrharta longiflora</i>	veldt grass	Reported from San Diego	Not in Jepson
<i>Erica lusitanica</i>	heath	Threat to wildlands?	NCo (Humboldt Co.)
<i>Euphorbia lathyris</i>	caper spurge, gopher plant	Invades coastal scrub, marshes, dunes; Sonoma, Marin cos.; threat to wildlands?	NCo,CCo,GV,SCo
<i>Gazania linearis</i>	gazania	Horticultural; invades grassland in S.F., coastal scrub?	CCo,SCo
<i>Glyceria declinata</i>		Although reported from Central Valley vernal pools, genetic research is needed to confirm identity; plants that have been called <i>G. declinata</i> key in Jepson to native <i>G. occidentalis</i>	Uncertain; not in Jepson
<i>Hedera canariensis</i>	Algerian ivy	Horticultural; invasive in riparian areas in SoCal?	Not in Jepson
<i>Hirschfeldia incana</i>	Mediterranean or short-pod mustard	Increasing in western, southern Mojave; threat to wildlands?	NCo,SNF,GV,CW,SCo, DMoj
<i>Hypericum canariense</i>	Canary Island hypericum	Reported in San Diego area, coastal sage scrub, grassland; threat to wildlands?	SCo
<i>Hypochaeris radicata</i>	rough cat's-ear	Widespread in coastal grasslands, wetlands; threat to wildlands?	NW,CaRF,nSNF,ScV, CW,SCo
<i>Isatis tinctoria</i> ^B	dyers' woad	Well-known invader in Utah; threat to wildlands?	KR,CaR,nSNH,MP
<i>Ligustrum lucidum</i>	glossy privet	Horticultural; spreading rapidly on Mendocino coast; problem in other areas?	NCo; not in Jepson
<i>Limonium ramosissimum</i> ssp. <i>provinciale</i>	sea lavender	Reported spreading in Carpinteria Salt Marsh; problem in other areas?	Not in Jepson

Exotic Pest Plants of Greatest Ecological Concern in California

Need More Information: Continued

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Ludwigia uruguayensis</i> (= <i>L. hexapetala</i>)	water primrose	Invasive in aquatic habitats; non-native status questioned?	NCo,sNCoRO,CCo, SnFrB,SCo
<i>Malephora crocea</i>	ice plant	Invades margins of wetlands, bluffs along SCo	CCo,SCo,sChI
<i>Maytenus boaria</i>	mayten	Horticultural; scattered in riparian forests, ScV; east SnFrB	ScV,SnFrB
<i>Mesembryanthemum nodiflorum</i>	slender-leaved iceplant	Abundant on Channel Islands; invades wetlands; habitats where problematic?	SnFrB,SCo,ChI
<i>Nicotiana glauca</i>	tree tobacco	Disturbed places; not very competitive with natives in coastal scrub, chaparral; spreading along Putah Creek (Yolo Co.); problems elsewhere?	NCoRI,c&sSNF, GV,CW,SW,D
<i>Oxalis pes-caprae</i>	Bermuda buttercup	Invades disturbed sites; invasive in undisturbed habitats?	NCo,NCoRO,CCo, SnFrB,SCoRO,SCo
<i>Parentucellia viscosa</i>		Threat to NCo (Humboldt Co.) dune swales?	NCo,NCoRO,CCo,SCo
<i>Passiflora caerulea</i>		Horticultural; reported from SoCal; threat to wildlands?	SCo; not in Jepson
<i>Pennisetum clandestinum</i> ^{FC}	Kikuyu grass	Disturbed sites, roadsides; threat to wildlands?	NCo,CCo,SnFrB,SCo, Santa Cruz ls.
<i>Phyla nodiflora</i>	mat lippia	Most varieties in CA are native; taxonomy unclear; status of plants in vernal pools, wetlands?	NW(except KR,NCoRH), GV,CCo,SnFrB,SCo, PR,DSon
<i>Pinus radiata</i> cultivars	Monterey pine	Cultivars invading native Monterey, Cambria forests, where spread of pine pitch canker is a concern	CCo
<i>Piptatherum miliaceum</i>	smilo grass	Aggressive in SoCal creeks, canyons; threats to wildlands?	NCo,GV,CW,SCo
<i>Pistacia chinensis</i>	Chinese pistache	Horticultural; invades riparian areas and woodlands in ScV	ScV
<i>Prunus cerasifera</i>	cherry plum	Oak woodland, riparian areas; esp. Marin, Sonoma cos.; bird-distributed; problems elsewhere?	SnFrB,CCo
<i>Pyracantha angustifolia</i>	pyracantha	Horticultural; spreads from seed in S.F. Bay area; bird-distributed; problem elsewhere?	sNCoRO,CCo,SnFrB, SCo
<i>Salsola soda</i>	glasswort	Threat to salt marshes?	nCCo,SnFrB
<i>Salsola tragus</i> ^C	Russian thistle, tumbleweed	Abundant in dry open areas in w. Mojave Desert, Great Basin; not limited to disturbed sites; threats?	CA
<i>Salvia aethiopis</i> ^B	Mediterranean sage	Creates monocultures in E. Oregon grasslands; threat to CA wildlands?	MP
<i>Stipa capensis</i>		Distribution and threats?	Not in Jepson
<i>Tamarix aphylla</i>	athel	Spreading in Salton Sea area; threats to wildlands?	nSnJV,nSCo,D
<i>Tanacetum vulgare</i>	common tansy	Jepson reports as uncommon, escape from cultivation in urban areas; problem in wildlands?	NCo,NCoRO,CaRH, SCoRO
<i>Verbena bonariensis</i> , <i>V. litoralis</i>	tall vervain	Horticultural; invades riparian forests, wetlands; extensive along ScV riparian corridors; roadsides (Yuba Co.); elsewhere?	ScV,nSnJV,nSnFrB,CCo



The California Exotic Pest Plant Council

Annual Grasses

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
<i>Aegilops triuncialis</i> ^B	barbed goatgrass	Serpentine soils, grasslands	sNCoR, CaRF, n&cSNF, ScV, nCW
<i>Avena barbata</i>	slender wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub, disturbed sites	CA-FP, MP, DMoj
<i>Avena fatua</i>	wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub on deeper soil, disturbed sites	CA-FP, MP, DMoj
<i>Brachypodium distachyon</i>	false brome	Expanding in SoCal; common in Orange Co.	sNCoR, sCaRF, SNF, GV, CW, SCo, sChI
<i>Bromus diandrus</i>	ripgut brome	Coastal dunes, coastal sage scrub, grasslands	CA
<i>Lolium multiflorum</i>	Italian ryegrass	Wetland areas, esp. vernal pools in San Diego Co.; common in disturbed sites	CA-FP
<i>Schismus arabicus</i>	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV, CW, sChI, D
<i>Schismus barbatus</i>	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV, SW, D

Considered, but not listed

Latin Name ¹	Common Name	Habitats of Concern and Other Comments
<i>Albizia lophantha</i>	plume acacia	Not invasive
<i>Anthoxanthum odoratum</i>	sweet vernal grass	Disturbed sites on coast; Marin, Sonoma, Mendocino cos.
<i>Carpobrotus chilensis</i>	sea fig	Native status in question; not a threat to wildlands
<i>Centranthus ruber</i>	red valerian	Horticultural; roadcuts in Marin Co.; not a threat to wildlands
<i>Convolvulus arvensis</i> ^C	field bindweed	Disturbed sites; ag lands
<i>Coprosma repens</i>	mirror plant	No evidence of wildland threat
<i>Crocosmia x crocosmiiflora</i>		Generally in disturbed coastal, urban areas, roadsides
<i>Digitalis purpurea</i>	foxglove	Horticultural; scattered in prairies, meadows, disturbed sites; not a major wildland threat
<i>Dipsacus sativus</i> , <i>D. fullonum</i>	wild teasel, Fuller's teasel	Roadsides, disturbed sites
<i>Fumaria officinalis</i> , <i>F. parviflora</i>	fumitory	S.F. Bay area, Monterey Bay salt marshes, sandy disturbed sites
<i>Medicago polymorpha</i>	California bur clover	Grasslands, moist sites; mainly restricted to disturbed sites
<i>Melilotus officinalis</i>	yellow sweet clover	Restricted to disturbed sites in CA
<i>Nerium oleander</i>	oleander	Horticultural; not invasive, although reported from riparian areas in Central Valley, San Bernardino Mtns.
<i>Picris echioides</i>	bristly ox-tongue	Disturbed areas
<i>Silybum marianum</i>	milk thistle	Disturbed areas, especially overgrazed moist pasturelands; may interfere with restoration
<i>Xanthium spinosum</i>	spiny cocklebur	Identified as native in <i>The Jepson Manual</i> (Hickman, 1993) and <i>A California Flora</i> (Munz and Keck, 1968); restricted to disturbed areas
<i>Zantedeschia aethiopica</i>	calla lily	Horticultural; mainly a garden escape in wet coastal areas
<i>Zoysia cultivars</i>	Amazoy and others	Horticultural; no evidence of wildland threat

Request for Information: Exotic Pest Plants of Greatest Ecological Concern in CA

Please use this form to propose adding a new plant to the CalEPPC list or to provide other comments. Please provide as much detail as possible. Use the second side of this form or attach additional sheets if more space is needed. Please mail completed form to: **Peter Warner, 555 Magnolia Avenue, Petaluma, CA, 94952-2080**. Comments can be submitted by email to **peterjwarner@earthlink.net**

Species Name: _____

Does this weed displace healthy native communities, or is it mainly restricted to disturbed sites like roadsides, agricultural areas, etc.? _____

In which region(s) of California does this weed infest wildlands? Indicate county(ies) and/or Jepson regions (see page 3). _____

Which native communities does it infest? _____

List any rare plants, animals or communities threatened by this weed: _____

How does it spread? (Seeds carried by wind, birds, other animals; vegetative runners?) _____

Is this plant a recent invader of California wildlands? Ideas about how it got here? _____

Is this plant sold by nurseries, or used in landscaping, restoration or other activities that might lead to its further spread in wildlands? _____

Describe any techniques that have been used to eradicate this plant. Have they been successful? If not, why is the plant difficult to eradicate? _____

Other comments? _____

Name: _____ Affiliation: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ FAX: _____ email: _____

Request for Information: Exotic Pest Plants of Greatest Ecological Concern in CA

Notes:

Who We Are:

Throughout California, natural wildlands and parks are under attack from invasive pest plants. As natural habitat is replaced by exotic plants, we also lose many of the state's native birds, insects, fish and other wildlife species. People concerned with the protection, management and enjoyment of our natural areas have become increasingly alarmed about the spread of invasive exotic vegetation. Since its formation in 1992, CalEPPC has been dedicated to finding solutions to problems caused by non-native pest plant invasions of the state's natural areas. The objectives of CalEPPC are to:

- provide a focus for issues and concerns regarding exotic pest plants in California;
- facilitate communication and the exchange of information regarding all aspects of exotic pest plant control and management;
- provide a forum where all interested parties may participate in meetings and share in the benefits from the information generated by this council;
- promote public understanding regarding exotic pest plants and their control;
- serve as an advisory council regarding funding, research, management and control of exotic pest plants;

- facilitate action campaigns to monitor and control exotic pest plants in California; and
- review incipient and potential pest plant management problems and activities and provide relevant information to interested parties.

What We Do:

CalEPPC:

- Holds an annual statewide symposium;
- Co-sponsors regional workshops on control of problem wildland weeds;
- Publishes a quarterly newsletter with timely, practical information;
- Maintains an informative web site at www.caleppc.org
- Sponsors rigorous experiments on control methods for French broom, German ivy, pampas grass and other invasive pest plants;
- Advances public and professional awareness of wildland weed problems and solutions by sponsoring illustrated brochures and a soon-to-be published book on California's worst wildland weeds;
- Is recognized as an authoritative source of new information on all aspects of wildland weed management.

1999 CalEPPC Membership Form

If you would like to join CalEPPC, please remit your calendar dues using the form provided below. All members will receive the CalEPPC newsletter, be eligible to join CalEPPC working groups, be invited to the annual symposium and participate in selecting future board members. Your personal involvement and financial support are the keys to success. Additional contributions by present members are welcomed!

Individual

- | | |
|--|-----------|
| <input type="checkbox"/> Low Income/
Student* | \$15.00 |
| <input type="checkbox"/> Regular | \$25.00 |
| <input type="checkbox"/> Family | \$40.00 |
| <input type="checkbox"/> Contributing | \$50.00 |
| <input type="checkbox"/> Sustaining | \$100.00 |
| <input type="checkbox"/> Lifetime | \$1000.00 |

Institutional

- | | |
|--------------|-----------|
| N/A | |
| Regular | \$100.00 |
| Contributing | \$250.00 |
| Patron | \$500.00 |
| Sustaining | \$1000.00 |

Please make an additional contribution in my name to:

Student/Low Income membership: \$ _____

Cape Ivy Biocontrol Fund: \$ _____

Please make your check payable to **CalEPPC** and mail with this application form to:

CalEPPC Membership
c/o Sally Davis
32912 Calle del

Name _____

Affiliation _____

Address _____

City/State/Zip _____

Office Phone _____

Home Phone _____

Fax _____

email _____

** Students, please include current registration and/or class schedule*

The CalEPPC List:

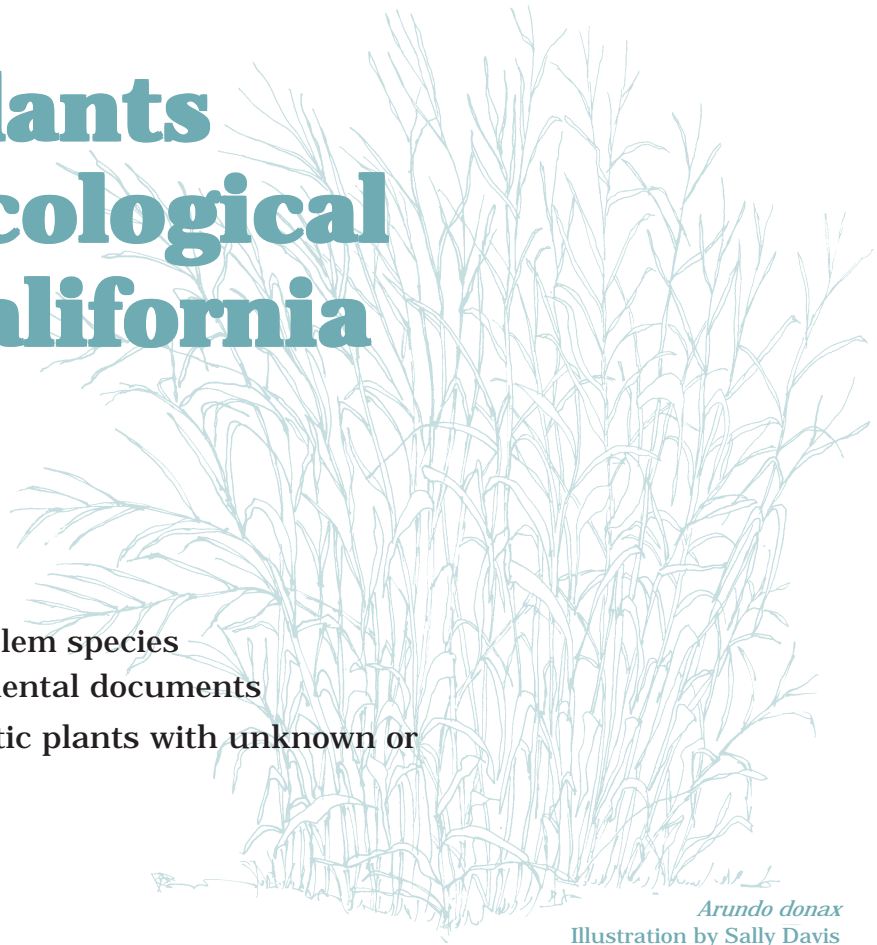
Exotic Pest Plants of Greatest Ecological Concern in California

October, 1999

Potential uses for this list:

- Informing the public
- Targeting species for control efforts
- Alerting restorationists to potential problem species
- Aiding those who comment on environmental documents
- Soliciting additional information on exotic plants with unknown or changing status

NOT FOR RESALE



Arundo donax

Illustration by Sally Davis

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COUNCIL



APPENDIX D.

Guide and Annotated Outline for Writing Preserve Management Plans For Preserve Areas Covered By the City of Carlsbad's HMP

**A GUIDE AND ANNOTATED OUTLINE
FOR WRITING**

**PRESERVE MANAGEMENT PLANS
FOR PRESERVE AREAS COVERED
BY THE CITY OF CARLSBAD'S HMP**

**(Adapted from the California Department of Fish and Game Guide and Outline for Writing Land
Management Plans, February 2003)**

USING THIS OUTLINE

This outline has been adapted from the California Department of Fish and Game's guide to preparation of land management plans (CDFG 2003) to help you write a preserve management plan that is useful and easily read by those who want information about preserve areas within the Carlsbad HMP preserve system. It is important to use a standardized format for the preserve management plan so that the City of Carlsbad and the wildlife agencies may easily review and confirm that the preserve management plan includes the necessary goals, objectives, actions, priorities, and area-specific management directives (ASMDs) to manage and monitor species and habitats within the context of the Carlsbad HMP and overall MHCP. Appropriately designed and developed preserve management plans will greatly facilitate the ability of the City of Carlsbad to maintain compliance with the permit conditions of its Implementing Agreement for the HMP. The CDFG land management plan format is being used for the CDFG lands within the City and provides a consistent template for the non-CDFG preserve areas.

This outline provides instructions and examples for writing each chapter. It also serves as an example for the required format. **Each chapter heading (identified by a Roman numeral) should be addressed within the plan.** The amount of information provided within each chapter will be determined by the intensity of management necessary to maintain the preserve area as viable wildlife habitat. **In some cases, it may not be necessary to use certain subheadings; these are listed as optional in the outline.**

Periodically, the CDFG Land Management Plan outline will be revised to reflect additional information, style improvements, and streamlining efforts. The preserve steward for the City of Carlsbad should update this outline to maintain consistency with updates in the CDFG outline as needed.

SOME TIPS AND NECESSARY FORMAT INFORMATION:

A Table of Contents containing page numbers for chapters and sections must be provided.

Page numbers should appear on every page of your plan, including all maps, tables, and figures. Chapter I, Introduction, is page one and is always unnumbered. All pages preceding page one should be numbered with lower case Roman numerals, starting with -i- on the Table of Contents page.

Tables and figures should be placed immediately following the page where they are first mentioned in the text (for example, if Figure 1 is mentioned on page 3 for the first time, it appears as page 4).

All figures should be prepared on 8-1/2 x 11-inch paper so that reproduction remains a simple task. To prepare professional-looking figures, maintain a minimum 1/2-inch border. Each figure and table should be numbered and titled. The title should reflect what the figure depicts, such as a location map or habitat types on the property. The numbers and titles of figures and tables may be listed under a separate List of Figures (or Tables); see Table of Contents for example. Compass direction and mileage scale should be included on all figures which illustrate geographical features.

TITLE AND SIGNATURE PAGES

The following two pages are examples of the Title Page and Signature Page that are required for each plan.

E X A M P L E (Title Page)

City of Carlsbad
(and other management entity as needed)

DRAFT PRESERVE MANAGEMENT PLAN

for

(NAME OF AREA)

Month, Year

EXAMPLE (Signature Page)

(NAME OF AREA) FINAL DRAFT MANAGEMENT PLAN

Prepared by: Name
 Address
 Phone

Approved by:

Preserve Steward	Date
------------------	------

City _____
Date _____

CDFG	Date
------	------

USFWS _____ Date _____

TABLE OF CONTENTS

The Table of Contents of each land management plan should follow the same format as shown on page i of this document. All pages, starting with Chapter I, Introduction, are numbered consecutively, including figures, tables, and maps. Appendices have their own separate page numbers such as A-1, A-2,..., B-1, B-2,....

TABLE OF CONTENTS

TABLE OF CONTENTS	Page No.
ACKNOWLEDGEMENTS (Optional)	X
LIST OF FIGURES	X
LIST OF TABLES	X
I. INTRODUCTION	X
A. Purpose of Inclusion of the Preserve Area in the HMP	X
B. Preserve Area History	X
C. Purpose of This Management Plan	X
II. PROPERTY DESCRIPTION	X
A. Geographical Setting	X
B. Preserve Area Boundaries and Adjacent Lands	X
C. Geology, Soils, Climate, Hydrology	X
D. Cultural Features	X
1. Archaeology	X
2. Historic Land Use	X
3. Existing Structures	X
III. HABITAT AND SPECIES DESCRIPTION	X
A. Vegetation Communities, Habitats and Plant Species	X
B. Animal Species	X
C. Species Covered by the HMP (including all Endangered, Threatened and Rare Species)	X
IV. MANAGEMENT GOALS	X
A. Definition of Terms Used in This Plan	X
B. Biological Elements: Goals	X
1. Operations and Maintenance ASMDs	X
C. Public Use Elements: Goals	X
1. Operations and Maintenance ASMDs	X
D. Facility Maintenance Elements: Goals	X
1. Operations and Maintenance ASMDs	X

- E. MHCP Biological Monitoring Element
 - 1. Calrsbad HMP-Level Species and Habitat Monitoring
 - 2. Coordination with MHCP-Level and Regional Monitoring effort
- V. OPERATIONS AND MAINTENANCE SUMMARY
 - A. Operations and Maintenance ASDMs to Implement Plan
(if not provided under IV.B.1, C.1, or D.1 above)
 - B. Existing Staff and Additional Personnel Needs Summary
 - C. Management, Monitoring, Operations and Maintenance Budget Summary
- VI. REFERENCES (For all citations within plan)

APPENDICES: As necessary to list:

- 1) Preserve Area Descriptions
- 2) Animal and Plant species inventories
- 3) Soil Surveys
- 4) Climatic Information
- 5) Etc.

ACKNOWLEDGEMENTS

(Optional)

The author(s) may wish to thank groups or individuals who helped prepare the plan or provided necessary information or guidance.

LIST OF FIGURES

If appropriate, a list of figures (which includes all maps, drawings, or charts) may be provided here along with their page numbers.

LIST OF TABLES

If appropriate, a list of any tables provided in the management plan may be provided here along with their page numbers.

I. INTRODUCTION

A. Purpose for Inclusion of the Preserve Area in the HMP

Describe the primary purpose for which this was included in the HMP and OSMP. Additional purposes should also be stated. Be brief, but provide summary information about the management objectives presented later within the plan. Describe the resources protected by this preserve area in very general terms.

B. Preserve Area History (This section may be combined with Section A if the description is straightforward)

Describe the circumstances leading to dedication of this preserve area which might include set-aside for mitigation, acquisition in response to local or regional development pressure, environmental concerns, inholding consolidation, or other issues, and list any local or regional groups which had influence in promoting this dedication.

If relevant, give the acquisition transaction date(s) and the total number of acres acquired.

C. Purpose of This Management Plan

The following language is required to be stated in the plan to clearly delineate the City's purposes in preparing such plans:

- 1) The plan guides management of habitats, species, and programs described herein to achieve the City's obligation to protect and enhance wildlife values under their HMP and Implementing Agreement.
- 2) The plan serves as a guide for appropriate public uses of the preserve area.
- 3) The plan serves as a descriptive inventory of fish, wildlife and native plant habitats, which occur on or use this preserve area.
- 4) The plan provides an overview of the preserve area's operation and maintenance, and personnel requirements to implement management goals. It serves as a budget planning aid for preserve area budget preparation.

II. PRESERVE AREA DESCRIPTION

This chapter should provide the most current information available to describe the geographical, physical, and cultural site characteristics and features to promote good management of the area. Some of the following subsections may be combined if the subjects below are addressed and information is presented in a logical sequence.

A. Geographical Setting

Describe preserve area location clearly, giving written instructions on how it can be reached by land transportation, and provide a regional map (Map 1) which identifies this property's location in the City-wide preserve system. Local crossroads should be shown, as well as compass direction (north), and mileage scale. This is an overview map which gives the unfamiliar reader a regional perspective for locating the property. The map should be a computer-generated using GIS data. The map size should be 8-1/2 x 11 inches.

B. Preserve Area Boundaries, Adjacent Land Use, and Adjacent Preserve Areas

Provide a property map (Map 2) with boundaries distinctly outlined to place it in perspective with adjacent lands. The map should contain sufficient detail to provide information on entrances to and any open roads within the site. Compass direction and mileage scale should be given on the map. Size should be 8-1/2 x 11 inches.

Give a brief description of adjacent land use and prior land use on the preserve area, if known. Provide documentation of any easements issued to others within or across the preserve area. A map of easements should be provided as well, the map size should be 8-1/2 x 11 inches.

List all adjacent or nearby preserve areas (within the same management unit as defined by the OSMP) and the preserve manager contact information. List the habitat types and management issues in common with adjacent preserves and opportunities for coordinated management between preserve areas within the management unit.

C. Geology, Soils, Climate and Hydrology

These subjects may be combined into one subheading or separated for individual discussion, depending upon how much information is provided. You should give the reader an overall assessment of geological, edaphic, climatic and hydrologic factors which will influence management objectives. You only need to provide information which is pertinent to management of the area.

Geological information which describes how the area evolved or how it relates to the surrounding geological formations can be useful in describing the overall area (eg., alluvial valleys, volcanic outcrops, floodplains).

Soil survey information, obtained from the City of Carlsbad in GIS format, may influence species distributions, water regimes and agricultural activities. Soil types which have significant impacts on management should be discussed here. A soils map may be helpful in making management decisions if soil types are important or complex. A detailed description is not necessary unless it relates to management.

A discussion of local climate should include useful information such as seasonal norms for high and low temperatures, seasonal average precipitation, growing season, and any other climatic factors, which influence the area, or should be considered in managing the preserve area.

On some preserve areas, hydrological and water right information will be extremely important. Describe all known surface and subsurface water sources and their seasonal influences on management of the area. If there are wells on the area, the depth to groundwater and pumping rate should be provided, if known. Provide information regarding any surface water rights, (i.e. riparian, pre-1914, adjudicated, appropriative) and current points of diversion. For appropriative rights, include State Water Resources Control Board application permit and license numbers and identify whether use is for direct diversion, storage or both. Also, identify any contracts, MOU's or other agreements related to water use.

D. Cultural Features

Describe any known archeological sites without providing their specific locations on the property, and include a summary of the results of any site surveys/inventories, including who conducted them. An assessment of the impacts of management should be given for such sites. Check within the CEQA Guidelines for appropriate action in dealing with suspected or existing archeological sites. At the minimum, state that an archeological survey will be initiated where appropriate, prior to any management activity.

Describe all existing structures including roads, levees, fencing, and buildings, and their intended future use on the area. If such structures are likely to be considered "historical resources" of the state pursuant to Executive Order W-26-92 and historic resources preservation laws, the preserve management plan should include measures preserve and maintain these resources to the extent prudent and feasible within existing budget and personnel resources.

III. HABITAT AND SPECIES DESCRIPTION

This chapter provides a descriptive inventory of habitats and species which are located on or use the preserve area. General ecological information necessary for proper management of habitats should be presented in this section.

A. Vegetation Communities, Habitats and Plant Species

Describe each major native plant community or habitat which occurs on the preserve area. Include a vegetation or habitat map. Be sure to name any special natural communities, which are listed in the Natural Diversity Database (NDDDB). General habitat descriptions should follow the “List of California Terrestrial Natural Communities” based on the classification described in A Manual of California Vegetation (Sawyer-Keeler Wolf 1995). Vegetation communities should also be crosswalked to the Holland vegetation classification to be consistent with MHCP habitat types. When using the NDDDB classification system include at least two floristic vegetation series or more if you can.

Provide an inventory (list), if available, of native plant species which are known or likely to occur on the preserve area. If not available, include a statement that at the earliest feasible opportunity, and before natural habitats are manipulated, inventories will be conducted to determine that no rare, threatened or endangered plant or special plant species or communities will be negatively impacted by management activities. You may want to include non-native vegetation as well. Generally, the list can be placed in an appendix, but major species affected by or targeted for management should be mentioned within the text. An overview of their habitat and management requirements should be presented here. Use proper nomenclature for preparing the list of species which generally includes scientific name (the common name should also be included).

B. Animal Species

Provide an inventory (list), if available, of animals (including fish, reptiles, amphibians, birds, and mammals) which are known to inhabit or seasonally use this property. Lists can be placed in an appendix, but species affected by or designated for particular management objectives should be mentioned here. An overview of their habitat and management requirements should be presented here. If inventories have not yet been completed, provide a list of species which could potentially inhabit or use the area based on personal field experience and other available model's (e.g., the CDFG California Wildlife Habitat Relationships model). Make a statement to the effect that at the earliest feasible opportunity, and before natural habitats are manipulated, inventories will be conducted to determine

that no animal T&E species or special species will be negatively impacted by management activities.

C. Species Covered by the HMP (including all Endangered, Threatened and Rare Species)

List all state and federal threatened or endangered, rare, or otherwise covered plants and animals which use the preserve area and briefly describe their ecological requirements (see Exhibit A for a complete list of covered species and their located referenced in the MHCP; address all species on lists 1-3 that use the preserve area; list 4 includes species not currently covered by the HCP). Covered species are species addressed in the HMP and Implementing Agreement and are covered by incidental take permits from the wildlife agencies. Mammals, birds, plants, invertebrates, fish, reptiles, and amphibians require separate headings if combined into one list.

IV. MANAGEMENT GOALS

Chapter IV defines the terms used and provides management direction for management actions on this preserve area. The goals and tasks stated here should guide all management decisions until the plan is revised and updated.

The following terms and definitions (in boldface) should be presented at the beginning of this chapter to familiarize the reader with terminology used in the plan. Include definitions for only those terms you use in the plan.

A. Definitions of Terms Used in This Plan

1. **Elements: An element refers to any biological unit, public use activity, or facility maintenance program as defined below for which goals have been prepared and presented within this plan.**

Since the “elements” are the basis of the plan, be sure to discuss what types of elements are necessary with other preserve managers, the preserve steward, and wildlife agency staff that are familiar with the area and/or resources. We do not want to have so many elements, that goals become redundant, but we do want to discuss all elements to be affected by management on the preserve area.

2. **Biological Elements: These elements consist of species, habitats, or communities for which specific management goals have been developed within the plan.**

With the exception of covered species, biological elements should always be defined in terms of **habitat** management programs, since the overall management objectives are ecosystem or multi-species oriented. When appropriate, covered species management goals should also be contained within the context of a habitat management program. In some cases, this may not be possible and single species management programs should then be considered as separate biological elements.

Within each defined biological element, biological and public use management goals should be specified and described. Criteria used to identify biological elements may include but are not limited to the following:

- a) Protection of the element is required by the conditions set forth in the MHCP Conservation Analysis, the Carlsbad HMP, and the Implementing Agreement.
- b) Any covered species known or suspected to occur on or to use the property must be specified within another element or as a separate biological element.

- c) Essential habitat for one or more covered species must be specified as a biological element. An example is vernal pool habitat upon which numerous state-listed plant species depend.
- d) Manipulated habitats which are intensively managed for fish and wildlife values must be specified as biological elements. An example is Coastal and Valley Freshwater Marsh which is created and/or enhanced for migratory waterfowl and other associated wetland species.
- e) Restoration efforts which may restore an extirpated species or habitat, or maintenance efforts which may avoid the threat of extirpation. An example is Great Valley Cottonwood Riparian (NDDB type).

3. Public Use Elements: Public use elements are any recreational, scientific, or other use activity appropriate to and compatible with the purposes for which this preserve area is managed.

When drafting appropriate public use activities, think about potential impacts to the area's resources. The proposed public use should be related to wildlife or wild lands. In addition, a reasonable and defensible correlation between the proposed public use and how it relates to the primary Carlsbad HMP land management policies should be articulated. If reasonable public use is justified, it may also be tempered with limits on actual number of public involved. Provide a map (if applicable) of trail systems or recreational use zones identified through the management plan process, the map size should be 8-1/2 x 11 inches.

Criteria used to characterize such public use elements include but are not limited to:

- a) Use is authorized or considered an allowable use by the MHCP and/or HMP (e.g., uses such as hiking, bird watching, and interpretive programs).
- b) Use is compatible with fish and wildlife requirements in the area if properly conducted (e.g., scientific research programs).
- c) Historical uses which may be restricted seasonally or year-round under this plan due to incompatibility with biological element needs (e.g., fishing or interpretive programs).

4. Facility Maintenance Element: This is a general-purpose element describing the maintenance and administrative program, which helps, maintain orderly and beneficial management of the area.

An example of a facility maintenance element is provided later in this chapter.

5. Fire Management Element:

This includes language regarding the MHCP and HMP fire management guidelines. This element should address (as needed) issues such as coordination with local regional CDF units on wildfire suppression, staging fire fighting equipment, access points, identifying safety hazard areas to fire fighting personnel, post fire activities (e.g. restoration) and preventive fuel or fire breaks, specifically in sensitive habitat areas. A statement should be needed to address the City's vegetation clearance ordinances and various appropriate clearing methods (e.g. mowing, discing, blading, managed goat herds, etc.). In some cases, a separate prescription burn plan may be appropriate, described briefly under a "Biological Element" and the plan attached as an addendum. Close coordination with the City and wildlife agencies will be required to develop this element.

6. Biological Goals: A biological goal is the statement of intended long-range results of management based upon the feasibility of maintaining, enhancing or restoring species populations and/or habitat.

Biological goals may be, for example, restoration of riparian habitat to its predisturbed state or maintaining a particular habitat for optimal deer herd size.

7. Public Use Goals: A public use goal is the statement of the desired type and level of public use compatible with the biological element goals previously specified within the plan.

Public use goals could be to educate the public about rare species or special habitats on the preserve area.

8. Area Specific Management Directives (ASMDs): ASMDs are the individual projects or work elements that implement the goal and are useful in planning operation and maintenance budgets. ASMDs are should be prioritized and described in detail in the annual work plans for each preserve area.

Examples of ASMDs are:

- 1) to provide nesting habitat for a certain species over a given period of time;
- 2) to revegetate a former riparian community;
- 3) to build ponds and/or levees to provide wintering waterfowl areas;

- 4) to maintain roads for public access. grading and graveling roads;
- 2) specific maintenance on existing levees;
- 3) description of types of revegetation efforts;
- 4) specific maintenance tasks on buildings.

Chapter IV, Part B is the most important section, so read thoroughly:

B. Biological Elements: Goals

Section B should have a subsection for every biological element described. Within each subsection, provide:

- 1) The name and general description of biological element;
- 2) General long-range goals;
- 3) Relevant specific permit conditions identified in the HMP and Implementing Agreement;
- 4) Management or operations and maintenance ASMDs required to complete each goal (this information is optional).

A description should accompany each goal, which provides management information and direction on how to meet or exceed the goal. ASMDs should be described sufficiently to provide information on how restoration, maintenance, or enhancement of this particular element will be accomplished. If O&M ASMDs are listed in a summary table, these should provide specific detail on how goals will be met by task performance.

After the goals are characterized, briefly describe any internal or external management constraints, which may affect meeting those goals. Some examples are:

- 1) environmental factors such as the influence of local water availability (either surface or subsurface waters); the introduction or spread of non-native species; presence of T&E species; flood; drought; erosion; air pollution; hazardous waste materials;
- 2) legal, political or social factors including federal or state laws, policies, or regulations which influence or mandate certain types of management; special permitting requirements (eg., ACOE 404, T&E species, archeological sites); City ordinances (eg., nuisance abatement); MOUs or other special agreements with private or public entities; water or mineral rights for the area;

- 3) financial factors such as the source of funding to be used for operation and maintenance, personnel requirements, and overall management of the area (fund source may dictate management direction).

Discuss potential *environmental impacts* from management decisions and avoidance or mitigation measures which will be employed, if necessary, to avoid or significantly reduce such impacts. Demonstrate that potential impacts are temporary or that the overall effect of the action is a net improvement/enhancement in habitat value in the preserve area. It is the intent of the Carlsbad HMP and OSMP implementation not to undertake projects that adversely impact a covered species or their habitats. Therefore, no impacts will be allowed that reduce overall habitat quality in the preserve area and thus reduce the ability of the City to meet the permit conditions of the HMP and Implementing Agreement.

The following is a biological element example with goals and tasks:

Biological Element: Coastal and Valley Freshwater Marsh

Maintain optimum winter habitat for migratory waterfowl by on-going marsh management techniques to optimize winter food availability for migratory species.

Goal: Continue with established flooding and drawdown timetable; maintain mode of dynamic experimental vernal/summer seasonal wetland management.

Goal: Continue mechanical manipulation of wetland vegetation during summer dry period (when covered species will not be impacted) to maintain adequate open water during flooded period.

ASMD 1: Disc 100 acres of tules annually to maintain marsh in optimal successional stage.

ASMD 2: Repair leaking levees to prevent premature drawdowns.

ASMD 3: Build 4 additional nesting islands in specified units.

ASMD 4: Clean specified water supply ditches.

For each ASMD, describe how the action will be implemented, what the desired result will be (quantitatively if possible), and how the response will be monitored, recorded, and analyzed within the adaptive management context. Describe the adaptive management adjustments that may be anticipated if the ASMD does not achieve the desired result.

If you wish to discuss the goals for each element in a narrative format, in order

to provide more detail or to clarify certain management issues, be as succinct as possible while providing sufficient information to meet MHCP and HMP monitoring and management requirements. Do not forget to discuss management constraints, environmental impacts, and mitigation measures (if applicable).

C. Public Use Elements: Goals

This Section is prepared in the same manner as Section B. It includes a narrative describing the program for each public use element, its goals and ASMDs (optional), management constraints, and environmental impacts and potential mitigation measures.

If an interpretive services program is to be conducted on the preserve area (such as providing hiking trails, or bird tours), describe in sufficient detail the type of program(s) to be implemented along with any associated goals and potential impacts associated with them.

As in previous sections, environmental impacts should be discussed for each public use program, and, if appropriate, mitigation measures to offset such impacts should be described in detail. *If any public use program impact covered species*, those impacts should be discussed briefly within the public use element and reference made to the provisions in the MHCP and HMP indicating the impact is associated with an allowable use. All potential impacts, even from allowable public uses, should be avoided, minimized, and mitigated to the extent possible, given preserve management priorities and budget constraints.

Some examples of public use elements are:

- 1) General public recreation (including bird watching, plant identification, other self-guided activities)
- 2) Fishing program
- 3) Scientific research, surveys or monitoring (by outside groups)
- 4) Trails, blinds, boardwalks or viewing platforms
- 5) Interpretive centers, educational kiosks

D. Facility Maintenance Element: Goals

This Section describes the physical facility and grounds maintenance program, which includes the administration necessary to maintain orderly and beneficial management of the preserve area

The following examples of goals and ASMDs are paraphrased and excerpted from the CDFG Mendota land management plan:

Properly administer overall management of the property by:

Goal: Maintain accurate business records on expenditures, staff, maintenance, and other administrative duties.

Goal: Maintain regular office hours in order to respond to public requests for information in a timely manner and otherwise conduct business in a normal manner.

Goal: Maintain all equipment, vehicles, facilities, residences, office structures, shop and associated buildings, fuel tanks, and any related items in optimum working condition to maximize efficient use of operating expenses allocated to this area.

ASMD 1: Regular inspection and servicing of all heavy equipment and vehicles.

ASMD 2: Regular inspection and repair of all buildings, residences and structures. This may include items such as plumbing, electrical, painting, fixtures, and any other features necessary to protect health and safety of staff and visitors to the property.

ASMD 3: Regular inspection and maintenance of fuel tanks to comply with federal and state laws.

As with the other elements, you may list ASMDs here or in the next chapter. Do not forget to outline potential environmental impacts and mitigation, if appropriate, associated with facility maintenance goals and objectives. Briefly describe potential impacts to covered species. All potential impacts, even from necessary operations and maintenance, should be avoided, minimized, and mitigated to the extent possible, given preserve management priorities and budget constraints.

E. MHCP Biological Monitoring Element

This Section is prepared in the same manner as Section B. It includes a narrative describing the program for each monitoring element, its goals and ASMDs, the optimal monitoring season for special or targeted species/habitats and any known constraints, limitations or methodologies. In this section, you should include all standard or required protocols specified in the MHCP and/or by the wildlife agencies and discuss the relevance and consistency of the MHCP and HMP to the monitoring activities implemented in this preserve area. Key sections, guidelines, and directives within the MHCP and HMP plans relating to monitoring should be reiterated here. Regional coordination of monitoring data collection and analysis, obligations for monitoring of “preserve design,” or of HMP compliance should also be discussed. Clearly understand and

identify the preserve-level and MHCP-level monitoring that is required for this preserve area. Coordinate with the preserve steward and wildlife agencies to clarify the role of this preserve area in subregional and regional monitoring efforts.

V. OPERATIONS AND MAINTENANCE SUMMARY

This chapter contains information in a summary format, which will guide budget preparation and work plans for the property. Use of the Property Analysis Record (PAR) software is preferred for accurate budget preparation and updating.

A. Operations and Maintenance

ASMDs to Implement Plan. If you have not already listed them in the previous section, use this section to itemize O&M ASMDs required to fulfill goals for previously described biological, public use, and facilities maintenance elements. You should give brief descriptions of specific operations and maintenance tasks, which are necessary to implement the goals of this plan. This will help provide information necessary for annual budget preparation for management of the property.

B. Existing Staff and Additional Personnel Needs Summary

Summarize the number of existing staff employed at or who spend a percentage of their work schedule performing tasks on the preserve area, and any additional requirements for personnel, both full time and temporary. Briefly outline the justifications for personnel requested without going into specific task descriptions. Provide the position classifications required to fully implement the plan as written. This may be in narrative or table format.

C. Management, Monitoring, Operations and Maintenance Budget Summary

This section is provided to summarize all estimated management, monitoring, operations and maintenance costs associated with management of the preserve area. This summary would provide more specific information required for annual budget preparation.

The following table is provided as the preferred format for such a summary (preferably derived from PAR-based estimate):

TABLE . OPERATIONS AND MAINTENANCE SUMMARY OPTIONS

Option 1:

Summary Table: Costs summarized by goal.

Goals	Priority *	Labor (in PYs)	Personnel Class	On-Going Cost \$	One-Time Cost \$
1. Preserve Covered species	1	0.17	WHS I	\$10,000	\$5,000
A. Conduct Surveys					
B. Avoid Impacts					
C. Etc.					
Continue until all goals are summarized.					
TOTAL:	Total No.		\$ Total		\$ Total

*Define meaning of priorities.

Option 2:

Summary Table: Costs summarized by goals and ASMDs:

Goals and ASMDs	Priority *	Labor (in PYs)	Personnel Class	On-Going Cost \$	One-Time Cost \$
1. Preserve Covered species	1	0.17	WHS I		
A. Conduct Surveys				\$1,000	\$5,000
B. Avoid Impacts				\$9,000	
C. Etc.					
Continue until all goals are summarized.					
TOTAL:	Total No.		\$ Total		\$ Total

*Define meaning of priorities.

VI. REFERENCES

Use standard scientific reference nomenclature to cite authors and their published research. Be sure to add references when using information from other sources.

Example:

Department of Fish and Game. 1999. List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. Sacramento.

Meyers, K.E. and W.F. Laudenslayer, Jr., Eds. 1988. A Guide to Wildlife Habitats of California. California Department of Forestry and Fire Protection. Sacramento.

APPENDICES

A title page that uniquely identifies it (e.g., Appendix A - Legal Description of Property) should precede all appendices. All pages within this appendix should be numbered consecutively: A-1, A-2, A-3...

Use Appendices as necessary to list items:

- 1) Property Descriptions
- 2) Animal and Plant species inventories
- 3) Soil Surveys
- 4) Climatic Information
- 5) Etc.

EXHIBIT A

List 1: Species Proposed for Coverage under the Carlsbad Subarea Plan

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<u>Brodiaea filifolia</u>	Thread-leaved brodiaea	FT/CE/NE	4-37
<i>Chorizanthe orcuttiana</i>	Orcutt's spineflower	FE/CE/NE	4-56
<i>Dudleya blochmaniae ssp. blochmaniae</i>	Blochman's dudleya	FSC	4-74
Euphorbia misera	Cliff spurge	None	4-101
<u>Hazardia orcuttii</u>	Orcutt's hazardia	FSC/NE	4-111
<i>Quercus dumosa</i>	Nuttall's scrub oak	FSC	4-159
Invertebrates			
<u>Panoquina errans</u>	Salt marsh skipper	FSC	4-202
<u>Euphyes vestris harbisoni</u>	Harbison's Dun Skipper	FSC/NE	4-196
Birds			
<u>Pelecanus occidentalis californicus</u>	California brown pelican	FE/SE	4-251
<i>Plegadis chihi</i>	White-faced ibis	FSC/SSC	4-256
<u>Accipiter cooperii</u>	Cooper's hawk	SSC	4-264
<i>Pandion haliaetus</i>	Osprey	SSC	4-269
<i>Falco peregrinus anatum</i>	American peregrine falcon	CE	4-280
<i>Rallus longirostris levipes</i>	Light-footed clapper rail	FE/CE/FP	4-285
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	FT/SSC	4-291
<i>Sterna elegans</i>	Elegant tern	FSC/SSC	4-299
<i>Sterna antillarum browni</i>	California least tern	FE/CE/FP	4-304
<i>Empidonax traillii eximius</i>	Southwestern willow flycatcher	FE/CE	4-314
<i>Vireo bellii pusillus</i>	Least Bell's vireo	FE/CE	4-321
<u>Poliophtila californica californica</u>	Coastal California gnatcatcher	FT/SSC	4-333
<i>Icteria virens</i>	Yellow-breasted chat	SSC	4-360
<i>Aimophila ruficeps canescens</i>	California rufous-crowned sparrow	FSC/SSC	4-366
<i>Passerculus sandwichensis beldingi</i>	Belding's savannah sparrow	FSC/CE	4-371
<i>Passerculus sanwichensis rostratus</i>	Large-billed savannah sparrow	FSC/SSC	4-377
Reptiles			
<i>Cnemidophorus hyperythrus beldingi</i>	Orange-throated whiptail	SSC	4-245

* See the "Key to Legal and Management Status" that follows List 4.

List 2: Species Coverage Contingent on Other MHCP Subarea Plans being Permitted

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<i>Acanthomintha ilicifolia</i>	San Diego thornmint **	FT/CE/NE	4-9
<u>Ambrosia pumila</u>	San Diego ambrosia	FE/NE	4-16
<i>Ceanothus verrucosus</i>	Wart-stemmed ceanothus **	FSC	4-50
<i>Dudleya viscida</i>	Sticky dudleya	FSC	4-89
<u>Ferocactus viridescens</u>	San Diego barrel cactus	FSC	4-106
<i>Quercus engelmannii</i>	Engelmann oak	None	4-165

* See the "Key to Legal and Management Status" that follows List 4.

** Coverage for this species is also contingent on funding for management of conserved areas.

List 3: Species Coverage Contingent on Funding for Management of Conserved Areas

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<i>Arctostaphylos glandulosa</i> ssp. <i>crassifolia</i>	Del Mar manzanita	FE/NE	4-26
<i>Baccharis vanessae</i>	Encinitas baccharis	FT/CE/NE	4-32
<i>Comarostaphylis diversifolia</i> ssp. <i>diverifolia</i>	Summer holly	FSC	4-63
<i>Corethrogyne filaginifolia</i> var. <i>linifolia</i>	Del Mar sand aster	None	4-68
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery **	FE/CE/NE	4-94
<u>Iva Hayesiana</u>	San Diego marsh elder ***	FSC	4-116
<u>Myosurus minimus</u> ssp. <u>Apus</u>	Little mousetail **	FSC/NE	4-133
<i>Navarretia fossalis</i>	Spreading navarretia **	FT/NE	4-140
<i>Orcuttia californica</i>	California Orcutt grass **	FE/CE/NE	4-147
<i>Pinus torreyana</i> ssp. <i>torreyana</i>	Torrey pine	FSC	4-154
Invertebrates			
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp **	FE/NE	4-178
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp **	FE/NE	4-184

* See the "Key to Legal and Management Status" that follows List 4.

** Coverage for this species is also contingent on the City of Carlsbad receiving legal control over the protection, management, and monitoring of the vernal pools adjacent to the Poinsettia Train Station in Carlsbad.

*** Coverage for this species is also contingent on other MHCP subarea plans being permitted.

List 4: MHCP Species Not Covered under the Carlsbad Subarea Plan

Scientific Name	Common Name	Status*	MHCP Subregional Plan Vol. II Page Ref.
Plants			
<i>Dudleya blochmaniae</i> ssp. <i>brevifolia</i>	Short-leaved dudleya	CE/NE	4-80
<i>Lotus nuttallianus</i>	Nuttall's lotus	FSC/NE	4-122
<i>Tetracoccus dioicus</i>	Parry's Tetracoccus	FSC	4-170
Invertebrates			
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	FE	4-211
Reptiles and Amphibians			
<i>Scaphiopus [Spea] hammondi</i>	Western spadefoot toad	SSC	4-215
<i>Bufo californicus</i>	Arroyo toad	FE/SSC	4-222
<i>Clemmys marmorata pallida</i>	Southwestern pond turtle	FSC/SSC	4-233
<i>Phrynosoma coronatum blainvillei</i>	San Diego horned lizard	FSC/SSC	4-238
Birds			
<i>Aquila chrysaetos</i>	Golden eagle	BEPA/SSC	4-274
<i>Campylorhynchus brunneicapillus cousei</i>	Coastal cactus wren	FSC/SSC/NE	4-328
<i>Sialia mexicana</i>	Western bluebird	None	4-355
<i>Amphispiza belli belli</i>	Bell's sage sparrow	FSC/SSC	4-380
Mammals			
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat	FE/ST	4-401
<i>Perognathus longimembris pacificus</i>	Pacific pocket mouse	FE/SSC/NE	4-407
<i>Chaetodipus fallax fallax</i>	Northwestern San Diego pocket mouse	FSC/SSC	4-416
<i>Lepus californicus bennetti</i>	San Diego black-tailed jackrabbit	FSC/SSC	4-421
<i>Felis concolor</i>	Mountain lion	SPM	4-425
<i>Odocoileus hemionus fuliginata</i>	Southern mule deer	RGS	4-431

Key to Legal and Management Status of Species in Lists 1 - 4

FE Federally Endangered
 FT Federally Threatened
 BEPA Bald Eagle Protection Act
 FSC Federal Species of Concern (former Category 2 Candidate)
 CE State Endangered
 CT State Threatened
 SSC State Species of Special Concern
 SPM State Special Protected Mammal
 RGS State Regulated Game Species
 None No Federal, State, or City status
 NE Narrow Endemic Species in the MHCP

