



City of Carlsbad Preserves

2012-2016 Preserve Management Plan



September 2011

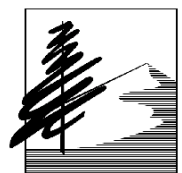
City of Carlsbad Preserves

2012-2016 Preserve Management Plan

September 2011

Prepared for:

Center for Natural Lands Management
215 W. Ash Street
Fallbrook, CA 92028
Point of Contact: Markus Spiegelberg, San Diego Area Manager



Prepared by:

Tierra Data Inc.
10110 W. Lilac Road
Escondido, CA 92026
Point of Contact: Elizabeth M. Kellogg, President



Table of Contents

1.0 Introduction	1
1.1 Purpose of This Preserve Management Plan.....	1
1.2 How This Plan Is Organized	8
1.3 Administration and Management of the Preserve	8
1.3.1 Management Context	8
2.0 Biophysical Overview of Properties	11
2.1 Geographic and Topographical Setting.....	11
2.2 Property Boundaries and Adjacent Land Use	11
2.3 Climate, Hydrology, Geology and Soils	11
2.3.1 Climate	11
2.3.2 Water Resources and Hydrology.....	17
2.3.3 Geology and Soils	17
2.4 Cultural Features	20
3.0 Habitat and Species Descriptions	21
3.1 Vegetation Communities, Habitats, and Plant Species	21
3.1.1 Vegetation Communities	21
3.1.2 Vegetation Assessments	24
3.1.2.1 CNPS Relevé Assessments	24
3.1.2.2 Oak Woodlands Assessments	25
3.1.2.3 Diegan Coastal Sage Scrub Monitoring Plots.....	26
3.1.3 Plant Species.....	28
3.1.4 Animal Species.....	28
3.1.5 Sensitive Species Covered by the HMP	28
3.1.6 Sensitive Plant Species	29
3.1.7 Sensitive Animal Species	30
3.1.8 Nonnative Plants and Animals	31
3.2 Summary of Issues and Threats in Carlsbad Open Spaces	40
3.2.1 Ecological Threats Models.....	41
3.2.2 Diegan Coastal Sage Scrub and Chaparral Threats Model	41
3.2.3 Coastal California Gnatcatcher Threats Model	42
4.0 Management Strategy	45
4.1 Definition of Terms Used in This Plan	45
4.2 Management and Monitoring Assumptions	46
4.3 Biological Element.....	46
4.3.1 Vegetation Associations ASMDs.....	47
4.3.1.1 All Vegetation Associations.....	47
4.3.1.2 Diegan Coastal Sage Scrub	48
4.3.1.3 Coast Live Oak Woodland.....	48
4.3.2 Covered Species ASMDs	49
4.3.2.1 Thread-Leaved Brodiaea.....	50
4.3.2.2 Nuttal's Scrub Oak, Cliff Spurge, Orcutt's Hazardia, San Diego Ambrosia, Blochman's Dudleya, and Del Mar Manzanita	50
4.3.2.3 Raptors	51
4.3.2.4 Coastal California Gnatcatcher, Least Bell's Vireo, and Southwest Willow Flycatcher.....	51
4.3.2.5 All Other Covered or Sensitive Animal Species.....	52

- 4.3.3 Wildlife Corridors52
- 4.3.4 Nonnative Plants.....52
- 4.3.5 Exotic and Domestic Animals.....53
- 4.3.6 Erosion Control53
- 4.3.7 Reporting, Updating, and HMP Coordination.....53
- 4.3.8 Adaptive Management54
- 4.4 Public Use Element.....55
 - 4.4.1 Public Use ASMDs55
- 4.5 Fire Management Element56
 - 4.5.1 Fire History.....56
 - 4.5.2 The Fire Environment58
 - 4.5.3 Goals.....60
 - 4.5.4 Fire Management ASMDs.....61
- 4.6 Facility Maintenance Element.....62
 - 4.6.1 Facility Maintenance Goal and ASMDs62
- 4.7 MHCP Biological Monitoring Element62
 - 4.7.1 Monitoring Goal and ASMDs64
- 5.0 Implementation Strategy 65**
 - 5.1 Roles and Responsibilities65
 - 5.1.1 Wildlife Agencies.....65
 - 5.1.2 California Coastal Commission.....65
 - 5.1.3 City of Carlsbad.....66
 - 5.1.4 Carlsbad HMP Preserve Steward66
 - 5.1.5 Preserve Manager66
 - 5.1.6 Scientific Community, Environmental NGOs, and General Public.....67
 - 5.2 Preserve Management Decision Authority67
 - 5.3 Existing Staff and Additional Personnel Needs Summary68
 - 5.4 Management, Monitoring, Operations and Maintenance Budget Summary.....69
 - 5.5 Reporting Requirements.....69
 - 5.5.1 Three-Year Management Plans69
 - 5.5.2 Annual Reports and Work Plans69
 - 5.5.3 Data69
- 6.0 Parcel Descriptions 70**
 - 6.1 Batiquitos Drive Open Space70
 - 6.1.1 General Open Space Site Characteristics70
 - 6.1.2 Land Use.....71
 - 6.1.3 Soil Characteristics.....71
 - 6.1.4 Fire History.....71
 - 6.1.5 Vegetation72
 - 6.1.6 Sensitive Resources.....72
 - 6.1.7 Management Actions.....72
 - 6.2 Carillo Ranch Open Space74
 - 6.2.1 General Open Space Site Characteristics74
 - 6.2.2 Land Use.....75
 - 6.2.3 Soil Characteristics.....75
 - 6.2.4 Fire History.....75
 - 6.2.5 Vegetation76
 - 6.2.6 Sensitive Resources.....76
 - 6.2.7 Management Actions.....76
 - 6.3 Carlsbad Municipal Golf Course78

6.3.1 General Open Space Site Characteristics	78
6.3.2 Land Use.....	79
6.3.3 Soil Characteristics.....	80
6.3.4 Fire History.....	80
6.3.5 Vegetation	80
6.3.6 Sensitive Resources.....	82
6.3.7 Management Actions.....	83
6.4 Carlsbad Village Open Space.....	84
6.4.1 General Open Space Site Characteristics	84
6.4.2 Land Use.....	85
6.4.3 Soil Characteristics.....	85
6.4.4 Fire History.....	85
6.4.5 Vegetation	86
6.4.6 Sensitive Resources.....	86
6.4.7 Management Actions.....	86
6.5 La Costa Canyon Park Open Space	88
6.5.1 General Open Space Site Characteristics	88
6.5.2 Land Use.....	88
6.5.3 Soil Characteristics.....	89
6.5.4 Fire History.....	89
6.5.5 Vegetation	89
6.5.6 Sensitive Resources.....	92
6.5.7 Management Actions.....	92
6.6 La Costa/Romero Open Space	93
6.6.1 General Open Space Site Characteristics	93
6.6.2 Land Use.....	93
6.6.3 Soil Characteristics.....	94
6.6.4 Fire History.....	94
6.6.5 Vegetation	94
6.6.6 Sensitive Resources.....	94
6.6.7 Management Actions.....	95
6.7 Lagoon Lane Open Space	96
6.7.1 General Open Space Site Characteristics	96
6.7.2 Land Use.....	96
6.7.3 Soil Characteristics.....	97
6.7.4 Fire History.....	97
6.7.5 Vegetation	98
6.7.6 Sensitive Resources.....	98
6.7.7 Management Actions.....	98
6.8 Lake Calavera Preserve.....	100
6.8.1 General Open Space Site Characteristics	100
6.8.2 Land Use.....	101
6.8.3 Soil Characteristics.....	101
6.8.4 Fire History.....	101
6.8.5 Vegetation	104
6.8.6 Sensitive Resources.....	104
6.8.7 Management Actions.....	107
6.9 Los Monos Reserve.....	108
6.9.1 General Open Space Site Characteristics	108
6.9.2 Land Use.....	108
6.9.3 Soil Characteristics.....	109

6.9.4 Fire History..... 109

6.9.5 Vegetation 111

6.9.6 Sensitive Resources..... 111

6.9.7 Management Actions..... 111

6.10 Macario Canyon Open Space..... 112

6.10.1 General Open Space Site Characteristics 112

6.10.2 Land Use..... 113

6.10.3 Soil Characteristics..... 113

6.10.4 Fire History..... 113

6.10.5 Vegetation 113

6.10.6 Sensitive Resources..... 114

6.10.7 Management Actions..... 114

6.11 Poinsettia Park Open Space 116

6.11.1 General Open Space Site Characteristics 116

6.11.2 Land Use..... 117

6.11.3 Soil Characteristics..... 117

6.11.4 Fire History..... 117

6.11.5 Vegetation 118

6.11.6 Sensitive Resources..... 118

6.11.7 Management Actions..... 118

6.12 Research Center Open Space 120

6.12.1 General Open Space Site Characteristics 120

6.12.2 Land Use..... 120

6.12.3 Soil Characteristics..... 121

6.12.4 Fire History..... 121

6.12.5 Vegetation 122

6.12.6 Sensitive Resources..... 122

6.12.7 Management Actions..... 122

6.13 Veterans Park Open Space 124

6.13.1 General Open Space Site Characteristics 124

6.13.2 Land Use..... 124

6.13.3 Soil Characteristics..... 125

6.13.4 Fire History..... 125

6.13.5 Vegetation 126

6.13.6 Sensitive Resources..... 126

6.13.7 Management Actions..... 126

7.0 References 128

Appendix A: City of Carlsbad Open Space Plant Species List, 2009-2010 A-1

Appendix B: Animal Species Observed B-1

Appendix C: Zero and Moderate Tolerance Exotic Species..... C-1

Appendix D: Coastal Sage Scrub Monitoring Plan D-1

Appendix E: Budget Table..... E-1

List of Figures

Figure 2-1. Average monthly temperature regime at two weather stations at (A) Oceanside and (B) Vista from 1953 and 2010 (Data Source: WRCC 2010).	15
Figure 2-2. Annual precipitation at two weather stations from 1953 to 2010 (partial data available for 2006). Oceanside data covers the period from 1953 to 2007. Vista data covers the period from 1963 to 2010 (Data Source: WRCC 2010).	15
Figure 3-1. Average (+/- 1 s.e.) total percent cover for six Diegan coastal sage scrub plots in City of Carlsbad Open Space properties. Cover generated from point-intercept utilizing 50 m transects at ½ m interval for 98 total points per transect.	27
Figure 3-2. Dominant exotic and native species within the DCSS Plots.	28

List of Maps

Map 1-1. Location of City of Carlsbad open space parcels considered herein.	3
Map 1-2. Open space parcels and management units in the Open Space Management Plan.	4
Map 1-3. Management entities and the Carlsbad Open Space Management Plan lands.	5
Map 1-4. Conservation status of lands within the Open Space Management Plan.	6
Map 1-5. Cores, linkages, special resource areas and the Carlsbad open space parcels considered herein.	7
Map 1-6. Facilities management zones and open space parcels considered herein.	10
Map 2-1. Forty-foot contours and the Carlsbad Open Space parcels.	12
Map 2-2. Existing regional land use, the Carlsbad watershed, and the City of Carlsbad.	13
Map 2-3. Existing land use within the City of Carlsbad.	14
Map 2-4. Mean annual precipitation in northern San Diego County from 1953 to 2010.	16
Map 2-5. The Carlsbad hydrologic unit and watersheds within.	18
Map 4-1. Regional fire history, with extent of fire called out by decade.	57
Map 6-1. Local land use at Batiquitos Drive Open Space.	71
Map 6-2. Soils at Batiquitos Drive Open Space.	72
Map 6-3. Vegetation communities and sensitive species at Batiquitos Drive Open Space.	73
Map 6-4. Local land use at Carillo Ranch Open Space.	75
Map 6-5. Soils at Carillo Ranch Open Space.	76
Map 6-6. Vegetation communities at Carillo Ranch Open Space.	77
Map 6-7. Local land use at Carlsbad Municipal Golf Course.	79
Map 6-8. Soils at the Carlsbad Municipal Golf Course.	80
Map 6-9. Vegetation communities and sensitive species at Carlsbad Municipal Golf Course.	81
Map 6-10. Local land use at Carlsbad Village Open Space.	85
Map 6-11. Soils at Carlsbad Village Open Space.	86
Map 6-12. Vegetation communities and sensitive species at Carlsbad Village Open Space.	87
Map 6-13. Local land use at La Costa Canyon Park and La Costa/Romero Open Spaces.	89
Map 6-14. Soils at La Costa Canyon Park Open Space.	90
Map 6-15. Fire history at La Costa Canyon and La Costa/Romero Open Spaces.	90
Map 6-16. Vegetation communities and sensitive species at La Costa Canyon Park and La Costa/Romero Open Spaces.	91
Map 6-17. Soils at La Costa/Romero Open Space.	94
Map 6-18. Local land use at Lagoon Lane Open Space.	97
Map 6-19. Soils at Lagoon Lane Open Space.	98
Map 6-20. Vegetation communities and sensitive species at Lagoon Lane Open Space.	99
Map 6-21. Local land use at Lake Calavera Preserve.	102
Map 6-22. Soils at Lake Calavera Open Space.	103

Map 6-23. Fire history at Lake Calavera Open Space.	104
Map 6-24. Vegetation communities and sensitive species at Lake Calavera Preserve.	105
Map 6-25. Local land use at Los Monos Reserve.	109
Map 6-26. Soils at Los Monos Open Space.	110
Map 6-27. Fire history at Los Monos Reserve.	110
Map 6-28. Vegetation communities at Los Monos Reserve.	111
Map 6-29. Local land use at Macario Canyon Open Space.	113
Map 6-30. Soils at Macario Canyon Open Space.	114
Map 6-31. Vegetation communities and sensitive species at Macario Canyon Open Space.	115
Map 6-32. Local land use at Poinsettia Park Open Space.	117
Map 6-33. Soils at Poinsettia Park Open Space.	118
Map 6-34. Vegetation communities and sensitive species at Poinsettia Park Open Space.	119
Map 6-35. Local land use at Research Center Open Space.	121
Map 6-36. Soils at Research Center Open Space.	122
Map 6-37. Vegetation communities and sensitive species at Research Center Open Space.	123
Map 6-38. Local land use at Veterans Park Open Space.	125
Map 6-39. Soils at Veterans Park Open Space.	126
Map 6-40. Vegetation communities and sensitive species at Veterans Park Open Space.	127

List of Photos

Photo 6-1. Batiquitos Drive.	70
Photo 6-2. Carillo Ranch Open Space.	74
Photo 6-3. Carlsbad Municipal Golf Course.	78
Photo 6-4. Carlsbad Village Open Space.	84
Photo 6-5. La Costa Canyon Park Open Space.	88
Photo 6-6. La Costa/Romero Open Space.	93
Photo 6-7. Lagoon Lane Open Space.	96
Photo 6-8. Lake Calavera Preserve.	100
Photo 6-9. Los Monos Reserve.	108
Photo 6-10. Macario Canyon Open Space.	112
Photo 6-11. Poinsettia Park Open Space.	116
Photo 6-12. Research Center Open Space.	120
Photo 6-13. Veterans Park Open Space.	124

List of Tables

Table 1-1. Open space planning in the City of Carlsbad.	2
Table 2-1. Hydrologic subunits of the Carlsbad Hydrologic Unit for the parcels covered in this PMP. These hydrologic units are used for managing water quality through the Carlsbad Watershed Management Plan (Resource Conservation District of Greater San Diego 2002), the San Diego Basin Plan (Regional Water Quality Control Board 1994, as amended), and the Carlsbad Water Urban Runoff Management Plan.	17
Table 2-2. Characteristics of soils found on Open Space Preserves (U.S. Department of Agriculture 1973).	19
Table 3-1. Vegetation community acreages for the Open Space Preserves.	22
Table 3-2. Number and location of vegetation community assessments.	25
Table 3-3. Dominant plant species within the Lake Calavera Oak Tree Assessment Plot.	26
Table 3-4. Dominant plant species within the Carillo Ranch Oak Tree Assessment Plot.	26
Table 3-5. Average percent cover of plant groups within the DCSS plots.	28

Table 3-6. Sensitive Plants Known to Occur on the Preserve.	32
Table 3-7. Sensitive Animals Known to Occur on the Preserve.....	33
Table 3-8. Moderate Tolerance Weed Species Observed.....	34
Table 3-9. Zero Tolerance Weed Species Observed.....	37
Table 4-1. Summary of Monitoring ASMDs for Vegetation Associations and Covered Species.....	49
Table 4-2. Species to be monitored and time of optimum detection. Bolded species are known to occur within Carlsbad Open Space Preserve parcels.....	63
Table 5-1. Preserve management personnel and general duties. Personnel may spend a percentage of their time performing tasks on site or generally related to management of the Carlsbad Open Space Preserves.	68
Table 6-1. Site characteristics at Batiquitos Drive Open Space.	70
Table 6-2. Management activities and specific actions at Batiquitos Drive Open Space for the next five years.	73
Table 6-3. Site characteristics at Carillo Ranch.....	74
Table 6-4. Management actions at Carillo Ranch Open Space for the next five years.	77
Table 6-5. Site characteristics at the Municipal Golf Course.	79
Table 6-6. Sensitive plants identified or potentially occurring on-site (Carlsbad Municipal Golf Course EIR Biological Constraints Analysis, 1997, p.18-24 in Cotton Beland Associates 2000).	82
Table 6-7. Sensitive wildlife identified on-site (Carlsbad Municipal Golf Course EIR Biological Constraints Analysis, 1997, p. 25-30 in Cotton Beland Associates 2000).....	82
Table 6-8. Management actions at Carlsbad Municipal Golf Course for the next five years.....	83
Table 6-9. Site characteristics at Carlsbad Village Open Space.....	84
Table 6-10. Management actions at Carlsbad Village Open Space for the next five years.....	87
Table 6-11. Site characteristics at La Costa Canyon Park Open Space.....	88
Table 6-12. Recommended management actions on the La Costa Canyon Park Open Space for the next five years.	92
Table 6-13. Site characteristics at La Costa/Romero.....	93
Table 6-14. Management actions at La Costa/Romero Open Space for the next five years.	95
Table 6-15. Site characteristics at Lagoon Lane Open Space.....	96
Table 6-16. Management actions at Lagoon Lane Open Space for the next five years.	98
Table 6-17. Site characteristics of Lake Calavera Preserve.....	101
Table 6-18. Sensitive floral species identified on-site (Biological Resources Report for Lake Calavera Trails, Merkel and Associates 2005), Lake Calavera Mitigation Bank.....	104
Table 6-19. Sensitive fauna species observed on-site, Lake Calavera Mitigation Bank.	107
Table 6-20. Management actions at Lake Calavera Mitigation Bank Open Space for the next five years.....	107
Table 6-21. Site characteristics of Los Monos Open Space.	108
Table 6-22. Management actions at Los Monos Open Space for the next five years.....	111
Table 6-23. Site characteristics for Macario Canyon Open Space.	112
Table 6-24. Management actions at Macario Canyon Open Space for the next five years.....	114
Table 6-25. Site characteristics for Poinsettia Park Open Space.....	116
Table 6-26. Management actions for Poinsettia Park Open Space for the next five years.....	118
Table 6-27. Site characteristics of Research Center Open Space.	120
Table 6-28. Management actions at Research Center Open Space.	122
Table 6-29. Site characteristics of Veterans Park Open Space.....	124
Table 6-30. Management actions at Veterans Park Open Space for the next five years.	126

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ASMD	Area-Specific Management Directive
CAGN	coastal California gnatcatcher
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CNLM	Center for Natural Lands Management
CNPS	California Native Plant Society
COHA	Cooper's hawk
DBH	diameter at breast height
DCSS	Diegan coastal sage scrub
ESA	Endangered Species Act
GIS	geographic information system
GME	General Management Entity
GPS	global positioning system
HMP	Habitat Management Plan
HRS	Habitat Restoration Services
LBV	least Bell's Vireo
LFMZ	Local Facilities Management Zone
MHCP	Multiple Habitat Conservation Program
NCCP	Natural Community Conservation Planning
NGO	non-governmental organization
OSMP	Open Space Management Plan
PMP	Preserve Management Plan
SDGE	San Diego Gas & Electric
SDNHM	San Diego Natural History Museum
SKW	Sawyer/Keeler-Wolf
SMC	southern maritime chaparral
TAIC	Technology Associates International Corporation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WIFL	southwest willow flycatcher
WRCC	Western Regional Climate Center
W-UI	Wildland-Urban Interface
WURMP	Watershed Urban Runoff Management Plan
YBCH	yellow-breasted chat

1.0 Introduction

1.1 Purpose of This Preserve Management Plan

The purpose of this preserve management plan (PMP) is to provide management, monitoring, and reporting guidelines that will serve the conservation goals for certain properties owned and managed by the City of Carlsbad (City) during the 2012-2016 period. The previous PMP served the 2009-2011 period, which represented the first three years of management of these properties. This PMP has been prepared to be consistent with the north coastal San Diego County's Multiple Habitat Conservation Program (MHCP), Carlsbad Open Space Management Plan (OSMP) (Technology Associates International Corporation [TAIC] 2004) and the City of Carlsbad Subarea Plan, also called the Carlsbad Habitat Management Plan (HMP), for specific natural habitat properties directly owned and managed by the City. The properties discussed in this plan are to be managed for the purpose of preserving sensitive resources which in turn will meet the City's obligation to the MHCP, OSMP, and HMP.

The MHCP is a comprehensive, multi-jurisdictional planning program that guides the long-term conservation and management of sensitive species and habitats within the north coastal portions of San Diego County. It is intended to protect viable populations of key sensitive plant and animal species and their habitats, while accommodating continued economic development for residents of the North County region. The MHCP is one of several large multi-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 area encompasses about 30,000 acres of natural habitat across seven incorporated cities in northwestern San Diego County (Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista). The seven subarea plans will contribute collectively to the conservation of biological communities and species in the MHCP area, and, in concert with other subregional plans, to continued ecosystem viability in southern coastal California. These plans defined core areas, linkages, and special resource areas that would be necessary to sustain the targeted species and habitats in perpetuity within the Carlsbad Subarea (see Map 1-5). Jointly these plans provide a mechanism for complying with the Endangered Species Act (ESA) and the NCCP Act and for issuing permit conditions related to development projects. Within both the ESA and NCCP context, the Carlsbad OSMP and the Carlsbad Subarea HMP form the regulatory bounds within which this specific PMP must remain consistent.

- **The purpose of this plan is to provide management, monitoring, and reporting guidelines that are consistent with both the OSMP and the Carlsbad Subarea HMP for specific habitat properties directly managed by the City.**

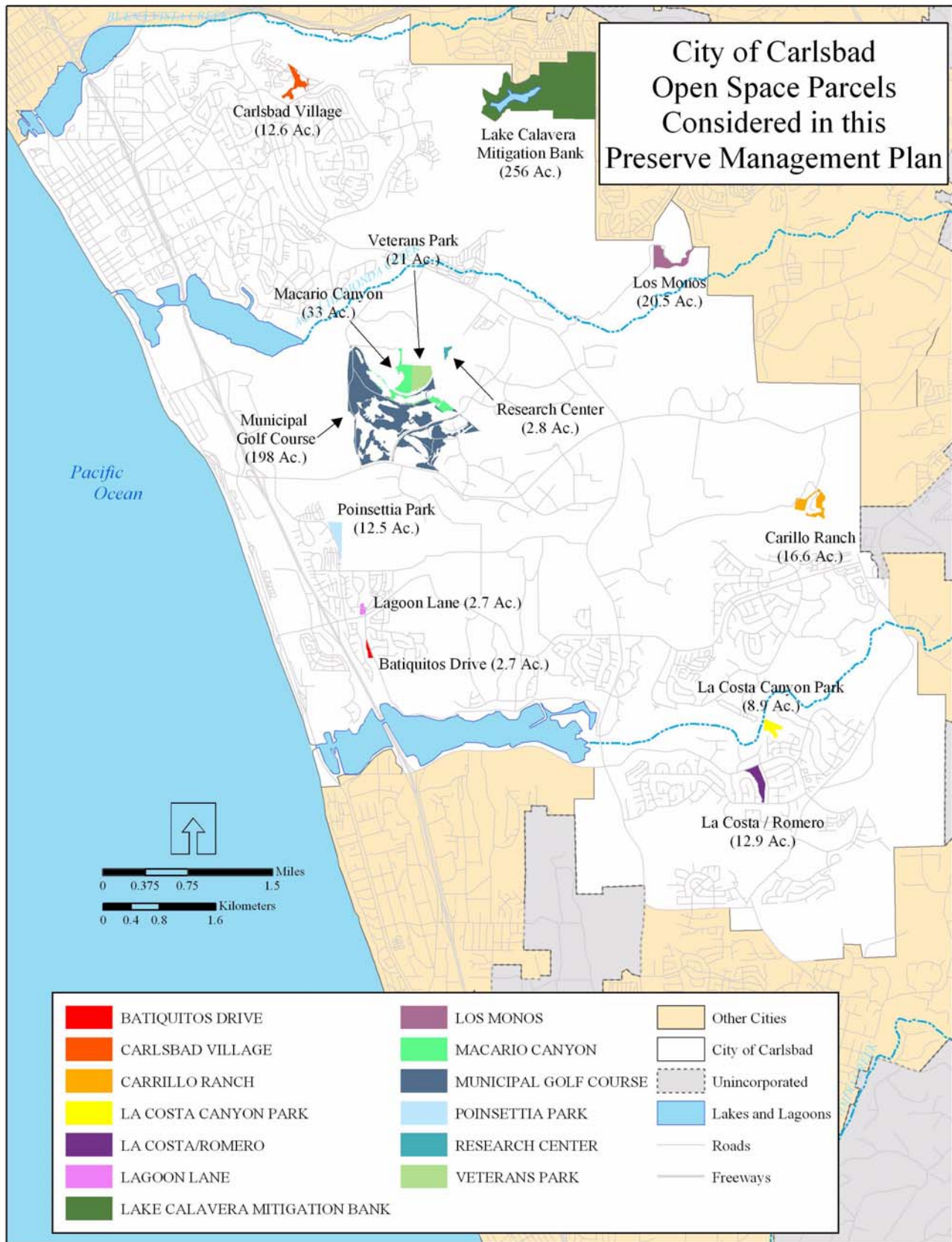
As the framework management plan for open space in the City of Carlsbad, the OSMP establishes the unified process, standards, guidelines, and conditions for all the Preserve Managers of the 7,135.1 acres of open space established by HMP (Table 1-1).

The PMP specifically addresses the 600.4 acres of natural open space for which the City of Carlsbad is directly responsible as the Preserve Manager (or General Management Entity [GME] as described in the OSMP). There are other Preserve Managers in charge of the other portions of open space, all under the umbrella of the OSMP. Map 1-1 through Map 1-4 depict the properties covered in this plan within the City's broader open space planning context.

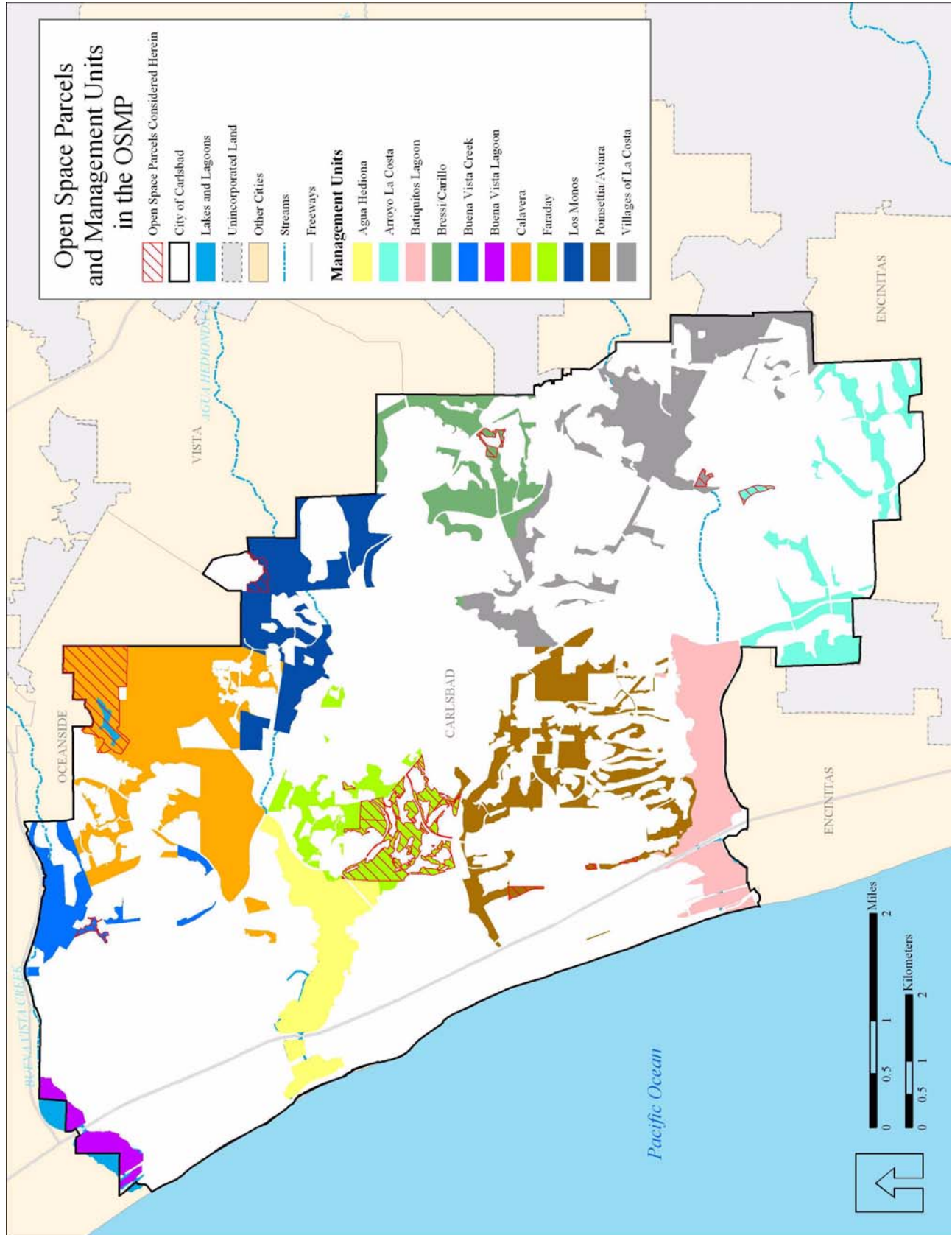
The Carlsbad Subarea HMP is a requirement of the MHCP. The HMP established the open space preserve and provides a regulatory framework for the OSMP. The HMP also incorporates the requirements of all involved regulatory agencies and sets systematic standards and permit conditions for new development in environmentally sensitive areas.

Table 1-1. Open space planning in the City of Carlsbad.

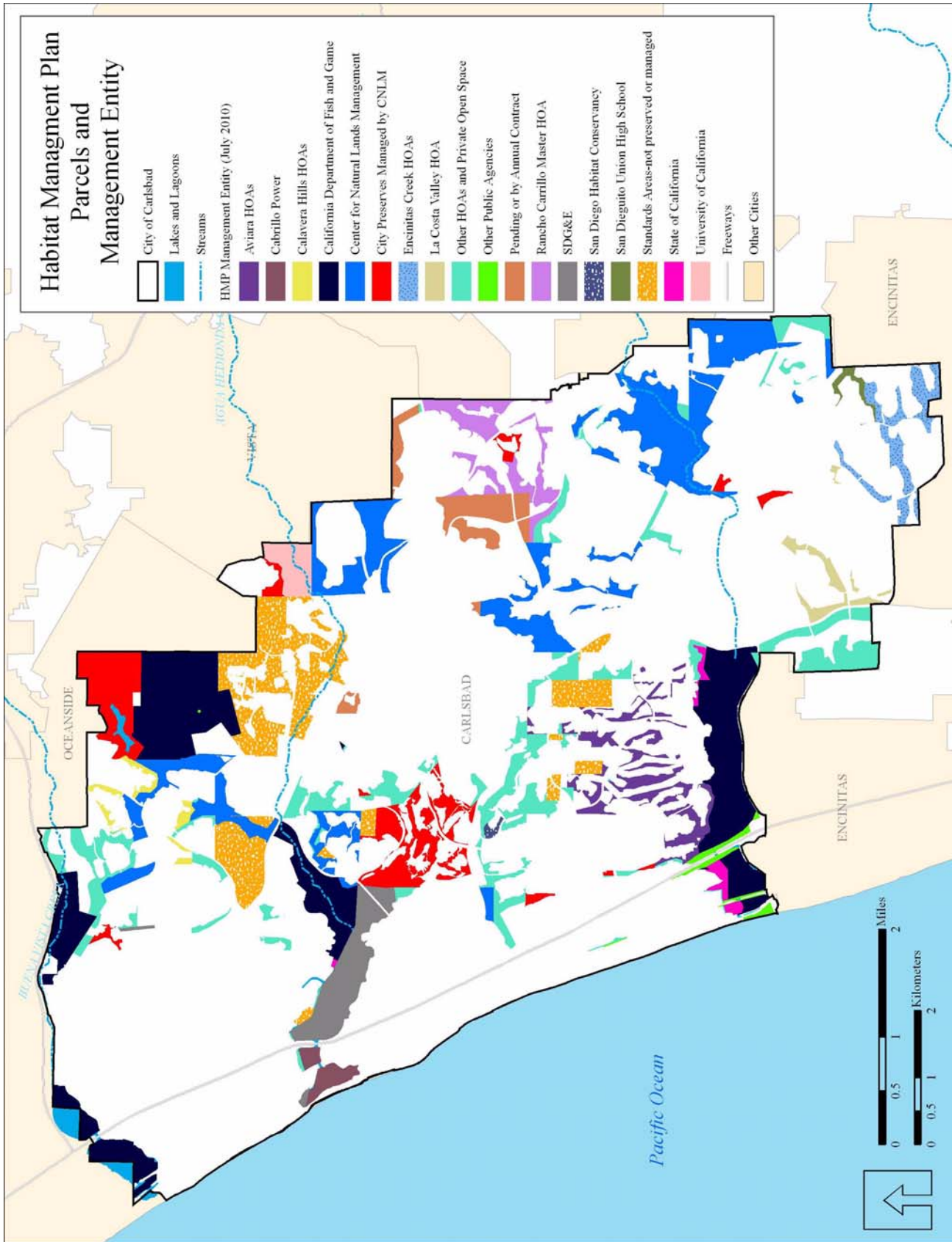
<p>Prior to 1986, the Carlsbad General Plan directed that 25% of the city would be preserved as open space to protect environmentally significant land and sensitive habitat. Under the Growth Management Plan approved by the voters in 1986, the targeted amount of open space was increased by 15% to fulfill aesthetic and quality of life concerns. Thus, at full buildout, the total planned open space will be 9,899 acres.</p> <p>The Growth Management Plan implemented the increased acreage by way of an Open Space Standard, which provided that "Fifteen percent of the total land area in local facilities management zone exclusive of environmentally constrained non-developable land must be set aside for permanent open space and must be available concurrent with development." This is one of 11 public facility/service "standards" addressed in the Growth Management Plan. The Growth Management Plan identifies, in each of the 25 development zones located throughout the city, the 15% of open space to be set aside in addition to the 25% originally mandated in the General Plan.</p> <p>Within the context of the City of Carlsbad, open space refers to land that is specifically designated and set aside for: 1) Preservation of natural resources; 2) Managed production of resources; 3) Programmed and unprogrammed outdoor recreation; and 4) Public health and safety. The OSMP covers three types of parcels:</p> <ul style="list-style-type: none"> ■ Natural Lands (7,345 acres) <ul style="list-style-type: none"> – 5,329 acres covered in the Carlsbad Subarea HMP of the MHCP. These lands are 100% preserves plus Standards Areas. (Standards areas are where a portion is expected to be developed and a portion is conserved. Standards are special land use regulations adopted by the City of Carlsbad to implement the Carlsbad Subarea HMP, applied only to lands designated as standards areas.) The OSMP represents the implementing framework for that lands come with a regulatory framework. – 2,015 acres were left out of the MHCP because they did not contribute much to the overall preserve design of the City's Subarea HCP but are managed as open space. ■ Developed Parks (both existing and planned). ■ Drainage basin overlay lands (these may overlap with the Carlsbad City Subarea/MHCP lands or lands in other categories). <p>The OSMP specifies the mechanisms for coordinating among several different organizations or entities that manage the various types of property constituting the lands covered in the OSMP. The General Management Entities associated with the Carlsbad OSMP are:</p> <ul style="list-style-type: none"> ■ Biological Management Entity (1,413 acres) <ul style="list-style-type: none"> – Center for Natural Lands Management (Carlsbad Oaks North, La Costa Villages, Kelly Ranch, Calavera Hills Phase II, Robertson Ranch, Buena Vista Creek Ecological Reserve, and Cassia) – San Diego Habitat Conservancy (Emerald Pointe Estates) – University of California Reserve System (UC Los Monos) ■ City of Carlsbad (600.4 acres of natural areas and developed parks) <ul style="list-style-type: none"> – Lake Calavera – Portions of Municipal Golf Course – Veterans Memorial park and several smaller units ■ Future Biological Management Entity (1732 acres) (will take over management of much of the area in the Standards Areas) ■ Other Public or Semi-Public Organizations (420 acres) <ul style="list-style-type: none"> – North County Transit – San Diego Gas & Electric – Cabrillo Power – State Parks ■ Private/Homeowners Association (1,713 acres) (land is in dedicated open space but there are currently no obligations to actively manage these areas for biological value) <ul style="list-style-type: none"> – Aviara Open Space - 244 acres with deed restrictions for conservation – Rancho Carillo Open Space - 182 acres with Open Space Easement in favor of the City ■ Wildlife Agencies (CDFG) (1,254 acres) <ul style="list-style-type: none"> – Agua Hedionda Lagoon Ecological Reserve, Batiqitos Lagoon Ecological Reserve, Carlsbad Highlands Ecological Reserve (includes Calavera Mountain), Buena Vista Creek Ecological Reserve, Summit, and the Brodiaea preserve.
--



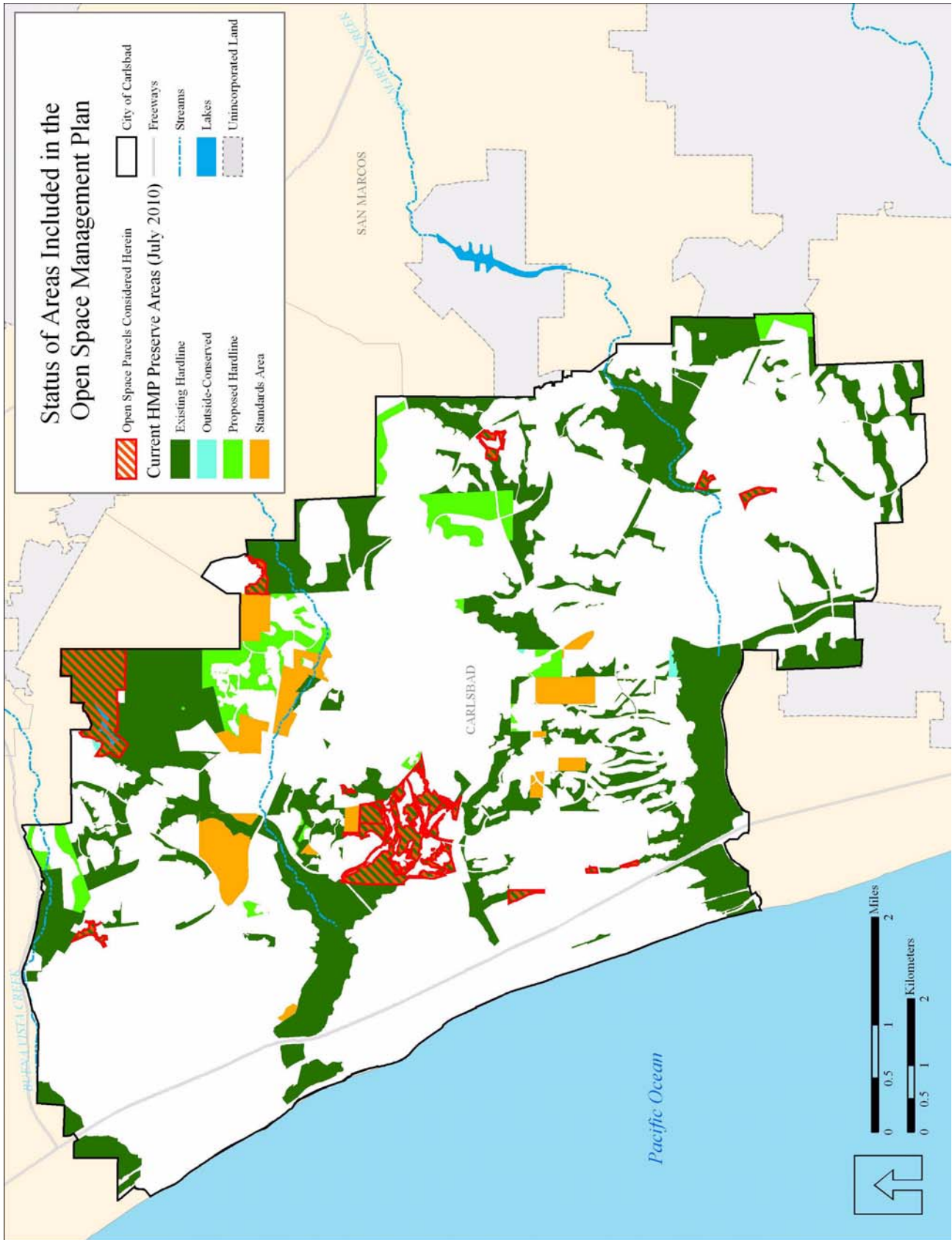
Map 1-1. Location of City of Carlsbad open space parcels considered herein.



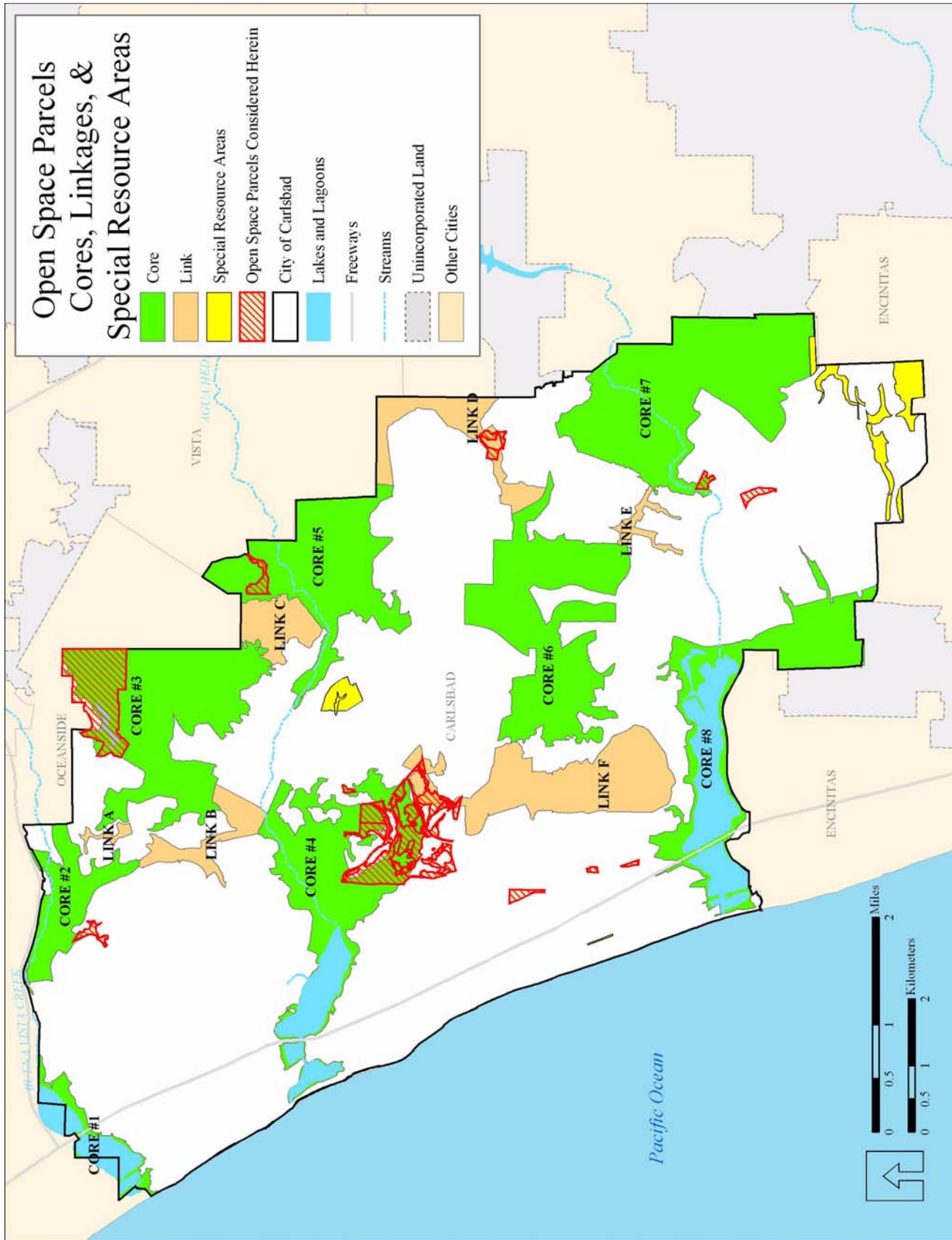
Map 1-2. Open space parcels and management units in the Open Space Management Plan.



Map 1-3. Management entities and the Carlsbad Open Space Management Plan lands.



Map 1-4. Conservation status of lands within the Open Space Management Plan.



Map 1-5. Cores, linkages, special resource areas and the Carlsbad open space parcels considered herein.

1.2 How This Plan Is Organized

This PMP follows the recommended format from Appendix D of the Carlsbad OSMP, which is consistent with the standard format for preserve management plans as defined by the California Department of Fish and Game (CDFG). The CDFG administers the NCCP program.

The first sections of this plan provide an overview of the conservation status and current natural resources condition of the parcels as a group. They serve as a descriptive inventory of wildlife and native plant habitats, which occur on, or use these lands. A statement follows the key habitat issues, preserve goals, and Area-Specific Management Directives (ASMDs) which are tied to the conditions of the HMP and Implementing Agreement. These objectives guide appropriate public uses of the preserve, preserve-level and subregional monitoring activities, operation and maintenance needs, and personnel requirements. Guidance is provided for incorporating 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.

Finally, this plan serves as a budget planning aid for preserve activities and investments, with details in Appendix E. Also included or appended are individual parcel and ASMD descriptions (Section 6); species lists (Appendix A and Appendix B); and a list of control priorities for exotic plants (Appendix C).

The following 13 properties owned by the City and managed by the Center for Natural Lands Management (CNLM), totaling 600.4 acres, are covered in this PMP:

- Batiquitos Drive Open Space, 2.7 acres
- Carillo Ranch Open Space, 16.6 acres
- Carlsbad Municipal Golf Course, 198.2 acres
- Carlsbad Village Open Space, 12.7 acres
- La Costa Canyon Park Open Space, 8.9 acres
- La Costa/Romero Open Space, 13.0 acres
- Lake Calavera Preserve, 256.1 acres
- Lagoon Lane Open Space, 2.7 acres
- Los Monos Reserve,¹ 20.5 acres
- Macario Canyon Open Space, 33.2 acres
- Poinsettia Park Open Space, 12.4 acres
- Research Center Open Space, 2.6 acres
- Veterans Park Open Space, 21.1 acres

1.3 Administration and Management of the Preserve

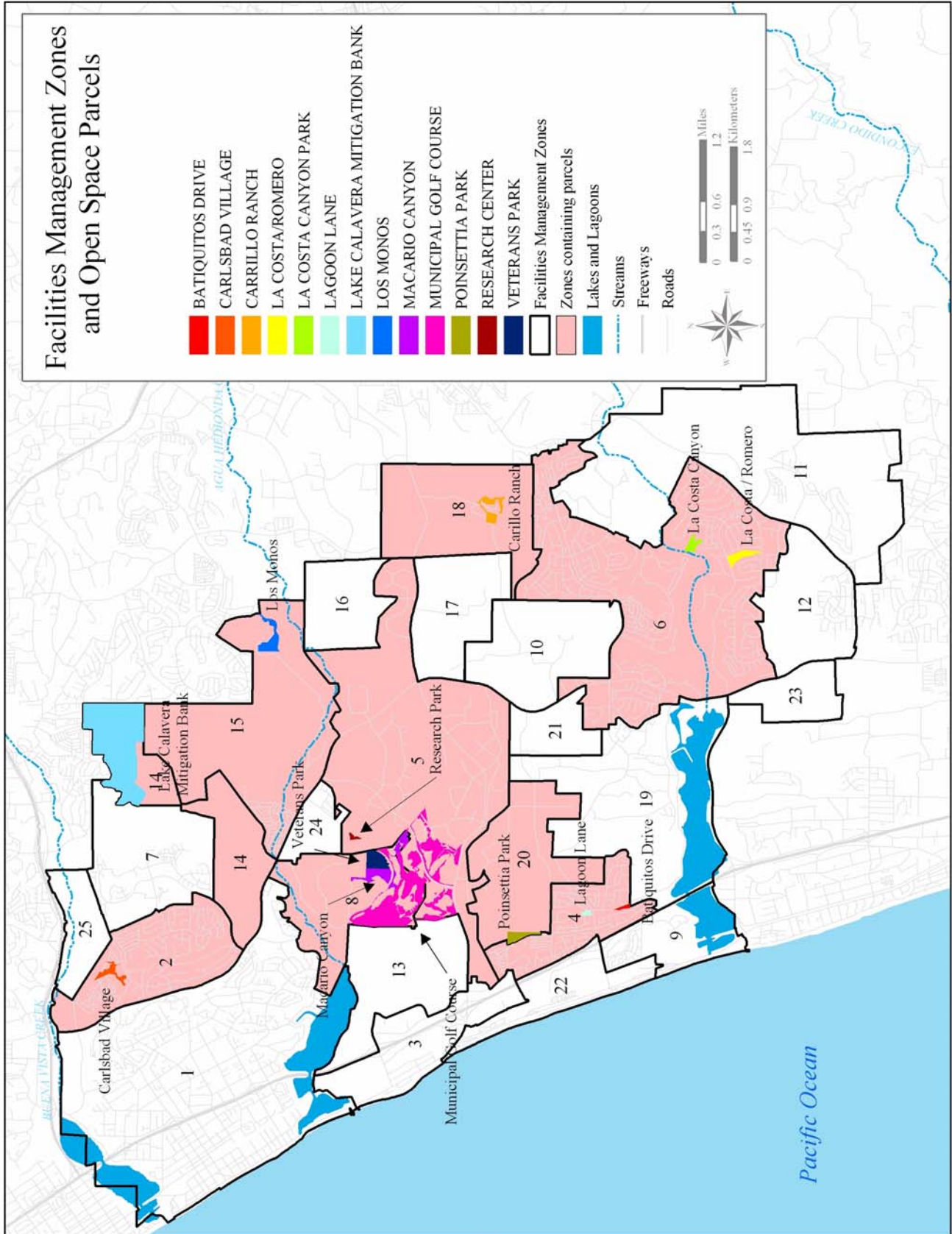
1.3.1 Management Context

The NCCP/HCP take permit/authorization requires that this PMP achieve the City's obligation to protect and enhance wildlife values pursuant to its Subarea HMP, Implementing Agreement, and OSMP.

1. City owned parcel near UCSD Dawson-Los Monos Preserve.

The City of Carlsbad organizes much of its planning functions using Local Facilities Management Zones (LFMZs) (Map 1-6). For this reason, the HMP organized and adopted certain objectives and conservation standards by LFMZ. These objectives are cross-referenced and carried forward in this Plan by each individual property and its related LFMZ (See Section 6 “Parcel Descriptions”).

Roles and responsibilities for implementing this plan are described in Section 5.1.



Map 1-6. Facilities management zones and open space parcels considered herein.

2.0 Biophysical Overview of Properties

The following sections describe the biophysical milieu of the open space parcels collectively. For more detailed information and maps on specific parcels refer to Section 6.

2.1 Geographic and Topographical Setting

The parcels considered in this PMP are scattered across the City of Carlsbad, from within three-quarters of a mile of the ocean (Batiquitos Drive Open Space) to the eastern boundary of the City, five miles inland (Carillo Ranch Open Space). Likewise, the topography within the boundaries of the individual parcels show a range of features, including lakes and minor watercourses to steep slopes of canyon walls with over 30% grades. Map 2-1 depicts the topographical setting of the City of Carlsbad and the elevation range within each open space parcel.

2.2 Property Boundaries and Adjacent Land Use

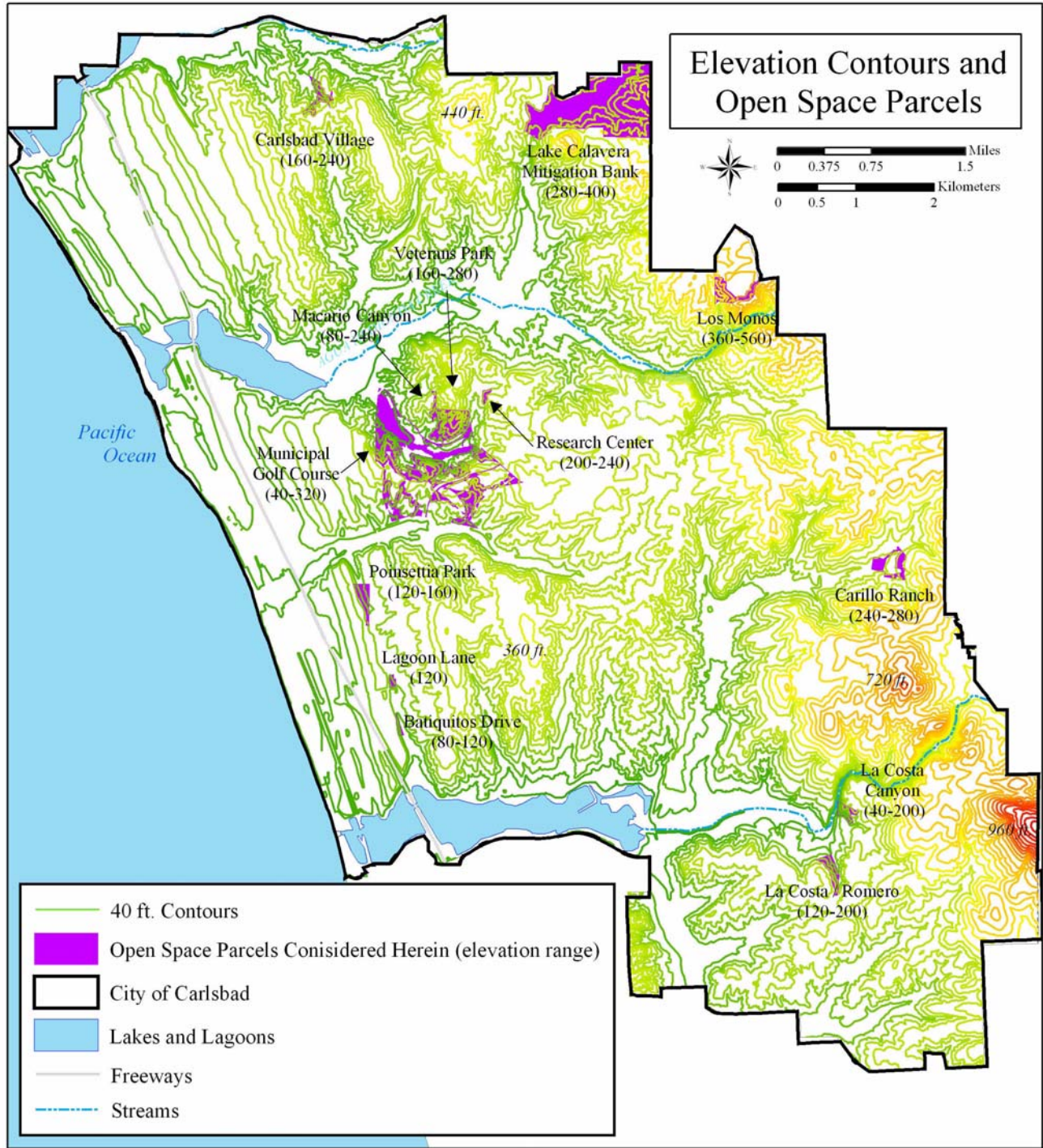
Note the placement of the urban centers of Escondido and Vista within the watershed of Carlsbad (Map 2-2). Map 2-3 shows land use within the City of Carlsbad as of 2006. Understanding this intensive urban context will guide the setting of priority activities on the individual parcels, as certain biological threats emanate from the urban setting.

2.3 Climate, Hydrology, Geology and Soils

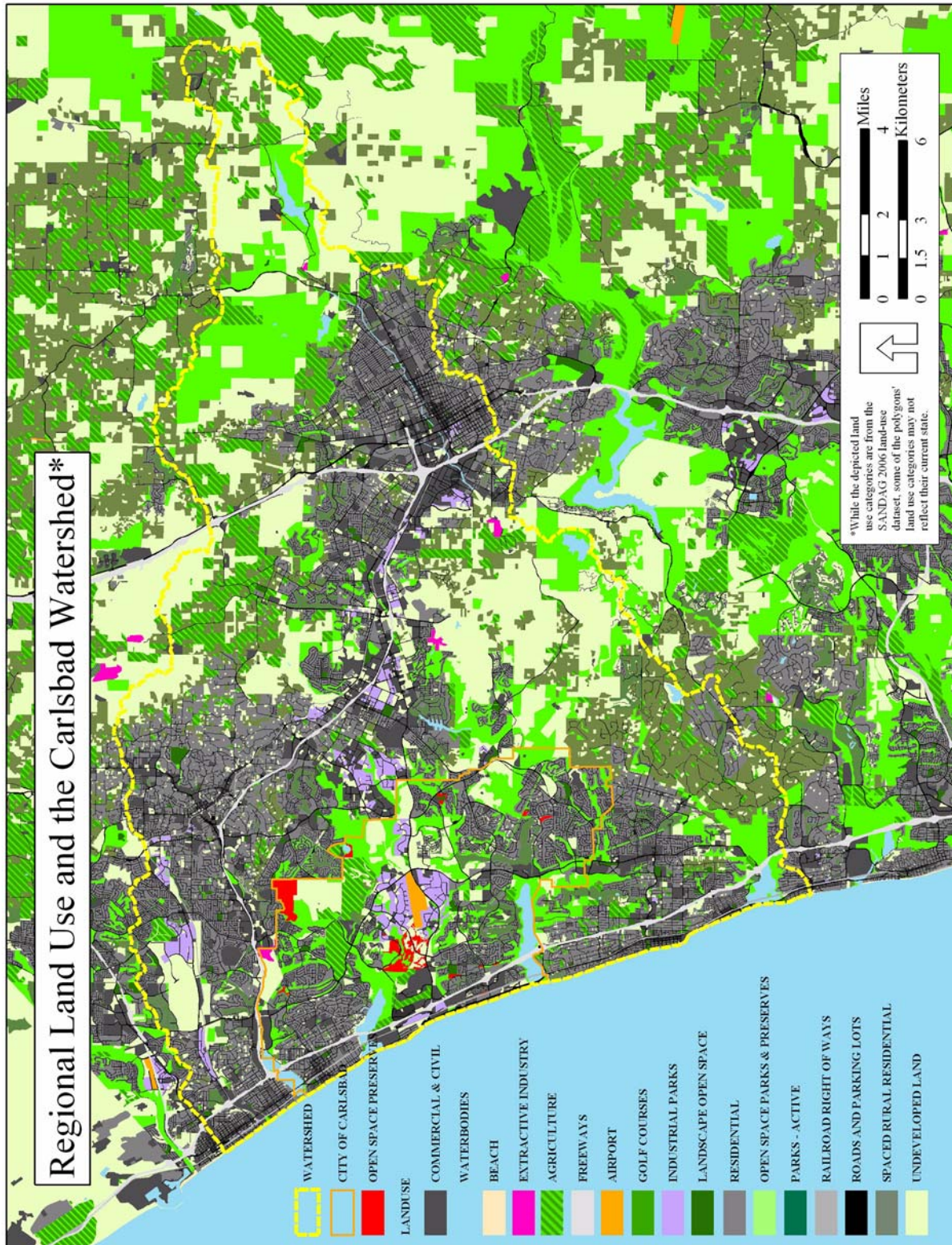
2.3.1 Climate

The local climate defines what plant and animal communities can potentially exist on preserve lands, in combination with hydrological and soil conditions. The Preserve, given its southern California coastal location, experiences a Mediterranean climate. The presence of a cold offshore current and semi-permanent high pressure ridge over the Pacific Ocean creates a climate that is similar to that found in Europe, South Africa, and Australia, and is characterized by mild winters, cool summers, infrequent rainfall, moderate daytime onshore breezes, high relative humidity, and frequent early morning clouds that disperse to hazy afternoon sunshine. Rainfall occurs in winter when the oceanic high-pressure center is at its weakest and farthest point south, and as the fringes of mid-latitude storms occasionally move through the area.

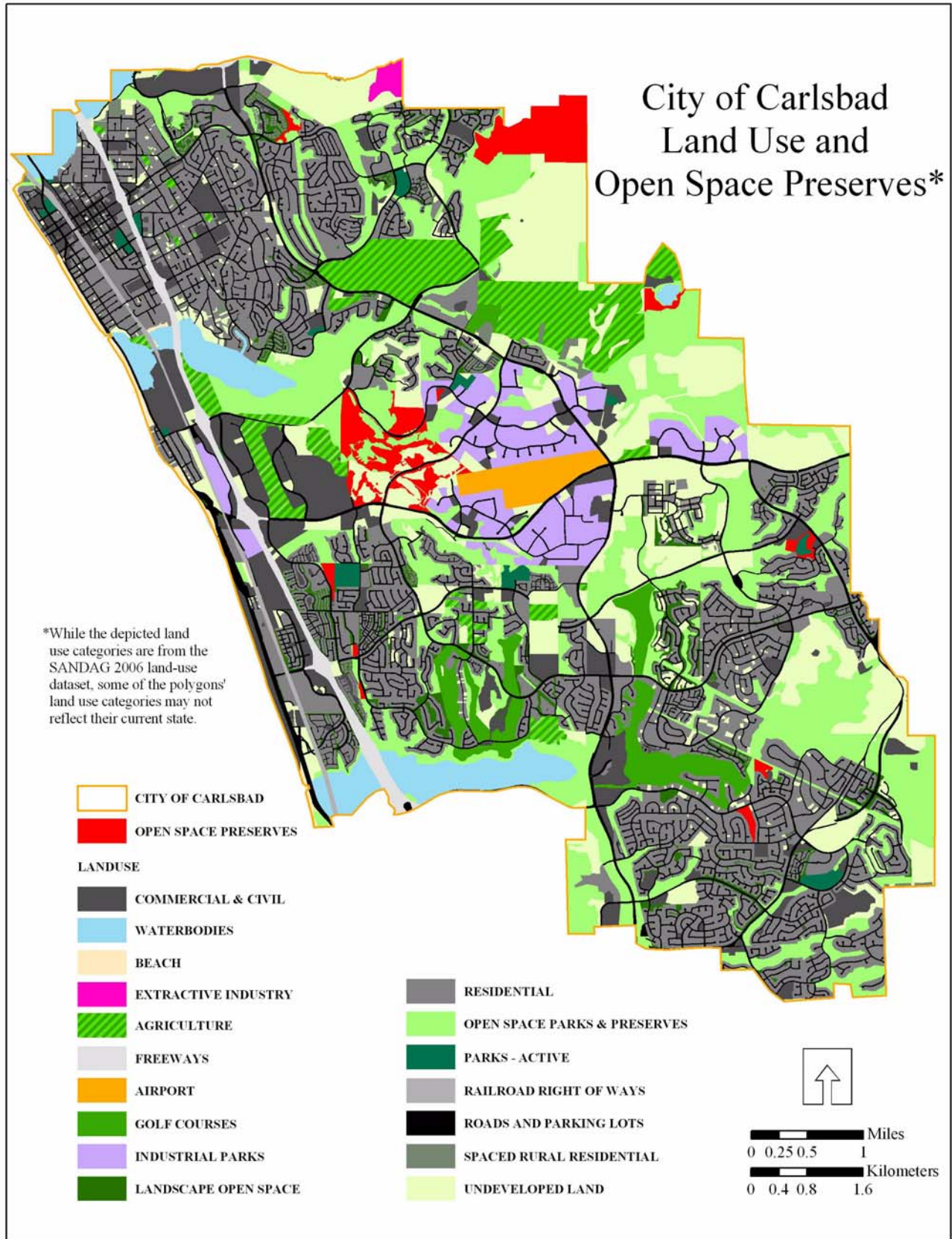
Data from two National Weather Service monitoring stations located at Oceanside and Vista (no weather stations are available from Carlsbad itself) characterize the general climate conditions (the Oceanside station has more of a coastal influence than would prevail at the coastal locations, and the Vista station is further inland and likely somewhat warmer than Carlsbad). Figure 2-1 shows the average monthly temperature regime at both weather stations (Western Regional Climate Center [WRCC] 2010). The frost-free growing season averages about 280-360 days (average dates of first and last frost).



Map 2-1. Forty-foot contours and the Carlsbad Open Space parcels.



Map 2-2. Existing regional land use, the Carlsbad watershed, and the City of Carlsbad.



Map 2-3. Existing land use within the City of Carlsbad.

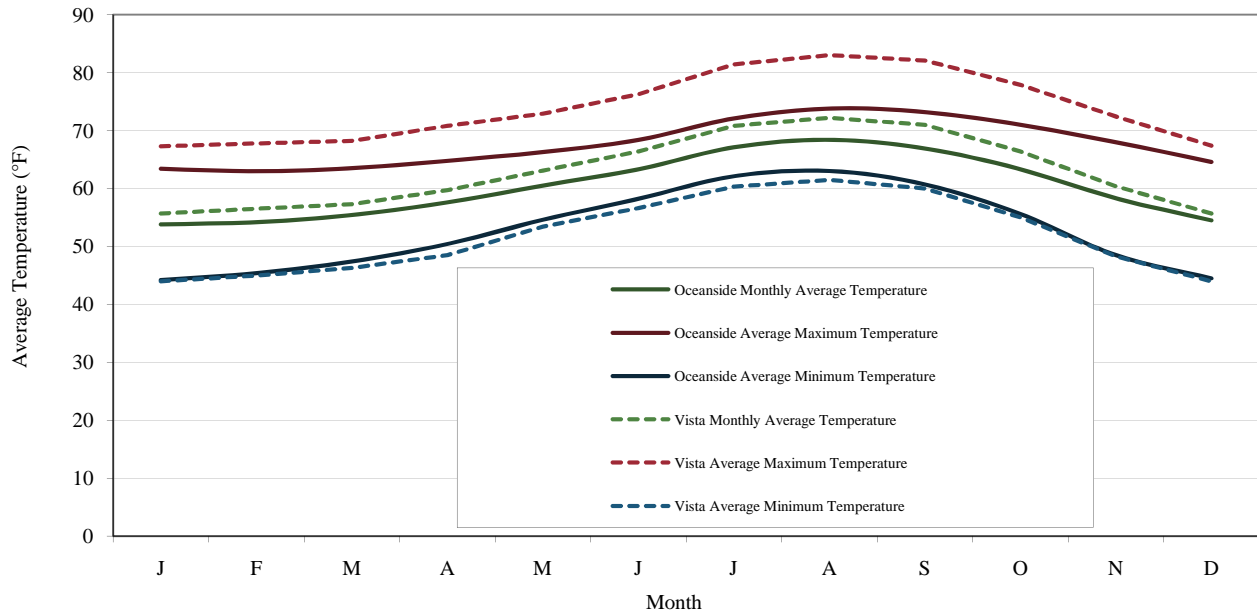


Figure 2-1. Average monthly temperature regime at two weather stations at (A) Oceanside and (B) Vista from 1953 and 2010 (Data Source: WRCC 2010).

Annual precipitation is highly variable, ranging from just 3 inches to 28 inches (Figure 2-2), with the average annual rainfall being 9.7 and 13.56 inches at Oceanside and Vista, respectively. January is usually the wettest month with an average of about 2.1-2.8 inches of precipitation, while July is usually the driest month with a mean of 0.03 and 0.1 inches of precipitation at Oceanside and Vista, respectively (Figure 2-2). In addition to rainfall, coastal fog adds to precipitation and plays an important role for coastal communities. The fall and winter are punctuated by warm, dry Santa Ana winds. El Niño conditions occur periodically, about every seven to ten years, bringing wetter than usual winters to southern California. Map 2-4 shows mean annual precipitation in northern San Diego County.

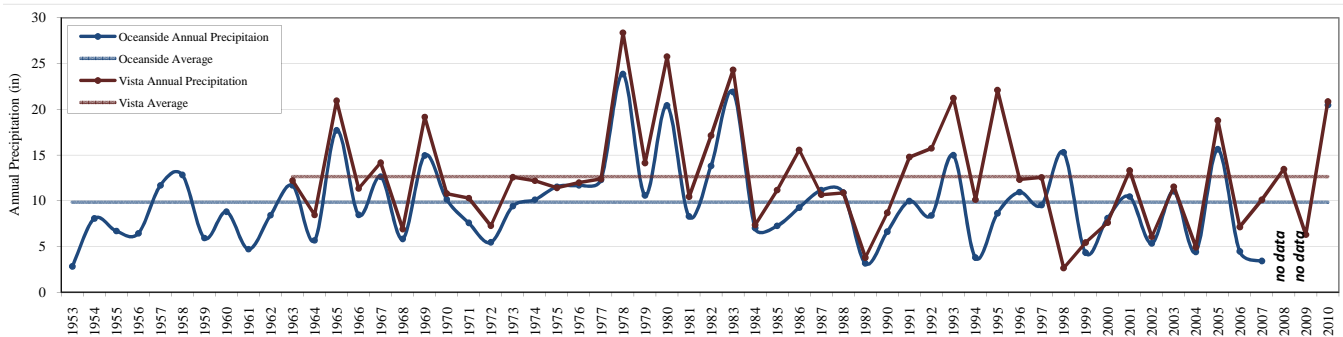
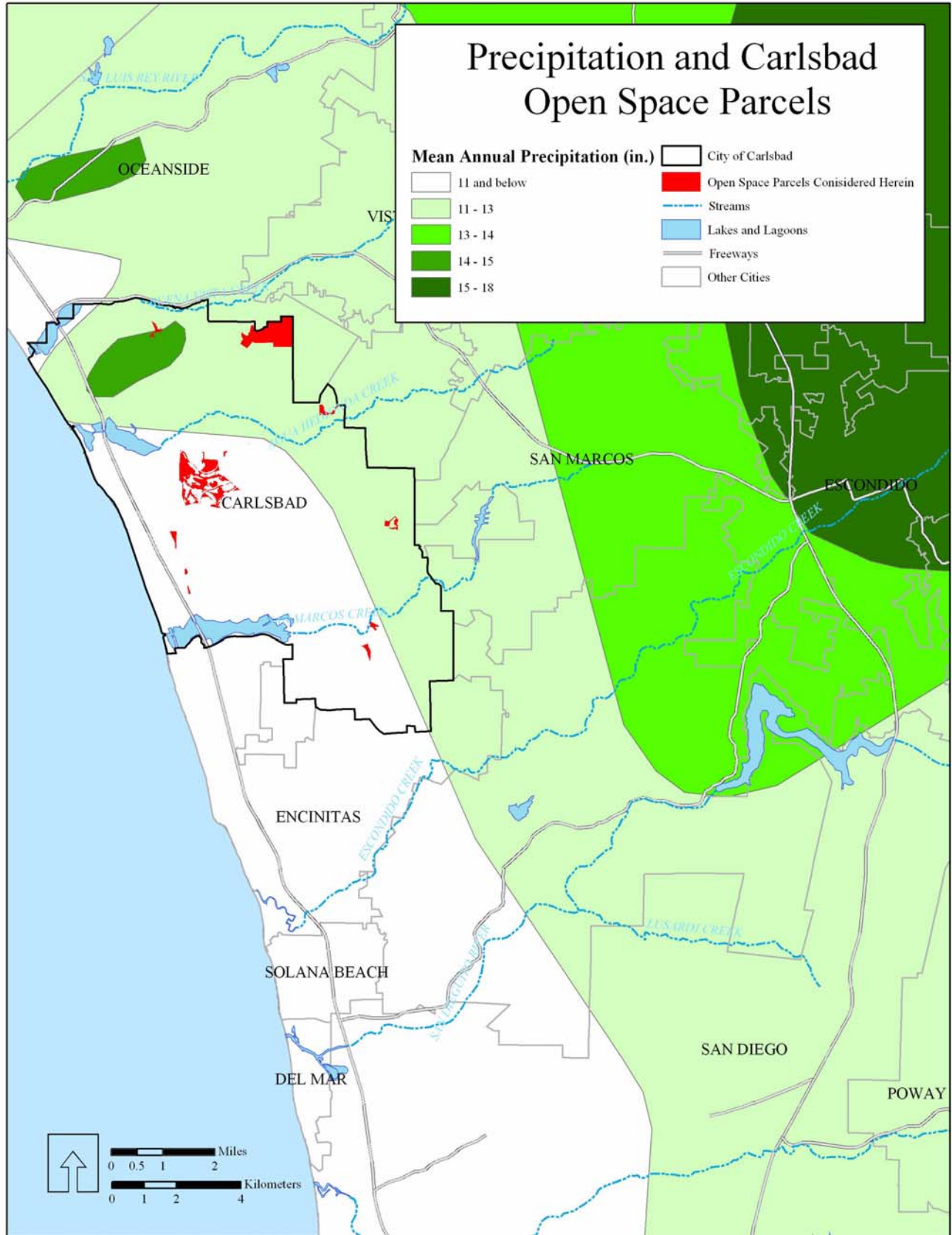


Figure 2-2. Annual precipitation at two weather stations from 1953 to 2010 (partial data available for 2006). Oceanside data covers the period from 1953 to 2007. Vista data covers the period from 1963 to 2010 (Data Source: WRCC 2010).



Map 2-4. Mean annual precipitation in northern San Diego County from 1953 to 2010.

2.3.2 Water Resources and Hydrology

All the parcels discussed in this plan are located within the Carlsbad Hydrologic Unit (See Map 2-5) of the San Diego Basin Plan (Regional Water Quality Control Board as adopted 1994, amended 2006). The Carlsbad Hydrologic Unit contains seven coastal watersheds and ten subareas that drain into either one of four major coastal lagoons or directly to the Pacific Ocean, and includes portions of Oceanside, Vista, San Marcos, Escondido, Encinitas, Solana Beach, Carlsbad, and the County of San Diego. It contains four major coastal lagoons: Buena Vista, Agua Hedionda, Batiquitos and San Elijo, and the Loma Alta Slough.

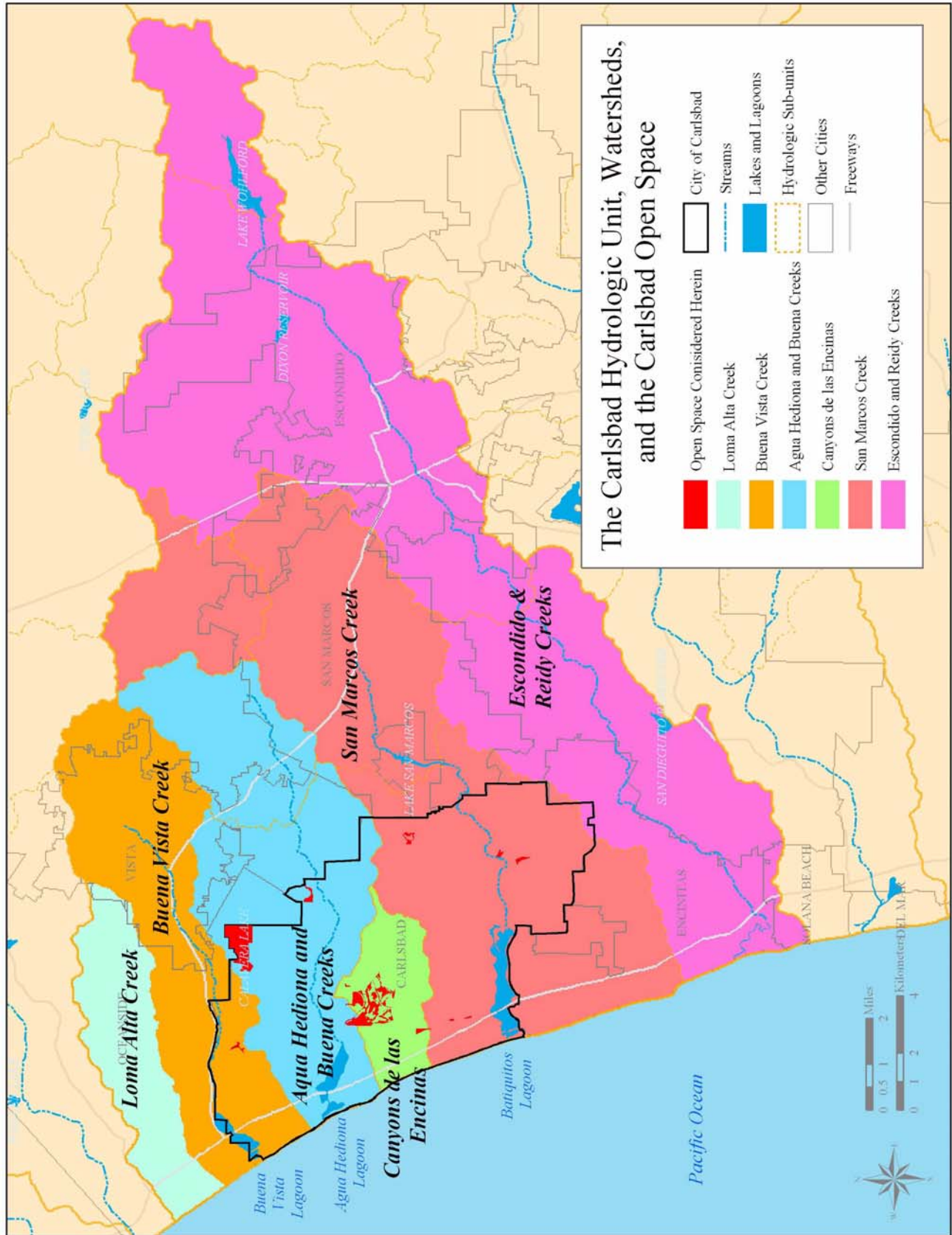
The parcels covered in this PMP are placed in their appropriate hydrologic subunit in Table 2-1, and the concerns and beneficial water uses are also identified for each subunit from the San Diego Basin Plan. These regional priorities and the regulatory framework of the Basin Plan may affect the ASMD priorities for the individual parcels. To support the Basin Plan, a Watershed Urban Runoff Management Plan (WURMP) has been created specifically for the Carlsbad Hydrologic Unit. This management plan identifies tasks related to urban runoff that all jurisdictions in the Carlsbad Hydrologic Unit are committed to implementing in order to improve the water quality of the individual watersheds.

Table 2-1. Hydrologic subunits of the Carlsbad Hydrologic Unit for the parcels covered in this PMP. These hydrologic units are used for managing water quality through the Carlsbad Watershed Management Plan (Resource Conservation District of Greater San Diego 2002), the San Diego Basin Plan (Regional Water Quality Control Board 1994, as amended), and the Carlsbad Water Urban Runoff Management Plan.

Hydrologic Subunit	PMP Parcels	Concerns	Designated Uses
Buena Vista Creek	Carlsbad Village	Buena Vista lagoon suffers from high coliform, nutrients, sedimentation and siltation. Habitat fragmentation and invasive exotic species are also concerns.	Agriculture, Industry, Contact Water Recreation, Non-contact Water Recreation, Warm Freshwater Habitat, Wildlife, and Rare Species.
Agua Hedionda & Buena Creeks	Calavera Preserve, Los Monos, northernmost portion of Municipal Golf Course	Sedimentation and coliform contamination are problems at the lagoon downstream. Habitat fragmentation and invasive exotic species are also concerns.	Municipal, Agriculture, Industry, Contact Water Recreation, Non-contact Water Recreation, Warm Freshwater Habitat, and Wildlife.
Canyons de las Encinas Creek	Municipal Golf Course (most), Research Park, Veterans Park, Macario Canyon	Sedimentation, habitat fragmentation and invasive exotic species are concerns.	Non-contact Water Recreation, Warm Freshwater Habitat, and Wildlife.
San Marcos Creek	Batiquitos Drive, Lagoon Lane, La Costa Canyon, La Costa/Romero	Sedimentation and siltation, habitat fragmentation and invasive exotic species are concerns. Lake San Marcos is experiencing regular algal blooms, likely exacerbated by urban and irrigation runoff from golf courses within the area.	Industry, Contact Water Recreation, Non-contact Water Recreation, Warm Freshwater Habitat, and Wildlife. Most of the beneficial uses focus around Batiquitos Lagoon. The lagoon is currently managed by the California Department of Fish and Game as a biological reserve, after the lagoon underwent a massive restoration effort by the Port of Los Angeles and the City of Carlsbad.

2.3.3 Geology and Soils

Forty-two different soil mapping types exist on the open spaces parcels covered in this PMP. Characteristics of these soils are presented in Table 2-2, and individual soil maps for each parcel are in Section 6. Soils in Carlsbad are a patterned complex of over 95 different loams, clays, and sands, among others. These soils are organized into landscape associations by their underlying origin, geology, and geomorphic position. They are then subdivided into mapping units based on their soil profile, surface texture, slope, and erodibility.



Map 2-5. The Carlsbad hydrologic unit and watersheds within.

Table 2-2. Characteristics of soils found on Open Space Preserves (U.S. Department of Agriculture 1973).

Soil Code	Description	Erodibility ^a	Depth (in.)	Range Site ^b
AtD	Altamont clay, 9 to 15 percent slopes	Moderate	26-38	Clayey
AtD2	Altamont clay, 9 to 15 percent slopes, eroded	Moderate	24-30	Clayey
AtE2	Altamont clay, 15 to 30 percent slopes, eroded	Moderate	20-28	Clayey
CbC	Carlsbad gravelly loamy sand, 5 to 9 percent slopes	Slight to Moderate	32-39	Sandy
CfC	Chesterton fine sandy loam, 5 to 9 percent slopes	Slight to Moderate	12-24	Acid Claypan
CID2	Cieneba coarse sandy loam, 5 to 15 percent slopes, eroded	Slight to Moderate	10-20	Shallow Loamy
CIG2	Cieneba coarse sandy loam, 30 to 65 percent slopes, eroded	High to Very High	10-20	Shallow Loamy
CmrG	Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes	High to Very High	5-15	Shallow Loamy
CnG2	Cieneba-Fallbrook rocky sandy loam, 30 to 65 percent slopes	High to Very High	20-34	Loamy
CsC	Corralitos loamy sand, 5 to 9 percent slopes	Slight to Moderate	60+	N/A
DaE	Diablo clay, 15 to 30 percent slopes	Moderate to High	25-36	Clayey
DaE2	Diablo clay, 15 to 30 percent slopes, eroded	Moderate to High	20-32	Clayey
DaF	Diablo clay, 30 to 50 percent slopes	High	20-28	Clayey
DoE	Diablo-Olivenhain complex, 9 to 30 percent slopes	Moderate to High	25-37	Claypan
ExG	Exchequer rocky silt loam, 30 to 70 percent slopes	High to Very High	8-13	Shallow Loamy
FxE	Friant rocky fine sandy loam, 9 to 30 percent slopes	High	3-15	Shallow Loamy
FxG	Friant rocky fine sandy loam, 30 to 70 percent slopes	High to Very High	3-12	Shallow Loamy
GaE	Gaviota fine sandy loam, 9 to 30 percent slopes	Moderate to High	9-20	Shallow Loamy
HrC	Huerhuero loam, 2 to 9 percent slopes	Slight to Moderate	20-43	Claypan
HrD2	Huerhuero loam, 9 to 15 percent slopes, eroded	Moderate	20-40	Claypan
HuC	Huerhuero-Urban land complex, 2 to 9 percent slopes	N/A	N/A	N/A
LeC	Las Flores loamy fine sand, 2 to 9 percent slopes	Slight to Moderate	20-40	Claypan
LeC2	Las Flores loamy fine sand, 5 to 9 percent slopes	Slight to Moderate	18-37	Claypan
LeD	Las Flores loamy fine sand, 9 to 15 percent slopes	Moderate to High	16-31	Claypan
LeD2	Las Flores loamy fine sand, 9 to 15 percent slopes, eroded	Moderate	42-52	Claypan
LeE	Las Flores loamy fine sand, 15 to 30 percent slopes	Moderate to High	16-28	Claypan
LeE2	Las Flores loamy fine sand, 15 to 30 percent slopes, eroded	Moderate to High	16-26	Claypan
LeE3	Las Flores loamy fine sand, 9 to 30 percent slopes, severely eroded	Moderate to High	16-20	Claypan
LrG	Las Posas stony fine sandy loam, 30 to 65 percent slopes	High to Very High	26-40	Shallow Loamy
LvF3	Loamy alluvial land-Huerhuero, 9 to 50 percent slopes, severely eroded	Severe	N/A	Not Suitable
MIC	Marina loamy coarse sand, 2 to 9 percent slopes	Slight to Moderate	60+	N/A
Rm	Riverwash	N/A	N/A	Not Suitable
SbC	Salinas clay loam, 2 to 9 percent slopes	Slight to Moderate	60+	N/A
ScA	Salinas clay, 0 to 2 percent slopes	Slight	60+	N/A
SnG	San Miguel-Exchequer rocky silt loams, 9 to 70 percent slopes	Moderate to Very High	18-23	Shallow Loamy
StG	Steep gullied land	Very High	N/A	N/A
TeF	Terrace escarpments	N/A	4-10	N/A
TuB	Tujunga sand, 0 to 5 percent slopes	Slight	60+	Sandy
VaB	Visalia sandy loam, 2 to 5 percent slopes	Slight	60+	N/A
VaC	Visalia sandy loam, 5 to 9 percent slopes	Slight to Moderate	60+	Loamy

a. Erodibility Rating System- Slight indicates that water erosion is a minor problem and the soil is suitable for intensive use if other factors are favorable. Moderate and Severe indicate that protective and corrective measures are needed before and during the time the soil is used.

b. Range Sites are kinds of rangeland that produce significantly different kinds and amounts of vegetation. Each site has a different potential for production of forage and presents different management problems. Clayey - The estimated total annual yield is 1,000 to 2,400 pounds per acre. The estimated total annual yield that wildlife and livestock can graze is 900 to 2,000 pounds per acre. Claypan - The estimated total annual yield ranges from 400 to 1,500 pounds per acre. The estimated total annual yield that wildlife and livestock can graze ranges from 350 to 1,350 pounds per acre. Loamy - The estimated total annual yield ranges from 600 to 1,800 pounds per acre. The estimated total annual yield that wildlife and livestock can graze is 350 to 1,200 pounds per acre. Sandy - The estimated total annual yield ranges from 300 to 1,500 pounds per acre. The estimated total annual yield that wildlife and livestock can graze is 225 to 1,000 pounds per acre. Shallow Loamy - Estimated total annual yield ranges from 50 to 300 pounds per acre. Estimated total annual yield that wildlife and livestock can graze is 25 to 150 pounds per acre.

The soils of Carlsbad are a mix of coastal plain and foothill complexes. The coastal plain soils include Huerhuero (formed from marine deposits) and the Marina-Carlsbad-Chesterton complex (formed from wind-blown sands). Low, wave-cut terrace escarpments or cliffs occur along the ancient seaward edge of the mesas which make up the coastal plain. The Diablo, Altamont, and Las Flores soils formed from marine sandstone and shale, and are older (more uplifted) and finer textured than their more coastal counterparts. The drainages that cut through these soils consist of the clay-textured Salinas soil.

Starting at about 600-800 feet in elevation, rolling to hilly uplands replace the coastal mesas. Soils of these foothills formed in place of granitic or gabbro parent material, rather than by ocean deposition. These include the Cieneba (recognizable by its granitic boulders on the surface), Fallbrook, and Vista soils on the slopes. In the alluvial drainages are Visalia and Tujung soils, which are deep and loamy.

Through use of the San Diego County Soil Survey online (<http://soildatam-art.nrcs.usda.gov/Manuscripts/CA638/0/part2.pdf>), the Preserve Manager can interpret soils on each parcel for their adaptability for various uses including recreation, habitat, restoration, and others.

2.4 Cultural Features

Currently no cultural information has been assembled for these parcels, other than the golf course. A search should be made at the San Diego Museum of Man for known cultural sites. In addition, this information may have been assembled for individual development plans associated with the parcels. The Preserve Manager is not responsible for cultural resource management.

3.0 Habitat and Species Descriptions

3.1 Vegetation Communities, Habitats, and Plant Species

A variety of vegetation communities, habitats, and plant species exist within the thirteen discontinuous parcels that are considered in this plan. Below are descriptions of the common vegetation communities that are present within the Carlsbad Open Space Preserves. Maps of the vegetation types by parcel are presented in Section 6. Excluding Lake Calavera Preserve, all vegetation maps were created during the 2009-2010 management period using the Oberbauer modified Holland Vegetation Communities Classification System of San Diego County (Oberbauer *et al.* 2008). The minimum mapping unit was ¼ acre; however, a finer scale was used for certain vegetation types.

3.1.1 Vegetation Communities

The vegetation communities reported here (except the Lake Calavera Preserve) are based on the Oberbauer modified Holland Vegetation Communities Classification System of San Diego County (Oberbauer *et al.* 2008). Recently, the State of California (CDFG) has adopted the Sawyer/Keeler-Wolf (SKW) system of classification, which is a quantitative, floristic system rather than a descriptive, physiognomic approach such as that of Holland. CNLM and City staff, as well as the Preserve Steward, agreed to using the Oberbauer *et al.* methodology during the 2009-2011 management period as the SKW system had not been adopted by most management entities and was not consistent with most vegetation maps produced in Carlsbad. All parties wanted consistent format. The SKW system is now being used for management purposes while the Oberbauer/Holland system is being used for regulatory purposes. In the future, it may be necessary to map the Preserve's vegetation communities with the SKW system.

Nonetheless, it remains important to be able to aggregate the floristic units into broader, ecologically meaningful types that are easier to interpret. The following plant community descriptions approximately follow the Oberbauer/Holland system.

Table 3-1 shows acreages of the vegetation communities by type.

Diegan Coastal Sage Scrub (DCSS). DCSS is generally dominated by California sagebrush (*Artemisia californica*), flat-top buckwheat (*Eriogonum fasciculatum*), and laurel sumac (*Malosma laurina*). Overall, the habitat is moderately tall (5-6 feet in height) and dense, but areas locally dominated by laurel sumac and lemonade-berry (*Rhus integrifolia*) typically exceed eight feet in height.

Coyote Brush Scrub. Coyote brush (*Baccharis pilularis*) is the defining plant species of this sage scrub-like plant community. It is generally found adjacent to drainages, or where excess water is available in the soil profile that can be exploited by these shrubs within a matrix of grassland.

Southern Maritime Chaparral (SMC). SMC is usually defined by a dominance of scrub oak (*Quercus berberidifolia*). Summer-holly (*Comarostaphylis diversifolia* ssp. *diversifolia*) may be locally common, or occur as a scattered element. Other plant species found in varying amounts in SMC include chamise (*Adenostoma fasciculata*), mission manzanita (*Xylococcus bicolor*), toyon, and lemonade-berry. This community is typically 5-10 feet tall and relatively dense.

Table 3-1. Vegetation community acreages for the Open Space Preserves.

Vegetation Community	BD	CR	CMGC	CV	LCC	LCR	LCP	LL	LMR	MC	PP	RC	VP	Total
Chaparral	0.3	0.0	5.5	0.0	0.0	3.9	67.5	0.0	0.0	0.7	0.0	2.3	5.9	85.8
Chamise Chaparral	0.2						13.8							14.0
Southern Maritime Chaparral			5.5			3.9				0.7		2.3	5.9	18.1
Southern Mixed Chaparral							53.7							53.7
Coastal Scrub, including transitional phases	2.6	0.3	110.8	5.8	6.9	3.3	71.3	0.8	19.2	24.7	5.6	0.0	14.9	266.1
Coastal Sage-Chaparral Scrub							0.5							0.5
Coyote Brush Scrub							2.1							2.1
Diegan Coastal Sage Scrub	0.6	0.2	101.6	3.9	6.9	2.5	67.9	0.1	8.3	24.0	4.7		11.7	232.1
Diegan Coastal Sage Scrub/Reveg							0.8							0.8
Disturbed - Diegan Coastal Sage Scrub						0.8				0.2			1.3	2.3
Diegan Coastal Sage Scrub - Baccharis Dom		0.2	9.3											9.5
Diegan Coastal Sage Scrub - Chaparral Transition	2.0			1.9				0.7	10.9		0.9			16.4
Diegan Coastal Sage Scrub - Needlegrass Grassland										0.5			2.0	2.5
Grasslands	0.0	4.4	24.9	3.3	0.0	1.5	45.2	0.0	0.0	3.4	0.0	0.0	0.0	82.7
Valley Needlegrass Grassland			0.4	0.1										0.6
Disturbed Valley Needlegrass Grassland							7.3							7.3
Saltgrass Grassland			0.2											0.2
Non Native Grassland		4.4	8.9	1.1		1.5	37.9			3.4				57.2
Non Native Grassland - Broadleaf Dominated			15.3	2.1										17.4
Riparian Scrubs	0.0	1.3	28.8	0.2	0.5	0.1	25.0	0.0	0.3	3.4	0.6	0.0	0.0	60.3
Mulefat Scrub			7.5				2.3			0.3	0.2			10.3
Riparian Scrub		0.8												0.8
Southern Riparian Scrub			21.3							3.1				24.5
Southern Willow Scrub		0.5		0.2	0.5	0.1	22.8		0.3		0.4			24.7
Riparian Woodlands	0.0	1.8	0.8	0.0	0.0	0.0	4.0	1.4	0.0	0.0	1.9	0.0	0.0	9.9
Southern Arroyo Willow Riparian Forest								1.4			1.9			3.3
Southern Riparian Woodland			0.8											0.8
Coast Live Oak Riparian Forest		1.8					4.0							5.8
Upland Woodlands	0.0	0.0	1.1	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1
Coast Live Oak Woodland							4.0							4.0
Eucalyptus Woodland			0.8											0.8
Non Native Woodland			0.3											0.3
Marshes and Wetlands	0.0	1.2	9.8	0.0	0.1	0.0	10.8	0.0	0.0	0.2	0.0	0.0	0.0	22.0
Cismontane Alkali Marsh							0.6							0.6
Coastal and Valley Freshwater Marsh			8.4				10.0			0.1				18.4
Coastal Brackish Marsh			0.3											0.3
Disturbed Wetland		0.1					0.2							0.3
Emergent Wetland			1.1											1.1
Freshwater Marsh		1.1	0.0		0.1					0.2				1.3
Other Cover Types	0.0	7.6	16.4	3.4	1.4	4.3	35.2	0.5	1.1	0.8	4.3	0.3	0.3	75.7
Non-native Vegetation							1.0							1.0
Disturbed Habitat		5.8	0.6	0.1	0.4	2.3	20.7	0.1	0.1					30.1
Ornamental Landscaping: Golf Course			3.2	2.7	1.0	1.3		0.2		0.2	1.3			9.9
Open Water					0.0		13.1							13.1
Developed		1.8	12.6	0.6		0.7	0.4	0.2	1.0	0.6	3.0	0.3	0.3	21.5
Totals	2.7	16.6	198.1	12.7	8.9	13.0	263.0	2.7	20.5	33.2	12.4	2.6	21.1	607.6

BD=Batiquitos Drive Open Space; CR=Carillo Ranch Open Space; CMGC=Carlsbad Municipal Golf Course; CV=Carlsbad Village Open Space; LCC=La Costa Canyon Park Open Space; LCR=La Costa.Romero Open Space; LCP=Lake Calavera Preserve; LL=Lagoon Lane Open Space; LMR=Los Monos Reserve; MC=Macario Canyon Open Space; PP=Poinsettia Park Open Space; RC=Research Center Open Space; VP=Veteran Park Open Space

Southern Mixed Chaparral. Southern Mixed Chaparral encompasses several on-site chaparral associations which vary due to relative abundance of component species, slope exposure, and possibly soil type. Characteristic plants in this habitat include chamise (often dominant), mission manzanita, toyon (*Heteromeles arbutifolia*), black sage (*Salvia mellifera*), and scrub oak. Incursions of narrow patches of flat-top buckwheat, laurel sumac, and California adolphia (*Adolphia californica*) are sometimes isolated components.

California Sage-Chaparral Scrub. This ecotonal community contains a high proportion of both sage scrub and chaparral indicator species, as well as plants that regularly occur in both scrub and chaparral communities (e.g. black sage, toyon). Soil fertility is poor, a trait supporting chaparral growth. However, sage scrub representation is too high to map such areas as clearly one vegetation type or the other. The community is generally 4-6 feet in height, and shrub density is considered moderate, creating a form which physically is similar to sage scrub.

Valley Needlegrass Grassland. Native bunchgrasses, primarily purple needlegrass (*Nassella pulchra*), dominate the cover. Substantial numbers of blue-eyed grass (*Sisyrinchium bellum*) can be found in mesic areas. Nonnative grasses and forbs are intermixed. Animal species associated with grassland are discussed below, in the Nonnative Grassland section, due to the far more extensive cover of nonnative grass habitat.

Nonnative Grassland. Historically, areas now dominated by nonnative grasses probably supported native grasslands and sage scrub. Conversion from these habitats probably resulted from a combination of disturbances, including agricultural practices and urban development. Slender wild oat (*Avena barbata*) is perhaps the most conspicuous dominant species, but brome grasses (*Bromus* spp.) and red-stem filaree (*Erodium cicutarium*) are also strongly represented. In some areas, the canopy can be dominated by black mustard (*Brassica nigra*) and shortpod mustard (*Hirschfeldia incana*). Other common species in Nonnative Grasslands may include fennel (*Foeniculum vulgare*), tocalote (*Centaurea melitensis*), horehound (*Marrubium vulgare*), and western jimsonweed (*Datura wrightii*).

Southern Cottonwood-Willow Riparian Forest. This community occurs along creeks where mature, often well-spaced western sycamores (*Platanus racemosa*), dominate the canopy. Arroyo willow (*Salix lasiolepis*), and Goodding's black willow (*Salix gooddingii*) form supporting elements. Mature coast live oaks (*Quercus agrifolia*) can contribute to the canopy on the upper margins away from the water. The understory may contain scattered young willows, mulefat (*Baccharis salicifolia*), western ragweed (*Ambrosia psilostachya*), mugwort (*Artemisia douglasiana*), and poison oak (*Toxicodendron diversilobum*). Wildlife use of this habitat is high.

Southern Willow Scrub. This habitat is dominated by stands of willows (*Salix* spp.). Depending on the habitat structure, these associations can be suitable for use by the least Bell's vireo (*Vireo bellii pusillus*; LBV). In addition, this habitat can support sensitive species including yellow-breasted chats (*Icteria virens*; YBCH) and the willow flycatcher (*Empidonax traillii*; WIFL) among others.

Mulefat Scrub. Stands of mulefat define this habitat which occurs within or along the margins of floodplains and is associated with other riparian types.

Southern Coast Live Oak Riparian Forest. This plant community is generally defined where coast live oaks dominate the riparian canopy. Mixed in are small numbers of western sycamores, with various species of willows being uncommon and isolated elements. The understory usually consists of dense poison oak and leaf litter.

Coast Live Oak Woodland. Coast live oaks also occur away from drainages and form a woodland when the canopy branches are less dense and interlocking. The understory is again dominated by poison oak, but lacks a streambed component.

Cismontane Alkaline Marsh. When standing water or saturated soils are present during most or all of year, this plant community may establish. High evaporation and low input of fresh water render these marshes somewhat salty, especially during the summer. Cismontane Alkali Marsh often includes southwestern spiny rush (*Juncus acutus*), spearscale saltbush (*Atriplex triangularis*), and Dombey's spike-sedge (*Eleocharis montevidensis*).

Coastal and Valley Freshwater Marsh. Freshwater Marsh is associated with inundated portions of drainages and small ponds. The dominant plant may be broad-leaved cattail (*Typha latifolia*) which forms a dense, five- to seven-foot tall canopy. Southwestern spiny rush is occasionally found at the edges, along with saltgrass (*Distichlis spicata*) and celery (*Apium graveolens*).

Ornamental/Revegetated Area (general category). The slopes abutting commercial or home developments are often planted with sage scrub and ornamentals. These include eucalyptus (*Eucalyptus* spp.), Perez rosemary (*Limonium perezii*), and a nonnative gumplant (*Grindelia* spp.) established with irrigation. In addition, this category includes areas of eucalyptus near agricultural fields, landscape plantings near commercial buildings, and stands of pampas grass (*Cortaderia jubata*).

3.1.2 Vegetation Assessments

One of the management directives of the 2009-2011 PMP (per Section 4.3) was to collect baseline characteristics of the dominant vegetation communities on each City property. The primary goal of this activity was to develop a baseline condition of habitat quality and to direct future management actions. These directives were accomplished by using California Native Plant Society (CNPS) Relevé Assessments, Oak Woodland monitoring plots and long-term Diegan coastal sage scrub monitoring plots (See Section 6 for plot locations).

3.1.2.1 CNPS Relevé Assessments

Method

General vegetation assessments were conducted using the CNPS Relevé Assessment protocol (CNPS 2011). Data collected using this protocol primarily provides information regarding the structure and species composition of each vegetation community, but also provides other relevant information that is needed to document basic long-term changes in the vegetation community. CNLM set up 20 Relevé Assessments on City properties (Table 3-2, and See Appendix 3 of CNLM 2010 for results). Each assessment was located in an area thought to be most representative of the entire vegetation community.

Results

The CNPS Relevé assessments provided a valuable insight to the cover and composition of each plant community monitored (See Appendix 3 in CNLM 2010). In general, all sites have high quality habitat, defined a vegetation assemblage that is characteristic of the specific vegetation community (structure and composition) and a low percent cover of nonnative plant species.

Table 3-2. Number and location of vegetation community assessments.

Site	# of Relevé Assessments/ Vegetation Community	DCSS Study Plot	# of Oak Woodland Assessments*
Carlsbad Village Drive	1 in DCSS		
Lake Calavera	1 in RF, 2 in NG, 1 in CC, 1 in SOC	2	1
Veterans Park/Macarario	2 in DCSS, 1 in SMC, 1 in DCSS/ NG	2	
Carillo Ranch			1
La Costa Canyon Park	1 in DCSS		
La Costa Romero	1 in DCSS		
Crossings Golf Course	2 in SWS	2	
Poinsettia Park	1 in DCSS, 1 in SWS		
Lagoon Lane	1 in RF		
Batiquitos Drive	1 in DCSS		
Los Monos	1 in SMC/DCSS		
Research Center	1 in SMC		

*During the year, City staff, City Preserve Steward and CNLM staff met with local oak tree experts. It was decided that the Preserve Steward would develop an oak woodland assessment method.

3.1.2.2 Oak Woodlands Assessments

Method

Data was collected from two oak woodland assessment plots. The goal of the work was to provide more detailed information on coast live oaks and their microhabitat as a baseline-type condition report. Each plot location was selected as a representative stand of oak trees at Lake Calavera and Carillo Ranch. Data collected from Carillo Ranch was within a stand of oaks on the western side of the property and included a census of all the oaks (see Figure 8, CNLM 2010). The diameter at breast height (DBH) of each tree was measured and a list of plant species within the study area was recorded. DBH measurements can provide some information regarding the age of each tree and stand. After taking measurements from this plot, CNLM staff altered the methodology for data collected at Lake Calavera, so that the data collection could be more easily repeated in future years. At Lake Calavera, a plot with a radius of 20 meters was developed. A global positioning system (GPS) coordinate of the center of the plot was taken, and then collected data from the nearest tree from 0 going clockwise. (CNLM staff later met with the City's Preserve Steward and Tom Coleman--an oak tree expert--during a site visit to determine if any oaks in Carlsbad had the golden spotted oak borer beetle problems, at which time it was decided that in the future, a more comprehensive method employed by Mr. Coleman should be used.)

CNLM staff collected data at the Lake Calavera property on January 29, 2010 and at the Carillo Ranch property on December 8, 2009. The global positioning coordinates for the Lake Calavera plot are UTM North 3670813.1 and UTM East 474633.6.

Results

Twenty-six individual oak trees were found within the oak assessment plot at Lake Calavera. Trees ranged from 1.27 centimeters (cm) to 91.08 cm in DBH, with a mean of 20.38 cm DBH (stdev=23.15 cm). Two trees showed signs of thinning canopy, otherwise, all trees appeared to be of good health. Dominant plant species within the plot are listed in Table 3-3.

Table 3-3. Dominant plant species within the Lake Calavera Oak Tree Assessment Plot.

Species	
<i>Quercus agrifolia</i>	<i>Malosma laurina</i>
<i>Brassica nigra</i>	<i>Erodium moschatum</i>
<i>Artemisia californica</i>	<i>Crassula connata</i>
<i>Heteromeles arbutifolia</i>	<i>Lotus scoparius</i>
<i>Lonicera subspicata</i>	<i>Carduus pycnocephalus</i>
<i>Mimulus aurentiacus</i>	<i>Amsinkia menziesii</i>
<i>Rhus integrifolia</i>	<i>Asterella</i> spp. (Liverwort)
<i>Carex triquetra</i>	<i>Hazardia squarrosa</i>
Club moss	<i>Eucrypta chrysanthemifolia</i>
<i>Claytonia</i> spp.	<i>Pholistoma racemosum</i>
<i>Cerastium glomeratum</i>	<i>Ranunculus hebecarpus</i>
<i>Marah macrocarpa</i>	<i>Nassella lepida</i>
<i>Salvia mellifera</i>	<i>Avena</i> spp.
<i>Sambucus mexicana</i>	<i>Ribes speciosum</i>
<i>Toxicodendron diversilobum</i>	

Forty-one individual oak trees were found within the oak assessment plot at Carillo Ranch. DBH ranged from 0.80 cm to 33.7 with a mean of 7.91 cm DBH (s.d.=7.88). All trees were observed to be of good health (i.e., no canopy thinning or evidence of significant insect or pathogen infestation). Dominant plant species within the assessment area are listed in Table 3-4.

Table 3-4. Dominant plant species within the Carillo Ranch Oak Tree Assessment Plot.

Species	
<i>Quercus agrifolia</i>	<i>Malosma laurina</i>
<i>Heteromeles arbutifolia</i>	<i>Schinus molle</i>
<i>Baccharis salicifolia</i>	<i>Rumex</i> spp.
<i>Leymus condensatus</i>	<i>Carduus pycnocephalus</i>
<i>Salix goodingii</i>	<i>Bromus madritensis</i> ssp. <i>rubens</i>
<i>Foeniculum vulgare</i>	<i>Typha latifolia</i>
<i>Picris echioides</i>	<i>Apium graveolens</i>
<i>Brassica nigra</i>	

3.1.2.3 Diegan Coastal Sage Scrub Monitoring Plots

Method

Although CNPS relevé assessments provide useful data for long-term preserve stewardship, more detail and information about the structure and composition of a vegetation community is needed to appropriately track and respond to change over time. The dominant vegetation community within City properties is DCSS. This is

also the dominant vegetation community in all City of Carlsbad nature reserves. It supports many of the sensitive flora and fauna protected by the City's HMP. Therefore, CNLM initiated a more thorough DCSS monitoring program at CNLM-owned and managed properties in 2009, and used this same protocol at several City properties (Appendix D). CNLM permanently installed two plots at each of the Lake Calavera, the Golf Course and Veterans/Macario Canyon preserves (see Section 5 for plot locations). These areas represent some of the largest contiguous nature stands of DCSS and most representative (i.e., not restoration areas such as at the Crossings Golf Course) areas of these vegetation community on City properties. In addition, they support the coastal California gnatcatcher (*Polioptila californica californica*; CAGN), which is one of the conditions of locating a DCSS plot to a given area. Data collected from these plots are being used in concert with other data collected on other CNLM-managed properties to evaluate long-term changes in the DCSS community in Carlsbad.

Results

Results of these DCSS plots indicate that the DCSS located on City properties is generally of very good quality, defined as having the expected species assemblage and cover, with limited disturbance from nonnative exotic species (Figure 3-1 and Figure 3-2, Table 3-5). Species richness data is summarized in Appendix 4 of CNLM 2010.

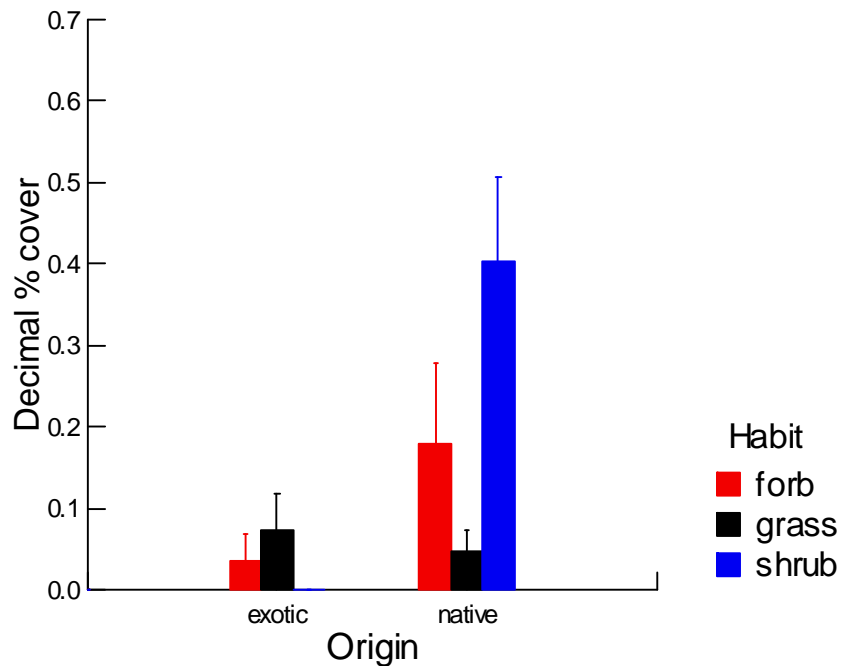
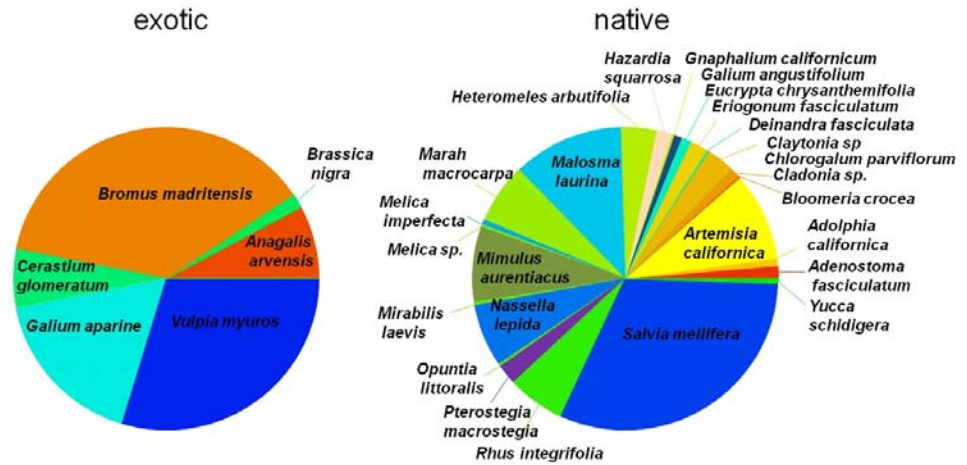


Figure 3-1. Average (+/- 1 s.e.) total percent cover for six Diegan coastal sage scrub plots in City of Carlsbad Open Space properties. Cover generated from point-intercept utilizing 50 m transects at ½ m interval for 98 total points per transect.



2010 City of Carlsbad Percent cover contribution by species

Figure 3-2. Dominant exotic and native species within the DCSS Plots.

Table 3-5. Average percent cover of plant groups within the DCSS plots.

	Exotic Forb	Exotic Grass	Native Forb	Native Grass	Native Shrub
Minimum Percent Cover	0	0	0	0	8.1
Maximum Percent Cover	18.2	24.2	56.6	12.1	65.7
Mean	3.5	7.2	17.8	4.7	40.2
Standard Deviation	7.2	9.9	22.2	5.5	23.0

3.1.3 Plant Species

CNLM noted all plant species observed on each property (Appendix A) except the Crossing Golf Course and Lake Calavera, for which this data was collected in previous years. A total of 338 species were observed, of which 227 are native and 111 are nonnative (Appendix A).

3.1.4 Animal Species

Animal species were noted during the 2009-2011 PMP term (Appendix B). A total of 103 animal species have been observed on City parcels. Of this total, 100 are considered native to San Diego. Animal data was collected during focused surveys and incidental observations for threatened and endangered species during the 2009-2011 management period. Lake Calavera data includes observations made during the 2009-2011 management period and those made by Merkel (2005). The Golf Course data includes data collected by Cotton Beland Associates (2000) and those made during LBV and southwest willow flycatchers (*Empidonax traillii extimus*) surveys (i.e. riparian areas only) during the 2009-11 management period.

3.1.5 Sensitive Species Covered by the HMP

Animal and plant species that are defined as “sensitive” are those that typically are endangered, threatened or rare, or occupy a rare vegetation or soil type, and have a listing status developed by a governmental agency or other organization. List of sensitive species that are most relevant to this PMP include both federal and state list of threatened and endangered species, HMP “covered” species lists, and MHCP “covered” species lists. The CNPS listing status is also included as they also are relevant and serve, to some extent, as an early warning system to troubled species. The HMP covered species are divided into several lists, Lists 1-3. List 1 are species given cov-

erage under the HMP; List 2 are species of whose coverage is dependent on other subarea plans being permitted; and List 3 are species which are covered contingent on funding of management of conserved areas in the region (i.e. not just Carlsbad).

The City's primary obligation for single species management and monitoring is to the HMP List 1 covered species. Species that belong to other lists are not ignored for management and monitoring purposes, especially if a threat to the species survival is discovered, but they are not given top priority. Management of this latter group is generally focused on protecting the species habitat from degradation, which is accomplished for most sensitive species observed on City properties with the management system employed by this PMP.

3.1.6 Sensitive Plant Species

The Municipal Golf Course and Lake Calavera Preserve were surveyed for sensitive plants in 2004 and in the late 1990s, respectively (See Merkel and Associates 2005 and Cotton Beland Associates 2000 for lists of survey dates). All other parcels were surveyed for sensitive plants in 2010 (See CNLM 2010 for details). All of these surveys, like all inventories in natural environments, are temporally and spatially limited and inevitably capture a subset of the total species present at a given survey location.

The sensitive plants documented to date on these properties are listed in Table 3-6 along with their sensitivity status. The recorded locations of sensitive plant species at all parcels except the Golf Course are depicted in Section 6. Only hand map files (i.e. not geographic information system [GIS] files) exist for the Golf Course; these areas will be re-surveyed during the term of this PMP to map sensitive species using GPS.

Only two state and federally listed species, thread-leaved brodiaea (*Brodiaea filifolia*) and Del Mar Manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), have been observed. These species are also Carlsbad HMP covered species (HMP List 1 and HMP List 3, respectively). Nuttal's scrub oak (*Quercus dumosa*), another HMP List 1 species, two HMP List 2 species, wart-stemmed ceanothus (*Ceanothus verrucosus*) and sticky dudleya (*Dudleya viscida*), and two other HMP List 3 species, summer-holly, San Diego marsh elder (*Iva hayesiana*), have been observed.

Thread-Leaved Brodiaea

The most notable incidental observation during term of the first PMP was the occurrence of three flowering thread-leaved brodiaea at Lake Calavera (See Section 6 "Parcel Descriptions" for their location). This indicates that more individuals are likely to occur in the area, as only a small percentage flower each year. CNLM provided the City with GPS coordinates of the location of the individuals and this information was added to the City's GIS database. CNLM also notified the Parks and Recreation staff to ensure that they were aware of the location as City planned trails occur near these individuals.

Nuttal's Scrub Oak

Another notable observation during the term of the first PMP was Nuttal's scrub oak, of which 59, 54, and 35 were observed at La Costa Romero, Macario/Veterans Park and Research Center, respectively (See Section 6 "Parcel Descriptions" for their locations). Most individual were in areas not regularly used by the public, and are relatively safe from trespass or inappropriate access.

Del Mar Manzanita

Del Mar Manzanita was observed in the late 1990s during surveys of the golf course area. Unfortunately, the total number of these individuals cannot be determined from the golf course planning technical reports. The golf course area will be re-surveyed during the term of this PMP to determine their exact status.

3.1.7 Sensitive Animal Species

The sensitive animal species occurring or with potential to occur on these properties are listed in Table 3-7 along with their MHCP and Carlsbad HMP status. The recorded locations of sensitive animal species for each parcel are shown in Section 6.

One federally listed species, the CAGN and one state and federally listed endangered species, the LBV have been observed. Both of these species are Carlsbad HMP List 1 species. HMP-covered sensitive species include five HMP List 1 species, the osprey (*Pandion haliaetus*), Cooper's hawk (*Accipiter cooperii*; COHA), YBCH, southern California rufous-crowned sparrow (*Aimphila ruficeps canescens*), and orange-throat whiptail (*Cnemidophorus hyperythrus beldingi*), and two HMP List 4 species, the spadefoot toad (*Scaphiopus [Spea] hammondi*) and black-tailed jackrabbit (*Lepus californicus bennetti*). Other sensitive species include the white-tailed kite (*Elanus leucurus*), sharp-shinned hawk (*Accipiter striatus*), and northern harrier (*Circus cyaneus*).

Coastal California Gnatcatcher

A total of 10 pair and 1 single male CAGN were found in 2009, a total of 6 pair and 3 single male CAGN were found in 2010, and a total of 10 pair CAGN were found in 2011 on all City parcels except the Golf Course. Eleven, 13, and 20 pair of CAGN were observed at the Golf Course by Dudek and Associates from 2009-2011, respectively.

In 2011, CAGN were located at Carlsbad Village Drive (1 pair), Los Monos (1 pair), Veterans Park (3 pair), Macario Canyon (1 pair), Lake Calavera (4 pair) and the Golf Course (20 pair). In addition to these CAGN observations during focused surveys, one juvenile CAGN was observed anecdotally on July 14, 2010 at the Batiqitos Drive site.

Least Bell's Vireo

A total of 1 pair and 3 single male LBV were observed at the Crossings Golf Course in 2009. This is the same number as in 2010, and each territory was essentially unchanged between years. The males may be paired, but due to the dense vegetation (and swampy soil) and an inability to access these individuals, no confirmation was able to be made. No LBV were observed in 2011 at the Golf Course. No LBV have been observed on other parcels, but suitable habitat exists at Lake Calavera, Poinsettia Park and Lagoon Lane.

Southwest Willow Flycatcher

No WIFL were observed at Calavera Lake or the Golf Course during the term of the first PMP. A willow flycatcher was reported by Cotton/Beland/Associates (2000), but it was not confirmed as ssp. *extimus*.

Other Sensitive Animals

Six YBCH territories were found at the Crossings Golf Course (4 territories) and Lake Calavera (2 territories) in 2010. COHA were detected at Lake Calavera (1 juvenile and 1 adult), and Carlsbad Village Drive (1 individual) in 2010. Two indi-

vidual southern California rufous-crowned sparrows were detected at Los Monos in 2010. Northern harriers were observed at Veterans Park/Macario and Lake Calavera in 2010. Spadefoot toads were observed by Merkel (2004) at Lake Calavera.

3.1.8 Nonnative Plants and Animals

Prior to the commencement of preserve management, many of the City parcels were being invaded by nonnative plant species. Although many of these species are benign, some are very invasive and degrade habitat very quickly. The prior PMP outlined two lists of species, termed “zero tolerance” and “moderate tolerance” species (Appendix G of the first PMP). Zero tolerance species are those that need immediate eradication as they are very invasive and damaging to ecosystems. Moderate tolerance species are those that are allowed to a certain threshold level and/or are difficult to completely eradicate and tend to be less damaging to ecosystems than zero tolerance species. The goal of the first PMP was to get the zero tolerance species removed/treated and under control to minimized their threat to the habitat. Another goal was to note moderate tolerant species for future removal. Most zero tolerant species were treated/removed during the term of the first PMP (See Section 6 “Parcel Descriptions”). In addition, black mustard and sahara mustard (in particular) and other moderate tolerance species were treated (as budget permitted). All nonnative plant species observed are listed in Appendix A. A list of moderate tolerant nonnative plant species which were observed is provided in Table 3-8; a list of zero tolerant nonnative plant species observed is provided in Table 3-9.

Three nonnative animals, the brown-headed cowbird (*Molothrus ater*), the great-tailed grackle (*Quiscalus mexicanus*), and the bull-frog (*Rana catesbeiana*) have been detected. All three species were detected at Calavera Lake and cowbirds were also observed at Poinsettia Park, Lagoon Lane and the Golf Course.

Table 3-6. Sensitive Plants Known to Occur on the Preserve.

Species	Locations Where Species Observed											Special Status ^{a, b, c, d}	
	BD ^f	CV ^f	CR ^f	LCCP ^f	LCR ^f	LL ^f	LC ^e	LM ^f	MCVP ^f	CG ^e	PP ^f		RC ^f
Thread-leaved brodiaea (<i>Brodiaea filifolia</i>)													A.1; HMP List 1; CNPS List 1B; FT, SE; NE, VP
Del Mar Manzanita (<i>Arctostaphylos glandulosa</i> ssp. <i>crassifolia</i>)										Observed			A.1; HMP List 3; CNPS List 1B; FE, SE; NE
Lewis' evening primrose (<i>Camissonia lewisii</i>)													CNPS List 3
Clay-field goldenbush (<i>Isocoma menziesii</i> var. <i>decumbens</i>)									-203				"numerous locations" CNPS List 1B
Nuttall's scrub oak (<i>Quercus dumosa</i>)					59				54			35	A.2.; HMP List 1; CNPS List 1B
California adolphia (<i>Adolphia californica</i>)					**	**	(~491)	**	*	*			CNPS List 2
Small-flowered morning glory (<i>Convolvulus simulans</i>)		25			23								CNPS List 4
Sticky dudleya (<i>Dudleya viscida</i>)				50									HMP List 2; CNPS List 1B
Wart-stemmed lilac (<i>Ceanothus verrucosus</i>)	1					16						27	A.2; HMP List 2; CNPS List 2
Summer-holly (<i>Comarstaphylis diversifolia</i> ssp. <i>diversifolia</i>)													A.2; HMP List 3; CNPS List 1B.
Western dichondra (<i>Dichondra occidentalis</i>)								Several patches	Several patches	1 patch			CNPS List 4
Palmer's grappling-hook (<i>Harpagonella palmeri</i>)				-500					2,296				CNPS List 4
San Diego marsh elder (<i>Iva hayesiana</i>)				Several patches									A.2; HMP List 3; CNPS List 2
Southwestern spiny rush (<i>Juncus acutus</i> var. <i>leopoldii</i>)				17			-250						"occasional" CNPS List 4
Ashy spike-moss (<i>Selaginella cinerascens</i>)										***			CNPS List 4
Seaside calandrinia (<i>Calandrinia maritima</i>)										60			CNPS List 4
Golden-ray pentachaeta (<i>Pentachaeta aurea</i>)								5					CNPS List 4
Short-leaf dudleya (<i>Dudleya blochmaniae</i>)										0			A.1; HMP List 1; CNPS List 1B
Small-flowered microseris (<i>Microseris douglasii</i> ssp. <i>playcarpha</i>)				1000									CNPS List 4; VP

^aMany individuals located within the Diegan coastal sage scrub; ^{**}Scattered individuals located within the Diegan coastal sage scrub; ^{***}Scattered individuals located throughout property; BD=Batiquitos Drive; CV=Carlsbad Village; CR=Carillo Ranch; LCCP=La Costa Canyon Park; LCR=La Costa/Romero; LL=Lagoon Lane; LCP=Lake Calavera; LMR=Los Monos; MCVP=Macario/Veterans Park; CG=Crossings Golf Course; PP=Poinsettia Park; RC=Research Center.

- a. MHCP Status- A.1 - MHCP covered species with site specific permit conditions, individual populations to be tracked using GIS. A.2 - MHCP covered species with habitat-based permit conditions, to be tracked as habitat, using Habitrak.
b. Carlsbad HMP Status- List 1:HMP Species Given Coverage under the Carlsbad Subarea Plan. List 2: HMP Species Coverage Contingent on Other MHCP Subarea Plans being Permitted. List 3: HMP Species Coverage Contingent on Funding for Management of Conserved Areas.
c. Federal Status- FE: Federally endangered; FT: Federally threatened; State Status- SE: State endangered; ST: State threatened; California Native Plant Society Status- CNPS List 1B: Rare, threatened, or endangered in California and elsewhere.; CNPS List 2: Rare, threatened, or endangered in California, but more common elsewhere; CNPS List 3: need more information about this plant (Review List).;CNPS List 4: Limited distribution (Watch List).
d. NE- Narrow Endemic species; VP- Vernal Pool species.
e. From documented sensitive species surveys in Cotton/Beland/Associates 2000 and Merkel and Associates 2005.
f. Data collected in 2010 (CNLM 2010).

Table 3-7. Sensitive Animals Known to Occur on the Preserve.

Species	Locations Where Species Observed ^a												Special Status ^b
	BD	CV	CR	LCCP	LCR	LL	LC	LM	MC/VP	CG	PP	RC	
Coastal California gnatcatcher (<i>Polioptila californica californica</i>)	1 indiv.	1 pair		1 pair (2009)			2 pair, 1 male	2 males	4 pair	13 pair	1 pair (2009)		FT; SCC; HMP List 1
Least Bell's vireo (<i>Vireo bellii pusillus</i>)										1 pair, 3 males			A.1; HMP List 1; FE, SE
Cooper's hawk (<i>Accipiter cooperii</i>)		Observed (2009)	Observed				Observed		Observed	Observed ^a			A.2; HMP List 1; SSC
Yellow-breasted chat (<i>Icteria virens auricollis</i>)							2 territories			4 territories	1 territory (2009)		A.2; HMP List 1; SSC
SC rufous-crowned sparrow (<i>Aimophila ruficeps canescens</i>)							Observed	Observed		Observed ^a			A.2; HMP List 1
Northern harrier (<i>Circus cyaneus</i>)							Observed	Observed (2009)		Observed			SSC
Southwest willow flycatcher ^c (<i>Empidonax traillii extimus</i>)										X ^b			A.1; HMP List 1; FE, SE
Sharp-shinned hawk (<i>Accipiter striatus</i>)							Observed ^a			Observed ^a			SSC
Tricolored blackbird (<i>Agelaius tricolor</i>)							Observed ^a						BCC, SCC
Orange-throat whiptail (<i>Cnemidophorus hyperythrus beldingi</i>)							Observed ^a			Observed ^a			A.2; HMP List 1; SSC
White-tailed kite (<i>Elanus leucurus</i>)							Occa- sional	Observed (2009)		Observed			SFP
SD black-tailed jackrabbit (<i>Lepus californicus bennettii</i>)							Observed ^a			Observed ^a			A.2; SSC
Western spadefoot toad (<i>Spea hammondi</i>)							Observed ^a						A.2; SSC

BD=Batiquitos Drive; CV=Carlsbad Village; CR=Carillo Ranch; LCCP=La Costa Canyon Park; LCR=La Costa Romero; LL=Lagoon Lane; LC=Lake Calavera; LM=Los Monos; MC/VP=Macario/Veterans Park; CG=Crossings Golf Course; PP=Poinsettia Park; RC=Research Center.

a. From sensitive species surveys in Cotton/Beland/Associates 2000 and Merkel and Associates 2005. 2010 data is from Dudek and Associates (pers.comm.)

b. Unless otherwise stated 2010 data is presented: **A.1** - MHCP covered species with site specific permit conditions, individual populations to be tracked using GIS; **A.2** - MHCP covered species with habitat-based permit conditions, to be tracked as habitat, using HabiTrak; **List 1**: HMP Species Given Coverage under the Carlsbad Subarea Plan; **List 2**: HMP Species Coverage Contingent on Other MHCP Subarea Plans being Permitted; **List 3**: HMP Species Coverage Contingent on Funding for Management of Conserved Areas; **BCC**: United States Fish and Wildlife Service (USFWS) Bird of Conservation Concern (USFWS Carlsbad Office website: <http://www.fws.gov/carlsbad/> accessed January 2007; **FE**: USFWS Federally Endangered; **FT**: USFWS Federally Threatened; **SCC**: CDFG Species of Special Concern.; **SA**: California Special Animal; **SE**: State Endangered

c. Noted as migrant and unsure if spp. extimus (Cotton/Beland/Associates 2000)

Table 3-8. Moderate Tolerance Weed Species Observed.

Species	Preserve Unit (i.e. La Costa Romero, etc.)	Locations	Size & Severity	Management Actions(2009-2011)	Planned Actions (2010-2016)
Cardoon (<i>Cynara cardunculus</i>)	Lake Calavera	Eastern side of lake near boundary	Several hundred originally found. Only a few remain.	Treated in 2010 & 2011 with good success	New individuals observed will be treated
Tocalote (<i>Centaurea melitensis</i>)	Los Monos	Along fill slope below water reservoir	Acre	None were planned	None
	Carlsbad Village Drive	Openings in DCSS on west facing slopes	Half acre	None were planned	None
	Lagoon Lane	On edges	Not a threat	None were planned	None
	Veterans Park/Macario Canyon	In grassland areas and open habitats throughout properties.	Moderate infestations.	None were planned	None
	La Costa Canyon Park	Throughout property.	High level of severity	None were planned	None
	Poinsettia Park	Scattered throughout the property	Low threat.	None were planned	None
	La Costa/Romero Street	Throughout property but mostly in grassland habitats.	High level of severity.	None were planned	None
Fuller's teasel (<i>Dipsacus sativus</i>)	Lake Calavera	Just west of Oak Riparian Park in drainage	Sporadic within less than a quarter acre	Sprayed once in 2011	Follow up treatments
Oats (<i>Avena barbata</i> , <i>Avena fatua</i>)	Los Monos	Along fill slope below water reservoir	Low density infestation	Not removed	None
	Carlsbad Village Drive	Nonnative grassland, throughout edges	Low density infestation	None were planned	None
	Veterans Park/Macario Canyon	In grassland areas and open habitats throughout properties.	Low density infestations	None were planned	None
	La Costa/Romero Street	Throughout property but mostly in grassland habitats.	High level of severity	None were planned	None
Sahara mustard (<i>Brassica tournefortii</i>)*	Los Monos	Along fill slope below water reservoir	Half acre or less	Not treated or removed	This species will be treated
	Lake Calavera	North side of lake along trails	Scattered individuals	Hand pulled 2010 & 2011	New individuals observed will be treated or hand pulled
	Bataquitos Drive	Southern end in openings	Very small	Hand-pulled 2010	New individuals observed will be treated or hand pulled
	Poinsettia Park	Near RV parking lot.	Low	None	Individuals observed will be treated or hand pulled
Rose natal grass (<i>Melinis repens</i>)*	Los Monos	Along road leading from western gate to living quarters	A dozen	Sprayed once 2009 & 2010	New individuals observed will be treated
	The Crossings	Near hole 6	Scattered clumps	Sprayed in 2011	New individuals observed will be treated
	Lagoon Lane	Along Buttercup Rd.	Less than 20 individuals	Sprayed in 2010	New individuals observed will be treated
Black mustard (<i>Brassica nigra</i>)	Los Monos	Along fill slope below water reservoir	Low density infestations	None were planned	None
	Veterans Park/Macario Canyon	In grassland areas and open habitats throughout properties.	Moderate density infestations	None were planned	This infestation will be treated
	La Costa Canyon Park	In open and cleared areas.	Low density infestations	None were planned	None
	Poinsettia Park	Scattered throughout property.	Low infestations	None were planned	

Table 3-8. Moderate Tolerance Weed Species Observed. (Continued)

Species	Preserve Unit (i.e. La Costa Romero, etc.)	Locations	Size & Severity	Management Actions(2009-2011)	Planned Actions (2010-2016)
	La Costa/Romero Street	Throughout property but mostly in grassland habitats.	Low density infestations	None were planned	None
	Carillo Ranch	Scattered throughout site.	Low density infestations.	None were planned	
	Lake Calavera	Found near north and south edges of lake; also found off Lake Blvd.	Several patches	Treated in 2011	These infestations will be treated
	The Crossings	Several areas around golf course mostly off SDGE easement roads (holes 10, 11, 13 & 17)	Very large and dense infestations near Hole 10. Other infestations are moderate	Treated some of these areas in 2010 & 2011	These infestations will be treated
Poison hemlock (<i>Conium maculatum</i>)	Carlsbad Village Drive	Openings in DCSS and SWS on western side and in ravine at bottom of west facing slope	Low density infestations	Treated in 2011	This infestation will be treated
	Veterans Park/Macario Canyon	In the main canyon	Low density infestations	None were planned	None
	Poinsettia Park	Adj. to the RV park	Low density infestations	None were planned	None
	La Costa/Romero Street	Northwestern portion of the preserve	Low density infestations	None were planned	None
	Lake Calavera	East side of lake near boundary; southern edges of lake	Large clump; scattered patches	None were planned	None
Italian ryegrass (<i>Lolium multiflorum</i>)	Carlsbad Village Drive	Dominant in nonnative grassland composing middle third of open space	Low density infestation	None were planned	
Tree tobacco (<i>Nicotiana glauca</i>)	Carlsbad Village Drive	Edges throughout	A few individuals	None were planned	None
	Veterans Park/Macario Canyon	Near old encampments and on edges of preserve.	Low density infestations.	None were planned	None
	Poinsettia Park	Scattered throughout the preserve.	Low density infestations.	None were planned	None
	La Costa/Romero Street	In canyons of preserve and some edges.	High where it occurs.	Treated in 2010 & 2011	New individuals observed will be treated
	Lake Calavera	Along Lake Blvd.	~200 individuals	Not removed	
	Batiquitos Drive	Scattered throughout	Several individuals, but very small	Sprayed in 2010, 2011	New individuals observed will be treated
Bermuda buttercup (<i>Oxalis pes-caprae</i>)	Carlsbad Village Drive	Edge of reveg, east side in northern quarter of DCSS	Low density infestation	None were planned	None
	Poinsettia Park	Scattered throughout property.	Low density infestations	None were planned	None
Bristly ox-tongue (<i>Picris echioides</i>)	Carlsbad Village Drive	Openings in hillside grasslands, wet areas	Hundreds	None were planned	None
	La Costa/Romero Street	Scattered throughout preserve in grasslands.	Low density infestations.	None were planned	None
	Carillo Ranch	Scattered.	High where it occurs.	None were planned	None
Russian thistle (<i>Salsola tragus</i>)	Carlsbad Village Drive	Disturbed bare areas, northeastern section	dozens	None were planned	None
Purple false brome (<i>Brachypodium distachyon</i>)	Veterans Park/Macario Canyon	Throughout the grasslands and open habitats.	Low density infestation	None were planned	None
	La Costa/Romero Street	In grassland habitat.	High density infestation	None were planned	None

Table 3-8. Moderate Tolerance Weed Species Observed. (Continued)

Species	Preserve Unit (i.e. La Costa Romero, etc.)	Locations	Size & Severity	Management Actions(2009-2011)	Planned Actions (2010-2016)
	Carillo Ranch	Scattered throughout site.	Low density infestation	None were planned	None
Mustard (<i>Hirschfeldia incana</i>)	Veterans Park/Macario Canyon	Scattered throughout preserve.	Low density infestation	None were planned	None
Italian thistle (<i>Carduus pycnocephalus</i>)	Poinsettia Park	Far southern portion of the preserve	High density infestation	None were planned	None
	Carillo Ranch	Along creek under oak trees	Low density infestation	None were planned	None
	Lake Calavera	Found near north and south edges of lake and along trails	Several stands/clumps	None were planned	None
Russian thistle (<i>Salsola tragus</i>)	Veterans Park/Macario Canyon	Scattered throughout preserve.	Low density infestation	None were planned	None
	Poinsettia Park	Several locations adj. to RV Park	Low density infestation	None were planned	None
Nasturtium	Poinsettia Park	Adj. to RV parking lot., about ¼ acre	High density infestation	Treated in 2011	Follow up treatments
	La Costa Canyon Park	Slope near drainage on south-east edge of property	Several individuals	Sprayed in 2010 & 2011	Follow up treatments
Smilgrass (<i>Piptatherum miliaceum</i>)	Carillo Ranch	Scattered in riparian areas under oak trees.	Low density infestation	None were planned	None
Mission prickly pear (<i>Opuntia ficus-indica</i>)	Bataquitos Drive	Throughout northern half of DCSS-chaparral	Several clumps	None were planned	None
African daisy (<i>Dimorphotheca</i> spp.)	La Costa Canyon Park	Located in upland areas	High density infestation		
Oleander (<i>Nerium oleander</i>)	La Costa Canyon Park	In drainage	Low density infestation		
African corn flag (<i>Chasmanthe floribunda</i>)	La Costa Canyon Park	Located in upland areas and in drainage	Moderate density infestation	Treated in 2010 and 2011	Follow up needed
	Carillo Ranch	Vegetated areas along creek	High density infestation	Treated in 2011	Follow up treatments
Pride-of-Madeira (<i>Echium candicans</i>)	La Costa Canyon Park	On slopes adj. to homes	Moderate to high	City asked to have these individuals left in place	None planned
Crete weed (<i>Hedypnois cretica</i>)	La Costa/Romero Street	Major threat to grassland habitat.	High		
Australian fire weed (<i>Senecio lineatifolius</i> var. <i>linearifolius</i>)	La Costa/Romero Street	One individual in wetland drainage on eastern edge of property.	Low, but has potential to increase rapidly if area is burned or disturbed.	Not removed	This species will be treated
Calla lily (<i>Zantedeschia aethiopica</i>)	Poinsettia Park	In riparian and DCSS on south-eastern portion of the preserve	Low.	Treated in 2010	Follow up treatments
Canarygrass (<i>Phalaris aquatica</i>)	Carillo Ranch	Near rock dam on western edge of preserve	Low	Treated in 2011	Follow up treatments

Table 3-9. Zero Tolerance Weed Species Observed.

Species	Preserve Unit (i.e. La Costa Romero, etc.)	Locations	Size & Severity	Management Actions(2009-2011)	Planned Actions (2010-2014)
Erect veldtgrass (<i>Ehrharta erecta</i>)*	Lake Calavera	Off Sky Haven Ln. near drainage; east side of lake in drainage	~200 individuals	Not removed	Treatments planned
	La Costa Canyon Park	Drainage area	Several individuals	Not removed	Treatments planned
Iceplant (<i>Carprobratus</i> spp.)	La Costa/Romero Street	Along western and eastern boundaries with private property	High density infestation	Not removed	Not removed, used as fuel protection for neighboring homes
	Carillo Ranch	Scattered patches throughout preserve	High	Treated in 2009 and 2010	Follow up treatments, if necessary
Iceplant (<i>Carpobrotus</i> spp.)	Lake Calavera	North side of lake along trails	Small clumps	Treated in 2011	Follow up treatments, if necessary
	The Crossings	Near hole 6 and the northern edge of the preserve near SDGE easement roads	Large clumps	Treated in 2010 & 2011	Follow up treatments, if necessary
Pampas grass (<i>Cortaderia selloana</i>)	Los Monos	Along small drainage sw corner of open space	Less than 20 individuals	Treated in 2009 & 2011	Follow up treatments, if necessary
	Lake Calavera	All throughout drainages	Few individuals	Treated in 2009, 2010 & 2011	Follow up treatments, if necessary
	Carlsbad Village Drive	West side of property near apartment buildings	Approx 20 large individuals	Treated in 2009 & 2010	Follow up treatments, if necessary
	The Crossings	Along drainage on the northeast side of the golf course near hole 15; found near SDGE easement roads on the northern side of the property	Only a few individuals	Treated in 2009 & 2010	Follow up treatments, if necessary
	Research Center	Northern edge, and along interface with landscaping	Only a few individuals	Treated in 2009 & 2010	Follow up treatments, if necessary
	Veterans Park/Macario Canyon	In several drainages and on edges.	Only a few	Treated in 2010	Follow up treatments, if necessary
	La Costa Canyon Park	In canyon	About 30 individuals	Treated in 2010	Follow up treatments, if necessary
	Poinsettia Park	In riparian area	Several small individuals	Treated in 2010	Follow up treatments, if necessary
	La Costa/Romero Street	Scattered inds. in drainage	Small infestation	Treated in 2010	Follow up treatments, if necessary
Castor bean (<i>Ricinus communis</i>)	Los Monos	Along fill slope below water reservoir	Small	Treated in 2011	Follow up treatments, if necessary
	Lake Calavera	Northern edge of boundary	A few individuals	Not removed	Treatments planned
Fountain grass (<i>Pennisetum sataceum</i>)	Los Monos	Upper fill slope below water reservoir	25-50 individuals	Treated in 2009&2011	Follow up treatments, if necessary
	Lagoon Lane	Along Poinsettia Drive	A dozen	Treated in 2009	Follow up treatments, if necessary
	Veterans Park/Macario Canyon	Along trail leading up hill on Macario Canyon portion	Only a few	Treated in 2011	Follow up treatments, if necessary
Acacia (<i>Acacia</i> spp.)	Carlsbad Village Drive	Northern section nearby service road/trail	2 individuals	Treated in 2010	Follow up treatments, if necessary
	La Costa Canyon Park	Many in drainage and in DCSS	Many	Treated in 2010	Follow up treatments, if necessary
	Poinsettia Park	Along western boundary	Many	Some removed, some trimmed back in 2010	None
Giant reed (<i>Arundo donax</i>)	Poinsettia Park	One patch near RV park	One small patch	Treated in 2011	Follow up treatments, if necessary

Table 3-9. Zero Tolerance Weed Species Observed. (Continued)

Species	Preserve Unit (i.e. La Costa Romero, etc.)	Locations	Size & Severity	Management Actions(2009-2011)	Planned Actions (2010-2014)
Crown marigold (<i>Glebionis coronarium</i>)	Carlsbad Village Drive	Along northern half of service road/trail	hundreds	None	Not planned
	Bataquitos Drive	Southern end, in openings	Very small	Hand-pulled 2010	Not planned
	La Costa Canyon Park	Many near the SDGE tower and cleared area.	Hundreds	Not planned	Not planned
	Lake Calavera	Northern edge of boundary (near Sky Haven Ln.)	Several individuals	Not removed	Not planned
Fennel (<i>Foeniculum vulgare</i>)	Carlsbad Village Drive	Grasslands, openings in DCSS	Thousands	Treated in 2009&2010	Follow up treatments, if necessary
	Veterans Park/Macario Canyon	Only a few scattered on edges and borders	Low infestation	Not treated	Not planned
	La Costa Canyon Park	In drainage	Low density infestation	Not treated	Not planned
	Poinsettia Park	Several small patches scattered throughout preserve.	Low density infestation	Not treated	Not planned
	La Costa/Romero Street	Scattered throughout preserve	Low density infestation	Treated	Follow up treatments, if necessary
	Carillo Ranch	Several in oak woodland	Low density infestation	Treated	Follow up treatments, if necessary
	Lake Calavera	East side of lake near boundary	Several individuals	Treated in 2009, 2010 & 2011	Follow up treatments, if necessary
	The Crossings	Northwest side of property near SDGE easement roads; just east of hole 17; and northeast boundary near hole 15	Several individuals	Treated in 2009& 2010	Follow up treatments, if necessary
Peruvian pepper (<i>Schinus molle</i>)	La Costa Canyon Park	Only one in DCSS	Low severity	Treated in 2010	Follow up treatments, if necessary
	Carillo Ranch	Scattered throughout property	High severity	Removed in 2010	Follow up treatments, if necessary
Brazilian pepper (<i>Schinus terebenthifolius</i>)	Lagoon Lane	Along edges	Dense	Not removed per request by City	None
	La Costa Canyon Park	Several in drainage	Low severity	Treated in 2010	Follow up treatments, if necessary
	La Costa/Romero Street	Only one or two near drainage channel	Low severity	Treated in 2010	Follow up treatments, if necessary
Mexican fan palm (<i>Washingtonia robusta</i>)	La Costa Canyon Park	Many in drainage	High severity	Treated in 2010	Follow up treatments, if necessary
	La Costa/Romero Street	Several scattered throughout preserve.	Low severity	Treated in 2010, or left in place	Follow up treatments, if necessary
	Carillo Ranch	Scattered throughout preserve.	Moderate severity	Treated in 2010	Follow up treatments, if necessary
Eucalyptus spp.	La Costa Canyon Park	In drainage	Several	Treated in 2010	Follow up treatments, if necessary
	Poinsettia Park	Many on western boundary of park	Many	Left in place per City request	None
	Carillo Ranch	Several scattered throughout property	Low severity	Treated in 2010	Follow up treatments, if necessary
Myoporum (<i>Myoporum laetum</i>)	La Costa/Romero Street	Scattered in drainage channel.	Low severity	Treated in 2010	Follow up treatments, if necessary
Tamarisk (<i>Tamarix</i> spp.)	La Costa/Romero Street	Scattered in drainage channel.	Moderate severity	Treated in 2009 & 2010	Follow up treatments, if necessary
	Carillo Ranch	In riparian area, only 1	Low severity	Low severity	Follow up treatments, if necessary
	Lake Calavera	Few on east end, and a few along Lake	Low severity	Treated in 2009 & 2010	Follow up treatments, if necessary
Shamal ash (<i>Fraxinus uhde</i>)	Carillo Ranch	Only 1 under oaks in riparian	Low severity	Treated in 2011	Follow up treatments, if necessary

Table 3-9. Zero Tolerance Weed Species Observed. (Continued)

Species	Preserve Unit (i.e. La Costa Romero, etc.)	Locations	Size & Severity	Management Actions(2009-2011)	Planned Actions (2010-2014)
Periwinkle (<i>Vinca major</i>)	Carillo Ranch	Large infestation on western edge of property	High severity	Treated in 2010	Follow up treatments, if necessary
Florist's smilax (<i>Asparagus asparagoides</i>)	Carlsbad Village Drive	In DCSS on north-facing section nearby a Mexican elderberry	Low density	None planned	None planned
	Poinsettia Park	In DCSS and riparian	Low density	None planned	None planned
	Lake Calavera	Northern boundary in drainage near trail	Small	Sprayed by contractors in 2011	Follow up treatments, if necessary
Olive (<i>Olea europaea</i>)	Batiquitos Drive	Throughout southern 2/3	Two dozen resprouting from previous cut stump treatments	Removed and treated in 2009, re-treated in 2010 & 2011	Follow up treatments, if necessary

3.2 Summary of Issues and Threats in Carlsbad Open Spaces

The large, historical losses and fragmentation of habitat continue to have impacts on a day-to-day basis both regionally and locally on these individual preserve parcels. These threats are cumulative and, to some extent, interactive. In addition, the introduction of many nonnative species (plant and animal) into habitat areas threatens native species diversity, longevity, and viability. The invasion threat of exotic plants is exacerbated in the mild climate of coastal southern California, where many horticultural introductions escape and thrive in natural areas.

In Carlsbad, the interface between preserved parcels intended for wildlife habitat conservation and the urban, built environment is the daily, local battleground for sensitive resources facing edge effects. The threats and impacts identified below are those that preserve managers are most likely to address on a day-to-day basis. Threats to habitats, species, and ecological processes may come from legal or illegal activities, and are numerous. Due to the highly fragmented configuration of open space in the City and the high edge-to-core ratio, most open space areas are or will be affected.

The following list contains general threats information. Initial parcel species threats are outlined in Section 6 for each parcel. Most of the parcel-specific threats information have been collected during the first three years of management and are used to develop goals and objectives for future management plans.

- Unwanted access to the properties for illegal recreation activities and encampments present safety and security concerns, including an increased wildfire ignition risk. These uses have subsided, but will continue unless access is managed.
- Altered fire regimes can result in declines of target management species as well as increased fuel hazards that place human life and values in the built environment at risk.
- Soil erosion can result in an essentially permanent loss in the productive capacity of an affected site, or sedimentation of downstream riparian and estuarine habitat.
- Fencing and artificial lighting may alter species composition in the affected area and restrict the necessary movement of species.
- Public access will continue to necessitate signage and other communication strategies to enforce rules that allow for uses compatible with biological objectives.
- Predator, exotic, and feral/domestic pet species can negatively impact sensitive species and reduce the likelihood of achieving other biological objectives. These conflicts are especially prevalent in urban preserves.
- Landscaping practices on adjacent properties may negatively affect biological objectives by introducing nonnative plants and animals and altering site conditions in the natural areas (through irrigation, fertilization, pest control, pruning, etc.), thus promoting shifts in species composition to nonnatives and genetic contamination from nonnative cultivars on-site or nearby.
- Continued fragmentation of the otherwise undeveloped properties immediately adjacent to, or within the matrix of, habitats connected with the PMP open spaces will negatively affect the potential for reproduction and genetic exchange within species, as well as put greater demands on resources within the PMP open spaces for motile species. Fragmentation can also have edge effects that lower the quality of habitat for certain species, affecting biological functioning.

- Persistent and increasing cover of nonnative plants may affect biological functions by reducing native biodiversity, including native plant species and native pollinators.
- Certain areas covered in this PMP have little potential to sustain healthy native communities without active restoration effort.

3.2.1 Ecological Threats Models

Ecological models are valuable tools to identify assumptions about how a particular habitat, landscape, or species could respond to natural and artificial perturbations. A model is essentially a theory and can be described using words, diagrams, computer programs, etc. While models reflect current knowledge, they are meant to be modified over time as our knowledge of, and experience with, a particular habitat or species changes. Models represent an assumption about how a particular habitat or species could respond to management practices and thus provide a rationale for the implementation of a particular management objective. Models also represent a testable hypothesis for inclusion in an adaptive management scenario.

The descriptive ecological models presented within this PMP focus on listing, describing and evaluating threats to two dominant and important plant communities, and one sensitive animal that rate the highest in importance for management and monitoring. The term “threat” has been defined in many ways and various terms have been used in lieu of threat (i.e., stressors, risk factors). The definition of a “risk factor” (a.k.a. threat) by Regan, Hierl, Franklin, and Deutschman document (Regan *et al.* 2006) is an “activity or process that threatens the viability of a population and cause negative trends in population size.” That definition is the preferred definition for the term “threat” as it is used in the rest of this PMP. Over the years, preserve threats have been closely monitored and noted and management actions have been set out to minimize these threats as listed in Table 3-8 and Table 3-9.

3.2.2 Diegan Coastal Sage Scrub and Chaparral Threats Model

Two dominant plant communities are DCSS and SMC. The dominant plant species of DCSS is California sagebush and the associated species include California buckwheat, laurel sumac, and coyote bush. The dominant plant species of SMC is chamise. Associated species include wart-stemmed ceanothus, summer holly, and Nuttall's scrub oak.

DCSS and SMC vegetation communities are adapted to a particular fire regime with fires occurring naturally, but most severely under the extreme Santa Ana heat and winds of late summer and fall. During these conditions there would generally be a “complete burn” where all above ground vegetation within the fire's path would be consumed. After such a fire, herbaceous plants, which are known to sprout after fires (fire followers), would dominate the landscape for a few years. Over time (3-5 years) the shrub lands would regain their dominance, and after 7-10 years a mature assemblage of plants and wildlife would again be found on site. However, post-fire vegetation recovery also depends greatly on many variables including fire intensity and frequency, season, community age and diversity, slope, soil type, and weather, and the availability of soil seed bank or other source material for natural regeneration.

Based on principle, it is not definitive whether or not it is imperative to provide management proxies for the natural fire regime historically experienced in sage scrub and chaparral communities in southern California prior to human habitation. Complicating this decision is the difference in historical fire regimes in DCSS and SMC communities related to species composition and diversity, proximity to the coast, etc. At least one expert does believe that there is a true risk of community type conversion due to frequent fires in addition to the possibility of community

“senescence” in the long term absence of fire (Keeley 2007). The lack of fire in a sage scrub community can result in canopy cover and species diversity reductions. A lower level of native annuals is present and in some cases, based on the length of time between fires, can disappear all together. Resident animal species that depend on these annual species are at risk of disappearing from the community. Nitrogen-fixing organisms are also greatly reduced with prolonged absence of fire (as summarized in Tierra Data 2005). Results from studies suggest that DCSS is more resilient to short fire return intervals. However, it has also been noted that this community appears to be at greater risk of type conversion to nonnative, annual grasslands. This may be a result of too great a fire return interval (5-10 years) or the increase in the fire frequency from the heavy annual grassland invasion. The apparent type conversion noted in the DCSS community may also be exacerbated by drought coupled with the slow temperature increase over the past ten thousand years. Additionally, post-fire re-sprouting in DCSS tends to be more successful in younger shrubs and at coastal sites (as summarized in Tierra Data 2005). After 25-35 years, dominant sage scrub species begin to die in areas that have not burned for 60 years or more (Tierra Data 2005).

There is some evidence that chaparral communities in particular can persist for a century or more without being burned and will recover just as well as younger stands after a fire event (Keeley 2007). However, with absence of fire in a chaparral community, a shift may occur that favors the vigorous crown sprouters, like oaks (*Quercus* spp.) and toyon. These species grow taller; increasing in canopy cover, thereby out competing the obligate seeder species like ceanothus (*Ceanothus* spp.) (Tierra Data 2005). Additionally, older chaparral stands that have gone for many years without fire lack the native, annual understory, much like a sage scrub community. And, like the sage scrub community, resident animal species that depend on these annual species are at risk of disappearing from the community. At this time, it appears that the main threat for both the DCSS and SMC communities is an altered fire regime, fire occurring at intervals that are potentially too long for healthy community development. It is highly unlikely that the HCA is threatened by too frequent of a fire return interval because of an aggressive fire suppression policy of the local fire authority.

Another issue of concern is the encroachment of nonnative plants due to the urban nature of the HCA and the existing level of nonnative plant species. Although most of the HCA has a low cover of nonnative plant species, encroachment of these species is apparent in various areas and needs to be monitored and controlled.

As previously discussed, there are also threats other than just an altered fire regime and nonnative plant species, but these two threats are the focus of our management and monitoring. In sum, management objectives focus on assessing the DCSS and SMC communities' attributes, researching the historical fire regime and the potentially negative effects of an altered fire regime in these communities, and beginning conversations with the local fire department and regulatory agencies regarding altered fire regimes and potential solutions.

3.2.3 Coastal California Gnatcatcher Threats Model

The CAGN was listed as threatened by the U.S. Fish and Wildlife Service (USFWS) in 1993 and is currently listed as a Species of Special concern by CDFG. At the time of listing, the number of pairs was estimated at between about 1,600 to 2,500 (Atwood 1990, 1992; MBA 1995; USFWS 1993). This listing was a result of concerns in a decrease in the numbers of this species due to loss and fragmentation of their habitat, DCSS. At the time of the writing of the MHCP, Carlsbad was thought to support the highest density and one of the more important coastal populations in the MHCP (about 30% of the total MHCP CAGN) (MHCP 2003).

Although there has been no collective/concurrent surveys for this species throughout its historic range, subregional and HCP level surveys have been conducted (USFWS 2009; CNLM/City of Carlsbad 2010). In 2003, the USFWS began a San Diego region-wide survey effort (covering approximately 40,000 hectares) using point counts (although most survey points are located in southern San Diego County, less than 10 are in Carlsbad). In 2010, the City of Carlsbad, in conjunction with Preserve Managers in its jurisdiction, collectively and concurrently surveyed about 75% of all suitable CAGN habitat in Carlsbad using focused surveys. USFWS estimated 1,667 pairs in their sampling frame (CI=1,240-2,176;) for 2009 surveys, which was a similar result to their 2003 and 2007 surveys. Eighty-five pair and 42 male CAGN were reported in 2010 in the City of Carlsbad. CAGN were observed across the City and in small, medium and large habitat fragments (range 1-900 acres) and suitable vegetation patch sizes (range 1 to 315 acres) (see Section 3.1.7 for City owned parcel data). Average density of CAGN in Carlsbad is between 8-12 acres per pair (CNLM/City 2010). Current density in Carlsbad is consistent with what was estimated during the MHCP planning process for coastal areas, as are the estimates of minimum (occupied) patch size (MHCP 2003).

In San Diego County, CAGN occur most commonly in DCSS dominated by California sagebush and flat-top buckwheat. Although most of the CAGN habitat in Carlsbad preserves this dominance, some protected areas, such as the Rancho La Costa Habitat Conservation Area, is dominated by black sage and laurel sumac. These latter areas also support CAGN, but in lower densities, which has been observed in other black sage-dominated areas (San Diego Association of Governments 2003). CNLM is currently monitoring DCSS habitat throughout the City, which includes collecting data on structure and composition, which are important co-variables in studying potential reasons for changes/fluctuations in CAGN population numbers. Monitoring results to date suggest that suitable, and generally good quality CAGN habitat exists throughout the City (summary of this data within this plan and CNLM 2010 for City-owned properties).

CAGN are resident species that usually breed between February and July. Typical nests support 3-4 eggs and are usually 3-4 feet from the ground in shrub species, such as coastal sagebush and buckwheat. Atwood (1999) studied nest success and found average number of fledglings per pair between 2.3 and 3.0 per season (SD 2.1-2.55) in Orange County. Nest failure is usually a result of predation by ground predators, such as raccoons (*Procyon lotor*) and other birds, primarily the scrub jay (*Aphelocoma californica*). Due to the highly urbanized nature of the City of Carlsbad, predation resulting from domestic animals, such as house cats, could lead to higher predation rates than larger, more intact areas; however, coyotes (*Canis latrans*), as observed by CNLM (CNLM 2010) and other preserve managers in Carlsbad, are very abundant, and cats are rarely observed as they are likely quickly preyed upon by coyotes. Brown-headed cowbird nest parasitism has also been known to cause nest failure (USFWS 1991 and others), which could be a problem at locations such as the Crossings Golf Course, which tend to attract cowbirds and where this species has been observed.

Although habitat loss continues to threaten CAGN, habitat conservation planning throughout San Diego County has assured many thousands of acres will be protected and the likelihood of this species' persistence is high. Although lack of habitat connectivity is a problem in many areas of San Diego, studies have shown that individuals have dispersed up to five miles and individuals are capable of traversing man-modified landscapes (Mock and Bolger 1992). Therefore, movement across Carlsbad in many areas may not be too restricted by roads and man-modified structures.

Primary threats to the species, in general, and in Carlsbad and on the Carlsbad parcels, include habitat degradation by off-trail use, dogs off-leash, and nonnative plant species, and possible habitat loss due to altered fire regime and subsequent habitat type conversion. Deterioration of habitat structure will result in less acreage of suitable nesting habitat and a likely decrease in productivity and persistence.

In sum, management objectives will be implemented that will combine the knowledge of the biology of CAGN, monitoring of the species and its habitat needs, and the challenges posed by the threats to the species.

4.0 Management Strategy

This section describes the proposed management strategies and tasks for the parcels covered in this PMP.

4.1 Definition of Terms Used in This Plan

Element. 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.

Biological Element. This element consists of species, habitats, or communities for which specific management goals have been developed with the plan.

Public Use Element. 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.

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

Fire Management Element. These are any management activities appropriate for reduction of fire-related threats to property and natural resources.

Goal. This is a statement of the intended long-range results of management.

Biological Goal. This is a statement of the intended long-range results of management based upon feasibility of maintaining, enhancing, or restoring populations or habitat.

Public Use Goal. This is a statement of the desired type and level of public use compatible with the biological element goals previously specified in the plan.

Area Specific Management Directive. An ASMD is a management work element that meets species- and habitat-specific needs in a phased manner that takes into account site-specific circumstances. The ASMDs are paired with preserve management hypotheses (assumptions and expectations for the response or outcome of management actions), which should be stated along with the ASMDs and can be tested through monitoring the results of management actions and of species and habitat status. ASMDs function as the individual projects or work elements that implement goals and are useful in planning operation and maintenance budgets. ASMDs are prioritized and described in detail in the annual work plans for each preserve area by preserve managers. The individual preserve managers identify which management issues affect their particular subunits and develop and implement the ASMDs, but in coordination with related ASMDs 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 in the Carlsbad Subarea HMP, and are incorporated into this PMP.

Adaptive Management. The City of Carlsbad expects that management and monitoring will occur through an adaptive approach. Information gained through monitoring will influence the City's management decisions regarding the next steps in the adaptive process. This approach acknowledges the lack of complete understanding of a system while at the same time recognizing the need to begin management activities. Adaptive management is a mechanism to learn more about the system since controlled experiments may not be a biologically or economically reasonable option before management action is necessary. Targeted measurement of key environmental and biological variables before and after the management action can provide insight into the effects of actions at a particular site. These actions can then be adapted to optimize the achievement of management goals.

The trigger for a change in the management approach occurs when results have not achieved the desired goal within a specified time frame. The assumptions underlying management goals must be stated explicitly and considered as hypotheses to be tested through monitoring programs that are, in effect, management experiments. The City will continue to use explicit models for experiments, observational studies, and adaptive management to implement management actions and test a priori assumptions.

4.2 Management and Monitoring Assumptions

The Preserve Manager is not responsible for the following tasks which are the responsibility of the City of Carlsbad (various departments):

- Fuel or fire zone management or fuel suppression.
- Clearing of debris from browditches, culverts, or any other man-made water control structure unless specified in this plan.
- Staking of property boundaries.
- Trail construction or maintenance.
- Permit-required habitat restoration.
- Major erosion problems (defined as problems that require local, state, federal or other agency permits, excavation, grading, or other tasks up an beyond simple sand bagging or other erosion control identified in Section 5 and the attached cost estimate).
- Removal of itinerant encampments. Preserve Manager is to find these encampments and report their location to the City. The City will remove encampment debris and trash.

4.3 Biological Element

The MHCP subregional plan includes policies and guidelines for coordinated implementation of species protection across the entire MHCP preserve system. The following section outlines ASMDs (square bullets) for vegetation associations and HMP covered species and methods to achieve these directives based on the MHCP Management and Monitoring Plan, the OSMP and the Center for Natural Lands Management experience. Although the ASMDs are consistent with the MHCP Management and Monitoring Plan, and the City of Carlsbad's OSMP, some of the timelines for surveys are adjusted to reflect comments, suggestions and requirements that the CNLM

has received on PMPs for other Center- managed properties in Carlsbad. For example, CNLM is not required on its properties to monitor shrub species on an annual basis, which is how it is outlined in the MHCP Management and Monitoring Plan.

Because they are part of the overall HMP preserve, the overall biological and conservation goals for the lands covered by this PMP are to help:

- 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 CAGN populations and movement corridors for large mammals.
- Conserve rare vegetation communities.
- Conserve narrow endemic species and maintain populations of target species.
- Remove nonnative plant species that are detrimental to the preserve areas

Parcel-specific ASMDs are also summarized in Section 6.

4.3.1 Vegetation Associations ASMDs

The ASMDs outlined below reflect the general objective of collecting information on the status of vegetation communities, such as vegetation structure and composition, threats and “health” and to address those threats summarized in Section 3.2.2. This information will help to collect ongoing information and guide future management actions. Parcels specific ASMDs are also outlined in Table 4-1 and Section 6, Section 4.7 identifies other monitoring and management tasks not outlined below.

This PMP does not provide ASMDs for all vegetation associations known to occur, but rather for the most dominant, or most sensitive, vegetation associations. In depth monitoring all vegetation associates is not deemed as necessary and would require financial resources that are not available at this time. As mentioned earlier, monitoring during the 2009-2011 period included vegetation community assessments using the CNPS Relevé method for many PMP vegetation communities. These Relevé’s do not need to be updated until about 2020, at which time they will be 10 years old.

4.3.1.1 All Vegetation Associations

- Remove or treat zero tolerance nonnative plant species (See Section 6 “Parcel Descriptions” for parcel specific details).
 - Method: The Preserve Manager will routinely survey all parcels to map and note any zero tolerance nonnative plant species (See Appendix C). These species will be removed annually. This information will be provided in each annual report and used for revisions to the PMP. Note: the City has asked that some zero tolerance species not be removed at this time (See Section 6 “Parcel Descriptions”). This includes the palm grove and myoporum trees at Lake Calavera, some eucalyptus and pepper trees at the Golf Course and others at other parcels. The City would like to use some of these areas for future mitigation purposes.
- Remove black mustard from selected locations (See Section 6 “Parcel Descriptions”).
 - Method: Black mustard will be primarily /treated using herbicide and mowing. The primary locations for these treatments are at Carlsbad Village Drive, Veterans/Macario, the Golf Course and Lake Calavera (See Section 6 “Parcel Descriptions”). Other locations may also be treated if budget permits.

- Identify threats to these vegetation communities
 - Method: The Preserve Manager will routinely visit these communities to assess currently known and potential future threats. This information will be added to the existing threats table and management recommendations will follow. This information will be provided in each annual report and used for revisions to the PMP.

4.3.1.2 Diegan Coastal Sage Scrub

The primary identified threats to DCSS appears to be the potential negative effects of an altered fire regime and nonnative plant species. Habitat attribute data such as percent cover, species diversity, and shrub height will be collected in the DCSS community to ascertain these threats. This information will be useful in identifying and evaluating the potential negative effects associated with an altered fire regime. For example, DCSS with a high cover of nonnative annual grasses may be more susceptible to type conversion with an increase in the fire return interval. This information will also be important to understanding trends in certain zoological species, such as the CAGN, which are also being monitored during the term of the PMP.

Questions:

1. What is the percent cover, species diversity, shrub height, and percent shrub mortality within the DCSS community? How does this attribute information assist in the determination of potential negative effects from an altered fire regime? Has the fire regime been altered for both communities? Is this a problem?
 - Continue to monitor these communities using the DCSS plots established in 2010 (Section 5 for plot locations) located at the Golf Course, Veterans Park/Macario and Lake Calavera. Use data derived from these plots to determine long-term vegetation management policies.
 - Method: See Appendix F. In sum, the Preserve Manager will collect data from the six study plots within selected Diegan coastal sage scrub areas in 2012, 2014 and 2016. Variables measured will include ground cover by species, percent bare ground and litter, shrub height, and species composition (richness). Other variables to be measured include mortality, recruitment, and abundance estimates of shrub species.

4.3.1.3 Coast Live Oak Woodland

Oak trees and oak woodlands are important as they provide habitat for many animal species and are generally rare in coastal San Diego County. Oak trees are very slow growing, and weeds and soil compaction limit regeneration. Oak trees in San Diego are also under threat of the gold spotted oak beetle, which is killing thousands of trees in the County. Therefore, it will be important to assess oak trees to better minimize the threats to this species and the woodland.

Questions:

1. What is the status of the health of selected oak trees and oak stands? Is the gold-spotted oak borer present?
2. Is natural regeneration and recruitment occurring in the oak stands and at levels that should be sustaining?
 - Identify any potential threats to oak woodlands and the species that depend on them.
 - Method: The threats assessment will include a survey of a sample of oak trees to look for the presences of the gold spotted oak borer and to document specific oak tree characteristics. Surveyor will fill out the current survey form (Southern California Citizen Scientist Tree Health Survey provided by the

U.S. Forest Service <http://ucanr.org/sites/gsobinfo/files/63837.pdf>). In addition, measurements (DBH and searches for seedlings) will be taken to develop age stand characteristics. These activities will occur in 2012 and 2015.

4.3.2 Covered Species ASMDs

Since the threat level is low for most of the known covered and sensitive species, only selected species will receive monitoring attention during the next five years. Those species selected for monitoring are those that are state or federally listed, may require management actions, and/or are important regionally and thus require additional data to supplement regional monitoring activities. This information will help guide future management actions or keep the City in compliance with its HMP agreements. Parcels specific ASMDs are also outlined in Section 6. Section 4.7 identifies other monitoring and management tasks not outlined below. Table 4-1 summarizes monitoring activities.

Table 4-1. Summary of Monitoring ASMDs for Vegetation Associations and Covered Species.

Resource	ASMD	Frequency or Year
All Vegetation Associations	<ul style="list-style-type: none"> ■ Monitor and survey for threats ■ Monitor and remove zero tolerance nonnative plant species ■ Remove black mustard from selected locations 	Annually
Diegan coastal sage scrub	<ul style="list-style-type: none"> ■ Assess structure and composition at existing DCSS plots 	2012, 2014, 2016
Oak woodland	<ul style="list-style-type: none"> ■ Conduct surveys to assess individual trees and sign for gold spotted oak borer or other disease/pests ■ Look for sign of natural recruitment ■ Use USFS protocol for oak assessments 	2012 and 2015
Thread-leaved brodiaea	<ul style="list-style-type: none"> ■ Survey known location at Lake Calavera ■ Map (GPS) and delineate population boundaries (GIS) ■ Assess habitat conditions 	Annually 2012-2014
Summer holly, Nuttall's scrub oak, San Diego marsh elder, other covered plant species	<ul style="list-style-type: none"> ■ Survey for and map occurrences at the Crossings Golf Course 	2012
Coastal California gnatcatcher (CAGN) Least Bell's vireo (LBV) Southwestern willow flycatcher (WIFL)	<ul style="list-style-type: none"> ■ Conduct focused surveys and map general distribution (GIS) ■ Note status (number of pairs, single individuals, etc.) 	2013 and 2016
Orange-throated whiptail Spadefoot toad Golden eagle California rufous-crowned sparrow Bell's sage sparrow San Diego black-tailed jackrabbit Southern mule deer Yellow-breasted chat Harrison's dun skipper butterfly Southwestern pond turtle	<ul style="list-style-type: none"> ■ Map general distribution (GIS) of individuals or sign as observed during CAGN surveys and other biological surveys 	During CAGN/LBV/ WIFL surveys or as noted during other management activities
Raptors (Coopers Hawk, white-tailed kited, etc.)	<ul style="list-style-type: none"> ■ Map raptor nest sites as they are observed ■ Map individuals as they are observed 	During CAGN/LBV/ WIFL surveys or as noted during other management activities
Exotic Species		
Nonnative plants, red fox, opossum, black rats, cowbirds, bullfrogs, cats, dogs	<ul style="list-style-type: none"> ■ Note these species are observed during biological monitoring activities (GIS) ■ Trap for cowbirds at Golf Course ■ Conduct bullfrog assessment at Lake Calavera. Estimate distribution and abundance. Develop/propose removal techniques 	<ul style="list-style-type: none"> ■ During other biological surveys ■ 2012

The ASMDs outlined below focus on Carlsbad HMP List 1, Narrow Endemics (that have potential to occur) and federally or state listed species, and include only those MHCP covered species which are known to occur or are highly likely to occur on City owned properties. All other sensitive plant and animal species, such as Carlsbad HMP List 2-4 or those with other sensitivity ratings (i.e. CNPS), will be noted and mapped. Future PMPs will address any potential future management and monitoring for all sensitive species.

4.3.2.1 Thread-Leaved Brodiaea

Thread-leaved brodiaea are known to occur at Calavera Lake. Only a few individuals were observed in a very disturbed grassland area and near a trail and fuel management zone. The threat of impact to this species by trail use or fuel management activities are low, as long as the trail alignment is left as-is, and as long as mowing activities are contained within their current areas (which does not include the thread-leaved brodiaea occurrence). The primary threat to this species is nonnative grasses and forbs. Individual counts and habitat assessments will be required to understand this potential threat to the species.

Questions:

1. How many individuals exist within the known occurrence at Lake Calavera? What is the plant species composition within this known occurrence? What are potential threats to this occurrence?
 - Count individual thread-leaved brodiaea within the known occurrence.
 - Method: Focused surveys will occur during the appropriate time of year (see Table 4-3) to this detect species. Each occurrence will be mapped using GPS and abundance noted. This activity will occur annually.
 - Protect locations of these species.
 - Method: The Preserve Manager will continue to remind City staff of the location and sensitivity of this occurrence.
 - Assess the habitat of this occurrence.
 - Method: A survey plot consisting of about 50 sub-plots will be constructed around the existing thread-leaved brodiaea. The size of the plot will be determined at the time of installation. The corners will be marked with rebar and GPS'd. Within each plot, the surveyor will estimate total cover of nonnative grasses and forbs and list all species observed. Total cover, richness and species composition will be determined using this method. These activities will be conducted from 2012-2014.

4.3.2.2 Nuttal's Scrub Oak, Cliff Spurge, Orcutt's Hazardia, San Diego Ambrosia, Blochman's Dudleya, and Del Mar Manzanita

As stated earlier, all City parcels have been surveyed for sensitive plant species. However, only the Crossings Golf Course does not have species locations that are geo-located. Therefore, the primary ASMD for sensitive plants during the term of this PMP is to survey for and map sensitive plant species at the Golf Course. The current threat level for these species at the other parcels is deemed very low, and thus, no monitoring activities are planned for these species at those locations.

- Survey and map existing occurrences at the Crossings Golf Course.
 - Method: The Preserve Manager will survey suitable habitat for these species at the Golf Course in 2012. Each occurrence will be mapped using GPS (either point or polygon) and abundance noted or estimated. All other sensitive plant species will also be noted and mapped.
- Outline short-term and long-term management goals and objectives if the species is observed.

- Method: The Preserve Manager will evaluate the management needs for future management plans.

4.3.2.3 Raptors

A number of raptor species have been observed within the preserve areas. The presence of these species is important as most need large acreage of land for adequate foraging (which is limited in Carlsbad) and many need mature habitat to nest. These species play an important role as the primary predator of small mammals and birds.

- Map the locations of sensitive raptor species.
 - Method: Sensitive raptor species will be noted and mapped as they are observed during focused CAGN/LBV/WIFL surveys and as incidentally located.
- Protect raptor nesting sites.
 - Method: The Preserve Manager will ensure that proper management actions will be taken to protect raptor nests. For example, the Preserve Manager will not conduct management activities that could harm the nest or nesting activities.
- Conduct any necessary tree trimming or cutting outside the breeding season in areas used by raptors.
- Eucalyptus trees will be checked for nests before removal. Eucalyptus trees have become as common a nest site as coast live oaks, according to the San Diego Bird Atlas Program (San Diego Natural History Museum [SDNHM] 2004).

4.3.2.4 Coastal California Gnatcatcher, Least Bell's Vireo, and Southwest Willow Flycatcher

As mentioned earlier, CAGN and LBV have been observed within the preserve areas. A migrant WIFL (but not confirmed as *ssp. exitimus*) was observed in the late 1990s at the Golf Course, but none have been observed since that time. These species will be monitored during the term of this PMP to continue to evaluate their abundance and distribution, to supplement monitoring efforts of all management entities in the City of Carlsbad and to ensure the City's compliance with monitoring requirements pursuant to their HMP.

CAGN monitoring is an important component to the management of the species, as it provides population status information that will assist in determining whether the number of pairs and individuals are increasing, decreasing or stable. This information, coupled with the DCSS study plot data, will allow the City to evaluate current trends and potential causes for those trends, as well as threats to the species.

Questions:

1. What is the current status (number of pair, single males, etc.) and distribution of CAGN on City-owned parcels? What are the changes in structure and composition of suitable CAGN habitat (addressed in Section 4.3.1.2)?
 - Protect and monitor the vegetation communities (2013 and 2016) and the habitat components that support the CAGN, LGV and WIFL.
 - Method: Conduct regular patrols to protect CAGN habitat from human impacts. Conduct vegetation monitoring pursuant to Section 4.3.1.1 and Section 4.3.1.2. Remove nonnative plant species that degrade habitat.
 - Conduct surveys and generate GIS data for the location and distribution of CAGN, LBV and WIFL.
 - Method: Conduct a minimum of 3 surveys separated by at least 7 days for CAGN in the month of March and April, 2013 and 2016. (Note: CAGN surveys at the golf course will be conducted by Dudek and Associates through

2012 pursuant to the golf course agency permits). Conduct up to 4 surveys for LBV and WIFL during April-July 2013 and 2016. WIFL surveys will follow the recently amended (2010) USFWS WIFL survey protocol (2000).

- Avoid activities that may disturb these species during breeding season.
 - Method: The Preserve Manager will avoid conducting activities, such as non-native plant removal, during the CAGN/LBV/WIFL breeding seasons.
- Conduct cowbird trapping.
 - Method: Cowbird trapping at the Golf Course will be conducted by Dudek and Associates through 2012 pursuant to wildlife agency permits for the golf course project. Trapping will continue in 2013-2016 at the Golf Course and may also occur at Poinsettia Park, where this species has been observed in past years.

4.3.2.5 All Other Covered or Sensitive Animal Species

No focused surveys are planned during the term of this PMP for other covered or sensitive species which include the orange-throated whiptail, spade-foot toad, golden eagle, southern California rufous-crowned sparrow, Bell's sage sparrow, San Diego black-tailed jackrabbit, southern mule deer, YBCH, Harrison's dun skipper butterfly, and the southwestern pond turtle. However, these species will be noted and mapped as they are observed during other biological survey activities and incidentally during management activities.

- Protect and manage these species primarily through the removal of nonnative species within their habitats and patrol efforts.
 - Method: The Preserve Manager will remove nonnative invasive plant species (Zero Tolerance Species per Appendix C) to protect these species. The Preserve Manager will conduct regular patrols to ensure that off-trail activities and other unwanted activities are minimized.
- Map occurrences of these sensitive species.
 - Method: Note and map sensitive species occurrences and update databases.

4.3.3 Wildlife Corridors

None of the City of Carlsbad's open space areas are found within a linkage or wildlife corridor and thus no management or monitoring activities are planned.

4.3.4 Nonnative Plants

Most zero tolerance nonnative species (Appendix C) have been controlled to the point that they no longer threatened the preserve (see threats table, Table 3-8). For the next five years, focus will be on treating any new occurrences of zero tolerance species and controlling the primary moderate tolerance species, black mustard, which has infested several locations. No other moderate tolerance species was determined to be a threat to the preserve. A description of the black mustard level and a list of zero-tolerance species for each City-owned parcel are provided in Section 6.

- Remove/treat all zero-tolerance species as they are observed. A summary of zero tolerant species with potential to occur, and their proposed removal, is provided in Section 6.
- Remove/treat the moderately tolerant nonnative plant species, black mustard, at selected locations as outlined in Section 6.
- Annually inspect property for new infestations of zero tolerant nonnative plant species.

4.3.5 Exotic and Domestic Animals

- Prevent the spread of nonnative ant species by working with adjacent landowners to prevent over-watering by irrigation and improper drainage into the preserve.
- Trap brown-headed cowbirds to reduce the threat from this species.
- Prevent the risks and potential losses and liabilities from dog use of the Preserve areas open to the public. All dogs must be confined to a leash. Stray or loose animals should be reported to the County Animal Control office.

4.3.6 Erosion Control

Most erosion within the preserve areas occurs along old degraded and unwanted trails at Lake Calavera. Volunteers, at the direction of City staff, installed gravel bags in many areas along these trails. During the term of the last PMP, erosion control was implemented at Batiquitos Drive after the removal of the olive trees (*Olea europaea*) and at La Costa Romero, in the main drainage area (including the cleaning of broad-itches). There is one large erosion gully at the Golf Course, which resulted from the abandonment of a road. CNLM had water bars and about 500 gravel bags installed to minimize future damage and allow vegetation to grow back in this area.

- Prioritize locations for control and erosion monitoring where the loss and destabilization of soil can have devastating and long-term effects on production capacity, wetland values, ecological processes, and sensitive species.
- Mitigate for minor erosion issues with the use of wattling, gravel bags, and silt fences. Specific erosion measures identified during the development of this PMP are outlined in Section 6.
- Alert the City of Carlsbad immediately to major erosion problems that are out of scope of the Preserves Manager duties and budget. Major erosion problems are defined as problems that require local, state, federal or other agency permits, excavation, grading, or other tasks up an beyond simple sand bagging or other erosion control identified in Section 6 and the attached cost estimate

4.3.7 Reporting, Updating, and HMP Coordination

Preserve Management entities are required to report annually to the City of Carlsbad, which in turn, summarizes management activities and prepares an annual report to the wildlife agencies. This commitment achieves the conservation goals of the Carlsbad HMP and the MHCP through complying with reporting requirements, report updating, and regular and effective communication and coordination.

The schedule and process for meetings and reporting below provide the City of Carlsbad's structure for:

1. Compliance monitoring (are the HMP and OSMP being implemented according to the Implementing Agreement and the conditions, policies, and guidelines established therein?); and
2. Effectiveness monitoring (is the management of the preserve system conserving the species and habitats as expected?).
 - Update this PMP every five years from its finalization. A draft update (or initial) preserve management plan is due in November of every fifth year and will be distributed to the Preserve Steward, City of Carlsbad, and Wildlife Agencies for review and comment. The final PMP will be due the following February.
 - Submit an Annual Work Plan and Annual Report each year for the Carlsbad Open Space Preserve. A draft Annual Work Plan and an Annual Report are due October 15 to the Preserve Steward, City, and Wildlife Agencies for review and comment, and the final Work Plan and Annual Report is due the following February. The Annual Report will summarize the activities accomplished during the year and any management and monitoring recommendations. The Annual Work Plan will

outline the planned monitoring and management actions for the year and include a prioritization of specific management needs and ASMDs to be implemented in the adaptive management context. See the OSMP Appendix D for required content and format. The annual update will be reviewed by the Wildlife Agencies and Preserve Steward, and be available for public review and comment.

- Attend the Quarterly Carlsbad Preserve Managers meeting to facilitate coordination among preserve areas/managers, to share ideas, address common problems, identify funding/grant opportunities (coordination of Section 6 and NCCP local assistance applications), etc. Attendance is required of Preserve Managers and the Preserve Steward. Invited attendees include the City, Coastal Commission, Wildlife Agencies, and public (key City and Wildlife Agency staff may be required for certain issues).
- Maintain frequent communication between Preserve Steward and Preserve Managers (ongoing as needed) by phone, e-mail, or in the field.
- Report emergency/critical issues to the City, Wildlife Agencies and/or Coastal Commission as needed (Preserve Manager and/or Steward to report depending on severity of issue).

4.3.8 Adaptive Management

Management of dynamic systems requires a similarly dynamic management structure that is capable of appropriate response in the context of perpetual change. Natural areas that are managed for conservation objectives are subject to a suite of changing conditions from the biological (e.g., normal population dynamics, climate change) to the legal (e.g., resident species being down-listed, de-listed, or listed) to the social (e.g., increasing pressures for recreational use). Adaptive management was a concept developed in response to these challenges and was defined as the systematic acquisition and application of reliable information to improve management over time (Wilhere 2002).

CNLM's interpretation of adaptive management embraces not only new scientific information but the possibility of new management objectives. As examples, new objectives could be the result of a change in the legal status of resident species, the need to consider a different restoration goal for the preserve because of changing climatic conditions, or a change in the preserve context whereby it either became connected with other preserves and acquired a 'metapreserve' context or became increasingly fragmented and isolated, undermining some original management objectives.

Our vision and application of adaptive management continue to grow with the maturity and experience of CNLM. At present, adaptive management is expressed and served by the following conditions:

1. Analysis and interpretation of information gathered from site and interpreted at a spatial scale that is appropriate for the site and the species: Mandatory (i.e., regulatory agency) monitoring is supplemented with additional data collection and framed appropriately such that meaningful information is gained on resident species. As appropriate for the spatial scale of the species' range, additional information from beyond the preserve may be used for interpretation. Similarly, the time scales of the species-lifespan, breeding cycles, etc.-help to determine how long information must be collected before it is biologically meaningful and can be interpreted for management purposes.
2. Appropriate management structure: We require that management plans for each preserve be updated every five years. This provides an opportunity to consider the management trajectory and review relevant information.

3. Staff selection: Preserve managers are selected who have a strong background in biological sciences, are comfortable in searching scientific literature and conducting scientifically rigorous field studies, and who have the ability to interact appropriately with the research community for management support.
4. Sound record-keeping: Just as adaptation in the evolutionary sense depends on inheritance from one generation to another of the trait of interest, so too adaptive management relies on a strong institutional memory that transcends individual managers.
5. Developing long-term relationships with researchers: The expertise needed to guide conservation-directed management is multi-disciplinary and best served by a team approach. Preserve managers accommodate requests from researchers to use the preserves for on-site research projects, barring any significant risks to native species and the environment. They also invest in relationships with the research community as an ongoing source of support for decision-making.
6. Management stability: One of the preconditions identified by Lee (1993) for genuine adaptive management is sufficient (institutional) stability to measure long-term outcomes. CNLM's agreements for preserve responsibility-whether pertaining to ownership, management, or conservation easement compliance (or a combination)-are in effect in perpetuity. This provides the necessary stability and time frame for effective adaptive management.

Section 6 is based on research and monitoring activities that occurred in the previous six years. The majority of the objectives and methods listed in the following section are a result of adaptive management decisions that were arrived upon based on observations, data gathering and data analysis during HCA surveys, projects, and other activities during 2005-2010. Additionally, the goals listed in Section 6 are similar in nature to the goals identified in the MHCP.

4.4 Public Use Element

Public use may include any recreational, scientific or other use activity appropriate to and compatible with the purposes for which this preserve area is managed. The preserve, with proper stewardship, is a significant amenity to the surrounding community, and has been used historically for recreation. The Preserve Steward recognizes that informing and educating adjacent residents and businesses of the preserve's value as open space and wildlife habitat will be essential to maintaining the current resource levels found on-site. Without local support, there will be ongoing degradation through misuse, vandalism, poaching and trash dumping. With an actively involved community there will be hundreds of eyes and ears keeping a vigilant watch over the habitat.

4.4.1 Public Use ASMDs

- Prohibit public access to any City-owned parcels other than Calavera Lake, the Carlsbad Village Drive parcels, La Costa Canyon Park, and Veterans/Macario Canyon because other parcels contain at-risk resources, or because they lack accessible or sufficiently ample terrain to implement a trail system. The City of Carlsbad is responsible for all trails, trail construction and trail maintenance within City-owned properties.
- The Preserve Manager will patrol and enforce preserve rules and regulations on a regular basis. An outline of the proposed patrolling schedule (i.e. weekly, monthly, quarterly) for each City-owned parcel is provided in Section 6.

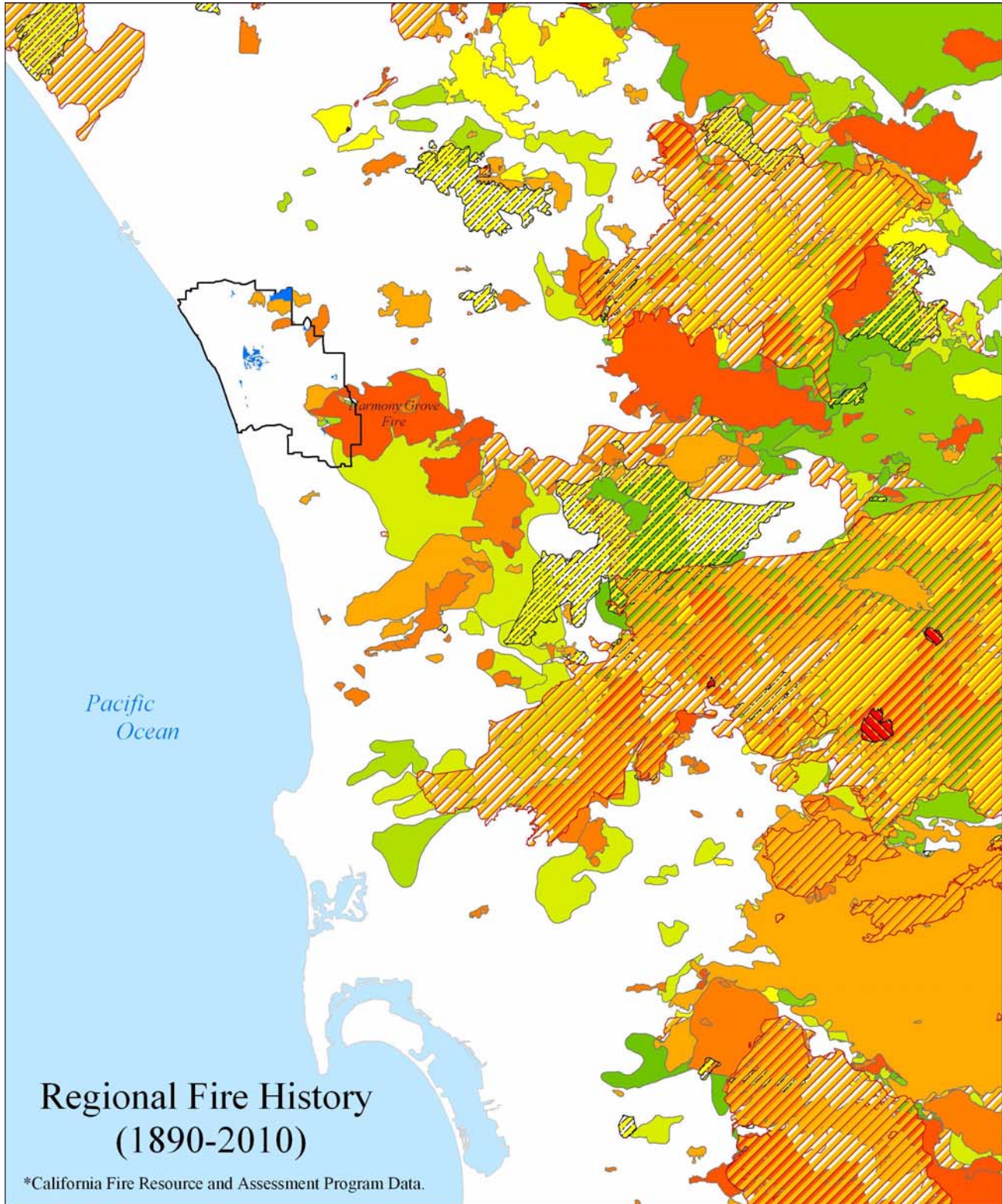
- The Preserve Manager will work with the City of Carlsbad Trails Coordinator to suggest trail improvements and resolution of problem areas at Calavera Lake.
- The Preserve Manager will maintain existing fences, which include the three-strand wire, post and rail at Lake Calavera and the chain link fence at the southern side of La Costa Romero. Fences used to block unwanted trail use at Lake Calavera will also be maintained.
- The Preserve Manager will participate in volunteer events associated with National Public Lands Day, Earth Day, National Trails Day and any other event in which the City asks for attendance. The goal is for the preserve manager to educate the public and bring awareness of natural resources in local neighborhoods.
- The Preserve Manager, with permission from the City, will allow access to City-owned property for science and research as appropriate.
- The Preserve Manager will enforce the following rules for access:
 - Dogs on leashes only.
 - No motorized vehicles.
 - No horseback riding.
 - Mountain biking allowed at Lake Calavera only.
 - Hiking on designated trails only.
 - No collecting of plant and wildlife species.
 - No hunting or shooting.
 - No camping.
 - No smoking or drinking of alcoholic beverages.
- The Preserve Manager will post appropriate signage on each City-owned parcel. Each sign will identify that the property is protected habitat, the City as the owner, contact information, a list of prohibited activities and other pertinent information.
- The Preserve Manager is not required to protect the Lake Calavera dam, spill way or associated structures and is not currently required to enforce the no human swimming or fishing rules at Lake Calavera.
- The Preserve Manager will update existing mini-kiosk with educational literature.
- The Preserve Manager will remove debris and trash within the properties.

4.5 Fire Management Element

All fuel management is the responsibility of parties other than the Preserve Manager. There are fuel zones along the northern and eastern boundaries of Calavera Lake and within the northern areas of La Costa/Romero. Other fuel modification activities occur at the Carlsbad Village Drive property and Veterans Park (mowing of mustard stands in both of these areas).

4.5.1 Fire History

While fire history should be verified on the ground by searching for fire scars and observing vegetation maturity, the open space preserves considered herein do not appear to be affected by the common scenario of over-frequent fire and an increase in fire size. Within the span of spatially recorded fires from 1910-2002 (update needed) (California Department of Forestry and Fire Protection, date), only Lake Calavera, Los Monos, La Costa Canyon, and La Costa/Romero parcels have experienced fires. Maps of these parcels and their respective fires are presented in Section 6. A regional fire history is shown in Map 4-1.



Map 4-1. Regional fire history, with extent of fire called out by decade.

The MHCP asks that the regional assumption of over-frequent fire be evaluated in the case of each preserve management plan, as this relates to the potential for vegetation type conversion as well as protection of fire-dependent species. Based on these maps, the open spaces here do not appear to be affected by the modern trend to more frequent and larger fires as is typical in much of San Diego County. However, the fire threat in this urban preserve is serious, as may be exemplified by the nearby Harmony Grove Fire of October 21, 1996. According to the after-action report, this fire became the most serious emergency event in Carlsbad's history (Fire Report <http://www.ci.carlsbad.ca.us/fire/hgfd.html>). Slightly over three hours after the fire began in the unincorporated community of Harmony Grove, shifting winds drove the fire across the southeastern boundary of the City, and into residential neighborhoods of La Costa. By midnight, the winds subsided and the fire began to die out, leaving \$11.8 million in private loss in the form of 54 Carlsbad homes destroyed and dozens of others damaged.

4.5.2 The Fire Environment

The following points are key to the fire planning context for the open space preserves:

1. All of the open space preserves can be considered a wildland-urban interface (W-UI). W-UI can be defined as the portion of burnable vegetation within 1.5 miles of occupied structure densities greater than 1 unit/40 acres. Policy-specific criteria for defining a W-UI was published in the Federal Register (January 4, 2001 66 FR 751), which established a minimum density of one occupied structure per 40 acres (16 ha). In its identification of a W-UI, the California Fire Alliance (2001) defined W-UI as all areas within 1.5 miles (2.4 km) of wildland vegetation, roughly the distance that firebrands can be carried from a wildland fire to the roof of a house.
2. Under certain Santa Ana wind conditions (such as occurred in the county in October of 2003 and 2007), entire open space preserves could be consumed by fire more quickly than a fire suppression unit could be on site. In mature chaparral or riparian vegetation, flame lengths could exceed 100 feet. In the mature riparian community, flame lengths could reach even higher.
3. Many of the open space preserves are connected to other conservation areas through native habitat corridors. Native vegetation in adjoining lands is part of the same fire context as the PMP preserve considered in this document. Fire can either spread from the PMP parcels onto those lands, or reach the PMP parcels from them.
4. The native vegetation of the PMP parcels positioned adjacent to urban land use, as well as the public access planned for the PMP lands predispose this property to a high wildfire risk. The fire threat comes largely from human-caused ignitions, such as from (prohibited) campfires set by the public for recreation, camping, or heat purposes. Other possible ignition sources could come from arson, careless smoking, children with matches, or sparks from equipment used on site or from off-road vehicles.
5. The plant and wildlife communities of the PMP open spaces evolved with a natural fire regime as a key natural ecological disturbance process, primarily driven by weather and the low moisture content of vegetation in late summer and fall. Native Americans also set fires as a land management tool, and burning for subsistence purposes had been a local practice for thousands of years. Native plants and wildlife have a range of adaptations to fire and open habitat conditions are created by fire. Development and fragmentation of habitats do not allow natural fire regimes to continue without placing adjacent homes and businesses at risk, thereby increasing pressure on fire protection agencies and

land managers to suppress wildfires. In the modern setting of a wildland-urban interface, potential fire ignitions have become more frequent, and possibly much larger and more disastrous than was natural. Additionally, today's prevalence of exotic annual grasses and forbs has changed fuel load characteristics such that fires can ignite and carry through into shrublands more easily.

6. The risk of extreme fire scenarios to species that are the focus of management should be evaluated in the context of the managed preserve. The highest risk is with respect to too short a return interval between fires, which prevents plants from either accumulating sufficient carbohydrate in their underground storage organs to resprout, or from accumulating sufficient seed bank storage in the soil to replace their populations post-fire. There is a risk that fires may be either too cool to germinate seeds that require fire stimulus, or so hot that the seed (or other propagules) is killed. And, in these compressed and fragmented native habitats, there is a risk of an entire open space preserve being consumed by fire in a single event, and species unable to disperse into the post-fire environment. In this latter case, the highest risk is to animal species with narrow niche specialties, those with sedentary life histories, or with low dispersal capability.

To evaluate potential fire regime risks on some of the target management species of the PMP open spaces, certain key plant species are evaluated below. An evaluation of fire effects on wildlife groups follows.

Nuttall's scrub oak (*Quercus dumosa*). The prolific sprouting ability of Nuttall's scrub oak makes it a prominent component of the early postfire community. It is exceptionally persistent with or without fire (Minnich and Howard 1984; Keeley *et al.* 1986). In coastal chaparral communities of southern California, Nuttall's scrub oak generally becomes dominant during the second decade after fire, and within 30 to 40 years communities on north-facing slopes have closed canopies. The vegetation composition of these sites remains essentially unchanged without further disturbance, with Nuttall's scrub oak continuing to dominate (Hanes 1971). Seedlings likely establish in unusually moist years but need litter, so this only happens in very old stands, similar to scrub oak (Zedler 1977), with which Nuttall's scrub oak will hybridize. No special fire management is recommended. Continued existence of this species would not be expected to be jeopardized by fire, and populations are expected to be stable with or without fire. It may increase in cover without fire due to its height and ability to dominate the canopy.

San Diego thornmint (*Acanthomintha ilicifolia*). San Diego thornmint is restricted in distribution to San Diego County and northern Baja California, Mexico (Skinner and Pavlik 1994; USFWS 1998). In San Diego County, this species is known from Carlsbad and San Marcos south to the Sweetwater River and Otay Mesa and east to Alpine (Beauchamp 1986; USFWS 1998). It is restricted to calcareous marine sediments (near the coast), clay, or gabbro-derived soils (Las Posas soils), and is associated with chaparral, DCSS, grasslands, or vernal pools (Hickman 1993; Skinner and Pavlik 1994; USFWS 1998; CDFG 2011) Because of its annual habit, San Diego thornmint may experience yearly fluctuations in population size and spatial location. Thornmint plants tend to be clustered around white sage shrubs or occur in denser (but primarily native) herbaceous vegetation in open areas within the scrub. While this species may be damaged by fire during the growing season, its annual habit and predisposition for low-fuel conditions makes negative fire effects unlikely.

Thread-leaved brodiaea (*Brodiaea filifolia*). A bulb of grasslands, seeps, and wet meadows, this species is highly adapted to fire due to its underground storage structure. These plants are normally dormant during the normal fire season, so are not directly affected, but benefit from nutrient flush, canopy opening, and other aspects of altered competitive status. It is an obligate resprouter. This adaptation is also true for western dichondra (*Dichondra occidentalis*), a Carlsbad HMP-covered species. It is a rhizomatous perennial herb that is considered a fire follower in both chaparral and coastal sage scrub. If present, its status would be favored by fire.

Summer-holly (*Comarostaphylis diversifolia* ssp. *diversifolia*). As with the manzanita (*Arctostaphylos* spp.) also in the Ericaceae family, this plant has urn-shaped flowers. Its showy red fruits give it its name. Although specific studies of fire adaptation of this species have not been conducted, it is a reasonable expectation that, similar to the manzanitas, summer holly would resprout after fire.

Coastal California gnatcatcher (*Polioptila californica californica*). CAGN prefer the cover and structure provided by mature unburned DCSS. Likewise, the California thrasher (*Toxostoma redivivum*) will recolonize burned sites only four to five years after a burn, and do not reach maximum densities until twenty years post-fire (Cody 1998). Of the sensitive wildlife present on the open space preserves covered under the Carlsbad HMP, the CAGN is likely the most challenging species with regard to fire management. They would sustain at least short-term adverse effects from a fire event. DCSS would likely begin to be recolonized by gnatcatchers after seven to eight years, but this would depend on environmental conditions that influence both canopy closure and dispersal capability of the bird.

In contrast, researchers have reported that swallows, swifts, sparrows, and flycatchers are more abundant in burned chaparral the first year following a fire. The SDNHM notes that this rebound effect is “especially dramatic” on Costa's hummingbird (*Calypte costae*) (SDNHM 2003). This results from heightened levels of poodle-dog bush (*Turricula parryi*), beardtongue (*Penstemon spectabilis*), and woolly blue-curls (*Trichostema lanatum*) that promote feeding and nesting.

Raptors. It is unusual for raptors to suffer mortality due to a direct impact of fire (U.S. Forest Service [USFS] 2003). Adults can escape fire; however, fire could directly reduce raptor populations if it impacts nesting trees. Low-intensity fires probably have little effect on raptors. Most raptors are unaffected or benefitted when occupying burned habitat. Burned areas provide little cover for prey species and raptors can take advantage of this vulnerability. Additionally, because prey species often increase after fire, raptors can also benefit. COHA populations have been documented to benefit from fire (Dodd 1988). Nonetheless, fires that destroy potential nesting trees could impede reproduction of raptors when alternative nesting sites are scarce (USFS 2003).

4.5.3 Goals

The fire management goals are to:

- Goal 1: Protect human life and safety as the first priority of every fire management activity. This is the responsibility of the City's fire department.
- Goal 2: Suppress 100% of all unplanned wildland fires, regardless of ignition source, to the smallest size possible, protecting all habitat values at risk in a prioritized manner. This is the responsibility of the City's fire department.

4.5.4 Fire Management ASMDs

- Coordinate with local City of Carlsbad Fire Department units on wildfire suppression, especially the Battalion Chief that would be the first responder. The following should be coordinated with the Fire Department:
 - Consistent with the Carlsbad HMP, identify access points for firefighting equipment. Identify locations for staging firefighting equipment that minimize impacts to sensitive resources, and are logical and safe for fire suppression.
 - Identify evacuation routes, and which gates should remain unlocked for this purpose or with emergency access protocols.
 - Identify no-bulldozing preferred zones and, in consultation with the Fire Department, a pre-defined anchor point(s) for stopping a fire, such as crossing a riparian drainage at a specific location. Identify safety hazard areas to fire fighting personnel and place all the above on a map. Provide the Fire Department a paper copy of the map and post signs on gates or other access points providing emergency guidelines and a map for firefighters. Phone numbers should be listed on the sign and provided to the fire department.
- Post a fire prevention and safety sign for recreational users of the PMP open spaces at key access points.
- Fuelbreaks should only be as wide as necessary to protect resources at risk, and should be enforced adjacent to homes. Best management practices will include mowing, but not disking unless a sensitive species benefits from disking. Low-growing natives and shrub islands should be the desired management condition, with highly flammable shrubs cut to minimum size or limbed up if left behind. The Preserve Manager will work with the Fire Department on this issue.
- If improper management of the 60-foot fuel management areas are observed, report to the HOA or business owner's association, and request if necessary, inspections by the Carlsbad Fire Department. This fuelbreak must function for fire protection, as there is little other reasonable means of fire protection that is environmentally acceptable.
- Consistent with MHCP guidelines, review the known fire history and field verify the accuracy of the mapped fires. Update vegetation community maps and attributes every five years based on any fires. Field monitoring will be conducted as part of the habitat management efforts, and will include assessments of the post-fire recovery of habitats and covered species.
- If in the future it is believed to be beneficial to conduct prescribed burns for ecological benefit, consider requesting that the Fire Department conduct small burns as part of a training exercise.
- Natural regeneration will be the primary approach for revegetation of natural areas post-burn. Do not re-seed burned areas unless there appears to be no natural recovery from a seed bank. If seeding appears necessary, only use seed collected from native plant populations on the preserve or the immediate adjacent lands and only after verifying that those populations are natural rather than themselves restored.
- Post-fire activities may focus on erosion and sediment control especially in riparian areas. As necessary, mechanical means will be used to control short-term erosion. This could include mulching, jute matting, wattling, culvert clearing, installation of debris racks in channels, or temporary water diversion structures. Erosion control through seeding will not be conducted as a general practice, but only with proper justification in a written rehabilitation plan that contains success criteria. No short-term erosion control will be implemented using nonnative seed, or other actions that may inhibit natural regeneration. Ryegrass will not be used for post-fire seeding. Ryegrass is a nonnative which

has been shown to persist for years in the restored environment. In addition, research has shown that ryegrass provides no more erosion control benefit than native species within the first year after a fire (Beyers *et al.* 1994).

- Areas of concentrated fire suppression activity should be rehabilitated immediately after fires and prior to the subsequent rainy season.
- If a fireline (a bare mineral soil line constructed as fire is burning used to contain a wildfire) is required within riparian habitat, hand line or burnout is preferred to bulldozer lines. Only use bulldozers when necessary to minimize fire size. Avoid the use of aerial fire retardant or Class A foams within 100 feet of riparian habitat watercourse strip.
- Work with HOAs to reduce runoff adjacent to preserves, which may lead to overgrowth of native vegetation resulting in greater fuel load within the preserve.

4.6 Facility Maintenance Element

4.6.1 Facility Maintenance Goal and ASMDs

Goal 1: The physical facility and grounds maintenance program will provide the maintenance and administration necessary to maintain orderly and beneficial management of the Carlsbad Open Space Preserves.

- Maintain signage, fencing, and gates.
 - Fences will be maintained to discourage trespass and dumping. Gates will be replaced as necessary, but most likely every 20 to 30 years. Various signs are posted at main access points to the open space preserves. Signs delineate the limits of the open space preserve, identify the Preserve manager, and list what activities are permitted or prohibited.
- While the preserve manager is not responsible for maintaining trails, periodically survey trails and identify erosion liabilities. Identify trails that are to be restored or allowed to return to a natural state.
- Maintain accurate business records on expenditures, staff, maintenance, and other administrative duties.
- 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.
- Protect health and safety of staff and visitors to the property and maximize efficient use of operating expenses allocated to this area.
 - Regularly inspect and service all heavy equipment and vehicles.

4.7 MHCP Biological Monitoring Element

An MHCP-wide monitoring plan (MHCP Volume III) was developed to provide guidance and direction for managing covered species and their habitats in compliance with the conditions for coverage identified in the biological analysis of the MHCP (MHCP Volume II), along with sample standardized survey protocols and data collection sheets. Although some monitoring management activities are adjusted to fit the need of management of City-owned land, this Preserve Management Plan is as consistent as possible with the monitoring and management requirements of the MHCP monitoring plan and the Carlsbad HMP and OSMP.

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 on an annual basis. The monitoring programs will be aimed at achieving the goals outlined in Section 4.3 “Biological Element”. The monitoring goals are set out for the second term (five years) of management of the City-owned parcels, which means they are based on the first three years of data collection and the management and monitoring decisions derived from that data and information.

This section identifies species and general ASMDs, following guidelines set forth in the OSMP and MHCP management and monitoring plan, as well as discussions with the wildlife agencies and San Diego Management and Monitoring group. Site specific management related ASMDs are summarized in Section 6. The monitoring results will be presented in annual reports and management guidance will be provided in the revised PMP.

Table 4-2 identifies species that are to be monitored and the optimum periods for surveying.

Table 4-2. Species to be monitored and time of optimum detection.^a Bolded species are known to occur within Carlsbad Open Space Preserve parcels.

Species	Optimum Survey Period
San Diego thornmint	Blooms between April and July
Thread-leaved brodiaea	Blooms between April and May
Summer holly^b	Anytime
Blochman's dudleya^c	March 1 - June 30
Nuttall's scrub oak^c	September 1 (acorns present)
San Diego marsh elder	Anytime
Harbison's dun skipper butterfly	May 15 through July 15
Arroyo toad	March 1 through July 1
Western spadefoot toad	During major rain events
Southwestern pond turtle	March 15 through November 1
California gnatcatcher^{c, d, e, f}	March 15 through June 30
California rufous-crowned sparrow^c	Anytime
Bell's sage sparrow	Anytime
Southwestern willow flycatcher ^c	March 15 through August 30
Least Bell's vireo	May 15 through August 10
Yellow-breasted chat^{c, d}	April 1 through August 30
Cooper's hawk^{c, d}	Anytime (winter)
Golden eagle	Anytime
San Diego black-tailed jackrabbit ^c	Anytime
Southern mule deer	Anytime
Herpetofauna, orange-throated whiptail^c	April 15 through August 31
Coastal sage scrub avifauna	March 1 through January 31
Wildlife corridor monitoring	Anytime

a. General Sensitive plant surveys and mapping will only occur at the Crossings Golf Course during the PMP term.

b. Observed at the Research Center Open Space

c. Carlsbad Municipal Golf Course

d. Lake Calavera

e. Los Monos (heard).

f. Carlsbad Village (heard).

4.7.1 Monitoring Goal and ASMDs

Goal 1: Guide and direct the management of covered species and their habitats, consistent with the current requirements of the MHCP monitoring plan, the Carlsbad HMP and OSMP and the goals and ASMDs set forth in Section 4.3 of this PMP.

The preserve manager (or preserve steward) will:

- Follow the ASMDs and monitoring methods outlined in Section 4.3 for sensitive vegetation communities and species.
- Support the MHCP compliance monitoring requirement of the City of Carlsbad by providing information in annual reports on covered species locations and acres of habitat, monitoring the condition of the habitat, and reporting on the performance of other required management actions.
- Monitor weather and climate. The Carlsbad Preserve Steward will be monitoring weather and climate for status reports to the MHCP. Ensure these data are incorporated in annual reports of this preserve and used to interpret changes in the status of covered species or habitat condition.
- Ensure compliance with the Carlsbad HMP and the MHCP through regional coordination of monitoring data collection and analysis. Keep up to date on changes in monitoring protocols of the MHCP to ensure clear understanding of the preserve-level and MHCP-level monitoring that is required for this preserve. Coordinate with the Carlsbad Preserve Steward and Wildlife Agencies to clarify the role of this preserve area in sub-regional and regional monitoring efforts.
- Use a systematic process for data management and updates, consistent with the Carlsbad OSMP and HMP. Annually check with the Wildlife Agencies to confirm current survey protocols of the MHCP program. 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.
 - Using standardized data entry formats preserve managers will submit data to the 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 an annual report. Summary data should be prepared according to a consistent format.
 - Resource mapping updates (primarily vegetation mapping) should be compiled and submitted to the Preserve Steward and the City in GIS format.
 - 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, such as GIS data, tabular data, and data summary reports would ideally 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 the City's web site.

5.0 Implementation Strategy

5.1 Roles and Responsibilities

The following identification of roles and responsibilities is summarized from the Carlsbad OSMP.

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, the Wildlife Agencies, California Coastal Commission (CCC), the broader scientific community, environmental non-governmental organizations (NGOs), and the general public who have the opportunity and/or 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.

5.1.1 Wildlife Agencies

The Wildlife Agencies include the USFWS and the CDFG. The USFWS and CDFG are responsible for:

- Enforcing compliance of 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, five-year status summary reports, preserve management plans, and other associated management/research activities.
- Under the MHCP, the Wildlife Agencies will conduct the same level of monitoring on lands they administer. Data management and analysis at the subregional level are the responsibility of the Wildlife Agencies. The agencies may choose to delegate some of their subregional and regional monitoring responsibility-for example, to an MHCP conservancy.

The distinction between compliance and effectiveness monitoring is important for understanding legal responsibilities under the MHCP. If compliance monitoring indicates that the cities are adequately performing their required actions per the implementing agreement, but effectiveness monitoring reveals that biological objectives are not being met due to unforeseen circumstances, then the federal “No Surprises” rule (USFWS 1998a) takes effect; hence, rectifying the problem becomes the financial responsibility of the Wildlife Agencies. For example, if the cities are performing all required conservation and adaptive management actions for a covered species, but the species is declining regardless due to an unforeseen circumstance, any specific research, management, or conservation actions that are required above and beyond those conducted pursuant to MHCP obligations become the responsibility of the state and federal governments. Any declines related to changed circumstances, as defined in the implementing agreement, are the responsibility of the take authorization holder (see MHCP Plan, Section 5.2), and should be addressed through adaptive management practices to rectify the problem.

5.1.2 California Coastal Commission

The CCC'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 CCC is responsible for:

- Overseeing development and HMP implementation in the Coastal Zone.
- Review of Annual Reports per request.

5.1.3 City of Carlsbad

The City of Carlsbad will:

- Oversee implementation and maintain compliance with this Plan.
- Conduct compliance monitoring through the development project approval process.
- Conduct species and habitat monitoring via the Preserve Steward and preserve managers.
- Manage and maintain properties via the Preserve Steward and preserve managers.

5.1.4 Carlsbad HMP Preserve Steward

The Preserve Steward is a role that has evolved from the necessity for the City to have the services of a person with the necessary ecology, conservation biology, biological resources management, and statistics background to oversee the City-wide monitoring, management, and maintenance of the whole OSMP preserve system. The Preserve Steward will play the central role in preserve management, serving as the City's technical expert on preserve management. The Preserve Steward is a contracted consultant (currently TAIC), and is responsible for:

- Taking a leadership role in the overseeing and coordination of City-wide preserve management, monitoring and reporting.
- Communicating frequently with the preserve managers, City, and Wildlife Agencies.
- Providing science-based technical guidance and direction to preserve managers for survey design, data collection and analysis.
- Supporting the City on compliance monitoring (review of pre-development 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.

The Preserve Steward will have primary responsibility for coordinating all parties with a role in preserve management, including the preserve managers, City departments, the Wildlife Agencies, and public interest groups. The Preserve Steward will direct the collection of all monitoring data, review all data and reports, formulate hypotheses regarding the status of species and habitats, consult with other scientists as needed to interpret monitoring data, design and carry out research within the limits of the resources available for management, prescribe adaptive management programs when needed, and prioritize threats to the preserve system and direct management actions accordingly. One of the Preserve Steward's key responsibilities will be to continuously evaluate the effectiveness and efficiency of management activities in view of the resources available, and ensure that the most cost-effective measures are consistently used.

5.1.5 Preserve Manager

The Preserve Manager is the entity with on-the-ground responsibility for managing and monitoring the preserve area covered in this Plan. Preserve Managers may be employees of the City, qualified environmental non-profit organizations that manage natural areas (like the CNLM), a State agency (such as CDFG), or another public or semi-public land management entity (such as the North County Transit District or San Diego Gas & Electric). The Preserve Manager is responsible for:

- Updating this PMP every three to five years as required in the HMP.
- Managing individual parcels according to the PMP.
- Monitoring species, habitats, and management actions according to the PMP.
- Coordinating with the Preserve Steward, other preserve managers, the City, and the Wildlife Agencies regarding open space management issues, management, and monitoring.
- Collecting biological monitoring data according to MHCP-established protocols for preserve-level, MHCP-level, and regional monitoring.
- Submitting data to the Preserve Steward and Wildlife Agencies.

5.1.6 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 to:

- Review Annual Reports.
- Observe activities and identifying issues in preserve areas.
- Provide input to the Wildlife Agencies, CCC, and the City as needs arise.

5.2 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.

The City Property and Environmental Management Department will work closely with the preserve managers and preserve stewards to establish a chain of command and communication with the Planning Department, Parks and Recreation Depart-

ment, Police Department, Fire Department and other relevant City departments. The Ranger that will be hired by the Preserve Manager 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.

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 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.

5.3 Existing Staff and Additional Personnel Needs Summary

A total of eight preserve management personnel may spend a percentage of their time performing tasks on site or generally related to management of the Carlsbad Open Space Preserves. These are listed, along with their general duties, in Table 5-1.

Table 5-1. Preserve management personnel and general duties. Personnel may spend a percentage of their time performing tasks on site or generally related to management of the Carlsbad Open Space Preserves.

Position Title	General Duties
Project Manager	Supervise and coordinate
Plant Ecologist	Vegetation analysis, sensitive species surveys
Ornithologist	Survey avian species including sensitive species.
Science Director	Planning and review
GIS/Database Manager	Maintain maps and databases.
Office Administrator	General support for bookkeeping, purchasing, record-keeping
Exotic Plant Control Specialist	Apply herbicides or other eradication treatments as needed
Legal Assistant	Inspection, negotiation, prepare and review documents

5.4 Management, Monitoring, Operations and Maintenance Budget Summary

Preserve management will be funded by contracts via the City of Carlsbad. Refer to Appendix E (provided by CNLM) for the associated 2012-2016 estimated budgets. Other funding mechanisms could include volunteerism, public and private donations or grants from wildlife groups or entities.

The total contributions as of writing are expected to be \$778,960 for the five-year term of management.

5.5 Reporting Requirements

Reporting includes three-year management plans, annual reports and work plans, GIS, and other data compilation.

5.5.1 Three-Year Management Plans

Management plans outline the primary goals of preserve management, the management techniques employed, funding mechanisms and budgets, and preserve manager qualifications. The City of Carlsbad's OSMP calls for open space-specific management plans to be completed every three years.

5.5.2 Annual Reports and Work Plans

Annual reports summarize all management activities undertaken in a particular year and report and discuss survey results. Work plans will outline specific projects and management activities that will be undertaken in a coming year. Both reports will include budget information, such as expenditures for the year and total remaining funds.

The annual report and work plan will be submitted to the City of Carlsbad by the 15th of December of each year.

5.5.3 Data

Various data collected during the year will be entered into MS Access or MS Excel and/or GIS databases for long term storage and use. The Preserve Steward will submit all GIS layers, such as project boundaries, vegetation, and sensitive species, each year to the City of Carlsbad and Wildlife Agencies.

6.0 Parcel Descriptions

6.1 Batiquitos Drive Open Space



Photo 6-1. Batiquitos Drive.

6.1.1 General Open Space Site Characteristics

A majority of this 2.7 acre long narrow parcel is set on a steep slope along Batiquitos Drive (Photo 6-1). While adjacent to a major road on one side, and a housing development on the other, its steep topography limits public use of the area. Over 30 large olive trees were removed during the term of the first PMP. These individuals have proved hearty and many still are stump sprouting. Herbicide treatments will need to continue into the term of this PMP. Erosion control, consisting of straw wattles and hydroseed, were applied following olive tree removal. These control measures held up very well, and little erosion has occurred. Table 6-1 summarizes key management attributes for this parcel.

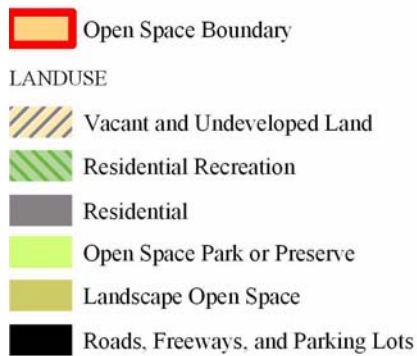
Table 6-1. Site characteristics at Batiquitos Drive Open Space.

Descriptor	Value/Category
Acreage	2.7
Elevation Range	80-120 ft.
Management Unit	Poinsettia/Aviara
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	4
Core/Linkage Area	None
Watershed	San Marcos Creek

6.1.2 Land Use

Local land use is presented in Map 6-1.

Local Land Use at Batiquitos Drive Open Space*



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



Map 6-1. Local land use at Batiquitos Drive Open Space.

6.1.3 Soil Characteristics

Map 6-2 depicts soils on Batiquitos Drive Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

6.1.4 Fire History

There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.



Soils at Batiquitos Drive Open Space

- Corralitos loamy sand, 5 to 9 percent slopes
- Marina loamy coarse sand, 2 to 9 percent slopes
- Terrace escarpments



Map 6-2. Soils at Batiquitos Drive Open Space.

6.1.5 Vegetation

Two vegetation communities are present, DCSS and chamise chaparral. The area in which the olive trees were is mapped as transitional DCSS due to the openness of the vegetation following olive tree removal (Map 6-3).

6.1.6 Sensitive Resources

The only sensitive resources detected in during the term of the first PMP were the CAGN and wart-stemmed ceanothus (Map 6-3). One individual CAGN was incidentally observed during the summer of 2010. One individual wart-stemmed ceanothus was observed. Refer to Table 6-2 for planned site surveys.

6.1.7 Management Actions

Table 6-2 presents a list of planned management actions required on Batiquitos Drive Open Space for the next five years.



Batiquitos Drive Vegetation and Sensitive Species

Open Space Boundary

CNLM Sensitive Plants Points 1998-2010

Ceanothus verrucosus

Draft Vegetation Communities

Chamise Chaparral

Diegan Coastal Sage Scrub

Diegan Coastal Sage Scrub - Chaparral Transition



Map 6-3. Vegetation communities and sensitive species at Batiquitos Drive Open Space.

Table 6-2. Management activities and specific actions at Batiquitos Drive Open Space for the next five years.

Management Activity	Specific Actions
Biological Surveys	<ul style="list-style-type: none"> California gnatcatcher surveys (2013 and 2016).
Capital Improvements	<ul style="list-style-type: none"> None recommended at this time.
Habitat Maintenance	<ul style="list-style-type: none"> Continue to treat re-sprouting olive trees and Spanish bayonet. Treat other zero tolerant species as observed. Note moderate tolerant nonnative species. Maintain erosion control measures as necessary (straw wattles).
Public Services	<ul style="list-style-type: none"> Quarterly patrol. Maintain signs and posts as necessary.

6.2 Carillo Ranch Open Space



Photo 6-2. Carillo Ranch Open Space.

6.2.1 General Open Space Site Characteristics

This oddly shaped parcel (Photo 6-2) surrounds the historic Leo Carillo Ranch. This historic site is owned by the City of Carlsbad. The southern and eastern portions of the property are landscaped with ornamentals that surround a dirt parking lot and are not part of the Preserve Managers management responsibility. The northern strip of the parcel runs along a riparian zone and oak woodland that previously contained a variety of large nonnative invasive plants including tamarisk (*Tamarix* spp.), Brazilian peppertree (*Schinus terebenthifolius*), giant reed (*Arundo* spp.), palms, and pampas grass. These nonnative species were removed or treated during the term of the first PMP. Table 6-3 summarizes key management attributes for this parcel.

Table 6-3. Site characteristics at Carillo Ranch.

Descriptor	Value/Category
Acreage	16.6
Elevation Range	240-280 ft.
Management Unit	Bressi/Carillo
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	18
Core/Linkage Area	Link D
Watershed	San Marcos Creek

6.2.2 Land Use

Local land use is presented in Map 6-4.

Local Land Use at Carillo Ranch Open Space*



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



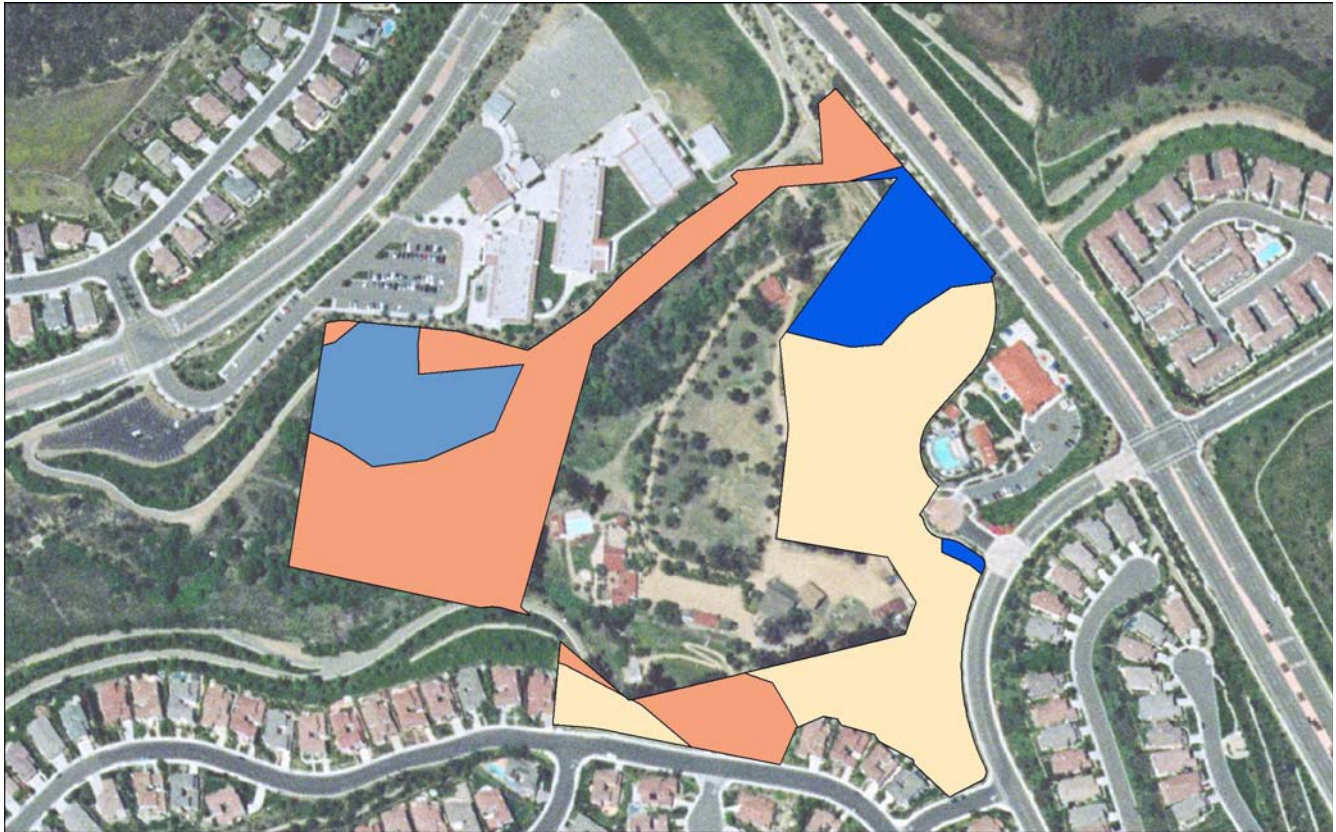
Map 6-4. Local land use at Carillo Ranch Open Space.

6.2.3 Soil Characteristics

Map 6-5 depicts soils on Carillo Ranch Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

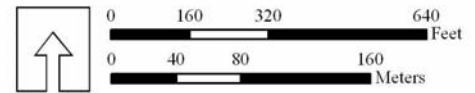
6.2.4 Fire History

There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.



Soils at Carillo Ranch Open Space

- Altamont clay, 9 to 15 percent slopes
- Riverwash
- Gaviota fine sandy loam, 9 to 30 percent slopes
- Salinas clay, 0 to 2 percent slopes



Map 6-5. Soils at Carillo Ranch Open Space.

6.2.5 Vegetation

The dominant vegetation community is coast live oak riparian forest. Other vegetation types include a large section of disturbed habitat, Ornamental, Freshwater Marsh, DCSS, and Southern Willow Scrub (Map 6-6).

6.2.6 Sensitive Resources

The only sensitive resource identified on this parcel was the COHA. Refer to Table 6-4 for a list of planned surveys for the site.

6.2.7 Management Actions

Table 6-4 presents a list of planned management actions required on Carillo Ranch Open Space for the next five years.



Carillo Ranch Vegetation and Sensitive Species



- Open Space Boundary
- ★ Oak Assessment 2010

- Sensitive Wildlife Species**
- Cooper's Hawk
 - White-tailed kite

Draft Vegetation Communities

- Diegan Coastal Sage Scrub
- Diegan Coastal Sage Scrub - Baccharis Dom
- Coast Live Oak Riparian Forest
- Riparian Scrub
- Southern Willow Scrub
- Freshwater Marsh

- Disturbed Wetland
- Non-Native Grassland
- Disturbed Habitat
- Ornamental
- Developed

Map 6-6. Vegetation communities at Carillo Ranch Open Space.

Table 6-4. Management actions at Carillo Ranch Open Space for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ Oak tree assessment following USFS protocol, which includes a gold spotted oak borer assessment (2012 and 2015). ■ Sensitive bird and raptor surveys (2013 and 2016).
Capital Improvements	<ul style="list-style-type: none"> ■ None recommended at this time.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Continue to treat zero tolerant nonnative plant species. Note moderate tolerant nonnative species. ■ Fire breaks to be maintained by Carillo Ranch staff.
Public Services	<ul style="list-style-type: none"> ■ Quarterly patrols. ■ Maintain signs and posts.

6.3 Carlsbad Municipal Golf Course



Photo 6-3. Carlsbad Municipal Golf Course.

6.3.1 General Open Space Site Characteristics

This 198 acre open space is a labyrinth of naturally vegetated fingers within and surrounding the Carlsbad Municipal Golf Course (Photo 6-3). Faraday Avenue bounds the open space to the North, while a series of industrial parks form its southern border. The City of Carlsbad maintains a trail through the western portion of the property. About 1/10 of the property is currently in its third year (to end in 2012) of habitat restoration, including both upland and riparian communities. These activities are being overseen by the City of Carlsbad Parks and Recreation Department and Dudek and Associates.

The construction of the golf course necessitated the production of an EIR and associated biological surveys (Cotton Beland and Associates 2000). The USFWS Biological Opinion also stipulated 5 years of brown-headed cowbird trapping and surveys for CAGN. Additional surveys conducted during the term of the first PMP included sensitive riparian bird species and surveys for zero and moderate tolerant nonnative plant species. Many nonnative plant species, including fennel, black mustard, acacia (*Acacia* spp.), and pampas grass, were removed or treated during the term of the first PMP. The primary goal for this area during the term of this PMP is to continue to remove black mustard, which occurs in many areas of the preserve area. Golf course staff patrol the site daily and are very thorough, which has minimized many potential off-golf course/trail problems. Table 6-5 summarizes key management attributes for this parcel.

Table 6-5. Site characteristics at the Municipal Golf Course.

Descriptor	Value/Category
Acreage	198
Elevation Range	40-320 ft.
Management Unit	Faraday
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	5 and 8
Core/Linkage Area	Core 4 and Link F
Watershed	Canyons de las Encinas and Agua Hedion and Buena Creek

6.3.2 Land Use

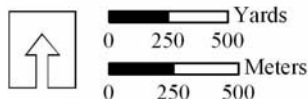
Local land use and proposed fencing are presented in Map 6-7.

Local Land Use at Carlsbad Municipal Golf Course*

-  Open Space Boundary
-  Other Open Space Preserves
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil
-  Golf Course
-  Lagoon
-  Airport
-  Industrial Park
-  Field Crops



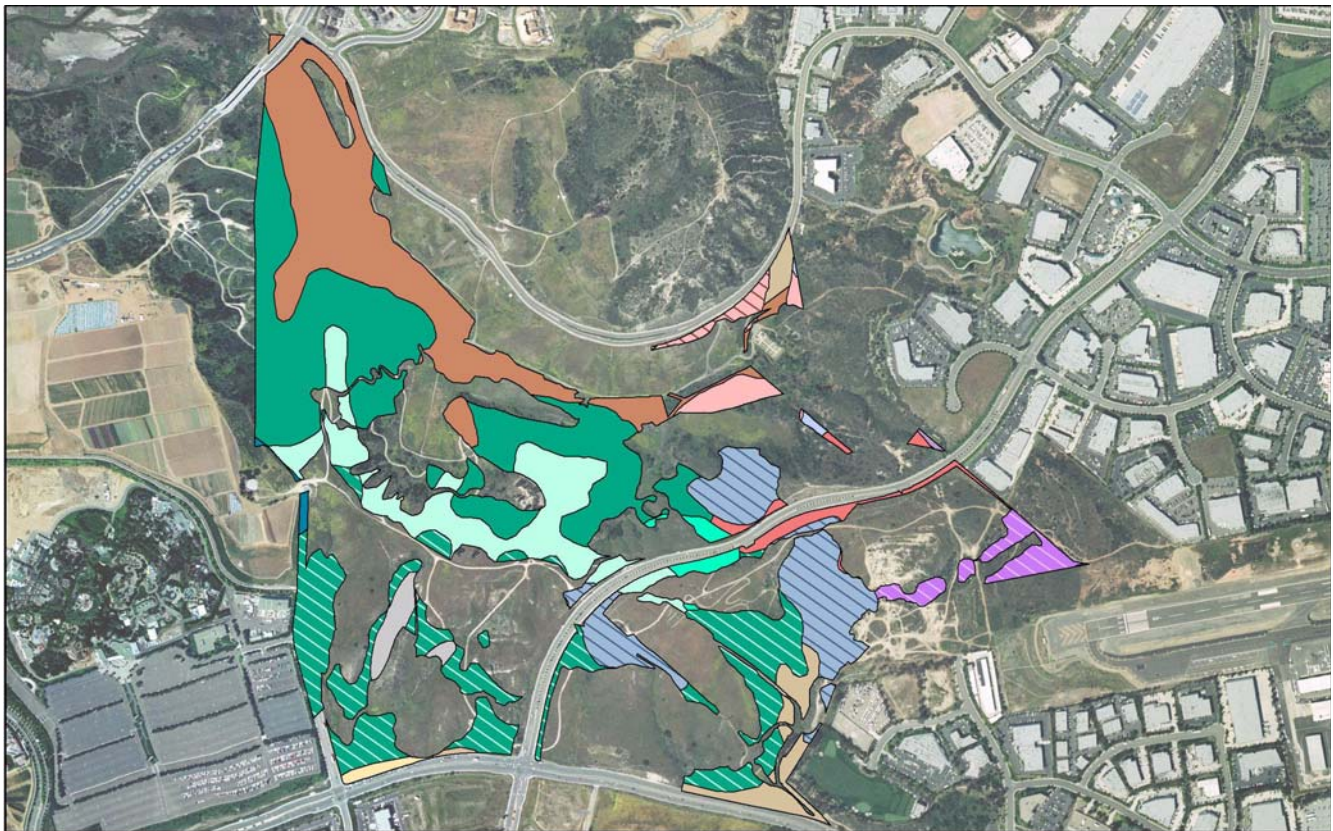
*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



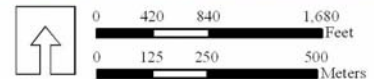
Map 6-7. Local land use at Carlsbad Municipal Golf Course.

6.3.3 Soil Characteristics

Map 6-8 depicts soils on the Carlsbad Municipal Golf Course. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.



Soils at Carlsbad Municipal Golf Course



- | | |
|---|--|
| Diablo clay, 15 to 30 percent slopes | Las Flores loamy fine sand, 2 to 9 percent slopes |
| Diablo clay, 15 to 30 percent slopes, eroded | Las Flores loamy fine sand, 9 to 15 percent slopes |
| Diablo-Olivenhain complex, 9 to 30 percent slopes | Loamy alluvial land-Huerhuero complex, 9 to 50 percent slopes, severely eroded |
| Friant rocky fine sandy loam, 9 to 30 percent slopes | Marina loamy coarse sand, 2 to 9 percent slopes |
| Gaviota fine sandy loam, 9 to 30 percent slopes | Salinas clay loam, 2 to 9 percent slopes |
| Huerhuero loam, 2 to 9 percent slopes | Steep gullied land |
| Huerhuero loam, 9 to 15 percent slopes, eroded | Tujunga sand, 0 to 5 percent slopes |
| Huerhuero-Urban land complex, 2 to 9 percent slopes | Visalia sandy loam, 2 to 5 percent slopes |
| Las Flores loamy fine sand, 15 to 30 percent slopes | Visalia sandy loam, 5 to 9 percent slopes |
| Las Flores loamy fine sand, 15 to 30 percent slopes, eroded | |

Map 6-8. Soils at the Carlsbad Municipal Golf Course.

6.3.4 Fire History

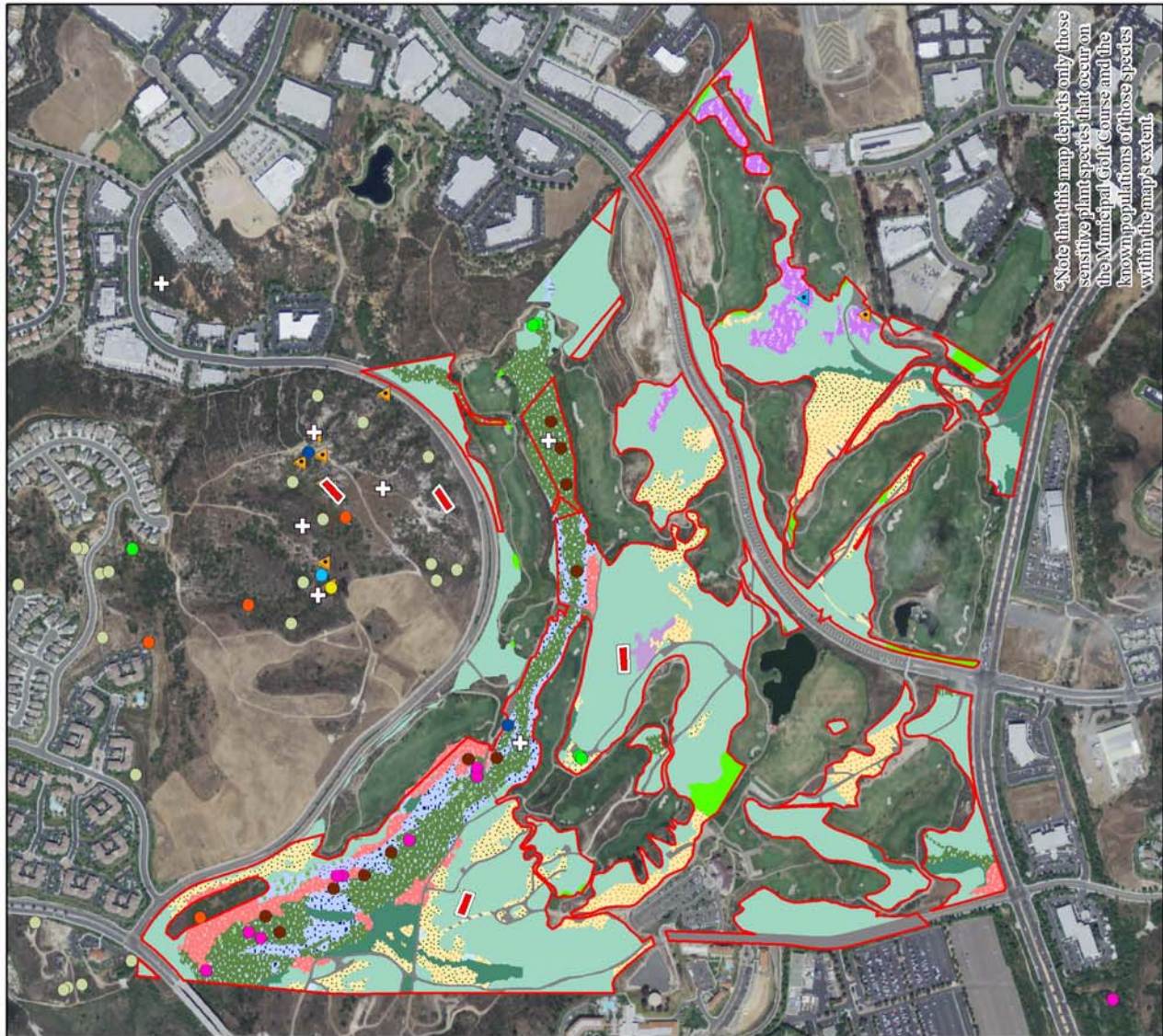
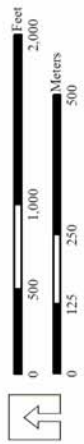
There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.

6.3.5 Vegetation

The two dominant vegetation communities are DCSS and Southern Willow Scrub/Riparian Forest (Map 6-9).

Carlsbad Municipal Golf Course Vegetation and Sensitive Species*

- MUNICIPAL GOLF COURSE
 - CSS plots
 - + City of Carlsbad Revele Locations
 - ▲ CNLM Sensitive Plants 1998-2010
 - ▲ Calandrinia maritima
 - ▲ Dichondra occidentalis
- #### Municipal Golf Course Vegetation_2011
- Coastal & Valley Freshwater Marsh
 - Coastal Brackish Marsh
 - Developed
 - Diegan Coastal Sage Scrub
 - Diegan Coastal Sage Scrub - Baccharis Dominated
 - Disturbed
 - Emergent Wetland
 - Eucalyptus Woodland
 - Freshwater Marsh
 - Mulefat Scrub
 - Non Native Grassland
 - Non Native Grassland - Broadleaf Dominated
 - Non Native Woodland
 - Ornamental Landscaping - Golf Course
 - Saltgrass Grassland
 - Southern Maritime Chaparral
 - Southern Riparian Woodland
 - Southern Riparian Scrub
 - Valley Needlegrass Grassland
- #### Sensitive Wildlife Species
- Northern Harrier
 - Coastal California Gnatcatcher
 - Greater roadrunner
 - Least Bell's Vireo
 - Lesser Nighthawk
 - Red-tailed Hawk
 - White-tailed Kite
 - Yellow-breasted Chat



Map 6-9. Vegetation communities and sensitive species at Carlsbad Municipal Golf Course.

6.3.6 Sensitive Resources

The following tables (Table 6-6 and Table 6-7) identify the sensitive species observed on the Carlsbad Municipal Golf Course. Surveys for sensitive plant species will be conducted during the term of this PMP to map individuals using GPS, which was not previously done.

Table 6-6. Sensitive plants identified or potentially occurring on-site (Carlsbad Municipal Golf Course EIR Biological Constraints Analysis, 1997, p. 18-24 in Cotton Beland Associates 2000).

Common Name	Scientific Name	CNPS List	State Status	Federal Status
California adolphia	<i>Adolphia californica</i>	2.1 ^a	none	none
Del Mar Manzanita	<i>Arctostaphylos glandulosa</i> ssp. <i>crassifolia</i>	1B.1 ^b	none	Federally Endangered
Lewis' evening primrose	<i>Camissonia lewisii</i>	3 ^c	none	none
Prostrate spineflower	<i>Chorizanthe procumbens</i>	4 ^d	none	none
Western dichondra	<i>Dichondra occidentalis</i>	4.2 ^e	none	none
Blochman's dudleya ^f	<i>Dudleya blochmaniae</i> ssp. <i>blochmaniae</i>	1B.1	none	none
Decumbent goldenbush	<i>Isocoma menziesii</i> var. <i>decumbens</i>	1B.2 ^g	none	none
Southwestern spiny rush	<i>Juncus acutus</i> ssp. <i>leopoldii</i>	4.2	none	none
Nuttall's scrub oak ^h	<i>Quercus dumosa</i>	1B.1	none	none
Ashy spike-moss	<i>Selaginella cinerascens</i>	4	none	none

- a. Rare or endangered in CA, more common elsewhere. Seriously endangered in CA.
 b. Rare or endangered in CA. Seriously endangered in CA.
 c. Plants for which we need more information. Review list.
 d. Plants of limited distribution.
 e. Plants of limited distribution. Fairly endangered in CA.
 f. Observed off-site, but adjacent to the Golf Course.
 g. Rare or endangered in CA. Fairly endangered in CA.
 h. Individuals observed on golf course were impacted by development.

Table 6-7. Sensitive wildlife identified on-site (Carlsbad Municipal Golf Course EIR Biological Constraints Analysis, 1997, p. 25-30 in Cotton Beland Associates 2000).

Common Name	Scientific Name	State Status	Federal Status
Northern harrier	<i>Circus cyaneus</i>	SSC	SSC
Least Bell's vireo	<i>Vireo bellii pusillus</i>	State Endangered	Federally Endangered
Orangethroat whiptail	<i>Cnemidophorus hyperythrus beldingi</i>	none	none
White-tailed kite	<i>Elanus leucurus</i>	Fully Protected	none
Cooper's hawk	<i>Accipiter cooperii</i>	none	none
Burrowing owl	<i>Speotyto cunicularia</i>	SSC	none
Southwestern willow flycatcher ^a	<i>Empidonax traillii extimus</i>	State Endangered	Federally Endangered
California horned lark	<i>Eremophila alpestris actia</i>	none	none
Loggerhead shrike	<i>Lanius ludovicianus</i>	SSC	none
Coastal California gnatcatcher	<i>Polioptila californica californica</i>	SSC	Federally Threatened
Yellow warbler	<i>Dendroica petechia</i>	SSC	none
Yellow-breasted chat	<i>Icteria virens auricollis</i>	SSC	none
Southern California rufous-crowned sparrow	<i>Aimophila ruficeps canescens</i>	none	none
Great blue heron	<i>Ardea herodias</i>	none	none
San Diego black-tailed jackrabbit	<i>Lepus californicus bennettii</i>	SSC	none
Northwestern San Diego pocket mouse	<i>Chaetodipus fallax fallax</i>	SSC	none
San Diego desert woodrat	<i>Neotoma lepida intermedia</i>	SSC	none

- a. Noted as migrant and not confirmed as ssp. *extimus*.

6.3.7 Management Actions

Table 6-8 presents a list of planned management actions required on Carlsbad Municipal Golf Course Open Space for the next five years.

Table 6-8. Management actions at Carlsbad Municipal Golf Course for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ Coastal sage scrub monitoring plots (2012, 2014 and 2016). ■ Sensitive plant species surveys and mapping (2012). ■ California gnatcatcher survey on entire property is being conducted by Dudek and Associates through 2012 pursuant to the agency permit conditions of the golf courses. No additional surveys are planned for this species. ■ Conduct presence/absence surveys for Least Bell's vireo and southwestern willow flycatcher (2013). Note and map all sensitive species observed. ■ Cowbird trapping is being conducted by Dudek and Associates through 2012 pursuant to the agency permits for the golf course. Cowbird trapping will continue each year during the term of this PMP (2013-2016).
Capital Improvements	<ul style="list-style-type: none"> ■ None recommended at this time.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Dudek and Associates will maintain upland and wetland mitigation areas through 2012 pursuant to wildlife agency permits for the golf course. ■ Preserve Manager will remove zero tolerant nonnative invasive plant species as necessary. Nonnative species observed in the past include shamal ash, pampas grass, myoporum, palm, tamarisk, castor bean, tree tobacco, fennel and others. Note moderate tolerant nonnative species. ■ Preserve Manager will treat black mustard in selected areas during each year of the PMP. ■ Preserve Manager will maintain existing erosion control efforts within the abandoned dirt road near the middle of this area. ■ Preserve Manager shall NOT remove Eucalyptus north and south of Hole 18, nor the Eucalyptus and pepper trees located at the southeast corner of the golf course per Golf Course superintendent requirements ■ Monitor the area near Hole 10 which was hydroseeded in 2011. Remove black mustard from these areas.
Public Services	<ul style="list-style-type: none"> ■ Conduct monthly patrols. ■ Maintain signs and posts as necessary.

6.4 Carlsbad Village Open Space



Photo 6-4. Carlsbad Village Open Space.

6.4.1 General Open Space Site Characteristics

This 13 acre parcel is a small canyon located uphill from Buena Vista Creek (Photo 6-4). An access road runs through the middle of the parcel for maintenance of the high power lines that cut through the valley north to south. The property is bounded by a dog park and Carlsbad Village Drive to the south, and to the north is contiguous with large section undeveloped land. Housing developments bound the parcel to the east and west. The access road provides a conduit, albeit unapproved by the City, for the public that wish to access the Buena Vista Creek Ecological Reserve to the north. Fennel and mustard infestations were treated, and acacia and eucalyptus trees were removed during the term of the first PMP. Table 6-9 summarizes key management attributes for this parcel.

Table 6-9. Site characteristics at Carlsbad Village Open Space.

Descriptor	Value/Category
Acreage	13
Elevation Range	160-240 ft.
Management Unit	Buena Vista Creek
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	2
Core/Linkage Area	Core 2 (only partially)
Watershed	Buena Vista Creek

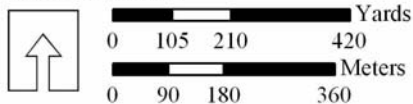
6.4.2 Land Use

Local land use is presented in Map 6-10.

Local Land Use at Carlsbad Village Open Space*



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



Map 6-10. Local land use at Carlsbad Village Open Space.

6.4.3 Soil Characteristics

Map 6-11 depicts soils on Carlsbad Village Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

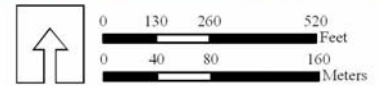
6.4.4 Fire History

There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.



Soils at Carlsbad Village Open Space

- Carlsbad gravelly loamy sand, 5 to 9 percent slopes
- Diablo clay, 30 to 50 percent slopes
- Diablo clay, 15 to 30 percent slopes, eroded
- Las Flores loamy fine sand, 2 to 9 percent slopes



Map 6-11. Soils at Carlsbad Village Open Space.

6.4.5 Vegetation

The dominant vegetation community is DCSS. Other communities include Ornamental (eucalyptus and acacia), and Nonnative Grassland (Map 6-12).

6.4.6 Sensitive Resources

The only sensitive resource observed during the term of the first PMP was the CAGN. Refer to Table 6-10 for a list of planned surveys for the site.

6.4.7 Management Actions

Table 6-10 presents a list of planned management actions required on Carlsbad Village Open Space for the next five years.



Carlsbad Village Vegetation and Sensitive Species

- Open Space Boundary
- + City of Carlsbad Releve Locations
- Brodiaea filifolia

Draft Vegetation Communities

- Developed
- Diegan Coastal Sage Scrub
- Diegan Coastal Sage Scrub - Baccharis Dom
- Disturbed Habitat

Sensitive Wildlife Species

- Coastal California Gnatcatcher
- Cooper's Hawk

- Non Native Grassland
- Non Native Grassland - Broadleaf Dom
- Ornamental
- Southern Willow Scrub
- Valley Needlegrass Grassland

Map 6-12. Vegetation communities and sensitive species at Carlsbad Village Open Space.

Table 6-10. Management actions at Carlsbad Village Open Space for the next five years.

Management Category	Actions
Biological Surveys.	■ Surveys for coastal California gnatcatcher (2013 and 2016).
Capital Improvements	■ No planned activities.
Habitat Maintenance	■ Continue to treat fennel, eucalyptus and acacia resprouts. Treat mustard. ■ Remove other zero tolerant nonnative plant species and note moderate tolerant nonnative species.
Public Services	■ Monthly patrol. ■ Maintain signs, posts and kiosks. Periodically add new information to the kiosk.

6.5 La Costa Canyon Park Open Space



Photo 6-5. La Costa Canyon Park Open Space.

6.5.1 General Open Space Site Characteristics

This 8.9 acre parcel is predominantly south facing coastal sage scrub (Photo 6-5) and is contiguous with larger undeveloped areas to the west and north (Box Canyon). In general, the habitat is of high quality. A small eucalyptus stand occupies the eastern end of the property, which is part of the City of Carlsbad's trail system, and so it was not removed. Pampas grass, palms, and other nonnatives were removed from the drainage during the term of the first PMP. This area gets some off-trail activity which is usually a result of individuals wanting to get from the park to Box Canyon. San Diego Gas & Electric (SDGE) grades their access road along the northern boundary. Table 6-11 summarizes key management attributes for this parcel.

Table 6-11. Site characteristics at La Costa Canyon Park Open Space.

Descriptor	Value/Category
Acreage	8.9
Elevation Range	40-200 ft.
Management Unit	Villages of La Costa
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	6
Core/Linkage Area	Coie 7
Watershed	San Marcos Creek

6.5.2 Land Use

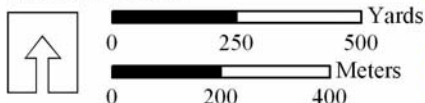
Local land use is presented in Map 6-13. Note location of proposed fencing in Map 6-13 and the associated details in Table 6-12.

Local Land Use at La Costa Canyon Park and La Costa/Romero Open Spaces*

-  Open Space Boundary
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil
-  Golf Course



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



Map 6-13. Local land use at La Costa Canyon Park and La Costa/Romero Open Spaces.

6.5.3 Soil Characteristics

Map 6-14 depicts soils on La Costa Canyon Park Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

6.5.4 Fire History

There is one fire recorded in 1935 that completely covered the current extent of this property (See Map 6-15). Several others, in 1943, 1970, and 1996 came very close. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.

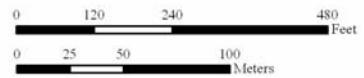
6.5.5 Vegetation

The dominant vegetation communities are DCSS and Southern Willow Scrub (Map 6-16).

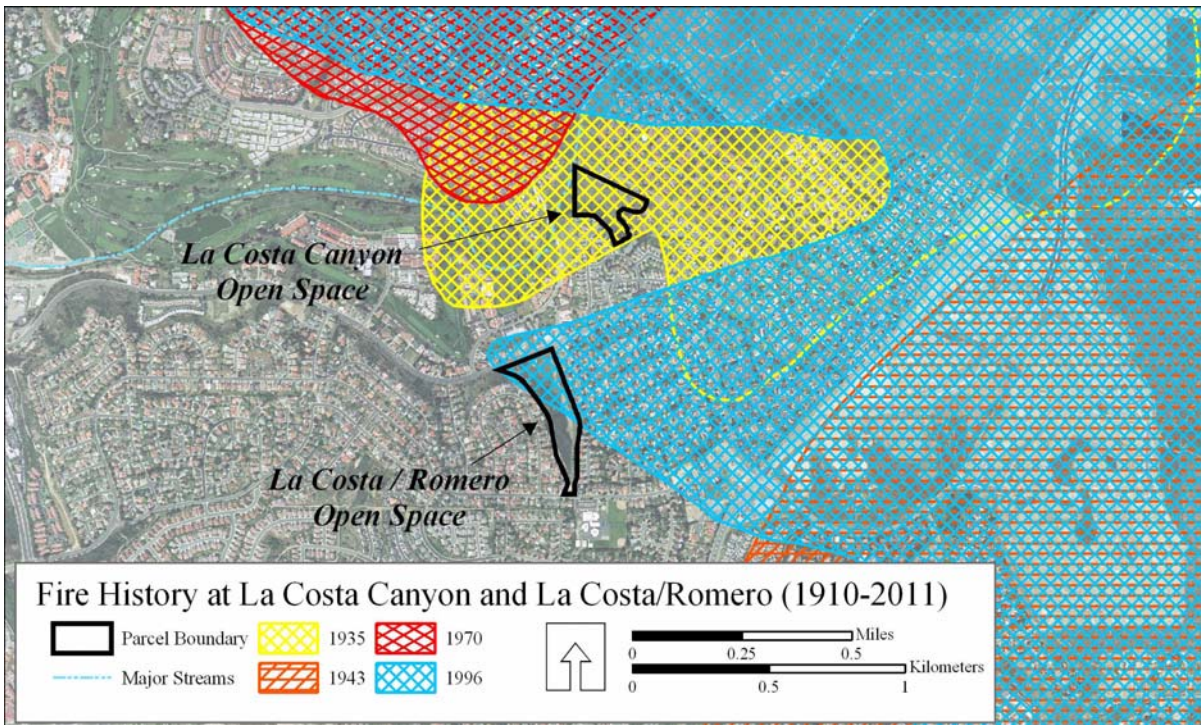


Soils at La Costa Canyon Open Space

- Exchequer rocky silt loam, 30 to 70 percent slopes
- San Miguel-Exchequer rocky silt loams, 9 to 70 percent slopes

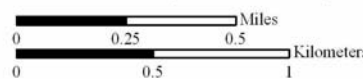


Map 6-14. Soils at La Costa Canyon Park Open Space.



Fire History at La Costa Canyon and La Costa/Romero (1910-2011)

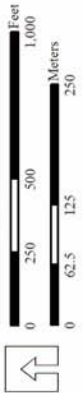
- Parcel Boundary
- 1935
- 1970
- 1943
- 1996
- Major Streams



Map 6-15. Fire history at La Costa Canyon and La Costa/Romero Open Spaces.

La Costa Canyon Park and La Costa/Romero Vegetation and Sensitive Species

- Open Space Boundary**
 - LA COSTA/ROMERO
 - LA COSTA CANYON PARK
- Sensitive Wildlife Species**
 - Coastal California Gnatcatcher
 - Greater roadrunner
 - SC Rufous-crowned sparrow
- CNLM Sensitive Plant Points 1998-2010**
 - Comarostaphylis diversifolia ssp. diversifolia
 - Convolvulus simulans
 - Dudleya viscida
 - Iva hayesiana
 - Juncus acutus ssp. leopoldii
 - Quercus dumosa
 - City of Carlsbad Revele Locations
- CNLM Sensitive Plant Polygons 2000-2010**
 - Comarostaphylis diversifolia ssp. diversifolia
 - Dudleya viscida
 - Harpagonella palmeri
 - Iva hayesiana
 - Microseris douglasii ssp. playcarpha
 - Quercus dumosa
- Draft Vegetation Communities**
 - Developed
 - Diegan Coastal Sage Scrub
 - Disturbed - Diegan Coastal Sage Scrub
 - Disturbed Habitat
 - Freshwater Marsh
 - Non Native Grassland
 - Open Water
 - Ornamental
 - Southern Maritime Chaparral
 - Southern Willow Scrub



Map 6-16. Vegetation communities and sensitive species at La Costa Canyon Park and La Costa/Romero Open Spaces.

6.5.6 Sensitive Resources

Sensitive resources identified include the CAGN, sticky dudleya, summer-holly, Palmer's grapplinghook (*Harpagonella palmeri*), San Diego marsh elder, south-western spiny rush and small-flowered microseris (*Microseris douglasii*).

6.5.7 Management Actions

Table 6-12 presents a list of planned management actions on La Costa Canyon Open Space for the next five years.

Table 6-12. Recommended management actions on the La Costa Canyon Park Open Space for the next five years.

Management Category	Actions
Biological Surveys.	<ul style="list-style-type: none"> ■ Coastal California gnatcatcher surveys (2013 and 2016).
Capital Improvements	<ul style="list-style-type: none"> ■ None.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Continue to treat zero tolerant nonnative plant species as they are observed. Note moderate tolerant nonnative species. ■ Preserve Manager will NOT remove Eucalyptus along both sides of trail that connects La Costa Canyon Park to the apartments located to the east, nor the large Eucalyptus along the edges of La Costa Canyon Park and the pride-of-Madeira located along the western edge.
Public Services	<ul style="list-style-type: none"> ■ Monthly patrols. ■ Update kiosk information regularly. ■ Maintain signs and posts.

6.6 La Costa/Romero Open Space



Photo 6-6. La Costa/Romero Open Space.

6.6.1 General Open Space Site Characteristics

This 12.9 acre parcel is bordered by residential properties to the east and west, with La Costa Avenue forming its northern border. It is not connected to other open space areas. There is a wide central path that runs the length of the parcel used by the public as an unauthorized trail, mowed by the fire department each year. The gate that was installed in 2010 along the southern end has helped control access (Photo 6-6). Primary management activities during the term of the last PMP included erosion control in the main drainage of the property and nonnative plant removal. Table 6-13 summarizes key management attributes for this parcel.

Table 6-13. Site characteristics at La Costa/Romero.

Descriptor	Value/Category
Acreage	12.9
Elevation Range	120-200 ft.
Management Unit	Arroyo La Costa
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	6
Core/Linkage Area	None
Watershed	San Marcos Creek

6.6.2 Land Use




Local land use is presented in Map 6-13.

6.6.3 Soil Characteristics

Map 6-17 depicts soils on La Costa/Romero Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.



Soils at La Costa/Romero Open Space

-  Altamont clay, 15 to 30 percent slopes, eroded
-  Altamont clay, 9 to 15 percent slopes
-  Terrace escarpments



Map 6-17. Soils at La Costa/Romero Open Space.

6.6.4 Fire History

The Harmony Grove Fire in 1996 partially covered the current extent of this property (See Map 6-15). Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.

6.6.5 Vegetation

The dominant vegetation communities are SMC, Nonnative Grassland, and DCSS (Map 6-16). There is also ornamental vegetation (ice plant [*Mesembryanthemum* spp.], pine [*Pinus* spp.], eucalyptus and others) along the eastern and western boundaries, which will not be removed as this vegetation forms part of the fuel management zone, or consists of larger trees, which provide aesthetic resources to the neighbors with little threat to the preserve area.

6.6.6 Sensitive Resources

Sensitive resources observed include Nuttall's scrub oak, California adolphia, small-flowered morning glory (*Convolvulus simulans*), and summer-holly. Refer to Table 6-14 for a list of planned surveys for the site.

6.6.7 Management Actions

Table 6-14 presents a list of planned management actions required on La Costa/Romero Open Space for the next five years.

Table 6-14. Management actions at La Costa/Romero Open Space for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ Coastal California gnatcatcher surveys (2013 and 2016).
Capital Improvements	<ul style="list-style-type: none"> ■ No activities are planned.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Continue to treat/remove resprouts of zero tolerant nonnative plant species, such as pampas grass, tree tobacco shrubs, myoporum shrubs, acacia trees, Brazilian pepper, and tamarisk trees, which were previously known to occur on the property. Note moderate tolerant nonnative species. ■ Install additional gravel bags as necessary to limit erosion in main drainage area. Clean brow-ditches along La Costa Avenue. ■ Mow flat area on southern part of preserve.
Public Services	<ul style="list-style-type: none"> ■ Conduct monthly patrols. ■ Maintain signs with posts.

6.7 Lagoon Lane Open Space



Photo 6-7. Lagoon Lane Open Space.

6.7.1 General Open Space Site Characteristics

This small 2.7 acre parcel (Photo 6-7) is bounded on three sides by streets and on the fourth by a housing development. It is a recovering, previously disturbed, riparian area that was once part of the small stream systems that fed Batiquitos Lagoon from catchments from within the City of Carlsbad. Willows dominate the canopy, accompanied by mulefat and DCSS elements that cascade down from the surrounding hillside from the west. Table 6-15 summarizes key management attributes for this parcel.

Table 6-15. Site characteristics at Lagoon Lane Open Space.

Descriptor	Value/Category
Acreage	2.7
Elevation	120 ft.
Management Unit	Poinsettia/Aviara
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	4
Core/Linkage Area	None
Watershed	San Marcos Creek

6.7.2 Land Use

Local land use is presented in Map 6-18.

Local Land Use at Lagoon Lane Open Space*

-  Open Space Boundary
-  Other Open Space Preserves
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil
-  Golf Course
-  Lagoon
-  Industrial Park
-  Field Crops



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



Map 6-18. Local land use at Lagoon Lane Open Space.

6.7.3 Soil Characteristics

Map 6-19 depicts soils on Lagoon Lane Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

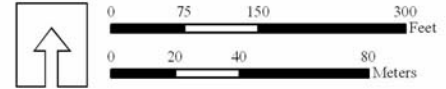
6.7.4 Fire History

There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.



Soils at Lagoon Lane Open Space

- Chesterton fine sandy loam, 5 to 9 percent slopes
- Terrace escarpments



Map 6-19. Soils at Lagoon Lane Open Space.

6.7.5 Vegetation

The dominant vegetation communities for this parcel are Southern Arroyo-Willow Riparian Forest and DCSS (Map 6-20).

6.7.6 Sensitive Resources

Sensitive resources identified on the parcel include California adolphia and wart-stemmed ceanothus. Refer to Table 6-16 for a list of planned surveys for the site.

6.7.7 Management Actions

Table 6-16 presents a list of planned management actions on Lagoon Lane Open Space for the next five years.

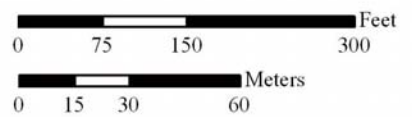
Table 6-16. Management actions at Lagoon Lane Open Space for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ Least Bell's vireo surveys (2013 and 2016).
Capital Improvements	<ul style="list-style-type: none"> ■ None.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Continue to treat/remove any zero tolerant nonnative plant species as they are observed. Note moderate tolerant nonnative species. ■ Preserve Manager will not remove large Eucalyptus along edges of Fire Station.
Public Services	<ul style="list-style-type: none"> ■ Quarterly patrols. ■ Maintain signs and posts. ■ Add information to the mini kiosk as needed.



Lagoon Lane Vegetation and Sensitive Species

- Lagoon Lane
- Vegetation Communities**
- Developed
- Diegan Coastal Sage Scrub
- Diegan Coastal Sage Scrub - Chaparral Transition
- Disturbed Habitat
- Ornamental
- Southern Arroyo Willow Riparian Forest



Map 6-20. Vegetation communities and sensitive species at Lagoon Lane Open Space.

6.8 Lake Calavera Preserve



Photo 6-8. Lake Calavera Preserve.

6.8.1 General Open Space Site Characteristics

This relatively expansive 256 acre parcel (Photo 6-8) surrounds Lake Calavera. It is bordered by housing developments to the north and east, however it is contiguous with undeveloped natural lands to the south (CDFG's Calavera Mountain/Carlsbad Highlands) and west (CNLM's Calavera Hills Habitat Conservation Area). The lake supports a variety of plants and wildlife. Exotic plant species, such as mustard, pose threats near the lake's edges. Other exotic plant species scattered through the eastern portion of the riparian areas' palms and myoporum trees reduce habitat quality.

Lake Calavera is extensively used by the public for walking and mountain biking (see Trail map). The Lake Calavera Trail improvement project started in early 2010. This project included delineating a formal trail system, installing erosion control measures and signage, and public outreach. Mini-kiosks were installed at every major access point, providing trail maps and other useful information. Dog feces pick up bags and trash cans were also installed, which has resulted in a dramatic decrease in dog feces. Unwanted trails were blocked with fence or vegetation.

Unwanted activities have decreased since management of this preserve area commenced. Over the last three years, CNLM rangers have encountered individuals riding off-road vehicles (mostly motorcycles), engaging in air-soft games, riding dirt bikes and creating jumps, throwing spears, selling products, hunting with bow-and-arrows, using radio-controlled airplanes and vehicles, horseback riding and many other illegal or unwanted activities. Routine patrols have reduced damages to the preserve, and the public is gradually accepting the trail system and new regulation.

Focused surveys for CAGN, LBV, and WIFL, habitat assessments and nonnative species removal were the primary management tasks which occurred during the term of the first PMP. The number of gnatcatchers observed ranged from 3 to 4 territories during the term of the first PMP. No LBV or WIFL were observed. Habitat assessments included the installation of CNPS Revele's, and oak woodland assessment plot, and the three permanent DCSS plots (Map 6-24). Most of the vegetation communities south of the Lake is of high quality, with little disturbance from invasive plant species (except for the nonnative grasslands). Vegetation north of lake is more disturbed, primarily because the top soil was graded off the site many years ago.

Nonnative plant species removed during the term of the first PMP include pampas grass, tamarisk, Spanish bayonet (*Yucca harrimaniae*), tree tobacco (*Nicotiana glauca*), fennel, cardoon (*Cynara cardunculus*), palm, myoporum trees (*Myoporum* spp.), black and sahara mustard, ice plant, and many others. The City did not want the large palm grove and myoporum trees located towards the northeast corner of the preserve to be removed, as they intend on using these areas for future wetlands mitigation projects.

The Lake Calavera area also has several habitat restoration projects, resulting from mitigation requirements of the Trail Plan, the Dam Spillway project and from a TransNet Environmental Working Group grant that the City was provided. Oversight of these restoration projects is done by City staff. The work is being performed by Habitat Restoration Sciences, Inc (HRS). The Spillway mitigation includes creating wetlands near the dam and some upland restoration near the southeast corner of the preserve. The Trail Plan mitigation and EMP grant fund habitat restoration along the south side of the Lake, which includes the creation of grassland and coastal sage scrub habitats.

In conjunction with the Lake Calavera Trail project, a biological resources report was developed for the property (Merkel and Associates 2005). Summarized results of sensitive species observed, and those noted during the term of the first PMP, and vegetation mapped as part of this study are provided in this section.

See Table 6-17 for site characteristics of this property.

Table 6-17. Site characteristics of Lake Calavera Preserve.

Descriptor	Value/Category
Acreage	256
Elevation Range	280-400 ft.
Management Unit	Calavera
Management Entity	City of Carlsbad
Conservation Status	Existing hardline conservation area.
Facilities Management Zone	14
Core/Linkage Area	Core 3
Watershed	Agua Hediona and Buena Creek

6.8.2 Land Use

Local land use is presented in Map 6-21. Note location of proposed fencing in Map 6-21 and the associated details in Table 6-20, Management Actions.

6.8.3 Soil Characteristics

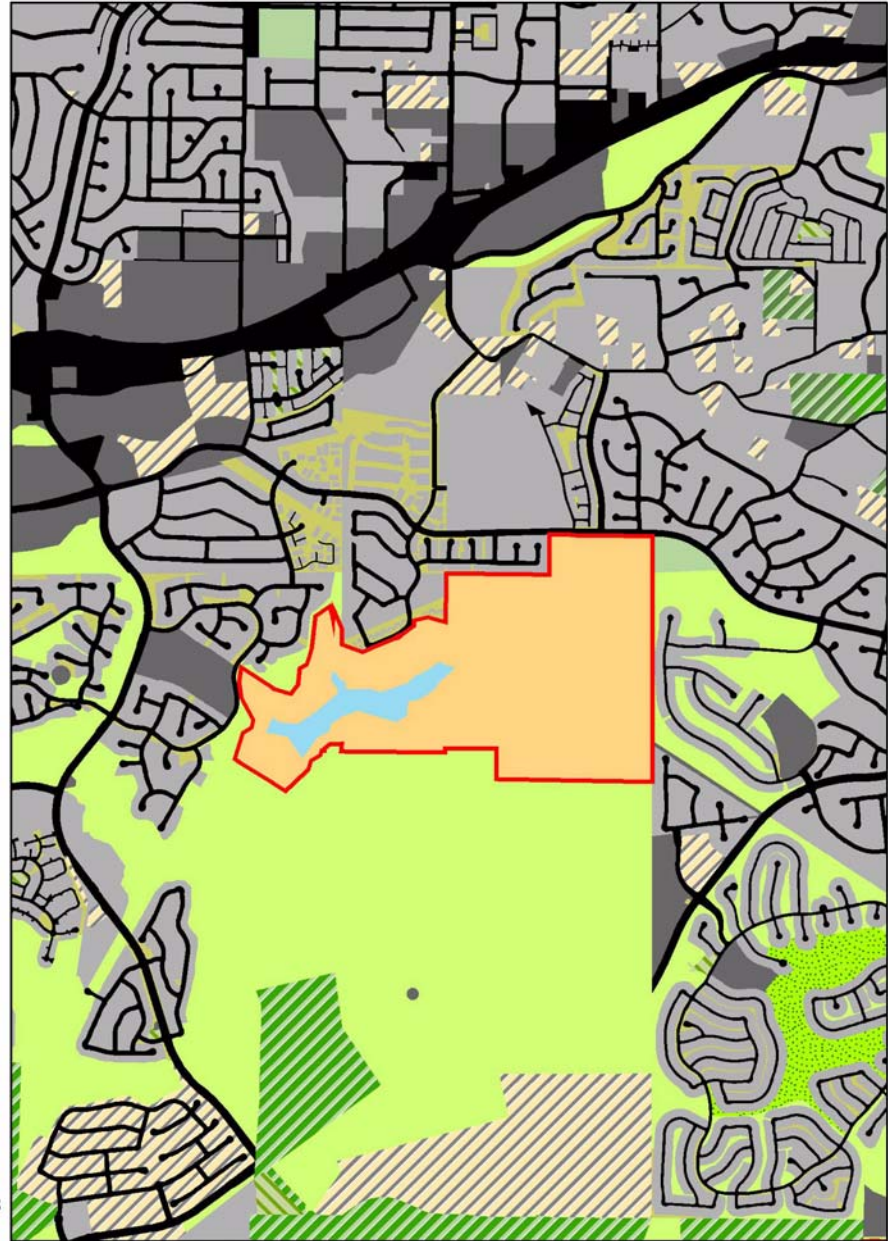
Map 6-22 depicts soils on Lake Calavera Preserve. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

6.8.4 Fire History

There is one recorded fire from 1979 that affected Calavera Lake (Refer to Map 6-23). Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.

Local Land Use at Lake Calavera Preserve*

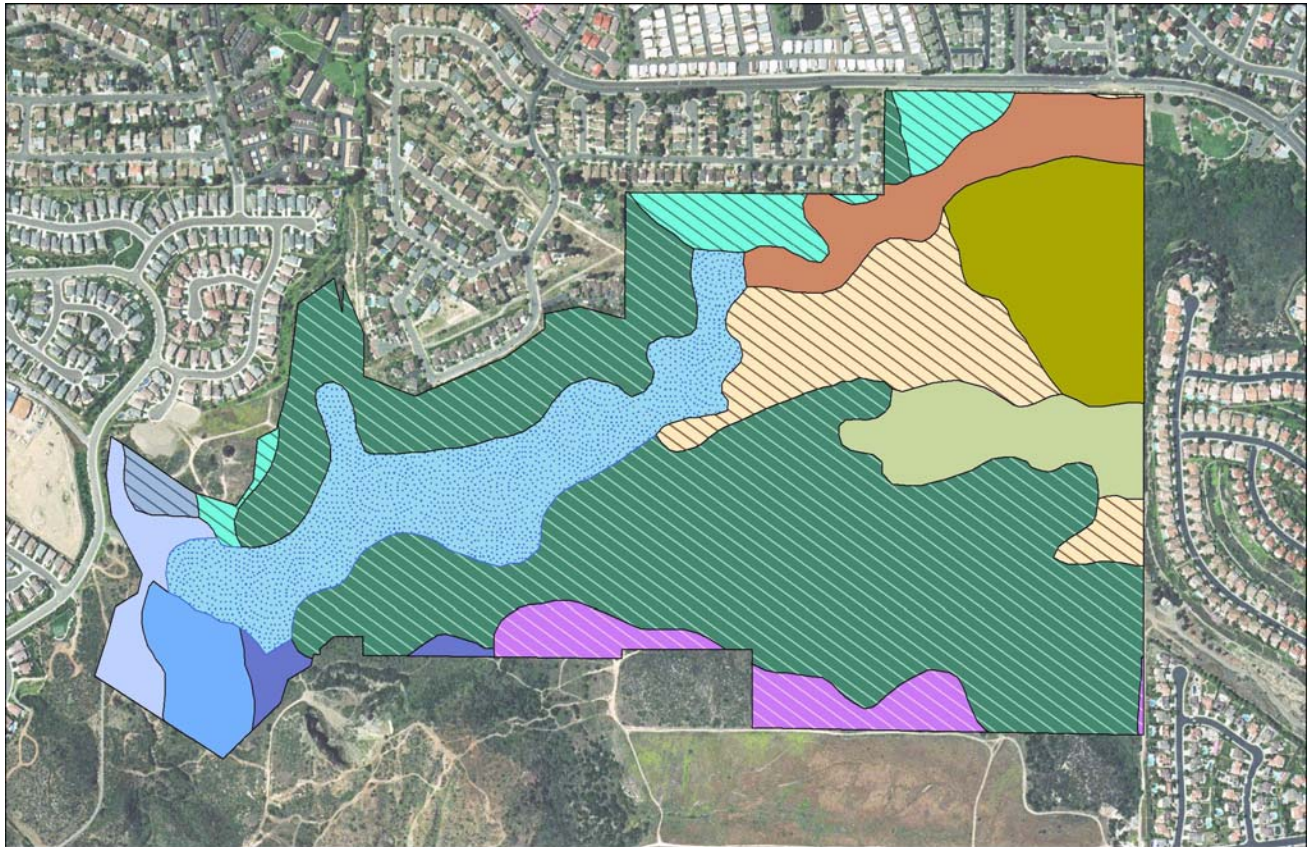
-  Open Space Boundary
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil
-  Golf Course
-  Lake
-  Field Crops



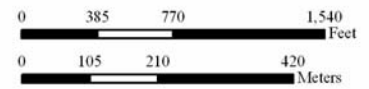
*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.















Map 6-21. Local land use at Lake Calavera Preserve.

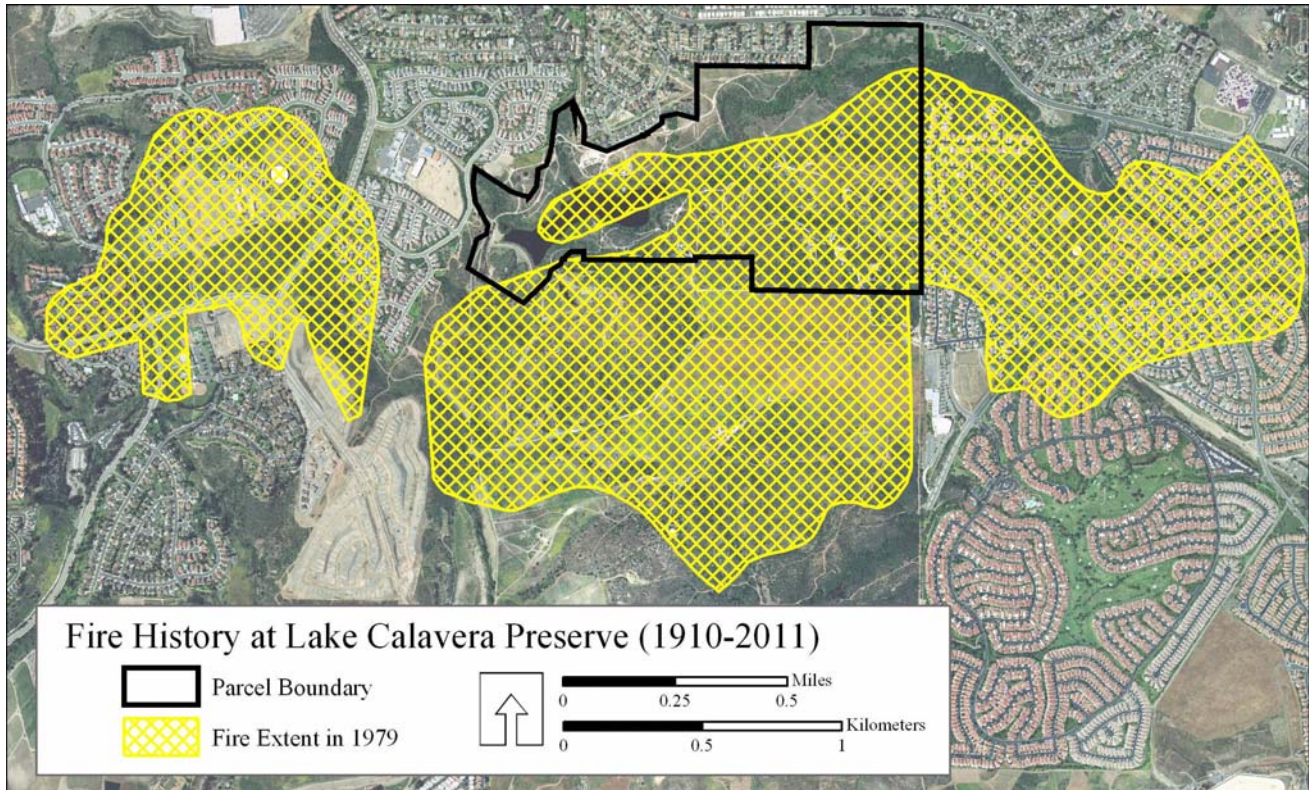


Soils at Lake Calavera Preserve



- | | |
|---|--|
|  Altamont clay, 9 to 15 percent slopes, eroded |  Las Flores loamy fine sand, 5 to 9 percent slopes |
|  Calavera Lake |  Las Flores loamy fine sand, 9 to 15 percent slopes, eroded |
|  Cieneba-Fallbrook rocky sandy loam, 30 to 65 percent slopes |  Las Flores loamy fine sand, 9 to 30 percent slopes, severely eroded |
|  Friant rocky fine sandy loam, 30 to 70 percent slopes |  Las Posas stony fine sandy loam, 30 to 65 percent slopes |
|  Friant rocky fine sandy loam, 9 to 30 percent slopes |  Loamy alluvial land-Huerhuero complex, 9 to 50 percent slopes, severely eroded |
|  Huerhuero loam, 9 to 15 percent slopes, eroded |  Salinas clay loam, 2 to 9 percent slopes |

Map 6-22. Soils at Lake Calavera Open Space.



Map 6-23. Fire history at Lake Calavera Open Space.

6.8.5 Vegetation

Map 6-24 depicts vegetation on the Lake Calavera Preserve.

6.8.6 Sensitive Resources

The following tables (Table 6-18 and Table 6-19) identify the sensitive species observed on the Lake Calavera Preserve. The most notable addition to the sensitive species list is the thread-leaf brodiaea, which was observed in 2010 for the first time.

Table 6-18. Sensitive floral species identified on-site (Biological Resources Report for Lake Calavera Trails, Merkel and Associates 2005), Lake Calavera Mitigation Bank.

Common Name	Scientific Name	CNPS List	State Status	Federal Status
California adolphia	<i>Adolphia californica</i>	2.1 ^a	none	none
Western dichondra	<i>Dichondra occidentalis</i>	4.2 ^b	none	none
Clay-field goldenbush	<i>Isocoma menziesii</i> var. <i>decumbens</i>	1B.1 ^c	none	none
Southwestern spiny rush	<i>Juncus acutus</i> ssp. <i>leopoldii</i>	4.2	none	none
Thread-leaf brodiaea	<i>Brodiaea filifolia</i>	1B	SE ^d	FT ^e

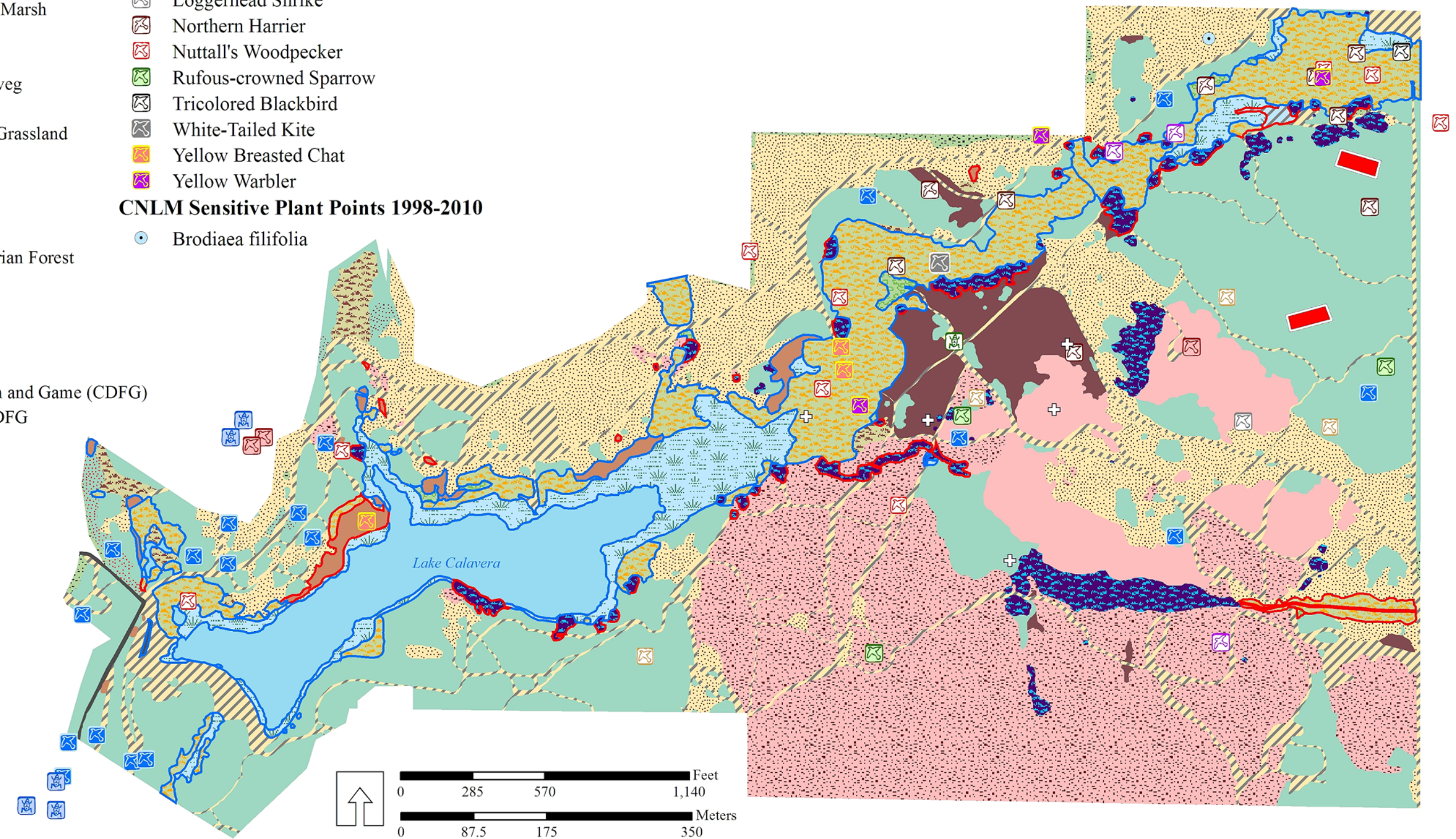
- a. Rare or endangered in CA, more common elsewhere. Seriously endangered in CA.
- b. Plants of limited distribution. Fairly endangered in CA.
- c. Rare or endangered in CA. Seriously endangered in CA.
- d. State endangered.
- e. Federally threatened.

Lake Calavera Preserve Vegetation and Sensitive Species

- CSS plots
 - + City of Carlsbad Releve Locations
- Vegetation**
- Open Water
 - Chamise Chaparral
 - Cismontane Alkali Marsh
 - Coast Live Oak Woodland
 - Coastal Sage-Chaparral Scrub
 - Coastal and Valley Freshwater Marsh
 - Coyote Brush Scrub
 - Diegan Coastal Sage Scrub
 - Diegan Coastal Sage Scrub/Reveg
 - Disturbed Habitat
 - Disturbed Valley Needlegrass Grassland
 - Disturbed Wetland
 - Mule Fat Scrub
 - Non-native Grassland
 - Non-native Vegetation
 - Southern Coast Live Oak Riparian Forest
 - Southern Mixed Chaparral
 - Southern Willow Scrub
 - Urban/Developed

- Sensitive Flora and Fauna**
- ☒ Orangethroat Whiptail
 - ☒ Western Spadefoot
 - ☒ Brown-headed Cowbird
 - ☒ California Thrasher
 - ☒ Coastal California Gnatcatcher
 - ☒ Cooper's Hawk
 - ☒ Greater Roadrunner
 - ☒ Loggerhead Shrike
 - ☒ Northern Harrier
 - ☒ Nuttall's Woodpecker
 - ☒ Rufous-crowned Sparrow
 - ☒ Tricolored Blackbird
 - ☒ White-Tailed Kite
 - ☒ Yellow Breasted Chat
 - ☒ Yellow Warbler
- CNLM Sensitive Plant Points 1998-2010**
- *Brodiaea filifolia*

- Jurisdictional Habitat**
- California Department of Fish and Game (CDFG)
 - Army Corps of Engineers, CDFG



Map 6-24. Vegetation communities and sensitive species at Lake Calavera Preserve.

This Page Intentionally Blank

Table 6-19. Sensitive fauna species observed on-site, Lake Calavera Mitigation Bank.

Common Name	Scientific Name	State Status	Federal Status
Monarch	<i>Danaus plexippus</i>	none	none
Western spadefoot	<i>Spea hammondi</i>	SSC	none
White-tailed kite	<i>Elanus leucurus</i>	Fully protected	none
Northern harrier	<i>Circus cyaneus</i>	SSC	none
Sharp-shinned hawk	<i>Accipiter striatus</i>	none	none
Cooper's hawk	<i>Accipiter cooperii</i>	none	none
Loggerhead shrike	<i>Lanius ludovicianus</i>	SSC	none
Coastal California gnatcatcher	<i>Poliopitila californica californica</i>	SSC	Federally Threatened
California thrasher	<i>Toxostoma redivivum</i>	none	none
Yellow warbler	<i>Dendroica petechia brewsteri</i>	SSC	none
Yellow-breasted chat	<i>Icteria virens</i>	SSC	none
Tricolored blackbird	<i>Agelaius tricolor</i>	SSC	none

6.8.7 Management Actions

Table 6-20 presents a list of planned management actions required on Lake Calavera Open Space for the next five years.

Table 6-20. Management actions at Lake Calavera Mitigation Bank Open Space for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ DCSS vegetation plots (2012, 2014 and 2016). ■ Coastal California gnatcatcher, least Bell's vireo, southwest willow flycatcher and raptor surveys (2013 and 2016). ■ Oak tree assessment following USFS protocol, which includes a gold spotted oak borer assessment (2012 and 2015). ■ Thread-leaf brodiaea abundance counts (annual) and habitat assessment (2012-2016). ■ Conduct a basic assessment the level and distribution of the bull-frog infestation. Recommend removal/management approaches.
Capital Improvements	<ul style="list-style-type: none"> ■ Fence and mini-kiosk maintenance.
Habitat Maintenance	<ul style="list-style-type: none"> ■ DO NOT remove 100+ Mexican fan palms, tree tobacco and myoporum trees within and east of the large stand of palms near the northeastern corner of property. ■ "Preserve Manager to continue to treat/remove any zero tolerant species as they are observed. Note moderate tolerant nonnative species. ■ Treat/remove black mustard along the northern side of the Lake. ■ City of Carlsbad's Trail Program will cover restoration of all rogue and other unwanted trails. The Trail Program will cover all trail improvements, signs, fences and other trail construction and public outreach needs. ■ The City removes vegetation from each side of the dam as part of federally mandated dam maintenance requirements.
Public Services	<ul style="list-style-type: none"> ■ Patrol 2-4 times per week to discourage illegal and unwanted activities, dumping and the construction of new bicycle jumps and paths. ■ Maintain perimeter signs and posts. ■ Participate in public outreach events as directed by City staff.

6.9 Los Monos Reserve



Photo 6-9. Los Monos Reserve.

6.9.1 General Open Space Site Characteristics

This 20.5 acre parcel (Photo 6-9) is dominated by high quality DCSS and chaparral with minimal cover by exotics. Public access has been restricted by the presence of barbed-wire fencing that is maintained by the City's water district. CAGN surveys, habitat assessments and nonnative plant removal were the primary management tasks which occurred during the term of the first PMP. CAGN were observed, and pampas grass and fountaingrass (*Pennisetum* spp.) were treated. In general, this site gets little use and requires little management. The City mows/weed whips the vegetation on the reservoir face every year as part of federally mandated compliance obligations. Table 6-21 summarizes key management attributes for this parcel.

Table 6-21. Site characteristics of Los Monos Open Space.

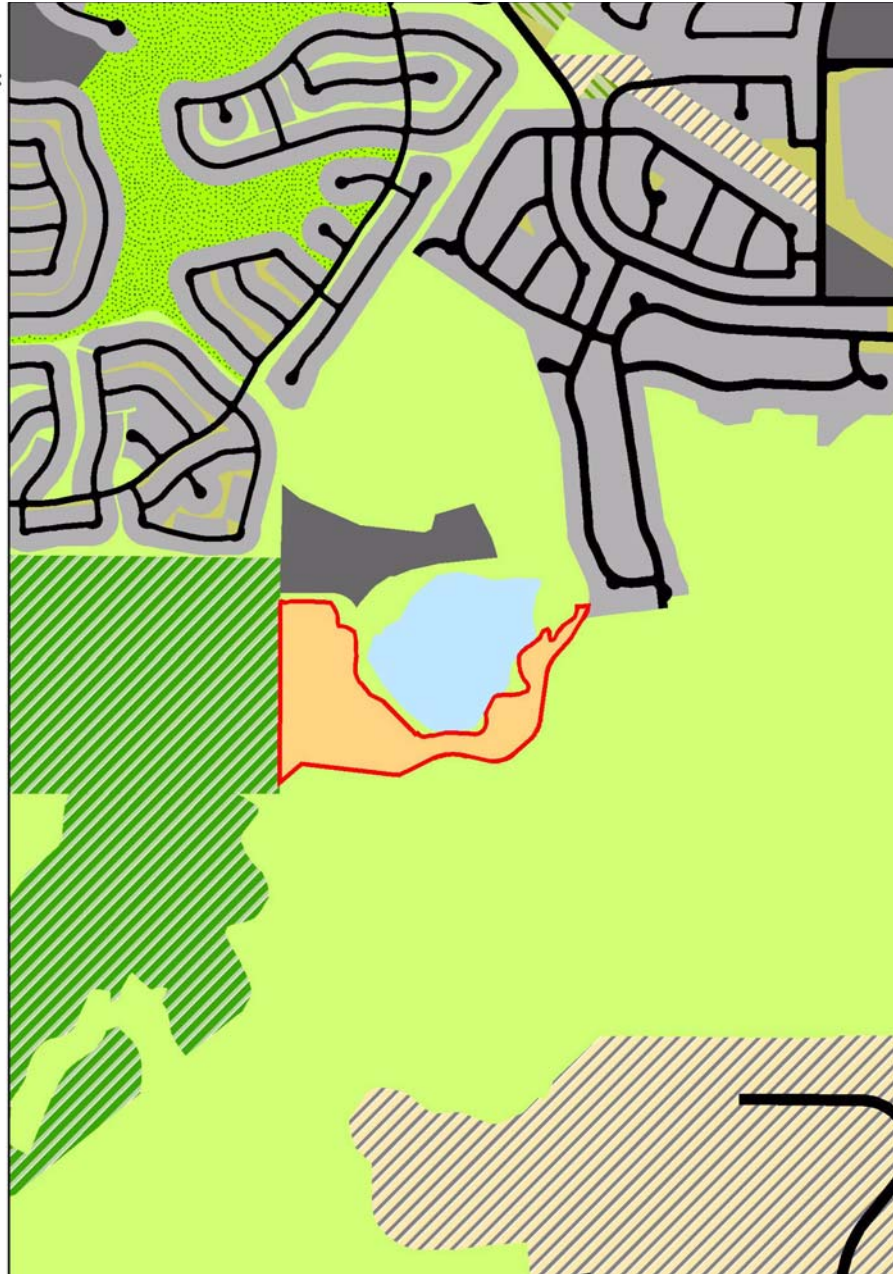
Descriptor	Value/Category
Acreage	20.5
Elevation Range	360-560 ft.
Management Unit	Los Monos
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	15
Core/Linkage Area	Core 5
Watershed	Agua Hediona and Buena Creek

6.9.2 Land Use

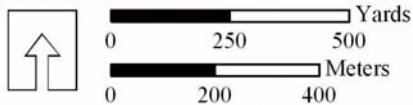
Local land use is presented in Map 6-25.

Local Land Use at Los Monos Reserve*

-  Open Space Boundary
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil
-  Golf Course
-  Field Crops
-  Reservoir



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



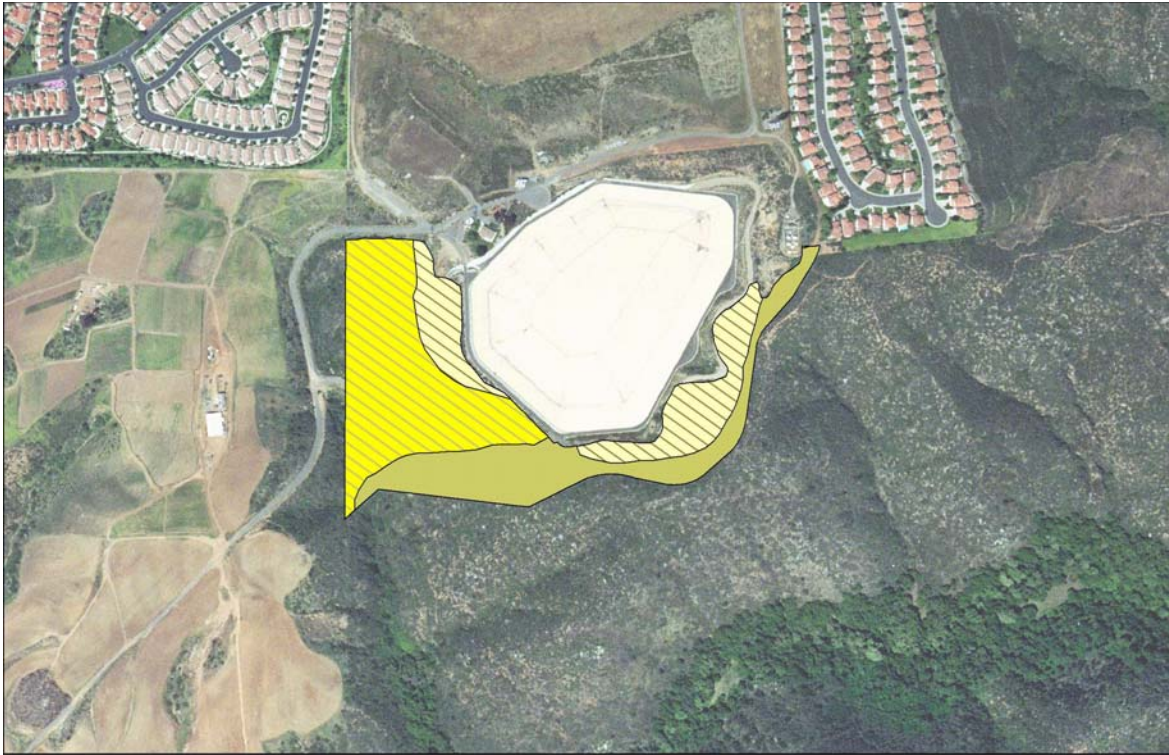
Map 6-25. Local land use at Los Monos Reserve.

6.9.3 Soil Characteristics

Map 6-26 depicts soils on Los Monos Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

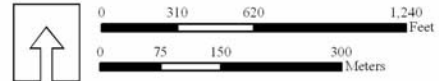
6.9.4 Fire History

There was one recorded fire in 1982 during the period of recorded fires between 1910-2003 (Refer to Map 6-27). Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.

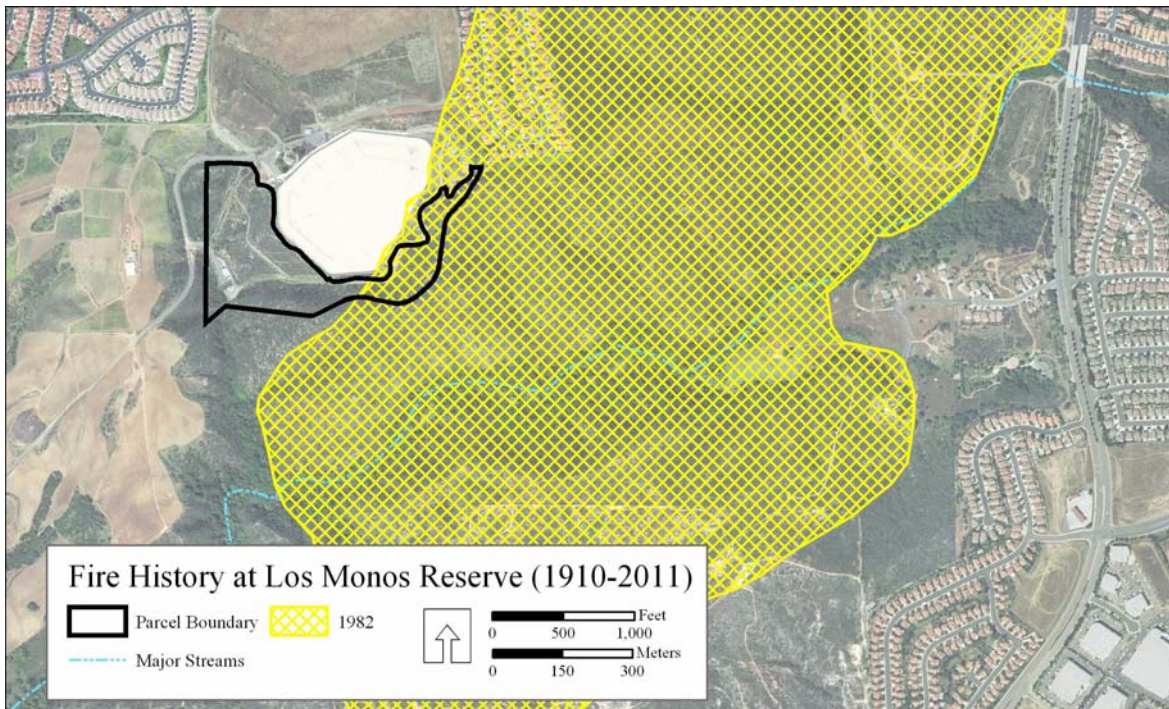


Soils at Los Monos Reserve

- Cienaba very rocky coarse sandy loam, 30 to 75 percent slopes
- Cienaba coarse sandy loam, 30 to 65 percent slopes, eroded
- Cienaba coarse sandy loam, 5 to 15 percent slopes, eroded

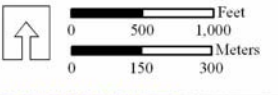


Map 6-26. Soils at Los Monos Open Space.



Fire History at Los Monos Reserve (1910-2011)

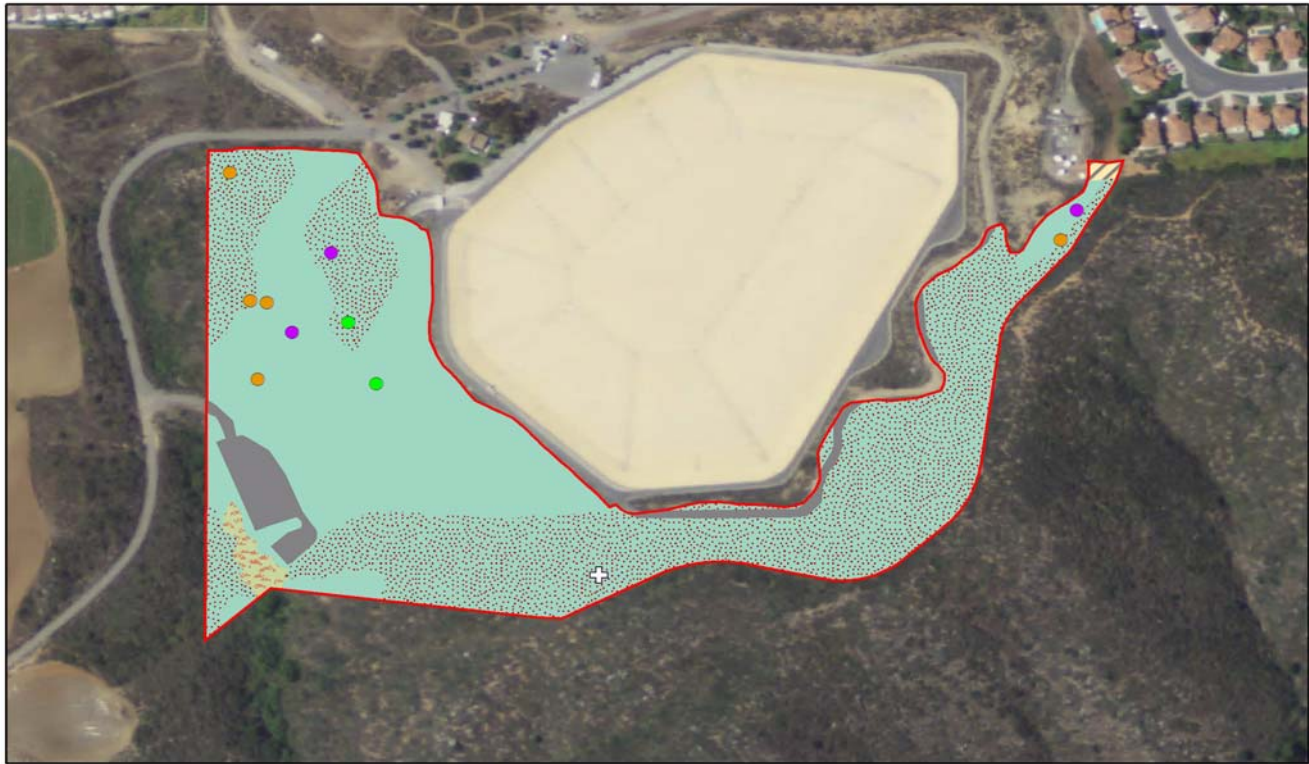
- Parcel Boundary
- 1982
- Major Streams



Map 6-27. Fire history at Los Monos Reserve.

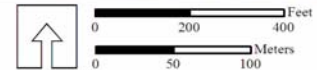
6.9.5 Vegetation

Map 6-28 depicts vegetation on Los Monos Open Space. The dominant vegetation communities are Southern Mixed Chaparral and DCSS.



Los Monos Vegetation

- | | |
|-------------------------------------|--|
| Sensitive Wildlife Species | Vegetation |
| ● Coastal California Gnatcatcher | ■ Developed |
| ● Greater Roadrunner | ■ Diegan Coastal Sage Scrub |
| ● Rufous-crowned Sparrow | ■ Diegan Coastal Sage Scrub - Chaparral Transition |
| □ Open Space Boundary | ■ Disturbed Habitat |
| ⊕ City of Carlsbad Releve Locations | ■ Southern Willow Scrub |



Map 6-28. Vegetation communities at Los Monos Reserve.

6.9.6 Sensitive Resources

The primary sensitive resource observed is the gnatcatcher. Other sensitive animals observed include the orange-throat whiptail, northern harrier, and southern California rufous-crowned sparrow. The only sensitive plant species observed was the California adolphia. Refer to Table 6-22 for a list of planned surveys for the site.

6.9.7 Management Actions

Table 6-22 presents a list of planned management actions required on Los Monos Open Space for the next five years.

Table 6-22. Management actions at Los Monos Open Space for the next five years.

Management Category	Actions
Biological Surveys	■ Coastal California gnatcatcher surveys (2013 and 2016).
Capital Improvements	■ None, assuming that fencing is maintained by the City via the Water District.
Habitat Maintenance	■ Survey for and remove any zero tolerant nonnative species. Note moderate tolerant nonnative species.
Public Services	■ Conduct quarterly patrols. ■ Maintain signs and posts.

6.10 Macario Canyon Open Space



Photo 6-10. Macario Canyon Open Space.

6.10.1 General Open Space Site Characteristics

This 33 acre parcel (Photo 6-10) contains several discontinuous sections, intersected by Faraday Avenue. The site is adjacent to the Veterans Park open space north of Faraday and the City Golf Course south of Faraday. Its topography is characterized by a flat plateau with gentle slopes extending down to Faraday Avenue to the south and southwest. Vegetation is predominantly DCSS and soils are fine sandy loams.

Management activities during the term of the first PMP included vegetation mapping, sensitive bird and plant surveys, habitat assessments and nonnative plant removal. Primary nonnative species removed/treated include acacia, fennel and Eucalyptus trees.

Table 6-23 summarizes key management attributes for this parcel.

Table 6-23. Site characteristics for Macario Canyon Open Space.

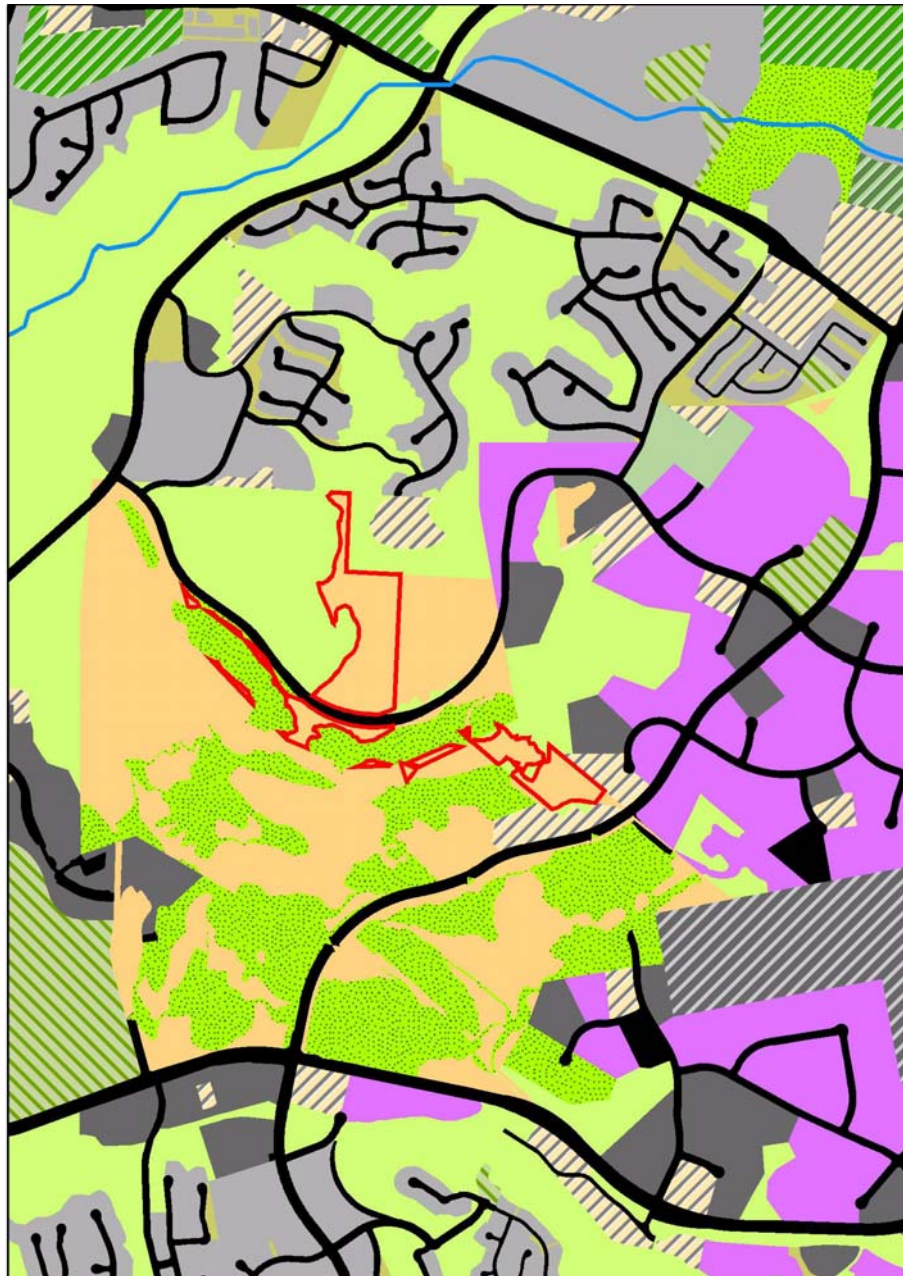
Descriptor	Value/Category
Acreage	33
Elevation Range	80-240 ft.
Management Unit	Faraday
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	8
Core/Linkage Area	Core 4
Watershed	Canyons de las Encinas

6.10.2 Land Use

Local land use is presented in Map 6-29.

Local Land Use at Macario Canyon Open Space*

-  Open Space Boundary
-  Other Open Space Preserves
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil
-  Golf Course
-  Lagoon
-  Industrial Park
-  Field Crops



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



Map 6-29. Local land use at Macario Canyon Open Space.

6.10.3 Soil Characteristics

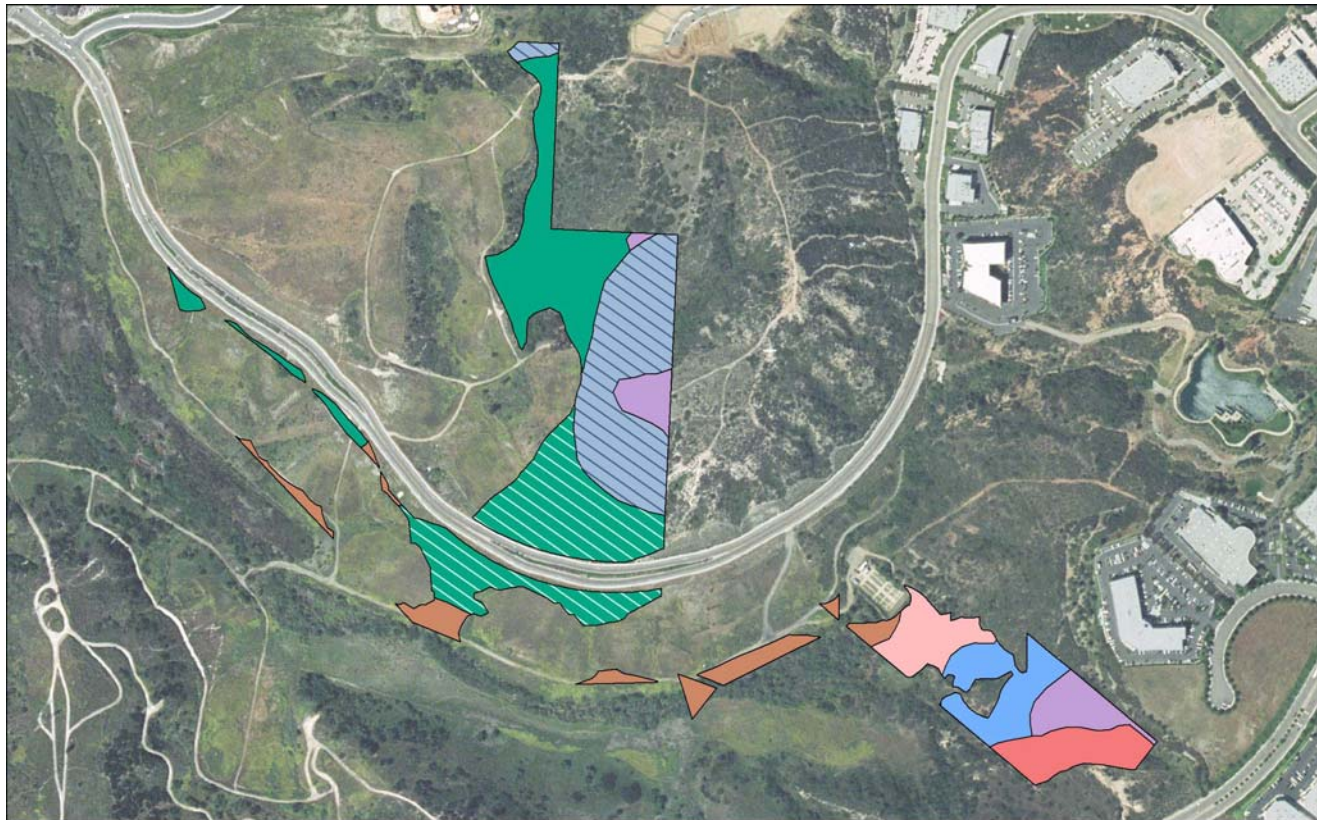
Map 6-30 depicts soils on Macario Canyon Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

6.10.4 Fire History

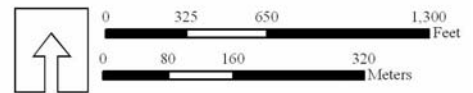
There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.

6.10.5 Vegetation

Vegetation communities include DCSS, SMC, and Nonnative Grassland (Map 6-31).



Soils at Macario Canyon Open Space



- Diablo clay, 15 to 30 percent slopes
- Las Flores loamy fine sand, 15 to 30 percent slopes
- Diablo clay, 15 to 30 percent slopes, eroded
- Las Flores loamy fine sand, 15 to 30 percent slopes, eroded
- Diablo-Olivenhain complex, 9 to 30 percent slopes
- Loamy alluvial land-Huerhuero complex, 9 to 50 percent slopes, severely eroded
- Friant rocky fine sandy loam, 9 to 30 percent slopes
- Salinas clay loam, 2 to 9 percent slopes
- Huerhuero loam, 2 to 9 percent slopes

Map 6-30. Soils at Macario Canyon Open Space.

6.10.6 Sensitive Resources

Sensitive resources identified during the term of the first PMP include the CAGN, northern harrier, white-tailed kite, western dichondra, and Palmer's grapplehook. Refer to Table 6-24 for a list of planned surveys for the site.

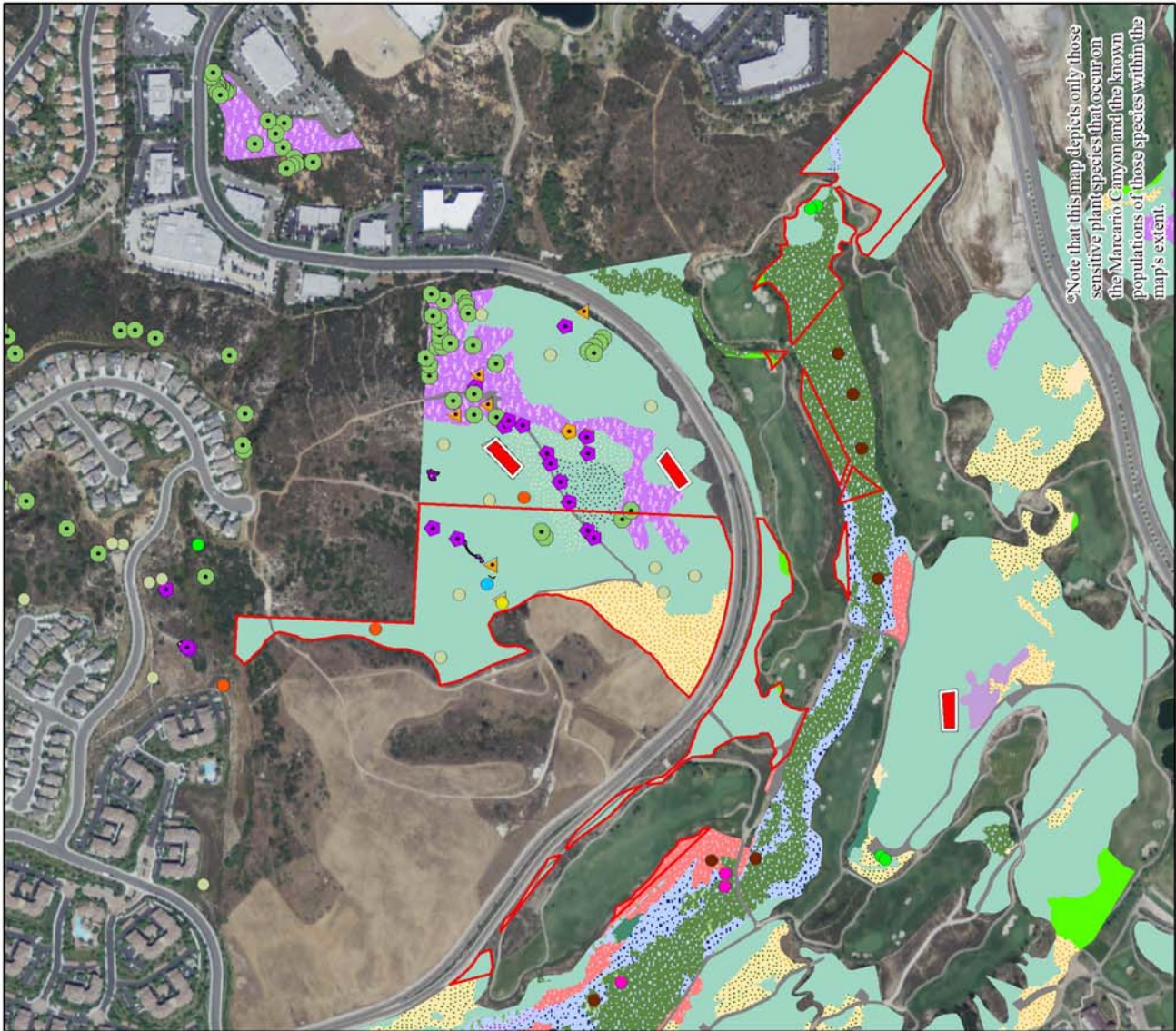
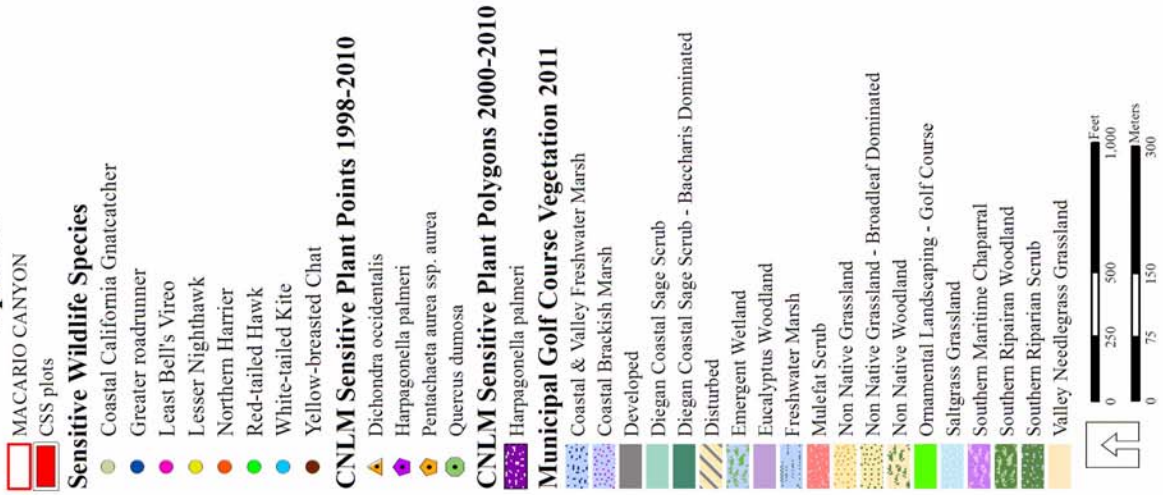
6.10.7 Management Actions

Table 6-24 presents a list of planned management actions on Macario Canyon Open Space for the next five years.

Table 6-24. Management actions at Macario Canyon Open Space for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ Coastal sage scrub monitoring plots (2012, 2014 and 2016). ■ Least Bell's vireo, southwest willow flycatcher and coastal California gnatcatcher surveys (2013 and 2016).
Capital Improvements	<ul style="list-style-type: none"> ■ None planned.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Erosion control as necessary. ■ PMP assumes that nonnative grassland/disturbed land along Faraday will be mowed by City for fire protection. ■ Remove zero tolerant nonnative plant species as they are observed. Note moderate tolerant nonnative species.
Public Services	<ul style="list-style-type: none"> ■ Conduct monthly patrols. ■ Maintain existing signs with posts.

Macario Canyon Vegetation and Sensitive Species*



Map 6-31. Vegetation communities and sensitive species at Macario Canyon Open Space.

6.11 Poinsettia Park Open Space



Photo 6-11. Poinsettia Park Open Space.

6.11.1 General Open Space Site Characteristics

This 12.5 acre parcel is bounded on three sides by urban development, and is contiguous with a downstream open space to the north. The City's Poinsettia Park borders its eastern edge (Photo 6-11) The Poinsettia Park open space has good quality DCSS and Southern Willow Scrub. Sycamores line the riparian zone.

Management activities that occurred during the term of the first PMP include nonnative plant removal, sensitive plant and bird surveys, and habitat assessments. Nasturtium, acacia and eucalyptus trees were the primary nonnative species removed and treated. Some of the nonnative acacia and myoporum trees along Paseo del Norte were encroaching in the preserve, and so were trimmed back. The City did not want the ornamental vegetation along Paseo del Norte to be removed as it was planted there for aesthetic purposes. A mini-kiosk was installed along Paseo del Norte.

Table 6-25 summarizes key management attributes for this parcel.

Table 6-25. Site characteristics for Poinsettia Park Open Space.

Descriptor	Value/Category
Acreage	12.5
Elevation Range	120-160 ft.
Management Unit	Poinsettia/Aviara
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	20
Core/Linkage Area	None
Watershed	Canyons de las Encinas

6.11.2 Land Use

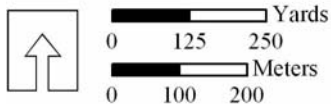
Local land use is presented in Map 6-32.

Local Land Use at Poinsettia Park Open Space*

-  Open Space Boundary
-  Other Open Space Preserves
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



Map 6-32. Local land use at Poinsettia Park Open Space.

6.11.3 Soil Characteristics

Map 6-33 depicts soils on Poinsettia Park Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

6.11.4 Fire History

There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.



Soils at Poinsettia Park Open Space

- Chesterton fine sandy loam, 5 to 9 percent slopes
- Salinas clay, 0 to 2 percent slopes
- Las Flores loamy fine sand, 15 to 30 percent slopes
- Terrace escarpments
- Marina loamy coarse sand, 2 to 9 percent slopes



Map 6-33. Soils at Poinsettia Park Open Space.

6.11.5 Vegetation

The dominant vegetation communities are DCSS and Southern Arroyo-Willow Riparian Forest (Map 6-34).

6.11.6 Sensitive Resources

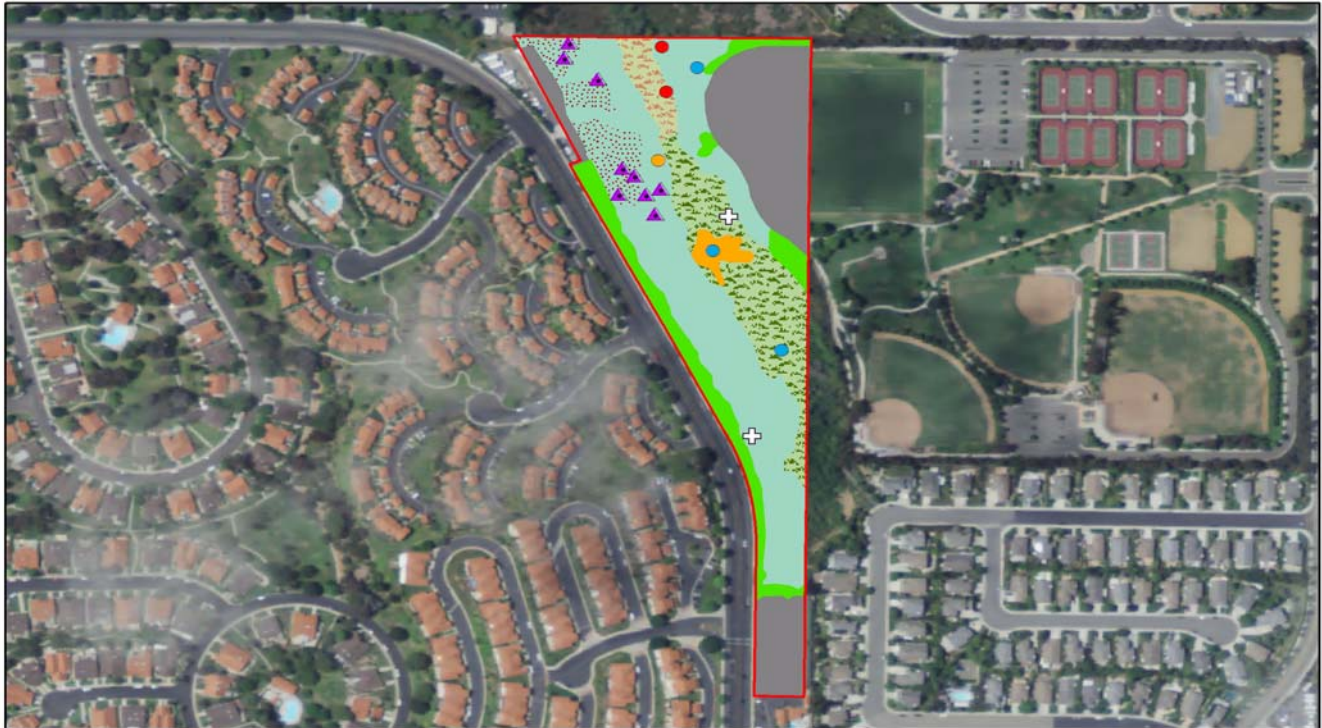
Sensitive resources observed during the term of the first PMP include the CAGN, YBCH, and wart-stemmed ceanothus. The unwanted brown-headed cowbird was also observed. Refer to Table 6-26 for planned site surveys.

6.11.7 Management Actions

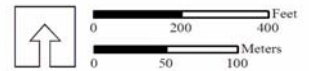
Table 6-26 presents a list of planned management actions on Poinsettia Park Open Space for the next five years.

Table 6-26. Management actions for Poinsettia Park Open Space for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ Coastal California gnatcatcher and least Bell's vireo surveys (2013 and 2016). ■ Cowbird trapping on-site or on adjacent site (CNLM's Encinas Creek) would be beneficial.
Capital Improvements	<ul style="list-style-type: none"> ■ None planned.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Continue to remove zero tolerant nonnative plant species. Note moderate tolerant nonnative species.
Public Services	<ul style="list-style-type: none"> ■ Monthly patrol. ■ Maintain signs and posts. ■ Maintain kiosk information.



Poinsettia Park Vegetation and Sensitive Species



- | | |
|---|---|
| <ul style="list-style-type: none"> Poinsettia Park Boundary + City of Carlsbad Releve Locations CNLM Sensitive Plant Points 1998-2010 ▲ Ceanothus verrucosus Sensitive Wildlife Species ● Brown-headed cowbird ● Coastal California Gnatcatcher ● Yellow-breasted Chat | <ul style="list-style-type: none"> Draft Vegetation Communities Baccharis Scrub - Mulefat Dom Developed Diegan Coastal Sage Scrub Diegan Coastal Sage Scrub - Chaparral Transition Ornamental Southern Arroyo Willow Riparian Forest Southern Willow Scrub |
|---|---|

Map 6-34. Vegetation communities and sensitive species at Poinsettia Park Open Space.

6.12 Research Center Open Space



Photo 6-12. Research Center Open Space.

6.12.1 General Open Space Site Characteristics

This small 2.6 acre southwest facing parcel is bordered by a series of industrial parks and offices. Its southern end is adjacent to small undeveloped areas that extend into the main basin just above Agua Hedionda Lagoon. Its dry, rocky, and low growing chamise chaparral habitat is relatively free from invasive plant species and represents high quality habitat (See Photo 6-12).

Management activities which occurred during the term of the first PMP include habitat assessment, sensitive bird and plant surveys, and nonnative plant removal. About 10 pampas grass were removed.

Table 6-27 summarizes key management attributes for this parcel.

Table 6-27. Site characteristics of Research Center Open Space.

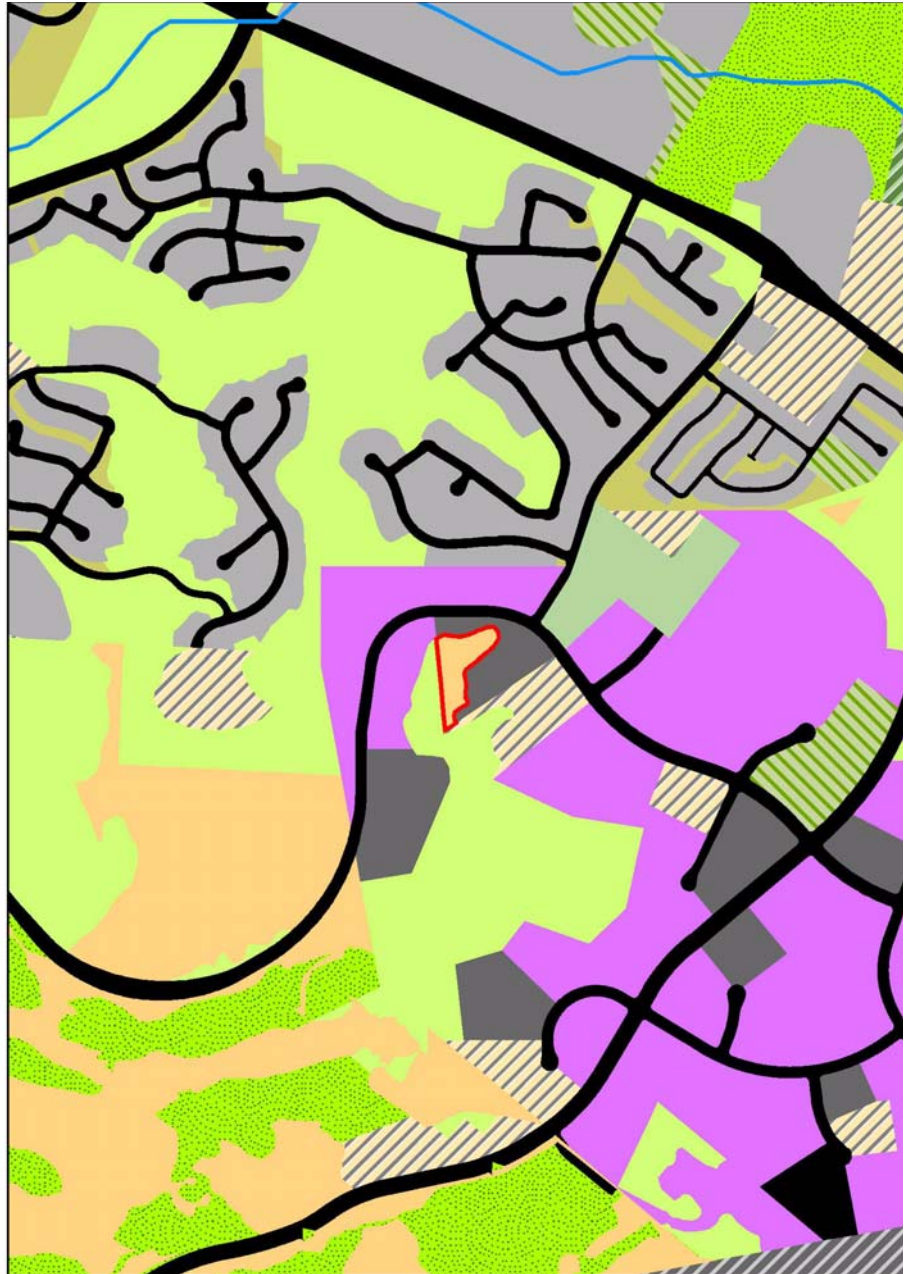
Descriptor	Value/Category
Acreage	2.6
Elevation Range	200-240 ft.
Management Unit	Faraday
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	5
Core/Linkage Area	Core 4
Watershed	Canyons de las Encinas

6.12.2 Land Use

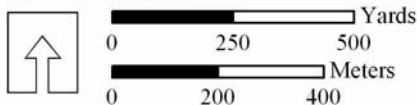
Local land use is presented in Map 6-35.

Local Land Use at Research Center Open Space*

-  Open Space Boundary
-  Other Open Space Preserves
- LANDUSE
-  Vacant and Undeveloped Land
-  Residential Recreation
-  Residential
-  Open Space Park or Preserve
-  Landscape Open Space
-  Park - Active
-  Roads, Freeways, and Parking Lots
-  Commercial and Civil
-  Golf Course
-  Lagoon
-  Industrial Park
-  Field Crops



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



Map 6-35. Local land use at Research Center Open Space.

6.12.3 Soil Characteristics

Map 6-36 depicts soils on Research Center Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

6.12.4 Fire History

There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.



Soils at Research Center Open Space

Friant rocky fine sandy loam, 9 to 30 percent slopes



Map 6-36. Soils at Research Center Open Space.

6.12.5 Vegetation

The dominant vegetation community is SMC (Map 6-37). Ornamental vegetation maintained by the City lies adjacent to the parking lot and the native vegetation.

6.12.6 Sensitive Resources

Sensitive resources identified during the term of the first PMP are summer-holly and Nuttall's scrub oak. No site surveys are planned for the next five years (Table 6-28).

6.12.7 Management Actions

Table 6-28 presents a list of planned management actions on Research Center Open Space the next five years.

Table 6-28. Management actions at Research Center Open Space.

Management Category	Actions
Biological Surveys	■ None planned.
Capital Improvements	■ None.
Habitat Maintenance	■ Remove zero tolerant nonnative species as they are observed. Note moderate tolerant nonnative species.
Public Services	■ Quarterly patrol. ■ Maintain signs and posts.



Map 6-37. Vegetation communities and sensitive species at Research Center Open Space.

6.13 Veterans Park Open Space



Photo 6-13. Veterans Park Open Space.

6.13.1 General Open Space Site Characteristics

This south-facing 21 acre parcel sits adjacent to the Macario Canyon open space to the west. Its topography is characterized by a flat plateau with gentle slopes extending down to Faraday Avenue to the south (See Photo 6-13). It is composed mainly of DCSS and SMC of good quality. Table 6-29 summarizes key management attributes for this parcel.

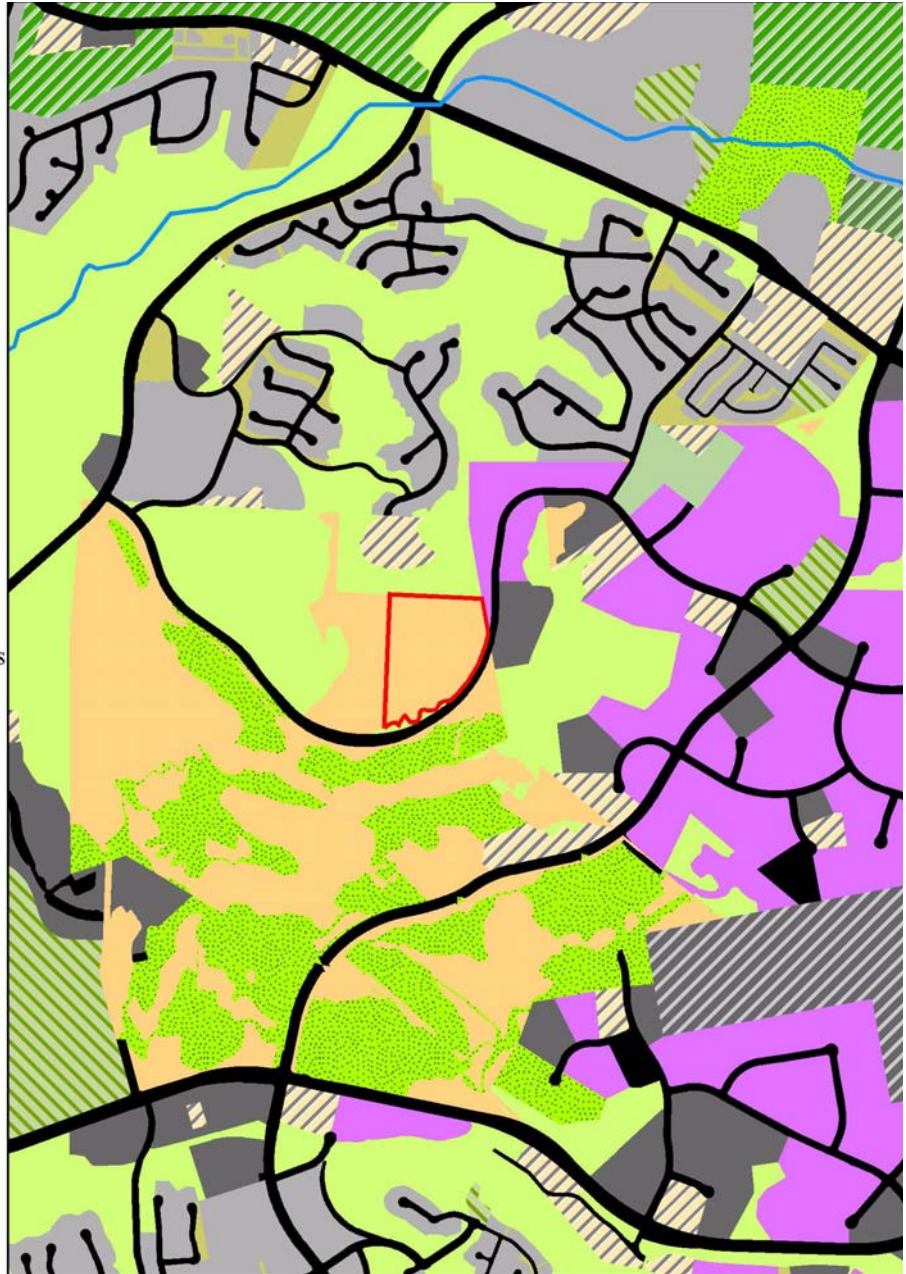
Table 6-29. Site characteristics of Veterans Park Open Space.

Descriptor	Value/Category
Acreage	21
Elevation Range	160-280 ft.
Management Unit	Faraday
Management Entity	City of Carlsbad
Conservation Status	Existing Open Space
Facilities Management Zone	8
Core/Linkage Area	Core 4
Watershed	Canyon de las Encinas

6.13.2 Land Use

Local land use is presented in Map 6-38.

Local Land Use at Veterans Park Open Space*



*While the depicted land use categories are from the SANDAG 2009 land-use dataset, some of the polygons' land use categories may not reflect their current state.



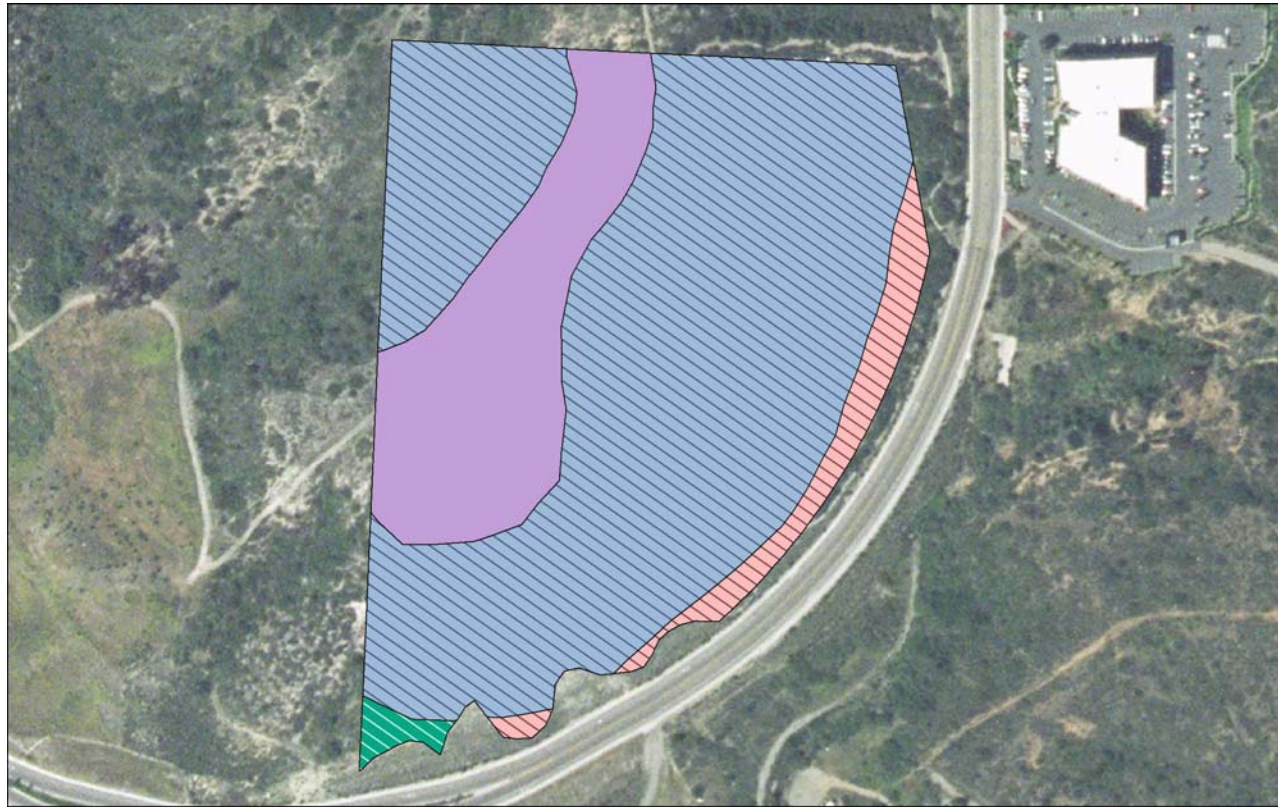
Map 6-38. Local land use at Veterans Park Open Space.

6.13.3 Soil Characteristics

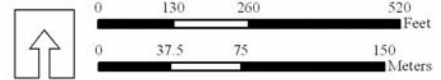
Map 6-39 depicts soils on Veterans Park Open Space. Table 2-2 lists the soil properties for all soils found on the Carlsbad Open Space parcels.

6.13.4 Fire History

There are no recorded fires for the period between 1910 and 2003 for this property. Refer to Map 4-1 for a depiction of regional fire history between 1910 and 2003.



Soils at Veterans Park Open Space



- Diablo clay, 15 to 30 percent slopes, eroded
- Las Flores loamy fine sand, 15 to 30 percent slopes, eroded
- Huerhuero loam, 2 to 9 percent slopes
- Loamy alluvial land-Huerhuero complex, 9 to 50 percent slopes, severely eroded

Map 6-39. Soils at Veterans Park Open Space.

6.13.5 Vegetation

Dominant vegetation communities are SMC and DCSS. There is also a very nice patch of native grassland (Map 6-40).

6.13.6 Sensitive Resources

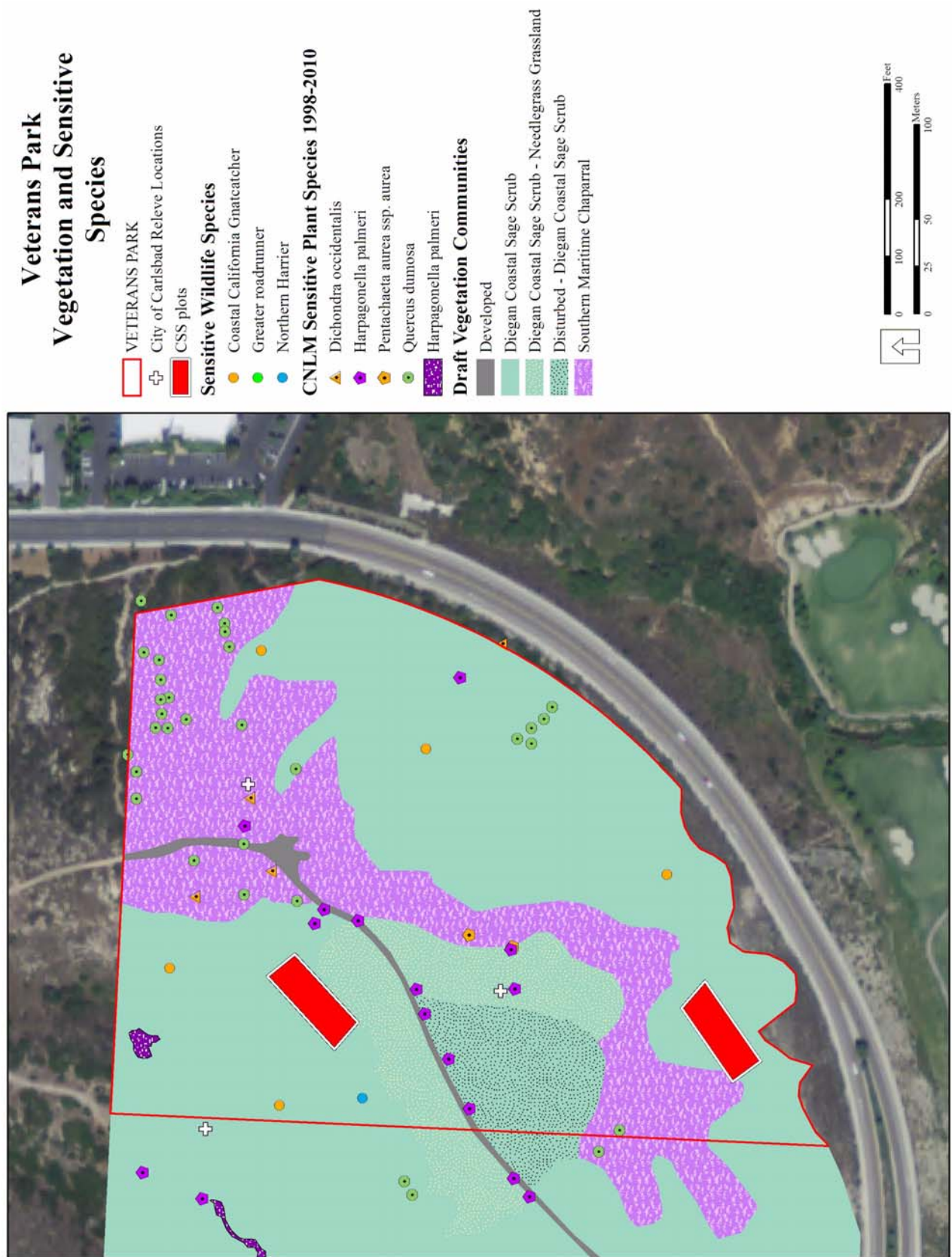
Sensitive resources identified during the term of the first PMP include the CAGN, COHA, Nutall's scrub oak, California adolphia, western dichondra, Palmer's grapplinghook, and golden chaetopappa (*Pentachaeta aurea*). Refer to Table 6-30 for planned site surveys.

6.13.7 Management Actions

Table 6-30 presents a list of planned management actions required on Veterans Park Open Space for the next five years.

Table 6-30. Management actions at Veterans Park Open Space for the next five years.

Management Category	Actions
Biological Surveys	<ul style="list-style-type: none"> ■ Coastal sage scrub monitoring plots (2012, 2014 and 2016). ■ Coastal California gnatcatcher surveys (2013 and 2016).
Capital Improvements	<ul style="list-style-type: none"> ■ None planned.
Habitat Maintenance	<ul style="list-style-type: none"> ■ Continue to remove zero tolerant nonnative plant species. Note moderate tolerant nonnative species. Treat mustard near Faraday Avenue.
Public Services	<ul style="list-style-type: none"> ■ Monthly patrol. ■ Maintain signs and posts.



Map 6-40. Vegetation communities and sensitive species at Veterans Park Open Space.

7.0 References

Websites

California Department of Fish and Game

(<http://www.dfg.ca.gov/lands/er/region5/crestridge/crestridge-acan-ili.html>)

(<http://www.dfg.ca.gov/cpb/species/ssc/ssc.shtml>)

(http://www.dfg.ca.gov/hcpb/species/t_e_spp/tespp.shtml)

(<http://www.dfg.ca.gov/whdab/html/animals.html>)

California Department of Forestry

(<http://www.fire.ca.gov/>)

California Fire Alliance 2001

(http://www.cafirealliance.org/master_content/downloads/AllianceOnePager.pdf)

California Native Plant Society

(<http://cnps.web.aplus.net/>)

Federal Register (January 4, 2001, 66 FR 751)

(http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2001_register&docid=01-52-filed.pdf)

North County Multiple Habitat Conservation Program (MHCP)

(<http://www.sandag.org/index.asp?projectid=97&fuseaction=projects.detail>)

San Diego Bird Atlas Project (SDNHM)

(<http://www.sdnhm.org/research/birdatlas/support.html>)

State of California's Natural Community Conservation Planning (NCCP) Act of 1991

(<http://www.library.ca.gov/crb/01/02/01-002.pdf>)

U.S. Department of Commerce National Climatic Data Center (NCDC) 2006.

(<http://www.ncdc.noaa.gov/oa/ncdc.html>)

U.S. Department of Fish and Wildlife Service

(http://ecos.fws.gov/tess_public/SpeciesReport.do?groups=Q&listingType=L)

Bibliography

American Ornithologists' Union. 1983, Seventh Edition. Check-list of North American Birds. American Ornithologists' Union, Washington, D.C.

Atwood, J.L. 1990. Status review of the California black-tailed gnatcatcher. *Western birds* 11:65-78.

Atwood, J.L. 1992. A maximum estimate of the California gnatcatcher (*Poliophtila californica*). Unpublished Technical Report, Manomet Bird Observatory, Manomet, Massachusetts.

Atwood, J.L. et al. 1999. Population Dynamics, Dispersal and Demography of California Gnatcatchers in Orange Co., California (1998 Progress Report). February 6.

Beauchamp, R.M. 1986. A Flora of San Diego County, California. Sweetwater River Press, National City, CA. 241 pp.

Beyers, J. L., S. G. Conard, and C.D. Wakeman. 1994. Impacts of an introduced grass, seeded for erosion control, on postfire community composition and species diversity in southern California chaparral. In *Proceedings of the 12th International Conference on Fire and Forest Meteorology*. Society of American Foresters, Bethesda, MD.

Bolton, H.E. 1927. Fray Juan Crespi; Missionary Explorer on the Pacific Coast 1769-1774. University of California Press, Berkeley California.

- Burrus, E. 1967. *Diario del Capitan Comandante Fernando de Rivera*. Ediciones Jose Purrua Turanzas, Madris. As in Marvin Dodge. 1975. *Vegetational Changes Associated with Land Use and Fire History in San Diego County*. Doctoral Dissertation, University of California, Riverside.
- Center for Natural Lands Management (CNLM). 2010. *City of Carlsbad Preserve Annual Report*. October 1, 2009 to September 30, 2010.
- Center for Natural Lands Management (CNLM)/City of Carlsbad. 2010. *City of Carlsbad 2010 Coastal California Gnatcatcher Survey Results*. December 22, 2010.
- California Native Plant Society (CNPS). 2011. *CNPS Releve Protocol*. <http://www.cnps.org/cnps/vegetation/protocol.php>
- Cody, Martin L. 1998. *California Thrasher (Toxostoma redivivum)*. In *The Birds of North America*, No. 323 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D. C.
- Collins, Joseph T. 1990. *Standard Common and Current Scientific Names for North American Amphibians and Reptiles (3rd ed.)*. The Society for the Study of Amphibians and Reptiles. Herpetological Circular No. 19.
- Cotton Beland Associates, Inc. 2000. *Carlsbad Municipal Golf Course Revised Draft Environmental Impact Report Appendices*. Pasadena California.
- Dodd, Norris L. 1988. *Fire management and southwestern raptors*. In: Gliski, R. L.; Pendleton, Beth Giron; Moss, Mary Beth; [and others], eds. *Proceedings of the southwest raptor symposium and workshop; 1986 May 21-24; Tucson, AZ*. NWF Scientific and Technology Series No. 11. Washington, DC: National Wildlife Federation: 341-347.
- Franklin, A.B., T.M. Shenk, D.R. Anderson, and K.P. Burnham. 2001. *Statistical model selection: an alternative to null hypothesis testing*. Pages 75-90 in Shenk, T.M. and A.B. Franklin (eds.), *Modeling in natural resource management*. Island Press. 223 pp.
- Garth, John S. and J.W. Tilden. 1986. *California butterflies*. *California Natural History Guides: 51*. University of California Press.
- Hall, E. Raymond, Ph.D. 1981. *The Mammals of North America*. Two volumes. John Wiley & Sons, New York, New York. 1,181 pp + Technical Appendices.
- Hickman, J.C., editor. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley and Los Angeles, CA. 1400 p.
- Holland, Robert F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Non-game Heritage Program, California Department of Fish and Game
- Holland, Robert F. 1995. *California Vegetation*. Kendall-Hunt Publishing Company, Dubuque, Iowa.
- Jameson, E.W., Jr. and Hans J. Peeters. 1988. *California Mammals*. University of California Press, Berkeley, California.
- Kendall, W.L. 2001. *Using models to facilitate complex decisions*. Pages 147-170 in Shenk, T.M., and A.B. Franklin (eds.), *Modeling in natural resource management*. Island Press. 223 pages.
- Lee, K.N. 1993 *Compass and gyroscope: integrating science and politics for the environment*. Island Press, Washington, D.C.
- Lewis H.T. 1973. *Patterns of Indian Burning in California: ecology and ethnohistory*. In *Ballena Press Anthropological Papers No.1*. Ramona California.
- Michael Brandman Associates (MBA). 1995. *Biological resources assessment for Daley Ranch, Escondido, San Diego County, California*. Prepared for Shea Homes. October.
- Merkel and Associates Inc. 2005. *Lake Calavera Trails Biological Resources Report*. Merkel and Associates. San Diego CA.
- Mock, P.J. and D.T. Bolger. 1992. *Ecology of the California gnatcatcher at Rancho San Diego*. Technical appendix to the *Rancho San Diego Habitat Conservation Plan*. Prepared by Ogden Environmental and Energy Services for Home Capital Development Corporation.
- Moriarty, David J.; Farris, Richard E.; Stanton, Patricia A. 1985. *Effects of fire on a coastal sage scrub bird community*. *Southwestern Naturalist*. 30(3): 452-453.

- Multiple Habitat Conservation Program (MHCP). 2003. MHCP Plan. Volumes I and II. Prepared for San Diego Association of Governments and MHCP Advisory Committee.
- Multiple Habitat Conservation Program (MHCP). 2003. MHCP Biological Monitoring and Management Plan Volume III. California Department of Fish and Game, U.S. Fish and Wildlife Service, and Conservation Biology Institute. March 2003.
- Oberbauer, T. 1993. Vegetation Communities in San Diego County Based on Holland's Descriptions. Unpublished list.
- Regan, H. M., L. A. Hierl, J. Franklin, and D. H. Deutschman. 2006. San Diego Multiple Species Conservation Program Covered Species Prioritization. Prepared by San Diego State University for the California Department of Fish and Game for Task B of Local Assistance Grant #P0450009. 133 pp.
- San Diego Natural History Museum (SDNHM). 2003. San Diego Natural History Museum website. Earth, wind, and wildfire. <http://www.sdnhm.org/exhibits/fire/index.html> Accessed 2003.
- Sawyer, J., and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society Press.
- Schwilk, D.W. and Jon E. Keeley. 1998. Rodent populations after a large wildfire in California chaparral and coastal sage scrub. *The Southwestern Naturalist*. 43(4):480-3.
- Simovich, Marie A, Post Fire Reptile Succession. *Cal-Neva Wildl. Trans.* 1979: 104-113. 1979.
- Simpson, G.G. 1961. Principles of animal taxonomy. Columbia Univ. Press, New York, NY. 247 pp.
- Skinner, M.W.; Pavlik, B.M. 1997. Inventory of rare and endangered vascular plants of California: Electronic Inventory Update of 1994, 5th edition. Sacramento: California Native Plant Society.
- Smith, Brian F. and [no first name provided] Tuma. 2002. A Cultural Resources Study for the Proposed Faraday Avenue Extension and Agua Hedionda Sewer Project. Brian F. Smith and Associates.
- Smith, Jane Kapler (ed.). 2000. Wildland fire in ecosystems: effects of fire on fauna. Gen. Tech. Rep. Rocky Mountain Research Station-GTR-42 vol. 1. Ogden, UT: U.S. Department of Agriculture, Forest Service, Missoula, MT. 83p.
- Technology Associates International Corporation (TAIC). 2004. City of Carlsbad Open Space Management Plan. Technology Associates International Corporation in association with the Center for Natural Lands Management. May 2004.
- Timbrook, J., J.R. Johnson, and D.D. Earl. 1982. Vegetation burning by the Chumash. *Journal of California and Great Basin Anthropology*. 4: 163-186.
- Tremper, B.D. 1976. Distribution of the Argentine ant, *Iridomyrmex humilis* Mayr. in relation to certain native ants of California: ecological, physiological, and behavioral aspects. Dissertation, University of California, Berkeley, CA.
- U.S. Department of Agriculture. 1973. Soil Survey, San Diego Area, California. Soil Conservation Service and Forest Service. Roy H. Bowman (ed.) San Diego, CA.
- U.S. Fish and Wildlife Service (USFWS). 1993. Endangered and Threatened Wildlife and Plants; Special Rule Concerning Take of the Threatened Coastal California Gnatcatcher. Final Rule. *Federal Register* 58:65,088-65,096. December 10.
- U.S. Fish and Wildlife Service (USFWS). 1998. Determination of endangered or threatened status for four plants from southwestern California and Baja California, Mexico. *Federal Register*. 63, 197: 54938-54956.
- U.S. Fish and Wildlife Service (USFWS). 2000. Five-point policy. *Federal Register* 65(106):35242-35357.
- U.S. Fish and Wildlife Service (USFWS). 2000. Receipt of an Incidental Take Permit Application and Availability of an Environmental Assessment Associated With the Habitat Management Plan for Natural Communities in the City of Carlsbad, California. *Federal Register*. 65, 125: 39919-39920.
- U.S. Fish and Wildlife Service (USFWS). 2009. Estimation of San Diego County Coastal California Gnatcatcher Population Size and Recovery following the 2003 October Wildfire.
- Wilhere, G.F. 2002. Adaptive management in habitat conservation plans. *Con Bio* 16(1):20-29.
- Wright, H. A., and A. W. Bailey. 1982. Fire ecology: United States and Southern Canada. John Wiley and Sons, New York.
- Zedler, P.H. Tony Cario, Jesse Else, and Kevin Cummins. 1995. Vegetation History of Cabrillo National Monument. Report submitted to National Biological Service, Channel Islands National Park, Ventura, California. 115 pp.

Appendix A: City of Carlsbad Open Space Plant Species List, 2009-2010

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
LYCOPHYTES													
SELAGINELLACEAE													
<i>Selaginella cinerascens</i>	Mesa spike-moss	X								X	X	X	
<i>Selaginella bigelovii</i>	Bigelow's spike-moss							X	X				
LEPTOSPORANGIATE FERNS													
DRYOPTERIDACEAE - Wood Fern Family													
<i>Dryopteris arguta</i>	coastal wood fern						X						
POLYPODIACEAE — Polypody Family													
<i>Polypodium californicum</i>	California polypody							X					
PTERIDACEAE — Brake Family													
<i>Pentagramma triangularis</i> ssp. <i>viscosa</i>	sticky silverback fern										X		X
<i>Pentagramma triangularis</i>	fern	X		X					X		X		
CONFIERS													
PINACEAE — Pine Family													
<i>Pinus</i> ssp.	pine		X										
MONOCOTS													
AGAVACEAE — Agave Family													
<i>Yucca schidigera</i>	Mohave yucca	X		X	X			X	X	X	X	X	X
ALLIACEAE — Onion Family													
<i>Allium</i> ssp.	onion				X								
<i>Allium haematochiton</i>	redskin onion	X											
AMARYLLIDACEAE — Amaryllis Family													
* <i>Amaryllis belladonna</i>	belladonna-lily									X			
ARECACEAE (PALMAE) — Palm Family													
* <i>Washingtonia robusta</i>	Mexican fan palm		X			X							X
ASPARAGACEAE — Asparagus Family													
* <i>Asparagus asparagoides</i>	florists smilax			X				X					
CYPERACEAE — Sedge Family													
<i>Carex triquetra</i>	triangular-fruit sedge	X			X								
* <i>Cyperus</i> ssp.	umbrella plant		X	X				X					
<i>Cyperus eragrostis</i>	tall flatsedge		X							X	X	X	X
* <i>Cyperus involucratus</i>	African umbrella plant		X							X		X	
<i>Eleocharis aciculatus</i>	needle spike-rush		X										X
<i>Eleocharis macrostachya</i>	pale spike-sedge											X	
<i>Eleocharis montevidensis</i>	Dombey's spike-sedge												X
<i>Scirpus californicus</i>	California bulrush											X	X
<i>Scirpus pungens</i>	threesquare bulrush											X	
<i>Scirpus robustus</i>	prarie bulrush											X	
<i>Schoenoplectus americanus</i>	Olney's bulrush		X										
<i>Schoenoplectus californicus</i>	California bulrush		X			X							
<i>Schoenoplectus pungens</i>	common threesquare					X							
HYACINTHACEAE — Hyacinth Family													
<i>Chlorogalum parviflorum</i>	soap-plant/amole	X	X		X								

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	wavy-leaf soap-plant/amole								X				
IRIDACEAE — Iris Family													
* <i>Chasmanthe floribunda</i>	African cornflag		X			X							
<i>Sisyrinchium bellum</i>	blue-eyed-grass	X	X		X		X					X	X
JUNCACEAE — Rush Family													
<i>Juncus acutus</i> ssp. <i>leopoldii</i>	southwestern spiny rush		X										X
<i>Juncus arcticus</i> var. <i>mexicanus</i>	Mexican rush					X							
<i>Juncus bufonius</i>	toad rush										X	X	X
<i>Juncus dubius</i>	mariposa rush												
<i>Juncus mexicanus</i>	Mexican rush											X	
<i>Juncus xiphioides</i>	iris-leaf rush												X
LILIACEAE — Lily Family													
<i>Agave attenuata</i>	agave											X	
<i>Agave americana</i>	American agave												X
<i>Allium praecox</i>	brandegee											X	
<i>Bloomeria crocea</i>	common goldenstar											X	X
<i>Calochortus weedii</i> var. <i>weedii</i>	weed's mariposa lily	X											
<i>Calochortus splendens</i>	splendid mariposa lily	X										X	X
<i>Chlorogalum parviflorum</i>	small-flower soap plant											X	
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	wavy-leaf soap-plant/amole												X
<i>Dichelostemma capitatum</i> ssp. <i>capitatum</i>	wild hyacinth											X	X
MELANTHIACEAE — Bunch Flower or Camas Family													
<i>Zigadenus fremontii</i>	Fremont's camas	X	X										
POACEAE (GRAMINEAE) — Grass Family													
<i>Achnatherum coronatum</i>	giant stipa	X									X	X	
<i>Agrostis pallens</i>	seashore bentgrass										X		
* <i>Agrostis viridis</i>	water bent									X			
* <i>Arundo donax</i>	giant reed					X							
* <i>Avena barbata</i>	slender wild oat	X			X	X		X	X	X	X	X	X
* <i>Avena fatua</i>	wild oat							X					
<i>Bothriochloa barbinodis</i>	cane bluestem		X		X			X				X	
* <i>Brachypodium distachyon</i>	purple falsebrome	X	X		X	X		X					
* <i>Bromus diandrus</i>	ripgut grass	X	X		X	X		X		X	X	X	X
* <i>Bromus hordeaceus</i>	soft chess	X	X			X		X		X	X	X	X
* <i>Bromus madritensis</i> ssp. <i>rubens</i>	foxtail chess, red brome	X	X	X	X	X		X	X	X	X	X	X
* <i>Cortaderia selloana</i>	Silva pampas grass	X		X			X	X	X		X		X
<i>Distichlis spicata</i>	saltgrass					X		X				X	X
* <i>Ehrharta erecta</i>	panic veldt grass									X			
* <i>Gastridium ventricosum</i>	nit grass	X			X			X			X	X	X
* <i>Hordeum</i> spp.	barley	X											X
* <i>Hordeum marinum</i>	Mediterranean barley							X				X	
* <i>Lamarckia aurea</i>	golden-top										X		
<i>Leymus condensatus</i>	giant wild-rye	X	X	X	X	X						X	X
* <i>Lolium multiflorum</i>	Italian ryegrass		X		X			X					X
* <i>Lolium perenne</i>	perennial ryegrass											X	
<i>Melica imperfecta</i>	coast range melic	X	X							X		X	X
* <i>Melinis repens</i>	natal grass										X	X	
<i>Muhlenbergia microsperma</i>	little-seed muhly	X										X	

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
<i>Nassella pulchra</i>	purple needlegrass											X	X
<i>Nassella lepida</i>	foothill needlegrass	X	X		X		X					X	X
<i>Nassella pulchra</i>	purple needlegrass	X	X		X	X		X				X	X
* <i>Paspalum dilatatum</i>	dallis grass					X							
<i>Paspalum distichum</i>	common knotgrass		X										
* <i>Pennisetum setaceum</i>	African fountain grass									X	X		
* <i>Phalaris aquatica</i>	harding grass					X							
* <i>Phalaris canariensis</i>	canary grass								X				
* <i>Phalaris minor</i>	little-seed canary grass										X	X	
* <i>Piptatherum miliaceum</i>	smilo grass		X			X						X	X
* <i>Poa annua</i>	annual bluegrass	X										X	
* <i>Polypogon monspeliensis</i>	annual beard grass		X		X	X		X	X		X	X	X
* <i>Schismus</i> spp.	schismus	X				X							
* <i>Schismus barbatus</i>	Mediterranean schismus							X			X	X	
<i>Vulpia microstachys</i>	fescue		X		X				X				
* <i>Vulpia myuros</i> var. <i>myuros</i>	rat-tail fescue	X			X			X	X	X	X	X	X
<i>Vulpia octoflora</i>	slender fescue	X						X			X		
THEMIDACEAE — Brodiaea Family													
<i>Bloomeria crocea</i> var. <i>crocea</i>	common goldenstar	X			X			X				X	
<i>Dichelostemma capitatum</i> ssp. <i>capitatum</i>	blue dicks	X	X	X	X			X			X	X	
EUDICOTS													
ADOXACEAE — Adoxa Family													
<i>Sambucus mexicana</i>	blue elderberry	X	X	X	X	X		X	X	X	X		
AIZOACEAE — Fig-Marigold Family													
* <i>Carpobrotus chilensis</i>	sea-fig					X							
* <i>Carpobrotus edulis</i>	hottentot-fig				X				X			X	X
* <i>Mesembryanthemum crystallinum</i>	crystalline iceplant	X							X			X	
AMARANTHACEAE — Amaranth Family													
<i>Atriplex</i> sp.	saltbush							X					
* <i>Atriplex semibaccata</i>	Australian saltbush							X			X		
* <i>Amaranthus albus</i>	white tumbleweed	X	X	X	X	X		X				X	
<i>Amaranthus blitoides</i>	prostrate amaranth											X	
<i>Chenopodium</i> spp.	goosefoot					X							
* <i>Chenopodium album</i>	lamb's quarters										X		
* <i>Chenopodium murale</i>	net-leaf goosefoot								X				
* <i>Dysphania ambrosioides</i>	Mexican tea	X	X	X	X								
* <i>Salsola tragus</i>	prickly Russian-thistle, tumbleweed	X	X	X				X					
<i>Sarcoconia pacifica</i>	Pacific pickleweed				X								
ANACARDIACEAE — Sumac or Cashew Family													
<i>Malosma laurina</i>	laurel sumac	X	X	X	X	X	X		X	X	X	X	X
<i>Rhus integrifolia</i>	lemonadeberry	X	X	X	X	X	X	X	X	X	X	X	X
* <i>Schinus terebinthifolius</i>	Brazilian pepper tree		X		X			X		X		X	X
<i>Toxicodendron diversilobum</i>	western poison-oak	X				X					X	X	X
APIACEAE (UMBELLIFERAE) — Carrot Family													
<i>Apiastrum angustifolium</i>	mock-parsley	X	X		X			X				X	X
* <i>Apium graveolens</i>	common celery		X			X						X	X
* <i>Conium maculatum</i>	common poison hemlock			X		X		X	X	X			X
<i>Daucus pusillus</i>	rattlesnake weed	X	X		X			X	X	X	X	X	
* <i>Foeniculum vulgare</i>	sweet fennel	X	X	X	X	X		X	X		X	X	X

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
<i>Lomatium dascycarpum</i> ssp. <i>dascycarpum</i>	woolly-fruit lomatium											X	
<i>Lomatium lucidum</i>	shiny lomatium												X
<i>Sanicula arguta</i>	sharp tooth sanicle			X	X								X
<i>Sanicula crassicaulis</i>	Pacific sanicle											X	X
APOCYNACEAE — Dogbane Family													
<i>Asclepias fascicularis</i>	narrow-leaf milkweed							X					
* <i>Vinca major</i>	greater periwinkle			X		X							
ARACEAE — Arum/Duckweed Family													
* <i>Zantedeschia aethiopica</i>	calla-lily			X								X	
ASTERACEAE (COMPOSITAE) — Sunflower Family													
<i>Acourtia microcephala</i>	purpleheads											X	
<i>Amblyopappus pusillus</i>	pineapple weed	X											
<i>Ambrosia psilostachya</i>	western ragweed	X							X			X	X
<i>Ancistrocarphus filagineus</i>	woolly fishhooks			X									
<i>Artemisia californica</i>	coastal sagebrush	X	X	X	X	X		X	X	X	X	X	X
<i>Artemisia douglasiana</i>	Douglas mugwort		X			X				X		X	
<i>Artemisia dracunculus</i>	mugwort											X	
<i>Aster subulatus</i> ssp. <i>ligulatus</i>	slim aster											X	
<i>Baccharis pilularis</i>	chaparral broom, coyote brush	X	X	X	X	X		X	X	X	X	X	X
<i>Baccharis salicifolia</i>	mule-fat, seep-willow	X	X	X	X	X		X		X	X	X	X
<i>Baccharis sarothroides</i>	broom baccharis				X						X		X
<i>Brickellia californica</i>	California brickellbush		X								X	X	
* <i>Carduus pycnocephalus</i>	Italian thistle		X	X		X		X			X	X	
* <i>Centaurea melitensis</i>	totalote	X	X	X	X	X		X	X	X	X	X	X
<i>Chamomilla suaveolens</i>	pineapple weed											X	
<i>Chaenactis artemisiifolia</i>	white pincushion										X		
<i>Chaenactis glabriuscula</i>	pincushion	X		X							X		
* <i>Chrysanthemum coronarium</i>	crown marigold		X					X		X		X	X
<i>Cirsium occidentale</i> var. <i>occidentale</i>	cobwebby thistle	X							X	X		X	
<i>Cirsium vulgare</i>	bull thistle											X	X
<i>Conyza canadensis</i>	horseweed	x	X	X	X	X			X	X	X	X	
<i>Corethrogyne filaginifolia</i> var. <i>californica</i>	California sand-aster	X			X								
* <i>Cotula australis</i>	Australian brass-buttons			X					X		X	X	
* <i>Cotula coronopifolia</i>	African brass-buttons		X			X		X				X	X
<i>Cynara cardunculus</i>	cardo											X	X
<i>Deinandra fasciculata</i>	fascicled tarweed	X	X	X	X	X		X		X	X	X	X
<i>Encelia californica</i>	california encelia	X	X	X	X	X		X	X		X	X	X
<i>Encelia farinosa</i>	brittlebush							X			X		
<i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i>	long-stem golden-yarrow	X	X	X	X	X		X	X		X	X	X
<i>Filago arizonica</i>	Arizona filago	X						X				X	
* <i>Filago gallica</i>	narrow-leaf filago	X	X	X	X	X		X				X	
* <i>Gazania</i> spp.	gazania				X								X
<i>Gnaphalium bicolor</i>	bicolor cudweed											X	X
<i>Gnaphalium californicum</i>	California everlasting	X	X	X	X	X	X	X	X		X	X	X
<i>Gnaphalium canescens</i> ssp. <i>beneolens</i>	fragrant everlasting											X	X
<i>Gnaphalium ramosissimum</i>	pink everlasting				X								

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
<i>Gnaphalium stramineum</i>	cotton-batting plant	X	X	X	X	X	X	X	X	X	X		
<i>Gutierrezia sarothrae</i>	matchweed											X	X
<i>Grindelia camporum</i>	rayless gumplant	X			X							X	
<i>Hazardia squarrosa</i> var. <i>squarrosa</i>	sawtooth goldenbus	X	X	X	X			X	X	X	X	X	X
* <i>Hedypnois cretica</i>	Crete hedypnois	X	X		X	X		X		X		X	X
<i>Hesperevax sparsiflora</i> var. <i>sparsiflora</i>	erect evax	X						X					
<i>Heterotheca grandiflora</i>	telegraph weed	X			X					X	X	X	X
* <i>Hypochaeris glabra</i>	smooth cat's ear	X	X		X						X		
<i>Isocoma menziesii</i> var. <i>decumbens</i>	clay-field goldenbush											X	X
<i>Isocoma menziesii</i> var. <i>menziesii</i>	spreading goldenbush	X	X		X			X					X
<i>Isocoma menziesii</i> var. <i>vernonioides</i>	coastal goldenbush				X	X		X			X	X	
<i>Iva hayesiana</i>	San Diego marsh-elder		X										
* <i>Lactuca serriola</i>	prickly lettuce		X		X						X	X	
<i>Lasthenia gracilis</i>	common goldfields	X											
<i>Lessingia filaginifolia</i> var. <i>filaginifolia</i>	cudweed aster											X	
<i>Mircoseris douglasii</i> var. <i>playcarpha</i>	small flowered microseris		X										
<i>Osmadenia tenella</i>	osmadenia	X										X	
<i>Pentachaeta aurea</i>	golden-ray pentachaeta	X											
* <i>Picris echioides</i>	bristly ox-tongue	X	X		X	X	X	X				X	X
<i>Pluchea odorata</i>	salt marsh fleabane		X		X	X						X	X
<i>Porophyllum gracile</i>	odora										X		
<i>Pseudognaphalium beneolens</i>	fragrant everlasting		X		X	X							
<i>Pseudognaphalium biolettii</i>	bicolor cudweed	X	X		X	X		X	X		X		
<i>Pseudognaphalium microcephalum</i>	white everlasting										X		
<i>Psilocarphus tenellus</i>	slender woolly marbles												X
<i>Rafinesquia californica</i>	California chicory											X	
<i>Senecio californicus</i>	California butterweed	X											
* <i>Senecio linearifolius</i> var. <i>linearifolius</i>	fireweed				X								
* <i>Senecio vulgaris</i>	common groundsel						X	X			X	X	
* <i>Silybum marianum</i>	milk thistle							X		X		X	X
* <i>Sonchus asper</i> ssp. <i>asper</i>	prickly sow-thistle	X	X		X	X	X	X	X		X		X
* <i>Sonchus oleraceus</i>	common sow-thistle	X	X		X					X	X	X	
<i>Stephanomeria diegensis</i>	San Diego wreath-plan											X	X
<i>Stephanomeria</i> sp.	wreath-plant	x	X	X	X			X			X		
<i>Stylocline gnaphaloides</i>	everlasting nest-straw	X	X		X						X	X	
<i>Xanthium strumarium</i>	cocklebur		X					X			X	X	X
<i>Uropappus lindleyi</i>	silver puffs				X							X	
<i>Viguiera laciniata</i>	San Diego sunflower										X		
BETULACEAE — Birch Family													
<i>Alnus rhombifolia</i>	white alder										X		
BORAGINACEAE — Borage Family													
<i>Amsinckia menziesii</i> var. <i>intermedia</i>	rancher's fiddleneck	X		X						X		X	X
<i>Cryptantha clevelandii</i> ssp. <i>clevelandii</i>	Cleveland's cryptantha	X											
<i>Criptantha clevelandii</i> ssp. unknown	Cleveland's cryptantha							X					
<i>Cryptantha micromeris</i>	minute-flower cryptantha						X				X		

Family and Latin Name	Common Name	Property												
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b	
<i>Cryptantha intermedia</i>	nievitas cryptantha	X	X	X	X		X					X	X	X
<i>Cryptantha microstachys</i>	tejon cryptantha	X												
<i>Cryptantha muricata</i>	prickly cryptantha											X		
* <i>Echium candicans</i>	pride of madeira		X		X									
<i>Harpagonella palmeri</i>	Palmer's grappling-hook	X	X											
<i>Heliotropium curassavicum</i>	salt heliotrope		X		X							X	X	
* <i>Myosotis discolor</i>	forget-me-not								X					
<i>Pectocarya linearis</i> ssp. <i>ferrocula</i>	slender pectocarya	X	X											
<i>Pectocarya peninsularis</i>	peninsular pectocarya										X			
<i>Plagiobothrys collinus</i> var. <i>gracilis</i>	San Diego popcornflower	X	X								X			
BRASSICACEAE (CRUCIFERAE) — Mustard Family														
* <i>Brassica nigra</i>	black mustard	X	X	X	X	X		X	X	X	X	X	X	X
* <i>Brassica tournefortii</i>	Saharan mustard								X		X			X
<i>Cardamine oligosperma</i>	Idaho bittercress								X					
* <i>Coronopus didymus</i>	lesser wart-cress	X	X				X							
<i>Descurania pinnata</i>	tansy mustard	X												
* <i>Hirschfeldia incana</i>	short-pod mustard	X									X	X	X	
<i>Lepidium nitidum</i> var. <i>nitidum</i>	shining peppergrass	X	X		X							X		
* <i>Lobularia maritima</i>	sweet alyssum		X	X								X	X	
* <i>Raphanus sativus</i>	wild radish	X	X	X	X	X		X			X	X		
<i>Rorippa nasturtium-aquaticum</i>	water-cress		X	X		X						X	X	
* <i>Sisymbrium orientale</i>	hare's-ear cabbage			X								X		
CACTACEAE — Cactus Family														
<i>Cylindropuntia prolifera</i>	coast cholla	X						X	X					
* <i>Opuntia ficus-indica</i>	mission prickly-pear, indian-fig	X		X					X			X	X	
<i>Opuntia littoralis</i>	coast prickly-pear	X	X	X	X	X		X	X	X	X	X	X	X
<i>Opuntia prolifera</i>	cholla											X		
CAMPANULACEAE — Bellflower Family														
<i>Triodanis biflora</i>	small venus looking-glass	x							X		X			
CAPPARACEAE — Caper Family														
<i>Isomeris arborea</i>	bladderpod	X		X	X	X		X				X	X	
CAPRIFOLIACEAE — Honeysuckle Family														
<i>Lonicera subspicata</i>	honeysuckle			X	X	X								X
<i>Lonicera japonica</i>	japanese honeysuckle													X
<i>Lonicera subspicata</i>	San Diego honeysuckle											X		
<i>Sambucus mexicana</i>	blue elderberry													X
CARYOPHYLLACEAE — Pink Family														
<i>Cardionema ramosissima</i>	tread lightly	X										X		
* <i>Cerastium glomeratum</i>	mouse-ear chickweed	X									X			
<i>Polycarpon depressum</i>	California polycarp	X			X			X			X	X		
* <i>Polycarpon tetraphyllum</i> ssp. <i>tetraphyllum</i>	four-leaf allseed					X	X		X					
* <i>Silene gallica</i>	common catchfly	X	X					X			X	X	X	
<i>Silene laciniata</i> ssp. <i>laciniata</i>	southern pink				X						X			
<i>Spergularia salina</i>	salt marsh sand-spurry				X									
<i>Spergularia arvensis</i>	stickwort starwort											X		
* <i>Stellaria media</i>	common chickweed	X												
CHENOPODIACEAE — Goosefoot Family														
<i>Salicornia virginica</i>	pickleweed											X	X	
* <i>Salsola tragus</i>	Russian thistle											X	X	

Family and Latin Name	Common Name	Property												
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b	
CISTACEAE — Rock-Rose Family														
<i>Cistus</i> sp.	rock rose													X
<i>Helianthemum scoparium</i>	peak rush-rose	X					X					X	X	X
CONVOLVULACEAE — Morning-Glory Family														
<i>Calystegia macrostegia</i>	morning-glory	X	X	X	X			X	X			X	X	
<i>Convolvulus arvensis</i>	bindweed													
<i>Convolvulus simulans</i>	small-flowered morning glory				X			X					X	
<i>Cuscuta</i> spp.	dodder	X												
<i>Dichondra occidentalis</i>	western dichondra/ponyfoot	X											X	X
CRASSULACEAE — Stonecrop Family														
<i>Crassula connata</i>	dwarf stonecrop												X	
<i>Xylococcus bicolor</i>	pygmyweed	X	X	X	X		X	X	X			X		
<i>Dudleya edulis</i>	ladies' fingers		X										X	X
<i>Dudleya lanceolata</i>	lance-leaf dudleya	X	X						X			X	X	
<i>Dudleya pulverulenta</i>	chalk dudleya	X	X									X	X	X
<i>Dudleya viscida</i>	sticky dudleya		X											
CUCURBITACEAE — Gourd Family														
<i>Marah macrocarpus</i> var. <i>macrocarpus</i>	manroot, wild-cucumber	X	X	X	X		X	X	X	X	X	X	X	X
DIPSACACEAE — Teasel Family														
<i>Dipsacus sativus</i>	Fuller's teasel													X
ERICACEAE — Heath Family														
<i>Arctostaphylos glandulosa</i> ssp. <i>glandulosa</i>	eastwood manzanita						X						X	
<i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i>	summer-holly		X		X		X							
<i>Xylococcus bicolor</i>	mission manzanita	X		X	X		X		X	X	X	X	X	X
EUPHORBIACEAE — Spurge Family														
<i>Chamaesyce albomarginata</i>	white-margin sandmat	X	X											
* <i>Chamaesyce maculata</i>	spotted spurge	X	X	X	X	X							X	
<i>Chamaesyce polycarpa</i>	small-seed sandmat							X	X			X	X	
<i>Croton californicus</i>	California croton			X	X									
<i>Eremocarpus setigerus</i>	doveweed												X	X
* <i>Euphorbia pepus</i>	petty spurge		X	X	X			X		X	X			
* <i>Ricinus communis</i>	castor bean											X	X	X
FABACEAE (LEGUMINOSAE) — Legume Family														
* <i>Acacia</i> spp.	acacia			X				X					X	
<i>Astragalus didymocarpus</i> var. <i>didymocarpus</i>	white dwarf locoweed	X	X											
<i>Astragalus trichopodus</i> var. <i>longus</i>	ocean locoweed							X						
<i>Lathyrus splendens</i>	pride-of-california													X
<i>Lathyrus vestitus</i> ssp. <i>alefeldii</i>	San Diego sweetpea													X
<i>Lotus hamatus</i>	lotus	X	X		X			X						
<i>Lotus purshianus</i>	Spanish clover												X	
<i>Lotus scoparius</i>	deerweed	X	X	X	X	X	X	X	X	X	X	X		X
<i>Lotus strigosus</i>	Bishop's/strigose lotus	X												
<i>Lupinus bicolor</i>	miniature lupine	X	X		X				X				X	X
<i>Lupinus hirsutissimus</i>	stinging lupine	X												
<i>Lupinus truncatus</i>	collar lupine											X		
<i>Lupinus succulentus</i>	arroyo lupine				X			X						
* <i>Medicago polymorpha</i>	California burclover	X		X	X			X					X	X

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
<i>*Mellilotus albus</i>	white sweet clover		X									X	
<i>*Mellilotus indicus</i>	indian sweet clover		X	X	X			X		X	X	X	
<i>Trifolium albopurpureum</i>	rancheria clover											X	X
<i>Vicia ludoviciana</i> var. <i>ludoviciana</i>	deer pea vetch	X											
FAGACEAE — Oak Family													
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	coast live oak, encina	X	X	X		X					X	X	X
<i>Quercus berberidifolia</i>	scrub oak												X
<i>Quercus dumosa</i>	Nuttall's scrub oak	X	X		X		X					X	
GENTIANACEAE — Gentian Family													
<i>Centaurium venustum</i>	canchalagua	X	X		X						X	X	
GERANIACEAE — Geranium Family													
<i>*Erodium botrys</i>	long-beak filaree/storksbill	X			X			X			X		X
<i>*Erodium brachycarpum</i>	short-beak filaree											X	
<i>*Erodium cicutarium</i>	red-stem filaree/storksbill	X	X		X	X		X	X	X	X	X	X
<i>*Erodium moschatum</i>	white-stem filaree/storksbill								X	X			
<i>Geranium carolinianum</i>	Carolina geranium				X				X			X	X
GROSSULARIACEAE — Gooseberry Family													
<i>Ribes indecorum</i>	white-flower currant										X		X
<i>Ribes speciosum</i>	fuchsia-flower gooseberry	X			X	X							X
HYDROPHYLLACEAE — Waterleaf Family													
<i>Eriodictyon crassifolium</i> var. <i>crassifolium</i>	felt-leaf yerba santa				X						X		X
<i>Eucrypta chrysanthemifolia</i> var. <i>chrysanthemifolia</i>	common eucrypta	X	X	X	X				X	X	X		
<i>Nemophilla</i> sp.	blue eyes	x									X		
<i>Phacelia cicutaria</i> var. <i>hispida</i>	caterpillar phacelia	X											
<i>Phacelia grandiflora</i>	giant-flower phacelia				X								
<i>Phacelia ramosissima</i> var. <i>latifolia</i>	caterpillar phacelia											X	X
<i>Pholistoma auritum</i>	fiesta flower	X											X
LAMIACEAE (LABIATAE) — Mint Family													
<i>*Marrubium vulgare</i>	horehound	X										X	
<i>Salvia apiana</i>	white sage							X			X	X	X
<i>Salvia columbariae</i>	chia	X					X				X	X	
<i>Salvia mellifera</i>	black sage	X	X	X	X	X	X	X	X	X	X	X	X
<i>Scutellaria tuberosa</i>	Danny's skullcap	x											
<i>Stachys ajugoides</i> var. <i>rigida</i>	white hedge-nettle				X			X				X	X
<i>Trichostema lanceolatum</i>	vinegar weed											X	
LYTHRACEAE — Loosestrife Family													
<i>*Lythrum hyssopifolia</i>	grass poly	X	X									X	X
MALVACEAE — Mallow Family													
<i>Malacothamnus fasciculatus</i>	chaparral bushmallow	X	X	X	X					X	X	X	X
<i>*Malva parviflora</i>	cheeseweed					X						X	
<i>Sidalcea malviflora</i> ssp. <i>sparsifolia</i>	checker-bloom							X				X	X
MYOPORACEAE — Myoporum Family													
<i>Myoporum laetum</i>	ngaio											X	X
MYRTACEAE — Myrtle Family													
<i>*Eucalyptus</i> sp.	eucalyptus											X	
<i>*Eucalyptus globulus</i>	blue gum	X	X							X			
NYCTAGINACEAE — Four O'clock Family													
<i>Mirabilis californica</i>	California wishbone plant											X	
<i>Mirabilis laevis</i>	coastal wishbone plant	X	X		X			X	X		X		X

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
OLEACEAE — Olive Family													
<i>*Fraxinus uhdei</i>	shamal ash					X							
<i>*Olea europaea</i>	olive								X				
ONAGRACEAE — Evening-Primrose Family													
<i>Camissonia</i> spp.	sun cup	X			X							X	
<i>Camissonia bistorta</i>	sun cup	X	X								X		
<i>Camissonia ignota</i>	Jurupa hills sun cup								X	X	X		
<i>Clarkia purpurea</i>	purple clarkia											X	X
<i>Epilobium canum</i>	California fuchsia, zauschneria		X			X							
<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	willow herb		X										
<i>Oenothera elata</i>	great marsh evening-primrose		X	X								X	
OROBANCHACEAE — Broom-Rape Family													
<i>Castilleja exserta</i>	purple owl's clover	X											
<i>Castilleja foliolosa</i>	woolly indian paintbrush	X											
<i>Cordylanthus rigidus</i> ssp. <i>setigerus</i>	dark-tip bird's beak	X									X		
OXALIDACEAE — Oxalis Family													
<i>*Oxalis pes-caprae</i>	Bermuda-buttercup		X	X				X					
<i>Oxalis albicans</i> ssp. <i>californica</i>	California wood-sorrel							X					
PAEONIACEAE -- Peony Family													
<i>Paeonia californica</i>	California peony												X
PAPAVERACEAE — Poppy Family													
<i>Eschscholzia californica</i>	California poppy	X	X					X	X			X	
PHRYMACEAE — Hopseed Family													
<i>Mimulus aurantiacus</i> var. <i>puniceus</i>	monkey flower	X	X	X	X	X	X	X	X	X	X		X
<i>Mimulus pilosus</i>	downy monkeyflower										X		
PITTOSPORACEAE — Pittosporum Family													
<i>*Pittosporum undulatum</i>	Victoria-box									X			
PLANTAGINACEAE — Plantain Family													
<i>Antirrhinum kellogii</i>	climbing snapdragon	X					X						
<i>Antirrhinum nuttallianum</i> ssp. <i>nuttallianum</i>	Nuttall's snapdragon	X	X		X		X				X		
<i>Antirrhinum nuttallianum</i> ssp. <i>subsessile</i>	big-gland nuttall's snapdragon								X			X	
<i>Linaria canadensis</i>	large blue toadflax	X									X		
<i>Plantago erecta</i>	dot-seed plantain	X	X					X			X	X	X
<i>*Plantago lanceolata</i>	English plantain		X									X	
<i>*Plantago major</i>	common plantain		X										
PLATANACEAE — Plane Tree or Sycamore Family													
<i>Platanus racemosa</i>	western sycamore			X		X						X	
PLUMBAGINACEAE — Leadwort Family													
<i>Limonium</i> ssp.	marsh-rosemary				X								
<i>*Limonium perezii</i>	Perez's marsh-rosemary		X		X			X			X	X	
POLEMONIACEAE — Phlox Family													
<i>Eriastrum</i> spp.	wooly star										X		X
<i>Gilia angelensis</i>	grassland gilia	X											
<i>Linanthus dianthiflorus</i>	farinose ground pink	X											
<i>Navarretia hamata</i>	pincushion	X									X	X	X
POLYGONACEAE — Buckwheat Family													
<i>Chorizanthe staticoides</i>	Turkish rugging										X		
<i>Chorizanthe fimbriata</i> var. <i>fimbriata</i>	fringed spineflower	X									X		
<i>Chorizanthe procumbens</i>	prostrate spineflower											X	

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
<i>Eriogonum fasciculatum</i> var. <i>fasciculatum</i>	coast california buckwheat	X	X	X	X	X	X	X	X	X	X		X
<i>Eriogonum elongatum</i> var. <i>elongatum</i>	tall buckwheat							X				X	
<i>Polygonum lapathifolium</i>	willow smartweed									X		X	
<i>Pterostegia drymarioides</i>	granny's hairnet	X	X	X	X		X	X			X	X	
* <i>Rumex conglomeratus</i>	whorled dock		X			X						X	
* <i>Rumex crispus</i>	curly dock	X			X			X			X	X	X
PORTULACACEAE — Purslane Family													
<i>Calandrinia ciliata</i>	red maids										X		
<i>Claytonia perfoliata</i> ssp. <i>perfoliata</i>	common miner's lettuce											X	X
<i>Portulaca oleracea</i>	common purslane											X	
PRIMULACEAE — Primrose Family													
* <i>Anagallis arvensis</i>	scarlet pimpernel, poor man's weatherglass	X	X	X	X	X	X	X	X	X	X	X	X
<i>Dodecatheon clevelandii</i> ssp. <i>clevelandii</i>	Padre's shooting star	X	X									X	X
<i>Samolus parviflorus</i>	water-pimpernel		X			X							
RANUNCULACEAE — Buttercup Famil													
<i>Clematis ligusticifolia</i>	yerba de chiva	X	X									X	
<i>Thalictrum fendleri</i> var. <i>polycarpum</i>	Fendler's meadow-rue											X	
ROSACEAE — Rose Family													
<i>Adenostoma fasciculatum</i>	chamise	X		X	X		X		X	X	X	X	X
<i>Cercocarpus minutiflorus</i>	San Diego mountain-mahogany								X				
<i>Heteromeles arbutifolia</i>	toyon, Christmas berry	X	x	X	X	X	X	X	X	X	X	X	X
<i>Prunus ilicifolia</i> ssp. <i>ilicifolia</i>	islay, holly-leaf cherry		x			X						X	
<i>Rosa californica</i>	California rose											X	X
<i>Rubus ursinus</i>	California blackberry					X							
RHAMNACEAE — Buckthorn Family													
<i>Adolphia californica</i>	spineshrub	X	x		X						X	X	X
<i>Ceanothus verrucosus</i>	wart-stem-lilac			X			X		X	X			
<i>Ceanothus tomentosus</i>	Ramona-lilac										X		
<i>Rhamnus crocea</i>	spiny redberry		X						X			X	X
RUBIACEAE — Madder or Coffee Family													
<i>Galium angustifolium</i> ssp. <i>angustifolium</i>	narrow-leaf bedstraw	X	X								X	X	X
<i>Galium aparine</i>	common bedstraw, goose grass	X						X	X		X		X
<i>Galium nuttallii</i> ssp. <i>nuttallii</i>	Nuttal's bedstraw											X	X
RUTACEAE — Rue Family													
<i>Cneoridium dumosum</i>	bushrue											X	X
SALICACEAE — Willow Family													
<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont cottonwood											X	
<i>Populus nigra</i>	lombardi poplar											X	
<i>Salix exigua</i>	narrow-leaved willow											X	X
<i>Salix gooddingii</i>	Goodding's black willow		X	X		X				X	X	X	X
<i>Salix laevigata</i>	red willow									X		X	X
<i>Salix lasiolepis</i>	arroyo willow		X	X	X	X		X		X	X	X	X
SAURURACEAE — Lizard's Tail Family													
<i>Anemopsis californica</i>	yerba mansa		X			X						X	X
SAXIFRAGACEAE — Saxifrage Family													
<i>Jepsonia parryi</i>	coast jepsonia	X										X	X

Family and Latin Name	Common Name	Property											
		VP/MC	LCCP	PP	LCR	CR	RC	CV	BD	LL	LM	CGC ^a	LC ^b
SCROPHULARIACEAE — Figwort Family													
<i>Castilleja affinis</i> ssp. <i>affinis</i>	coast paintbush											X	
<i>Castilleja exserta</i> ssp. <i>exserta</i>	purple owl's clover											X	X
<i>Cordylanthus rigidus</i> ssp. <i>setigerus</i>	dark-tipped bird's beak											X	X
<i>Keckelia cordifolia</i>	climbing bush penstemon												X
<i>Mimulus aurantiacus</i>	coast monkey flower											X	X
<i>Scrophularia californica</i> ssp. <i>floribunda</i>	California bee plant/figwort								X	X		X	X
SIMMONDSIACEAE — Jojoba Family													
<i>Simmondsia chinensis</i>	jojoba											X	X
SOLANACEAE — Nightshade Family													
<i>Datura wrightii</i>	western jimson weed			X				X				X	
* <i>Nicotiana glauca</i>	tree tobacco	X	X	X	X	X		X	X	X	X		X
<i>Solanum americanum</i>	white nightshade							X	X		X		
<i>Solanum douglasii</i>	Douglas's nightshade	X		X					X	X		X	
<i>Solanum parishii</i>	Parish's nightshade	X		X	X				X	X	X		X
TAMARICACEAE — Tamarisk Family													
<i>Tamarix</i> spp.	saltcedar				X	X					X	X	X
TROPAEOLACEAE — Nasturtium Family													
* <i>Tropaeolum majus</i>	garden nasturtium		X	X									
TAMARICACEAE — Tamarisk Family													
<i>Tamarix</i> sp.	tamarisk												X
TYPHACEAE — Cattail Family													
<i>Typha</i> ssp.	cattail		X		X	X							X
URTICACEAE — Nettle Family													
<i>Parietaria hespera</i>	pellitory	X		X					X	X			
<i>Urtica dioica</i> ssp. <i>holosericea</i>	hoary nettle		X	X								X	
* <i>Urtica urens</i>	dwarf nettle		X	X					X	X			
<i>Hesperocnide tenella</i>	western nettle								X	X			
VERBENACEAE — Vervain Family													
<i>Verbena lasiostachys</i>	vervain							X				X	
VITACEAE — Grape Family													
<i>Vitis girdiana</i>	desert wild grape										X		

* Denotes nonnative species
 Nomenclature follows: Checklist of the Vascular Plants of San Diego County, 4th Edition. Jon P. Rebman and Michael G. Simpson. 2006
 VP/MC=Veterans Park/Macario Canyon; LCCP= La Costa Canyon Park; PP= Poinsettia Park; LCR=La Costa Romeria; CR =Carillo Ranch; RC=Research Center; CGC=Crossings Golf Course; CL=Calavera Lake; CV=Carlsbad Village; BD=Batiquitos Drive; LL=Lagoon Lane; LM=Los Monos.
 a. From the Carlsbad Municipal Golf Course EIR Biological Constraints Analysis, 1997
 b. from the Lake Calavera Trails Biological Resources Report, 2005

This Page Intentionally Blank

Appendix B: Animal Species Observed

Species	CL	CVD	LM	VP/MC	PP	LL	BD	LCR	LCCP	CR	CGC	RC
Birds												
Acorn woodpecker		X										
Allen's hummingbird	Y	Z			XX	Y		XZ				
American coot	XX*											
American crow	XZ	YZ		XXX	XXX	YZ	XXX	XXX	YZ	X	XZ	
American goldfinch			X									
American kestrel	XZ										X*	
American widgeon	X											
Anna's hummingbird	XZ*	XX	X	XXX	XXX		XX	XX	XX	XX	XX	X
Ash-throated flycatcher	XXX*				X		Z				XZ	
Bewick's wren	XX*	XXX	X	XXX	XXX	Z	XZ	XXX	XXX	X	XZ	
Belted Kingfisher	Z*								Z			
Black-headed grosbeak	X				Z				Z		XXX	
Black phoebe	XXX	Z	XX	XX	XX		X	X		X	XZ	X
Blue grosebeak						Y					Y	
Blue-gray gnatcatcher	XXX			Z							Y	
Brown-headed cowbird	XZ				XXX	Y		Z			XXX	
Bufflehead	X											
Bullock's oriole	X											
Bushtit	XXX*	X	XX	XXX	XXX	XZ	XZ	XXX	XXX	X	XXX	
California quail	XXX	X	XXX	XX	XX				Z		XXX*	X
California thrasher	XX*		XXX	XZ			Z	X	X		XX	X
California towhee	XX*	XXX	XXX	XXX	XXX	Y	XXX	XXX	XXX	Y	XXX	X
Cassin's finch		X	X									
Cassin's kingbird	X								X		Y	
Cedar waxwing	*											
Cliff swallow	XZ										XX	
Coastal California gnatcatcher	XXX	XZ	XXX	XXX	X				XZ		XXX	
Common merganser	*											
Common moorhen	X*											
Common raven	XXX	XX	X		X		X	X	XX		X	
Common yellow-throat	XXX	X	X	XX	XXX	XZ		XXX		X	XXX	
Cooper's hawk	XXX	X		YZ				Z	Z	X	Z	
Costa's hummingbird	XX										X	
Double-crested cormorant	XZ*											
Downy woodpecker	YZ*										Z	
Gadwall	*											
Great blue heron (fly-over)	XZ										*	
Great egret	X										XX	
Great-tailed grackle	XXX							X				
Greater roadrunner	Z*		X	Z							X	
Green heron											Z*	
Hermit thrust	X											
Hooded oriole	XZ	Z	X			Z					X	X

Species	CL	CVD	LM	VP/MC	PP	LL	BD	LCR	LCCP	CR	CGC	RC
House finch	XX	XXX		XX	XXX	X	Z	YZ	XX	X	XZ	X
House sparrow	*											
House wren	X*			Z			Z		Z		X	
Horned lark	*											
Hutton's vireo					X					X		
Killdeer	XX											
Least Bell's vireo											XX	
Lesser goldfinch	XX		Z	XXX	XXX	Z	X	YY	Y	X	XZ	
Lincoln's sparrow	X*											
Mallard	XXX*									Y	XZ	
Mourning dove	XXX	X	X	X	XX			XX	XX	X	XZ	X
Northern flicker	Z*		Y					Y				
Northern harrier	XX		X	XX								
Northern mockingbird	XXX			XZ	XX	X	XXX	Z	XZ	Y	XXX	X
Northern shoveler	X*											
Nuttall's woodpecker	XZ		Y		Z	XZ		Y	XX	X	XX	
Orange-crowned warbler	XXX			Z	Z	XZ	YZ	ZZ			XXX	
Olive-sided flycatcher	*											
Pacific sloped flycatcher	XXX*										XZ	
Peacock										X		
Phainopepla	X											
Pied-billed grebe	XZ*											
Poor-whil									Y			
Red-tailed hawk	XXX		XX	YZ							X*	X
Red-shouldered hawk											*	
Red-winged blackbird	XXX										XXX	
Ruby-crowned kinglet	XZ*											
Ruddy duck	XZ*											
Rufous hummingbird		X	X		Z							
Rufous-crowned sparrow	X		X						Z			
Says phoebe	XZ			X					Y			X
Song sparrow	X	X	Z	XZ	XXX	Z	Y	XZ	X	XX	XXX	
Sora	*											
Spotted towhee	XX*	XX	XXX	XXX	XXX	XZ	XXX	Z	XXX	XX	XZ	X
Tree swallow	X*											
Turkey vulture (fly-over)	X										X*	
Violet-green swallow				X								
Virginia rail	*											
Western kingbird	Z	XZ	Y	Z			X	XZ	X		X	
Western meadowlark				X								
Western scrub-jay	XXX	X*		YZ			XZ	XXX	XXX	X	XZ	X
Western tanager										X		
White-crowned sparrow	XXX*	XXX	XX		Y		XZ		YZ		X	X
White-faced ibis (fly-over)	X											
White-tailed kite	Z										X	
White-throated swift (fly-over)	X*			YZ								
Wilson's warbler	X									X	Z	
Wrentit	XXX	XXX	XXX	XX	XXX	XX	XXX	XXX	XX	XX	XZ	X
Yellow warbler											Y	
Yellow-rumped warbler	XXX*		X	Y		X	Y	Y	XX	Y	XX	

Species	CL	CVD	LM	VP/MC	PP	LL	BD	LCR	LCCP	CR	CGC	RC
Yellow-breasted chat					XZ						XXX	
Insects												
Acmon blue											*	
Alfalfa butterfly											*	
Anise swallowtail											*	
Behr's metalmark	*			X							*	
Buckeye											*	
Common dogface											*	
Cabbage white	X*			X						X	*	
California ringlet	Z										*	
California sister	*										*	
Common White											*	
Funereal duskywing											*	
Hartford's sulfur											*	
Lacustra duskywing											*	
Lorquin's admiral	*										X*	
Marine blue											*	
Monarch	*										*	
Mourning cloak	*			X	Z					X	*	
Painted lady				X						X	*	
Pale swallowtail					Z						*	
Perplexing hairstreak											*	
Pygmy blue	*			X				X			*	
Queen											*	
Red Admiral											*	
Sara's orangetip	XXX									X	*	
Scorpion				X							*	
Southern blue	Z										*	
Sphinx moth				X							*	
West coast lady											*	
Western checkered skipper											*	
Western elfin											*	
Western tiger swallowtail	X									X	*	
Virginia lady											*	
Mammals												
Agile kangaroo rat	Y*											
Big brown bat	*											
Botta's pocket gopher	XXX*											
Brazilian free-tailed bat	*											
Cactus mouse	*											
California myotis	*											
Coyote	XXX*			XXX	X			XX	XZ		XZ	
Deer mouse	*											
Desert cottontail	XXX*	X	X	XX	XX		X	Y	XXX	X	X	
Ground squirrel	XXX*	X		XX	XX			Z	Z		X	
Hoary bat	*											
Raccoon (tracks)	XXX*							XY	X	X	X	
Opossum (tracks)	XZ*							Y			X	
Striped skunk	*											
Spotted skunk	*											

Species	CL	CVD	LM	VP/MC	PP	LL	BD	LCR	LCCP	CR	CGC	RC
Western harvest mouse	*											
Woodrat	YZ*			XXX	XXX			XXX	XXX	X		
Long-tailed weasel								Y				
Reptiles and Amphibians												
Belding's orange-throated whiptail	Z		X								*	
Bullfrog	XX*											
California kingsnake	*											
Coachwhip	*											
Garden slender salamander	*											
Gopher snake	YZ*											
Pacific treefrog	XXX			X		Z			XXX		XZ	
Rattlesnake (skin only)	Y			X								
Side-blotched lizard	X*			X	XX						X*	
Southern alligator lizard	*											
Southern pacific rattlesnake	Z*										*	
Striped racer	*											
Western fence lizard	XXX*		X	X	XX					X	X*	
Western spadefoot	*											
Western threadsnake	*											
Western toad	*										X	
Whip snake				Z								
Invertebrates												
Versatile fairy shrimp	Z*											
<p>*Merkel and Associates 2005 or Golf Course EIR Technical Report; X=2009; XX= 2009 & 2010; Y=2010; XXX=2009, 2010, 2011; Z=2011; YZ=2010&2011; XZ=2009&2011</p> <p>CL = Calavera Lake; CVD = Carlsbad Village Drive; LM = Los Monos; VP/MC = Veterans Park/Macario Canyon; PP = Poinsetta Park; LL = Lagoon Lane; BD = Batiquitos Drive; LCR = La Costa Romero; LCCP = La Costa Canyon Park; CR = Carillo Ranch; CGC = Crossings Golf Course; RC = Research Center</p>												

Appendix C: Zero and Moderate Tolerance Exotic Species

Zero Tolerance Exotics

Common Name	Scientific Name
Acacia	<i>Acacia</i> spp.
Creeping bentgrass	<i>Agrotis stolonifera</i>
Tree of heaven	<i>Ailanthus altissima</i>
Giant reed	<i>Arundo donax</i>
Bridal creeper	<i>Asparagus asparagoides</i>
Onionweed	<i>Asphodelus fistulosus</i>
Saharan mustard	<i>Brassica tournefortii</i>
Quaking grass	<i>Briza minor</i> ; <i>B. maxima</i>
Ice plant/Hottentot-fig	<i>Carprobrotus chilensis</i> , <i>C. edulis</i>
Yellow star-thistles	<i>Centaurea solstitialis</i>
Crown marigold	<i>Chrysanthemum coronarium</i>
Bull thistle	<i>Cirsium vulgare</i>
Pampas grass	<i>Cortaderia jubata</i> , <i>C. selloana</i>
Artichoke thistle	<i>Cynara cardunculus</i>
Scotch and Portuguese brooms	<i>Cytisus scoparius</i> , <i>C. striatus</i>
Cape ivy	<i>Delairea odorata</i>
Fuller's teasel	<i>Dipsacus sativas</i>
Stinkwort	<i>Dittrichia graveolens</i>
Veldtgrass	<i>Erharta calycina</i> ; <i>E. longiflora</i>
Eucalyptus	<i>Eucalyptus</i> spp.
Edible fig	<i>Ficus carica</i>
Fennel	<i>Foeniculum vulgare</i>
Shamal ash	<i>Fraxinus uhdei</i>
French broom	<i>Genista monspessulana</i>
English ivy/Algerian ivy	<i>Hedera helix</i> ; <i>H. canariensis</i>
Black walnut	<i>Juglans nigra</i>
Pepperweed	<i>Lepidium latifolium</i> ; <i>L. draba</i>
Japanese privet	<i>Ligustrum japonicum</i>
Natal grass	<i>Melinis repens</i>
Myoporum	<i>Myoporum laetum</i> ; <i>M. pacificum</i> ; <i>M. parvifolium</i>
Oleander	<i>Nerium oleander</i>
Olive	<i>Olea eruopaea</i>
African daisy	<i>Osteospermum</i> spp.
Fountain grass	<i>Pennisetum setaceum</i> ; <i>P. ciliare</i> ; <i>P. clandestinum</i>
Paradox canary grass	<i>Phalaris paradoxa</i>
Canary Island date palm	<i>Phoenix canariensis</i>
Castor bean	<i>Ricinis communis</i>
Black locust	<i>Robinia pseudoacacia</i>
Himalaya blackberry	<i>Rubus armeniacus</i>
Fireweed	<i>Senecio linearifolius</i> var. <i>linearifolius</i>
California and Brazilian pepper trees	<i>Schinus molle</i> , <i>S. terebinthifolius</i>
Blessed milkthistle	<i>Silybum marianum</i>
Johnson grass	<i>Sorghum halepense</i>
Spanish broom	<i>Spartium junceum</i> ;

Common Name	Scientific Name
Tamarisk	<i>Tamarix aphylla</i> , <i>T. chinensis</i> , <i>T. gallica</i> , <i>T. parviflorum</i> , & <i>T. ramosissima</i>
Hedge parsley	<i>Torilis arvensis</i>
Chinese elm	<i>Ulmus parvifolias</i>
Periwinkle	<i>Vinca major</i>
Mexican fan palm	<i>Washingtonia robusta</i>
Spanish dagger	<i>Yucca gloriosa</i>

Moderate Tolerance Exotics

Common Name	Scientific Name
Belladonna-lily	<i>Amaryllis belladonna</i>
Wild oats	<i>Avena barbata</i> , <i>A. fatua</i>
False-brome	<i>Brachypodium distachyon</i>
Black Mustard	<i>Brassica nigra</i>
Italian thistle	<i>Carduus pycnocephalus</i>
Tocalote	<i>Centaurea melitensis</i>
African corn flag	<i>Chasmanthe floribunda</i>
Poison hemlock	<i>Conium maculatum</i>
Bermuda grass	<i>Cynodon dactylon</i>
African umbrella plant	<i>Cyperus involucratus</i> (<i>C. alternifolius</i>)
African daisy	<i>Dimorphotheca sinuata</i>
Pride-of-Madera	<i>Echium candicans</i>
Russian olive	<i>Elaeagnus angustifolia</i>
Tall fescue	<i>Festuca arundinacea</i>
Crete weed	<i>Hedypnois cretica</i>
Gazania daisy	<i>Gazania linearis</i> (<i>G. longiscapa</i>)
Shortpod mustard	<i>Hirschfeldia incana</i>
Algerian sea lavender	<i>Limonium ramosissimum</i>
sweet alyssum	<i>Lobularia maritima</i>
Italian ryegrass	<i>Lolium multiflorum</i>
Water-primrose	<i>Ludwigia hexapetala</i> , <i>L. peploides</i> ssp. <i>montevidensis</i>
Crystalline iceplant	<i>Mesembryanthemum crystallinum</i>
Nasturcium	<i>Nasturcium</i> spp.
Tree tobacco	<i>Nicotiana glauca</i>
Mission prickly-pear	<i>Opuntia ficus-indica</i>
Buttercup oxalis	<i>Oxalis pes-capre</i>
Virginia and thicket creeper	<i>Parthenocissus quinquefolia</i> , <i>P. vitacea</i>
Paradox canary grass	<i>Phalaris paradoxa</i>
Bristly ox tongue	<i>Picris echioides</i>
Smilgrass	<i>Piptatherum miliaceum</i>
Firethorn, pyracantha	<i>Pyracantha angustifolia</i> ; <i>P. crenulata</i> ; <i>P. coccinea</i>
Wild radish	<i>Raphanus sativus</i>
Russian-thistle	<i>Salsola tragus</i>
Puncture vine	<i>Tribulus terrestris</i>
Rose clover	<i>Trifolium hirtum</i>
Cala lily	<i>Zantedeschia</i> sp.

Appendix D: Coastal Sage Scrub Monitoring Plan

The Center for Natural Lands Management-San Diego: Coastal Sage Scrub Monitoring Plan

Objective: Track the changes in structure and composition of the coastal sage scrub (CSS) community.

- a. Use data to evaluate the structure and composition of the CSS vegetation community and its correlation to predictions of vegetation changes based on theories postulated by ecological and threats models.
- b. Use data to evaluate changes or trends in “populations,” presence/absence and/or occupied/unoccupied habitat of sensitive animal species, primarily the coastal California gnatcatcher (*Poliophtila californica californica*) (CAGN).
- c. Use data to evaluate changes in species richness.
- d. Use data to evaluate changes over time from a baseline vegetation pattern.
- e. Use data to guide vegetation management decisions (i.e. nonnative plant removal, rare species range increases/introductions).

Background of Need

The Center for Natural Lands Management (CNLM) manages several thousand acres of CSS in San Diego County. These areas host many threatened, endangered and sensitive plant and wildlife species, provide for wildlife movement and are some of the last remaining stands of CSS in coastal San Diego. These areas were also specifically designated as important areas to conserve under the regional Habitat Conservation Planning (HCP) conservation efforts.

As a result, the CNLM needs to be able to evaluate recruitment and vigor of this vegetation community over time to guide management decisions and to evaluate changes in plant and animal communities. This monitoring will also provide an opportunity to evaluate theorized predictions of changes in vegetation communities resulting from urbanization, nonnative species invasion, global warming, increased edge, altered fire regime and fragmentation (to name a few).

Background of Ecological Model and Threats

CSS is a fire-adapted vegetation community with fires occurring naturally, but most severely, under the extreme Santa Ana heat and winds of late summer and fall and during drought conditions. During these conditions there would generally be a “complete burn,” where all above ground vegetation within the fire’s path would be consumed. After such a fire, herbaceous plants (fire followers), which are known to sprout after fires, would dominate the landscape for a few years. Over time (3-5 years) the shrublands would regain their dominance, and after 5-10 years a mature assemblage of plants and wildlife would again be found on site (Dallman 1998).

The fire frequency in CSS is as frequent as chaparral due to the volatile oils and resins that occur in CSS plants. The plants, such as white sagebrush (*Salvia apiana*), are able to resprout after a fire or produce many seedlings from the dormant seed bank that lies in the soil. Seed germination of some species may also be stimulated by fire (Holland and Keil 1995; Dallman 1998). However, if the fire frequency and intensity are too great, plants in the CSS community, such as black sage (*Salvia mellifera*) and California sagebrush (*Artemisia californica*) are permanently killed and can no longer regenerate, slowly converting the CSS community to a nonnative, annual grassland (Southwest Division, Naval Facilities Engineering Command 1998).

Each CNLM preserve in San Diego has a different fire history and a different predicted fire future. For example, most of the Rancho La Costa (RLC) Habitat Conservation Area (HCA) burned in the Harmony Grove fire in October of 1996, while the Manchester HCA has not burned (except two very small fires) in its entirety since 1917. Prior to 1917 no data are recorded, so it is uncertain as to when the last significant fire event occurred in the Manchester HCA.

Regardless of fire history and the current vegetation characteristics, there are many realized or potential threats to the integrity of the CSS vegetation community (See RLC Habitat Management Plan CSS Ecological Model and Threats Section (CNLM 2005) that need to be evaluated including:

1. What is the effect of an altered fire regime at each HCA?
2. What is the potential effect of global climate change?
3. What are the effects of urban edge?
4. What are the effects of fragmentation and isolation?
5. What are the effects of altered wildlife usage patterns?

The answers to these threats questions lead to other questions that are associated with effects on ecological processes and patterns, such as:

1. Are the variables investigated representing a threat?
2. At what spatial scale are the variables representing a threat?
3. How do the effects of the threats listed above effect the distribution and abundance of sensitive plant and wild-life species?
4. How do the threats listed above effect the distribution of non-sensitive plants and animals?
5. How do the effects of each threat alter ecological processes?
6. How do the various measured factors interact?

Predictions

Fire. We predict that as a result of fragmentation, complete burns of preserves are now less likely and that there will be fewer, smaller fires resulting in a mosaic of CSS with various age structures.

Global Climate Change. We predict that rainfall patterns will change (likely decrease) over the next 100 years resulting in a lengthening of the fire season, increased frequency of lightening fires, increased frequency of drought, and areas burned. We predict:

1. Possible regime shifts (altered abundance and recruitment patterns in various native vegetation assemblages).
2. Altered invasion severity of exotic species due to changes from native-adapted variations in weather phenomena.
3. Lowered native seedling survival of species due to changes from native-adapted variations in weather phenomena.
4. Lowered seed and/or clonal production of future generations due to changes from native-adapted variations in weather phenomena.
5. Negative interactions between native wildlife and changes resulting from the above mentioned predictions in vegetative cover.

Habitat Fragmentation and Urban Edge. We predict that habitat fragmentation will reduce plant diversity and migration and/or genetic exchange between plant populations. This could affect the CSS community by reducing vigor within populations and eventually leading to extinctions of specific plant species. Habitat fragmentation has resulted in an increase of urban edge on all our preserves. We predict that this will result in increased pressures from nonnative plant species, illegal vegetation clearing, dumping, erosion, and other threats that will change the vegetation structure and composition.

Monitoring Methodology

Approximately 50 plots will be established inside three of our preserves, and the number per preserve allocated by the amount of acreage currently occupied by CSS in each preserve. These plots will be placed in a stratified random manner across our preserves. Stratification will take into account:

1. Size of preserve
2. Slope and aspect
3. Distance from preserve edge/urban edge
4. Presence or absence of CAGN or San Diego horned lizard (*Phrynosoma coronatum blainvillii*)

5. Fire history

Plot Design and Setup

The plot design will be of a modified Whittaker nested vegetation sampling design as in Stohlgren et al. 1995. The dimensions of the macroplot will be 50 meters long by 20 meters wide. Three smaller nested plots will be placed inside the macroplot. The larger of these three is to be 20 meters long and 5 meters wide, placed in the center of the macroplot, with the long axis corresponding to that of the macroplot. The two other nested plots will be at opposite corners of the macroplot, and will measure 5 by 2 meters in length, again with the long axis corresponding to that of the macroplot. The design of the modified Whittaker plot we are using deviates from that described in Stohlgren et al. 1995 by not including the 12 smaller 1-square meter rectangles. The long axis of the modified Whittaker plots will be set to cross the environmental gradient present at the macroplot location. Sampling will be carried out for both continuous variables (percent cover by species) and non-parametric and semi-continuous variables (count of dead shrubs, species richness).

Point Intercept Data (Percent Cover)

Percent cover by species will be gathered by running a point-intercept transect along the upper border of each macroplot. The point-intercept transects will be measured at half meter intervals, thus generating 98 "hits" along the long (50 meter) side of the macroplot. Living plants will count as a point or "hit," if a 1.5 millimeter dowel is intersected in the vertical plane by the living tissue of a plant. At each half meter, data pertaining to bare ground, rock, or litter incident with the dowel will also be collected. Dead branches attached to a living shrub do not count as a "hit." If a completely dead shrub is incident to the dowel along the point intercept line, that shrub is noted by species (if possible) in a separate column from living plant "hits." The hope is that this may generate information pertaining to large-scale shrub die-off, as has been recently noticed, but had gone quantitatively undocumented in the RLC HCA.

Species Richness

Information gathered inside the smaller sub-plots located inside each macroplot will include species presence. Each species occurring within the sub-plot is recorded. Plants are identified to species and subspecies whenever possible.

We obtained shrub counts in our plots during our first year of sampling (N = 17 macroplots) and found that any counting inside subplots in addition to noting species richness cannot be supported on our HCA endowments. Collecting species richness in these subplots is the most time-consuming portion of each visit.

Sampling Intensity

CNLM met with Dr. Douglas Deutschman at San Diego State University to inquire into methods of maximizing our return from our effort. We could not afford to monitor more than approximately 20 macroplots per year. Also, the effects of trampling could mislead our conclusions about trend over time if we re-visited the same sites every year over the course of many years. It is necessary to capture the yearly variation in conditions such as rainfall and temperature, and thus we knew that many replicates would be needed in order to capture meaningful patterns.

Dr. Deutschman suggested a "rotating panel" approach. This approach incorporates visiting a subsample of all macroplots on a yearly basis, ensuring to balance the replicates according to aspect and to spread these replicates across the landscape in order to capture variation in weather or rainfall that may take place across our sample region. It was suggested that we re-visit eight macroplots over the course of three years, while rotating 12 or more new macroplots over the course of the three years. Thus, after the third year of sampling, roughly 50 plots have been visited, and the variation in measures among the eight re-visit macroplots can be compared to the rotating macroplots. In this manner we can judge if yearly re-visits are necessary in the long-term, or if more sites are needed each year.

For instance, one potential outcome is that the region in which we are sampling does not vary substantially in factors influenced by weather or disturbance, and that by stratifying sub-sampling across the region and visiting a subsample of the whole, we can adequately capture the variation in vegetative and species richness measures without over-taxing our annual budgets. Another potential outcome is that we will obtain substantial information from this rotating panel design to indicate how many more sites should be visited on a yearly basis to capture the yearly variation without visiting the entirety of our plots.

Rational for a Two-Tiered Approach

The data collected in the macroplot, and smaller sub-plots, will be useful in generating species area curves and (more importantly) in documenting species presence or absence, as well as recruitment and mortality over time. The advantages of using a multi-scaled approach to quantifying species richness are identified in Stohlgren et al. 1995. As the years progress, small changes in species presence or seedling recruitment may be observed as disappearances, appearances, increases, or decreases on the micro-scale of sub-plot. The appearance of nonnative species may be quickly identified on the macroplot scale, while the disappearance or lack of recruitment among native shrubs may be apparent on the smaller plot scale prior to any notice of change on the macroplot scale.

The point-intercept transect measures will provide a method of quantifying change in abundance by species and edaphic cover which may also tie into species richness changes observed within the sub-plots. For instance, nonnative grasses and/or litter cover changes may be predictive as explanatory variables in a multi-factorial analysis of the response variables mortality or species decline. Other variables that may be tied into a model explaining the measured pattern may include regional rainfall totals for the season and/or seasonal temperature averages, slope and aspect of macroplots, fire history, and the presence or absence of animal herbivory.

References

- Center for Natural Lands Management (CNLM). 2005. Habitat Management Plan for the Rancho La Costa Habitat Conservation Area. The Center for Natural Lands Management. February.
- Dallman, P.R. 1998. Plant life in the world's Mediterranean climates. California Native Plant Society. University of California Press. Berkeley and Los Angeles.
- Holland, V. L., and Keil, D. J., 1995. California vegetation. Kendall/Hunt Publishing Company. Dubuque, IA.
- Southwest Division, Naval Facilities Engineering Command. 1998. Camp Pendleton wildland fire management plant update. Marine Corps Base Camp Pendleton. California.
- Stohlgren, T. J., Falkner, M. B., and L. D. Schell. 1995. A modified-Whittaker nested vegetation sampling method. *Vegetation*. 117:113-121.

Appendix E: Budget Table

Compensation for Services: Habitat Management of the City of Carlsbad's Open Space

Incremental Payments. CNLM shall submit an itemized monthly request for payment covering the services completed to date. A progress report will accompany each payment request. Payment to CNLM shall be due upon receipt of payment request.

Yearly Costs by Category

Task Category	Year 1	Year 2	Year 3	Year 4	Year 5
Site Construction/Maintenance - Maintain fencing. Includes cost of fence maintenance supplies	3,055	3,122	3,190	3,260	3,332
Biotic Surveys - Surveys for sensitive species and other required biological monitoring activities. Includes oversight and planning costs for these activities as well as adaptive management	11,506	12,313	8,300	4,657	13,372
Habitat Maintenance - Planning, oversight and implementation of PMP directed nonnative plant removal and erosion control	28,738	26,320	22,817	28,970	19,602
Habitat Restoration - Planning, oversight and implementation of as-needed erosion control and hydroseeding.			5,000		
Water Management - Planning, oversight and implementation of cleaning browditches and erosion control associated with water conveyance structures.	3,338				
Public Services - Site enforcement (pat. rolling), trash pickup, fence maintenance, sign materials and installation costs, kiosk materials and installation costs and community outreach	35,370	36,102	36,850	37,613	38,393
General Maintenance - Debris removal and dumping costs	207	213	220	226	233
Reporting - Data analysis, data management, monthly reports, annual reports, annual work plans and budgets and revising the preserve management plan. Report production costs are included	8,800	8,976	12,131	13,551	13,616
Office - Office time and expenditures for preserve management staff, quarterly preserve management meetings, coordination, meetings and planning with City staff and typical office costs for preserve managers. Includes costs for office supplies	8,750	10,170	9,122	9,314	10,861
Field Equipment - Purchase of field equipment, mileage reimbursement (rate of fuel, insurance, registration, maintenance and replacement), tools and supplies and staff uniforms	11,300	11,639	11,988	12,348	12,718
Operations - Audits and personnel development and training	3,696	3,793	3,893	3,996	4,102
Administration - Administration includes the costs of administering contracts, running payroll, accounting and other tasks in support of employees. The administration rate is 24%.	27,542	27,036	27,243	27,344	27,895
Contingency - Contingency equals 10% of annual operating costs to respond to unforeseen events and challenges to the stewardship of the site and to buffer for unforeseen costs to particular tasks.	14,230	13,969	14,075	14,128	14,412
Totals	156,531	153,654	154,830	155,408	158,537

This Page Intentionally Blank