Conservation Significance of

Rancho Guejito

—the jewel of San Diego County—

Prepared by

Jerre Ann Stallcup, M.A.
Michael D. White, Ph.D.
Nancy L. Staus, M.S.
Wayne D. Spencer, Ph.D.

Conservation Biology Institute
651 Cornish Drive
Encinitas, CA 92024

October 2005

CONSERVATION
BIOLOGY
INSTITUTE

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

TABLE OF CONTENTS

List of Figures

List of Photos

List of Tables

EXECUTIVE SUMMARY

In 1974, the California Department of Parks and Recreation studied the feasibility of acquiring Rancho Guejito in San Diego County and developing it into a unit of the State Park system. The conclusion of that study was that Rancho Guejito should be acquired, as it *would preserve highly significant biotic, geologic, cultural, and scenic values* as well as *the only remaining intact Mexican land grant in Southern California*. Furthermore, conservation would offer the residents of Southern California a *living ranch interpretive experience* and outdoor recreation opportunities in the mid-elevation ecosystems of the Peninsular Ranges in Southern California, which are inadequately represented in public parks and reserves (California State Parks 1974).

Unfortunately, the acquisition did not happen at that time, but the gate to an unexplored landscape was opened for a glimpse of the natural and cultural resources that have remained sequestered undisturbed for thousands of years. Since that time, the story of Rancho Guejito has grown to legendary status among biologists and archaeologists in Southern California, as the *conservation jewel* of San Diego County.

In the early 1990s, the gate to Rancho Guejito was opened again, for biological and archaeological investigations related to a proposed emergency storage water reservoir in Guejito Valley. However, these investigations determined that the resources on the site were far too significant to justify the project.

Now, a generation after the initial State Parks study, the legend of Rancho Guejito has been resurrected, but this time under the threat of residential development.

This document provides an introduction to the intersecting cultural and biological conservation values of Rancho Guejito—its cultural history, rare biological resources, its ecological functions within surrounding conserved areas, its significance to past, present, and future generations of Californians—and a plea for conservation of the irreplaceable values it supports, the loss of which cannot be mitigated elsewhere:

- Rancho Guejito represents a geographical and cultural *bridge* between the coastal and mountain settlement patterns of Indians. The oaks and grasslands represented on the hills and valleys of Rancho Guejito provided sufficient resources to support large populations of different Indian groups.
- The cultural legacy of Rancho Guejito, and the natural resources that are intertwined in this legacy, are preserved to a remarkable degree, undisturbed in their original natural setting and context, providing significant research and interpretive opportunities, as well as a captivating story of our past.
- Rancho Guejito is the last remaining intact Mexican land grant and retains a historical landscape representing the earliest ranching in Southern California. The historic features and sites remain relatively untouched and still within their original setting, providing a once-in-a-lifetime opportunity for research, education, and interpretation.

- Nestled in the foothills of the Peninsular Ranges, Rancho Guejito is an ecological *gateway* to the high elevation habitats of the Cleveland National Forest—representing both a linkage to lower elevation coastal habitats and a landscape critical to supporting ecosystem functions and wilderness values of existing conservation investments.
- Rancho Guejito is part of a large ecological *core* area, whose integrity is essential to maintaining ecological processes that vegetation and wildlife communities depend on, such as natural hydrological and fire regimes, which require large landscapes to function.
- High integrity watersheds on Rancho Guejito support intact hydrologic processes and high water quality, which are crucial to the long-term viability of existing conservation investments in the San Pasqual Valley. Guejito Creek on the property supports designated Critical Habitat for a population of the endangered arroyo toad.
- Ranch Guejito supports a diverse assemblage of over 20 vegetation communities, including many communities not well protected in the ecoregion, such as oak savannas, grasslands, alkali meadows, and vernal pools, and some of the largest individual trees and largest stands of Engelmann oak woodlands in San Diego County.
- The large expanse of rolling grasslands on Rancho Guejito supports at least 16 different raptor species and one of the largest remaining populations of the endangered Stephens' kangaroo rat. Rancho Guejito could play a critical role in the persistence and recovery of this imperiled species, because its population represents a unique genetic legacy.
- In its location at the urban-wildland interface, Rancho Guejito provides unique aesthetic, recreational, educational, and spiritual opportunities for millions of people living in Southern California and represents an opportunity to protect quality of life in the face of rapid land use changes. These values have already been lost in much of Southern California and western San Diego County and can never be restored.

Enormous federal, state, and local investments have been made in the acquisition and conservation of natural lands, as witnessed by our National Forests, State Parks, National Wildlife Refuges, and Natural Community Conservation Planning (NCCP) programs like the Multiple Species Conservation Program (MSCP) in San Diego County. Indeed, the unique quality of life of Southern Californians relies on the recreational, educational, aesthetic, and spiritual values of these natural lands. But the viability of these lands and our quality of life will be jeopardized if the lands are not linked within a network of conserved landscapes and managed in a way that protects their resources and maintains their integrity.

Conservation and interpretation of both the natural and cultural environments, in an intact, natural setting, will enable a new synthesis of science-based habitat management and traditional ecological knowledge that is critical to maintaining our existing and growing network of conserved lands. Conservation of the natural and cultural resources at Rancho Guejito, in an intact, natural setting—between the coastal mesas of the NCCP reserves and the foothills and mountains of the National Forest lands—will allow us to begin realizing this vision.

1. INTRODUCTION

Rancho Guejito in north-central San Diego County is an irreplaceable icon of California's natural and cultural heritage. Historically referred to as *Rancho Guejito y Cañada de Palomía*, it is the only remaining intact Mexican land grant in Southern California, supporting a rich diversity of biological resources. As a result of its isolation, geography and terrain, and ownership patterns, this approximately 20,000-acre area represents a largely undisturbed and unexplored cross-section of an intact ecosystem and an entire traditional cultural system. Protection of Rancho Guejito, in its entirety, represents an opportunity to protect unique resource values that are rapidly vanishing under the continued onslaught of urban sprawl.

1.1 Unique Origins, Irreplaceable Legacy

The source of the name *Guejito* has puzzled historians for decades—until now. *Weyeto* was one of the First People who were transformed into sacred mountains. At 4,221 ft, *Weyeto* Mountain stands as a sacred sentinel over the undisturbed treasures of the vast oak-studded grasslands in the valleys below. The name *Weyeto* is from the Luiseño word *wee'tut*, for the Coulter pine that grows on the mountain, known today as Pine Mountain. Rancho Guejito took its name from this prominent, and spiritually powerful, topographic feature, which sits as a cornerstone of the old rancho.

Connecting the naming of the Rancho to *Weyeto* of the First People—the mountain and its natural resources that are his earthly manifestation—illuminates the ties between cultural and natural resources that are emblematic of early Southern California. The natural resources of Rancho Guejito have been sequestered undisturbed for thousands of years—perhaps first as a forbidden area of territorial conflict between the Ipai and the Luiseño people, later bypassed by early Spanish and Mexican travel routes, and more recently as a rancho preciously guarded by a succession of private landowners. Thus, the cultural and biological resources that persist today are representative of the original native cultures and biological communities that have inhabited the hills and valleys of Rancho Guejito for thousands of years.

In Southern California, where millions of people have chosen to make their homes in the footsteps of the original Indians, the early Spanish explorers, and the Mexican ranchers, why is this sort of undisturbed landscape important? The South Coast Ecoregion of California (Figure 1) lies within a geography recognized by scientists as a global hotspot of biodiversity—an area supporting high concentrations of species, particularly endemic species that occur nowhere else on Earth. Rancho Guejito remains a largely unexplored time capsule within this hotspot of biodiversity, at a crossroads of California's cultural heritage and a cross-section of its natural heritage.

Based on archaeological attributes, Rancho Guejito represents a geographical and cultural *bridge* between the coastal and mountain settlement patterns of Indians. The oaks and grasslands represented on the hills and valleys of Rancho Guejito provided sufficient resources to support large populations of different Indian groups. Similarly, Rancho Guejito, located in the foothills

Figure 1

of the Peninsular Ranges, serves as an ecological *gateway* to the high elevation habitats of the Cleveland National Forest—representing both a linkage to lower elevation coastal habitats and a landscape that is critical to supporting ecosystem functions of existing conservation investments.

It is the property's size and intactness that are arguably its greatest—and most imperiled—cultural and ecological values. Human-associated land use changes and significant road construction, which reduce the integrity of the landscape, are largely absent on Rancho Guejito. Such integrity is essential to maintaining the ecological processes that vegetation and wildlife communities depend on, such as hydrological and fire regimes, which require large landscapes to function naturally. The watershed basins within which Rancho Guejito resides are among the most intact in Southern California. Such intactness—in its original environmental setting—is also essential to interpreting the cultural history of the area, which is lacking in all but a few cultural sites in Southern California.

Geographically, Rancho Guejito is one of the largest biological core areas in a region with little intact and protected natural open space remaining. It is by far the largest cornerstone of the County of San Diego's North County MSCP, it is key to maintaining ecological functions both within and outside of this core area, and it meets virtually all of the state Resources Agency priority criteria for conservation (Table 1). Rancho Guejito is considered a *conservation jewel* by all governmental and nongovernmental agencies concerned with natural resources protection. A feasibility study by the California Department of Parks and Recreation in 1974 recommended that the area be acquired, first by protection of a 20,167-acre core area, followed by acquisition of surrounding undeveloped properties. The area of Rancho Guejito and surrounding undeveloped lands is roughly the size of Cuyamaca Rancho State Park (Table 2) and is comparable in scenic and educational value.

Rancho Guejito has been considered for use as a water supply reservoir and now is being planned for residential housing which, based on calculation of the most developable, gently sloped areas alone, could consume almost half of its area. Any development within Rancho Guejito would have profound consequences to an even larger intact landscape and the resource values it supports. Thus, in the face of rapid urbanization in Southern California, conservation of Rancho Guejito provides a fleeting opportunity to conserve a large, intact landscape where ecological processes can function and keep pace with climatic and other anthropogenic changes, and the cultural and historic heritage of Southern California can be explored and revealed for all its citizens.

1.2 Conservation Vision for the South Coast: A New Synthesis

The California landscape is a reflection of historical processes, both natural and cultural. Indians practiced natural resource management for millennia, long before habitat conservation and management programs were instituted, for example, as part of the State of California's NCCP program. The cultures and indeed the lives of Indians depended on a deep understanding of using and stewarding nature without destroying it.

Table 1. California Department of Fish and Game priority criteria for conservation.

Local or Statewide Significance	Site Viability and Habitat Conditions
• Critical wintering, breeding, or migratory habitat • Extremely rare species/habitats • Representative examples of species and habitats • Essential habitat linkages • Critical buffer zones • Species/habitats declining throughout the state • Critical for maintaining ecosystem functions • Critical habitat for species important to the Department • Lands critical for successfully implementing regional conservation plans	• Large area of natural vegetation or areas adjacent to large protected areas • Robust populations of species • Few, if any, immediate or near-term threats • Relatively undisturbed watersheds upstream of the site • Potential for multi-species protection **Site Diversity** • High number of species/habitats present • Populations of native species that exhibit important subspecies or genetic varieties • Populations of species/habitats that inhabit special unusual environments • Representative examples of functional diversity • Natural landscapes that support representative examples of important ecological functions

Source: California Legacy Project 2002.

Table 2. Comparison with other California State Parks of similar size.

State Park	Region	Size (acres)
Rancho Guejito	*San Diego County*	*20,000*
Cuyamaca Rancho	San Diego County	25,000
Humboldt Redwoods	North Coast	52,000
Big Basin Redwoods	San Francisco Bay	18,000
Henry W. Coe	Central Coast	23,300 ac wilderness area (>80,000 ac total)
Point Mugu	Central Coast	15,000
Great Valley Grasslands	Central Valley	2,826 ac grassland (180,000 ac complex)
Chino Hills	Inland Empire	12,452
Red Rock Canyon	Desert	27,000

This *traditional ecological knowledge* is defined as the knowledge base acquired by indigenous and local peoples over hundreds of years, through direct experience and contact with the environment, and passed on to successive generations (Anderson 2005b). It should come as no surprise that such a human-environmental relationship would not keep pace with the massive influx of people into Southern California over the past century. It is becoming increasingly clear, however, that a more sustainable coexistence is needed between modern human society and the natural resource base of California. The unique quality of life of Southern Californians relies on the recreational, educational, aesthetic, and spiritual values of their natural lands.

Enormous federal, state, and local investments have been made in the acquisition and conservation of natural lands, as witnessed by our National Forests, State Parks, National Wildlife Refuges, and NCCP programs like the MSCP in San Diego County. The viability of these lands and the quality of life they support will be jeopardized if the lands are not linked within a network of conserved landscapes and managed in a way that protects their resources and maintains their integrity. Increasingly, land managers are discovering that ancient cultural practices—stewarding native communities through burning, pruning, thinning, weeding, and rotation of land uses—have direct application to the management of our natural parks and open space reserves today.

Conservation and interpretation of both the natural and cultural environments, in an intact, natural setting, will enable a new synthesis of science-based habitat management and traditional ecological knowledge. This synthesis is critical to maintaining our existing and growing network of conserved lands. Furthermore, natural resources and the environmental services they provide, such as water quality and water supply protection, flood control, and scenic and recreational resources, require large landscapes to function. In our fragmented and increasingly urbanizing environment, there are few areas of natural landscapes large enough to perform these functions. Thus, existing conservation investments can only be maintained if we continue to enlarge, buffer, and link them to other natural open space.

Conservation of the natural and cultural resources at Rancho Guejito, in an intact, natural setting, at the gateway to the National Forest, will allow us to begin realizing this vision.

1.3 Approach

This study used existing, publicly-available information to address the ecological and cultural significance of Rancho Guejito. No field surveys were conducted. Yet, even with limited access to the property itself and incomplete data, the richness and rarity of Rancho Guejito's conservation values are self-evident. And, its undisputable irreplaceability underscores the imperative to complete comprehensive field studies before changes to current land uses are contemplated.

We relied on year 2000 digital aerial imagery and other digital data of vegetation associations, species locations, roads and development, topography, and hydrology available from a variety of sources, as well as the scientific literature and publicly available documentation of earlier (partial) surveys of the property. Some of this information is slightly dated, particularly in light of recent urban development, the wildfires of October 2003, and the near-record rainfall of 2004-2005. We also consulted records at the South Coastal Information Center (San Diego State University) and the notes of Malcolm Rogers, held at the San Diego Museum of Man, documents and maps at the San Diego Historical Society archives, the original surveyor's plat maps and land grant maps, and published materials, as cited at the conclusion of this report. As the archaeological record is very incomplete, we have made some general interpretations about the patterns of human habitation and adaptation across Southern California to establish a context for the significance of the conservation of Rancho Guejito. These interpretations were based on interviews with local experts and research conducted at a variety of prehistoric sites in the region over the past 70 years by archaeologists and anthropologists. Detailed methods and data sources for the various analyses presented in this report are provided in Appendix A.

To evaluate the role of Rancho Guejito within a regional context, we used the biogeography and human development patterns of Southern California to define three hierarchical scales or geographies that illustrate the cultural and natural resource values of the region surrounding Rancho Guejito. These three geographies include: (1) the portion of the South Coast Ecoregion, as defined by The Nature Conservancy (ECOMAP 1993, Bailey 1995), south of the urban footprint of Los Angeles and north of the U.S.-México border, (2) biogeographically distinct ecological subsections within the ecoregion, as defined by the U.S. Forest Service (Miles and Goudey 1997), and (3) Rancho Guejito itself and surrounding areas.

Our inability to conduct specific field surveys limited the potential conclusions of this report, but the partial database also heightened our sense of expectancy. Thus, while exact species composition and condition of the vegetation communities throughout the property are not known, their setting and location suggest that ecological processes have been maintained over the centuries and that many rare and significant resources remain. Similarly, while locations and content of the recorded archaeological sites are not known beyond the information in public records, many, many more sites are expected based on the limited survey information. Site locations as recorded are confidential and therefore not included in this report. Public disclosure of archaeological site locations has the potential to lead to damage through vandalism and unauthorized collection of artifacts, thus skewing the archaeological record. Scientific recordation of the precise location of all artifacts within a site is critical for archaeological conservation and interpretation.

Finally, we intentionally have chosen to interweave the chapters on biological and cultural resources, to represent the integration of these values both in a temporal as well as a spatial context across the landscape. Generations of natural processes, human and biological communities, and cultures have shaped this land over thousands of years—this is the tapestry that must be conserved.

2. REGIONAL CONTEXT

The conservation values of Rancho Guejito are most appropriately assessed in the context of their ecological and cultural contributions to the surrounding region, including the public lands and reserve system of San Diego County. Understanding the underlying forces and histories that have shaped the biological and cultural resources in the region, the patterns of their distribution, and how humans have affected these patterns is necessary to adequately understand the contribution that Rancho Guejito can make to regional conservation.

2.1 Biogeographic Patterns

Cismontane Southern California, that portion extending from the crest of the Peninsular Ranges and Transverse Ranges to the sea, is a unique and biologically diverse region (Figure 1). The natural resources of this region are a product of millions of years of geologic and global climate dynamics, which drove the evolution of a globally unique flora and fauna. The physical terrain and geology, climate patterns, and landscape-scale ecological processes define the geographic distributions of biological communities and species—the *biogeography* of the region. Scientists use biogeographic patterns as a means to classify, describe, and compare natural landscapes.

2.1.1 Geomorphologic Diversity

The shape and geologic composition of the Southern California landscape is a product of its long and complicated geologic history. Southern California was a very different place 150 million years ago, with a line of volcanic islands offshore of the ancient continent. Today, remnants of these Jurassic-age volcanic islands form part of a discontinuous, low mountain range along the coast and foothills of Southern California. These metavolcanic and gabbro peaks, including Otay Mountain, Tecate Peak, Viejas Mountain, Black Mountain, and Pine Mountain, are rich in mafic minerals such as iron and magnesium. Within the last 5 million years, activity along the San Andreas Fault pulled the Baja California peninsula away from mainland México, creating the Gulf of California and uplifting the Peninsular Ranges, including Palomar Mountain and Cuyamaca Mountain, to near their current elevations (Gastil et al. 1981, Grismer 1994). Massive sea level fluctuations, associated with glacial cycles of the Pleistocene Ice Age, have exposed marine sediments—the familiar mesas of coastal Southern California. Faulting and erosion have produced rolling foothills and broad inland valleys, such as the Ramona, Santa Ysabel, Henshaw, and Guejito valleys.

This diverse topography—the elevation and aspect of the landforms—affects physical factors such as climate and precipitation. Regional geological variations in the landforms shape the structure and chemical properties of soils and hydrologic conditions. Individual plant species and entire plant communities have evolved in association with specific climate and soil characteristics. Thus, the dynamics that produced the present physical and geological diversity of the region are largely responsible for the remarkable biological diversity that we see today.

2.1.2 Climate

Climate patterns also shape patterns of floral and faunal diversity. Climate patterns in the foothills and mountains can be described as Mediterranean, characterized by warm, dry summers and mild, wet winters. The immediate coastal strip is more accurately characterized as having a cool steppe climate, because rainfall is typically less than 14 in./year (Pryde 2004, Western Regional Climate Center 2005). Inter-annual weather patterns are also quite variable (Axelrod 1978, Western Regional Climate Center 2005). Annual precipitation increases with increasing elevation, ranging from about 10 in./year in coastal San Diego County to nearly 30 in./year of rainfall and 35 in./year of snowfall on Palomar Mountain. Although generally a minor component of the total annual precipitation of the region, summer monsoonal precipitation does occur regularly and tends to increase with increasing elevation. Temperatures rarely ever reach freezing in coastal areas, and daily temperature fluctuations are moderate. Inland from the coast, daily temperatures fluctuate widely, and freezing is common during the winter, particularly at higher elevations.

2.1.3 Biogeographic Divisions of the South Coast Ecoregion

Biogeographic regions can be excellent constructs against which to plan and implement conservation actions, because they contain distinct assemblages of natural communities and species (Olson et al. 2001). The South Coast Ecoregion has been subdivided into two major biogeographic units, called ecological sections by the U.S. Forest Service (Miles and Goudey 1997)—the Southern California Coast section and Southern California Mountains and Valleys section (Figure 2). Among other differences, such as topography and geology, the Southern California Coast section is that portion of the ecoregion with a climate under significant marine influence, ranging in elevation from sea level to 3,000 ft, and supporting primarily coastal scrub and chaparral communities, as well as riparian communities associated with low-gradient, higher order stream systems. The climate of the Southern California Mountains and Valleys section is only under moderate marine influence, has elevations ranging to over 11,000 ft, and supports inland and montane chaparral communities, oak woodlands and savannas, grasslands, mixed evergreen forests, coniferous forests, and low-order headwater stream systems.

Rancho Guejito is located within two subsections of the Southern California Mountains and Valleys section—the Western Granitic Foothills subsection and Palomar-Cuyamaca Peak subsection (Figure 2). The Western Granitic Foothills subsection (elevation range of about 1,200-4,000 ft) extends from the southern end of the Santa Ana Mountains to the U.S.-México border and includes the Merriam Mountains, Mount Woodson, Viejas Mountain, Sequan Peak, Otay Mountain, and Tecate Peak. The Palomar-Cuyamaca Peak subsection (elevation range of 2,000 to over 6,000 ft) includes Agua Tibia Mountain, Palomar Mountain, Hot Springs Mountain, Volcan Mountains, Cuyamaca Mountains, Laguna Mountains, Corte Madera Mountain, Hauser Mountain, and the In-Ko-Pah Mountains. In this report, we use these two ecological subsections as distinct biogeographic units in our analyses.

Figure 2

2.1.4 Biodiversity and Endemism

The biogeography of plant species diversity in California has received a great deal of attention (e.g., Barbour and Major 1988, Raven and Axelrod 1995). The South Coast Ecoregion lies at the heart of the California Floristic Province, which stretches from southern Oregon to El Rosario in Baja California. The California Floristic Province is world-renowned for its high plant species diversity (Mittermeier et al. 1998, Mittermeier et al. 1999, Conservation International 2005). Within the California Floristic Province, Stebbins and Major (1965) distinguished the South Coast Ecoregion (more accurately, the Southern California Floristic Region) as having the highest number of endemic plant species of any floristic region in the state, including a high number of relict species. Many of these endemic plants are associated with unique or restricted soil or habitat types.

There are over 90 native vegetation community types within the South Coast Ecoregion study area, and there are many more unique species associations (i.e., vegetation series, associations, or unique stands, Sawyer and Keeler-Wolf 1995), both known and yet to be described. As an example, the shrub/scrub communities shown in Figure 3—coastal sage scrub and chaparral—can be variously divided into major geographic divisions based on species composition, soil conditions, and elevation (Axelrod 1978, Westman 1983, Keeley 2000), each supporting distinct elements of the overall biogeographic diversity of these community types. Other community types, such as Coulter pine forest, oak woodlands, and grasslands, also exhibit interesting biogeographic patterns, discussed briefly below.

Coastal sage scrub

Three coastal sage scrub associations occur in the South Coast Ecoregion—Diegan sage scrub (generally within the Southern California Coast Ecological Section), Riversidian sage scrub to the east (generally within the Southern California Mountains and Valleys Ecological Section), and Venturan sage scrub to the north (Westman 1983). The Riversidian sage scrub association is the most diverse of the three, particularly for shrub species, and also has a high diversity of growth forms (Westman 1983). Rancho Guejito lies near the boundary of the Diegan and Riversidian sage scrub associations and, thus, supports elements of each.

Chaparral

Chaparral communities are often classified relative to the dominant species (e.g., chamise chaparral, scrub oak chaparral, red shank chaparral, etc.), which are distributed in relation to soil conditions, elevation, and climate (Keeley 2000). Rancho Guejito supports both southern and northern mixed chaparral associations, with southern mixed chaparral characterized by woolyleaf ceanothus (*Ceanothus tomentosus*) and mission manzanita (*Xylococcus bicolor*), and northern mixed chaparral by hoaryleaf ceanothus (*C. crassifolius*) and cupleaf ceanothus (*C. greggii*). Species diversity in chaparral communities in California is particularly high (Cody 1986), notably β (beta) diversity (changes in species composition along topographic or climatic gradients) and γ (gamma) diversity (species turnover at different geographic locations).

Figure 3

Coulter pine forest

The Coulter pine (*Pinus coulteri*), a California endemic, reaches the end of its southern distributional limit in San Diego County, with a few scattered stands in northern Baja California (Griffin and Critchfield 1972, Minnich and Franco Vizcaíno 1998). The population of Coulter pines on Pine Mountain on Rancho Guejito is the westernmost of the disjunct populations in San Diego County. These Coulter pines are interspersed with chaparral. In the South Coast Ecoregion, the association between Coulter pine and chaparral is common, and in this setting Coulter pines have evolved a serotinous reproductive strategy—retaining mature cones for several years or until they are opened by fire (Barbour and Minnich 2000).

Oak woodlands

Oak woodlands and grasslands are naturally rare in the South Coast Ecoregion and have been further reduced in extent via loss to development and type conversion (Oberbauer and Vanderwier 1991, Scott 1991). In San Diego County, oak woodlands are most abundant in the central foothills, from Cedar Creek north to Rancho Guejito. Many of the oak woodlands in this region are dominated by Engelmann oak (*Quercus engelmannii*). The Engelmann oak, which is endemic to Riverside and San Diego counties and northern Baja California, has the smallest range of any oak in California (Lathrop and Osborne 1990), with the majority of its distribution in San Diego County (Scott 1991). Engelmann oaks are taxonomically related to the white oak subdivision of the genus *Quercus* (Scott 1990), and their disjunct distribution from closely related oaks in Arizona and México reflects the South Coast Ecoregion serving as a refugia from drying climates several million years ago.

Grasslands

Large, intact grasslands in the South Coast Ecoregion were likely more widely distributed and interconnected during hotter, drier interglacial periods than they are today. Purposeful burning of shrublands by Indians could possibly have increased the size and connectivity of grassland habitats in previous centuries (Metcalf et al. 2001). Today, semi-arid, forb-dominated grasslands and the species they support—such as raptors, small grassland birds, badgers (*Taxidea taxus*), and the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*)—occur as smaller, fragmented or isolated areas in relatively flat inland basins.

The Stephens' kangaroo rat is a good example of how species' original distributions were shaped—first by climate and geography, subsequently by agriculture and urban development (Chapter 3.2.2). This rare heteromyid rodent is a habitat specialist in open, rolling grasslands or very sparse scrublands, on soft, loamy soils. For its body size, it has a very small geographic range (Bleich 1973, 1977; Price and Endo 1989) and is entirely endemic to the South Coast Ecoregion. Under a warmer, drier climate, the species' preferred habitats of semi-arid, forb-dominated grasslands would have been more widely distributed and interconnected than they are today, allowing for range expansion. The fragmentation by man of once contiguous habitat into numerous isolated patches, most of them too small to reliably support the species, was a major motivation behind the listing of the species as endangered in 1988 (USFWS 1988).

2.1.5 Landscape-scale Processes

Ecosystems of plant and animal species and their habitats are maintained by dynamic processes that operate across large landscapes. These ecological processes include disturbances from fire, flood, and soil erosion and deposition, as well as nutrient and energy flow through food webs, population dynamics, gene flow, and species interactions such as predation and competition. Several of the key ecological processes shaping the landscape supporting Rancho Guejito are discussed below.

Fire

Fire is one of the primary disturbance mechanisms in the South Coast Ecoregion. Fire and climate have shaped Southern California's vegetation mosaics and species diversity. Chaparral is perhaps California's most characteristically fire-adapted vegetation community. Most chaparral plants readily resprout, reseed, or otherwise renew following wildfires, which have recurred sporadically at intervals averaging perhaps 30 to 40 years (Keeley and Fotheringham 2001). If fire frequency shifts outside the natural range of variability that shaped a particular community, the community will change, gaining and losing constituent species that respond differently to the changes. If severe, this shift can be a complete ecological *type conversion*, from one community type to another, such as converting dense and diverse chaparral to annual grasslands dominated by introduced species (Zedler et al. 1983, Minnich and Dezzani 1998, Keeley 2001). These fast-growing weedy species ignite readily and burn rapidly, spreading fire into other areas. This further shortens the average time between fires and creates an ecological positive feedback loop, referred to as *niche construction* (Odling-Smee et al. 1996)—where species modify the physical environment to enhance their success, often at the expense of other species (Keeley 2001).

Watershed functions

Poff et al. (1997) discuss the concept of the *natural flow regime* of riverine systems as the critical determinant of their biological composition. The natural flow regime can be described by five key characteristics—magnitude, frequency, duration, timing, and rate of change of discharge (Poff et al. 1997). The natural flow regime of a particular stream system is a product of the characteristics of an entire watershed and, thus, can be affected by any changes in the characteristics of the watershed. Even minor changes to hydrologic processes can affect species like the endangered arroyo toad (*Bufo californicus*), which requires natural hydrologic regimes involving episodic flooding and high groundwater tables. Intact watershed basins that have no land cover changes, diversions, and dams have the highest watershed integrity and natural flow regimes.

Wildlife movement and population dynamics

Connectivity of natural open space is widely regarded as essential to functional landscapes (e.g., Noss 1987, Noss 1991, Saunders et al. 1991, Beier and Noss 1998, Crooks 2002). In fact, providing for connectivity of conserved lands is a fundamental principle of conservation planning (Noss et al. 1997, CDFG 1993, California NCCP Act 2002). Connectivity of habitats allows movement of demographic and genetic information, which is crucial to supporting species population dynamics and allowing evolutionary change. Connectivity is particularly important for terrestrial species with large home ranges. For example, adult male mountain lions (*Felis concolor*) in the Santa Ana Mountains have home ranges in excess of 100,000 acres (Beier and Barrett 1993). As lions tend to shy away from human residences and are frequently killed on highways (Boyce personal communication), they need very large, unfragmented landscapes to exist. The consequences of losing habitat connectivity can be profound, resulting in the loss of top predators (such as mountain lions), increasing the abundance of mesopredators (e.g., skunks and raccoons), and resulting in changes to community structure (Bolger et al. 1991, Crooks 2002).

2.2 Patterns of Human Land Use through Time

Archaeological investigations along the Southern California coast indicate that there was a diverse range of human occupation from the early Holocene into the Ethnohistoric period (Moratto 1984). Throughout this period of over 12,000 years, numerous distinct cultures, patterns of adaptation, and associated archaeological attributes have been identified. The classification and sequencing of these cultures have been the subject of considerable debate over the last few decades, and research continues. Loss of ancient sites and artifacts to development and fragmentation of historic ranchos have exacerbated the problem to the extent that we have only scattered pieces of an incomplete record of Southern California's early history.

2.2.1 Land Use Patterns in Southern California

Before Spanish contact, native people lived throughout Southern California in settlements that were adapted to the local and regional environments. These regional adaptation patterns, rather than temporal or cultural differences, resulted in differences in site attributes, as recorded in the archaeological record. Although travel and trade occurred, territorial and traditional areas were occupied and exploited by communities of people. Over time, the general trend was from small seasonal camps on hills and knolls near drainages, to larger more sedentary villages with satellite camps or resource procurement areas. Major drainages with seasonal or permanent water sources were magnets for settlement.

Archaeologists generally categorize resource exploitation and settlement strategies, based on the environment and resources available, into coastal, oak/grassland, mountain, and desert patterns, analogous to the biogeographic patterns discussed in Chapter 2.1. The spatial extent of these patterns is very coarsely approximated in Figure 4, based on interpretation of site attributes within each of these settlement patterns.

For example, the Colorado Desert and Anza-Borrego Desert settlement pattern is clearly different from the high elevation Cuyamaca and Laguna Mountain settlement pattern—although the same group of people claimed both areas as their territory, with seasonal movements or movements in response to drought between the mountains and the desert. In northern San Diego County, the settlement pattern of the San Luis Rey River drainage, occupying oak savannas,

Figure 4

grasslands, and chaparral communities along the river, was different from the Palomar Mountain pattern, although the same group of people used both areas and even moved from specific resource exploitation areas between the inland valleys and the coast.

Figure 5 shows the approximate distribution of territories of different native people in coastal Southern California. Presumably, within each of these territories, there were entire settlement and activity systems including main villages, seasonal camps, plant resource management areas, seasonal resource procurement locations, trails, astronomical observatories, ceremonial locations, and traditional locations. Unfortunately, major parts of these systems are being fragmented and destroyed before they can even be identified.

Based on ethnohistoric and ethnographic information, a large number of village sites occupied at the time of contact with non-Indian people have been identified (approximate locations are shown in Figure 6). Many of these villages were located along the coast near river mouths, and several were located in the mountains (e.g., Cuyamaca and Laguna Mountains, with seasonal camps on Palomar Mountain). *Shakishmai*, on Rancho Guejito, was most likely occupied by the Ipai. This lost village or *ranchería* (a complex or network of related settlements) is mentioned in the literature by early anthropologists and explorers, but nothing is known of it, not even its exact location (Kroeber 1970, Sparkman 1908).

2.2.2 Native People in San Diego County

Archaeological evidence indicates that the earliest people in San Diego County were primarily hunters, based on evidence from sites lacking substantial midden deposits (Rogers 1929). This hunting culture may have been dominant over a large part of the American West, when the continent was first occupied. After about 8,500 years before present, cultural complexes emphasized exploitation of marine mollusks, fish, and plant resources. The economy at more inland sites, typically set on hills overlooking drainages, has been interpreted as seed-gathering oriented, given the predominance of grinding stones in the tool assemblages.

Rogers (1945) defined the Yuman people in southern San Diego County as having come from, or possessing cultural traits derived from, the Colorado River area. The Yuman culture developed into what the Spanish called the Diegueño culture, after the mission at San Diego. However, many of the people living in the region were not affiliated specifically with the mission (Hedges 1975). In recent times, the term Kumeyaay has come into common usage to identify the Yuman-speaking people living in the central and southern part of the county. Luomala (1978) used the terms Tipai and Ipai to refer to the southern and northern Kumeyaay, respectively. The dividing line between the Tipai and the Ipai is approximately Point Loma to Cuyamaca Peak and Julian. The term Ipai is preferred by some to refer to the people formerly called the Northern Diegueño (Farmer 2004). This discussion uses the terms Ipai and Tipai to refer to the Yuman-speaking people who lived in inland northern San Diego County and inland southern San Diego County, respectively, and Kumeyaay to refer to the coastal Yuman-speaking people. The term Luiseño will be used for the San Luis Rey people.

Figure 5

Figure 6

The Ipai culture was very similar to the Luiseño culture during the Late Prehistoric period, confounding researchers' interpretation and identification of sites. The boundary between the Luiseño and Ipai cultures has been proposed as an imaginary line drawn approximately east from Agua Hedionda Lagoon, across the middle of Rancho Guejito (Figure 5), but archaeologically the distinction is not easily discernable (see Hector 1984). McDonald (1993) presented a summary of possible distinguishing characteristics between the Late Prehistoric Ipai and Luiseño people of San Diego County. These propositions should be tested and evaluated at sites, such as those on Rancho Guejito, that contain resources attributed to both the Ipai and Luiseño people.

2.2.3 Spanish, Mexican, and American Influence and Effects

The chain of 21 missions along California's El Camino Real (*The Royal Highwa*y) represents the first arrival of Europeans to California and the items they brought with them, such as livestock, fruits, flowers, grains, and industry. The first mission in Alta California was founded in San Diego in 1769—Misión San Diego de Alcalá. This was followed by the establishment of other missions and asistencias (similar to branch missions serving smaller populations) along the routes traveled by the missionaries (Figure 7). Historic records of the missionaries, as well as artifacts of the native people they visited, allow us to track their route of influence across the landscape.

Missionization forever changed the landscape and lifestyles of the native people. The missions recruited native people to use as laborers and to convert them to Catholicism. This had a dramatic affect on traditional cultural practices. Most villagers, however, continued to maintain many of their aboriginal customs while adopting the agricultural and animal husbandry practices learned from the Spaniards. The introduction of European diseases greatly reduced the Ipai and Luiseño populations.

In 1784, the Spanish government began giving land to individuals, against the wishes of the missionaries, who thought that the influence of the ranchers would prove to be bad for the native people. However, the granting of property to those who wished to settle was impossible to halt. The first land grants, in 1784, were given to veterans who wanted land in the Los Angeles area—Rancho San Pedro, Rancho San Rafael, and Rancho Santa Gertrudes (Robinson 1979).

In 1822, California became part of México, and between 1834 and 1836 the Mexican government secularized all 21 missions in the state, releasing much of the land held by the missions for private land grants and ranches. The mission lands were granted to Indians in some cases, but most of the land was given by the government to others. This resulted in political imbalance and a series of Indian uprisings against the Mexican rancheros. Many of the Luiseño and Ipai left the missions and ranchos and returned to their original village settlements (Cuero 1970).

Eventually, enormous tracts of land were granted to individuals throughout Southern California (Figure 7). The coastal land from San Francisco to San Diego was nearly all the property of the various ranchos, which ranged in size from 20 to 115,000 acres. The legacy of the old Spanish and Mexican land grants is still seen in modern times, as the ranchos are shown on maps as

Figure 7

unsectioned lands, outside the surveyor's normal methods of mapping and dividing property. There were 30 land grants in San Diego County alone!

When California became a U.S. territory in 1848 and achieved statehood in 1850, the Luiseño and Ipai were heavily recruited as laborers and experienced harsh treatment. Conflicts between Indians and encroaching Anglos finally led to the establishment of reservations for some villages. Other mission groups were displaced from their homes, moving to nearby towns or ranches. The reservation system interrupted the social organization and settlement patterns, yet many aspects of the original culture still persist today, including certain rituals and religious practices along with traditional games, songs, and dances.

2.3 Patterns of Human Landscape Alterations

Human inhabitants have long influenced the California landscape, whether through the fires they set or the cascading effects brought about by their hunting of large mammals. The mark of modern society, however, is notable for its scale as well as its stark permanence. Today's footprint of human land uses, including residential, commercial, and industrial development, road networks, and agriculture, have eliminated and severely fragmented landscapes and cultures in the South Coast Ecoregion, particularly in the coastal plain (Figure 3). The scale and scope of this impact is staggering—the human footprint in the greater Los Angeles area has effectively bisected the lower elevations of the ecoregion, and major road networks threaten the connectivity of even the higher elevation landscapes.

Fragmentation of natural habitat poses one of the greatest threats to conservation of biodiversity as well as to cultural resources and legacies. While direct impacts are responsible for the loss of resources, indirect effects are far more insidious, ranging from degradation of natural ecosystems and vandalism of cultural sites to fragmentation of the environment and the context for interpreting cultural histories. Significant advances in the science of conservation biology and the understanding of its direct and indirect adverse effects on native biota, especially as a result of habitat fragmentation, have come from pioneering research conducted in San Diego County. The effects of fragmentation on cultural resources are less well studied, but equally as destructive—particularly in our ability to understand early human uses and management of native habitats, interpret the scale and sequencing of events, and determine the relationships between different groups of people, i.e., the original context or environment of their habitation.

In this chapter, we focus on two metrics—roadlessness and ecological integrity—to further characterize areas of human modification and, conversely, areas of relatively undisturbed landscapes. Because of the physical separation of the northern and southern halves of the South Coast Ecoregion, we focus our analyses on the southern half of the ecoregion, i.e., Riverside, Orange, and San Diego counties, which we refer to as the *region*. The remaining area of natural habitat in this region varies with respect to degree of fragmentation, patch size, and the nature of adjacent land uses, all of which affect their resource values, ecological functions, and our ability to interpret prehistoric and historic land uses.

2.3.1 Roads and Roadless Areas

Roads fragment natural ecosystems (Reed et al. 1996) and provide human access to areas for logging, mining, agriculture, and development, leading to additional loss of habitat and degradation of ecosystem integrity. Roads have broad geographic impacts, such as serving as sources of air and water pollution, altering hydrologic patterns, disrupting migration patterns, facilitating human intrusion, providing corridors for nonnative species invasions, and causing direct mortality via road kill (Spellerberg 1998, Strittholt et al. 2000, Beier 1995, Trombulak and Frissell 2000, Jones et al. 2000, Czech et al. 2001, Paul and Meyer 2001). Thus, roadless areas have been identified by conservationists as targets because they retain many of the species and natural resource functions critical for maintaining regional biodiversity values (Strittholt et al. 2000). Large roadless areas have the potential to support ecological processes that operate at large scales and the species that depend on these processes. Therefore, the distribution and size of roadless areas can provide a meaningful characterization of regional resource values.

An analysis of the distribution of three size classes of roadless areas shows that the region supports a relatively low proportion of roadless areas and even fewer large roadless areas (Figure 8). Roadless areas are virtually absent near the coast, except for parts of Camp Pendleton and the Santa Ana Mountains. The largest roadless areas, those greater than 10,000 acres, are generally restricted to steep and mountainous terrain and designated wilderness areas, such as the Agua Tibia Wilderness Area, Palomar Mountain, the upper San Diego River gorge, Volcan Mountains, Otay Mountain Wilderness Area, Pine Valley and Hauser wilderness areas, and much of the eastern escarpment of the Peninsular Ranges. Rancho Guejito stands out in that it is part of a very large, relatively low-elevation roadless area in excess of 10,000 acres and is separated from adjacent roadless areas by single, one or two-lane roads.

2.3.2 Ecological Integrity

Human modifications of the landscape are the largest threats to integrity of landscapes, natural resources, and ecosystem function in this region. We used the distribution of urbanization, agriculture, and roads, as a measure of human modifications of the regional landscape, to characterize the integrity of aquatic and terrestrial systems in the region, with integrity being inversely related to the degree of human modification (Appendix A).

Watershed integrity

Watershed basins are good units for conservation analyses because they integrate conditions over relatively large areas and support geographically distinct ecological processes, depending on their position in the landscape. For example, headwater basins differ from higher order stream basins with respect to their natural flow regimes, nutrient processing functions, and sediment dynamics. Human alterations of the landscape adversely affect a variety of ecological processes, but land cover changes (e.g., loss of natural vegetative cover and increases in impervious surface cover), construction of dams, and diversion and impounding of stream flow specifically affect watershed processes, such as natural flow regimes and sediment dynamics. We measured watershed integrity using watershed subbasins (hydrologic subareas) as the analytical unit

Figure 8

(Figure 9). In this analysis, the area of land cover change was calculated for each watershed subbasin and ranked, with higher integrity basins having lower levels of land cover change. Most of the basins in the developed, coastal portion of the region have low integrity, whereas Rancho Guejito still has quite high integrity. It is, in fact, one of the westernmost high integrity watershed basins in the county.

Terrestrial integrity

We measured terrestrial integrity using 574-acre grids (5,000 ft on a side) as the unit of measurement (Figure 10, Appendix A). Within the Southern California Coast section, areas of high terrestrial integrity are apparent at the Otay-Sweetwater National Wildlife Refuge, Marine Corps Air Station (MCAS) Miramar, Marine Corps Base (MCB) Camp Pendleton and adjacent Rancho Mission Viejo, portions of the Santa Ana Mountains, and Central-Coastal portion of the Nature Reserve of Orange County. Within the Southern California Mountains and Valleys section, high integrity areas are largely confined to mountainous areas, e.g., those within the Palomar-Cuyamaca Peak subsection, except for several areas within the Western Granitic Foothills subsection.

Within the Western Granitic Foothills, the ecological integrity of the landscape already has been compromised as a result of development and agriculture in the vicinity of Alpine, Ramona, Escondido, and Valley Center. Residential and agricultural development from Poway to Ramona and east to Santa Ysabel along SR-78, and El Cajon to Alpine along I-8, have essentially created three separate blocks of the remaining high integrity habitat within the Western Granitic Foothills subsection (Figure 10). Rancho Guejito represents a large proportion of the northern habitat block within the subsection, which extends from the Santa Ysabel Valley to the eastern edge of Valley Center, and includes existing conservation areas in the San Pasqual Valley, Boden Canyon, Santa Ysabel Ranch West, Hellhole Canyon, and National Forest land surrounding Pamo Valley.

2.4 Patterns of Regional Conservation

The status of natural resource conservation is constantly changing, as more land is developed, more land is conserved, and as more resources are uncovered and relationships are investigated. Although both biological and cultural resources share the same landscapes, and their histories are interwoven, we have far more information on biological resources than we do for cultural resources, which often remain buried or are vandalized, unless there are focused efforts to characterize and protect them. As our understanding of natural systems and conservation biology has grown in recent decades, biologists and planners have developed principles and metrics for interpreting the status of our efforts. Gap analysis, for example, provides a rigorous means of using surrogates to quantify representation of biological systems in the matrix of an area's public and private lands. We have begun to estimate the sizes of landscapes required for ecological processes to function. However, there are no equivalent metrics or analyses established for cultural resources data, in part because the magnitude of their loss is too great, the gaps in data too wide, and, perhaps more importantly, the context for interpretation is missing, as a result of the fragmentation and degradation of the original landscapes.

Figure 9

Figure 10

2.4.1 Cultural Resources

Prehistoric heritage

As described in Chapter 2.2, early cultures of native people in Southern California were complex and varied across the landscape through many centuries. While fragments of these complex settlement and activity systems have been identified, many of these resources have been lost forever. Conservation and investigation of resources have been opportunistic, rather than systematic, as a result of development processes and patterns throughout Southern California.

Resources in the coastal areas were the first to be destroyed. Highways, cities, bay dredging, river management, and urban development have destroyed or forever buried these cultural sites. Of all the coastal Indian villages in San Diego County that were known in the early 1900s, none remain intact, and only limited archaeological information about these sites is preserved. An exception is on Camp Pendleton, the last remaining large area where coastal archaeological sites have been saved. Thus, our understanding of maritime and marine resource exploitation, and use of coastal wetlands, is poorly understood.

Remains of the oak/grassland settlement pattern are also becoming increasingly rare as a result of expanding development in Jamul, La Mesa, Santee, El Cajon, Poway, Ramona, Escondido, Valley Center, San Marcos, Vista, Bonsall, Temecula, and western Riverside County. These areas have also been the most heavily impacted by agriculture. There are no large areas of conserved land representing this settlement system that are not impacted by roads, development, agriculture, and utilities. Archaeologists are currently working to understand the importance of Indian management of grasslands and chaparral vegetation within this settlement pattern and to identify evidence for their use archaeologically. Given the extent and rapid pace of development, it is almost too late.

The mountain and desert settlement patterns are relatively well preserved. The Cleveland National Forest, Cuyamaca Rancho State Park, and Anza-Borrego Desert State Park have conserved many archaeological sites representing this pattern. Yet, even these areas have never been completely inventoried for cultural resources—so archaeologists don't know exactly what has been saved. For example, archaeologists have recorded 4,261 sites in Anza-Borrego Desert State Park, but this represents only a very small sample of the entire 600,000-acre park.

The Society for California Archaeology estimated in 1973 that 1,400 sites per year were being lost to development within the State of California. It is likely that over 50,000 additional sites have been destroyed since that study (Sampson and Hector 2005). At the same time, the population of the state continues to increase—Los Angeles, Riverside, San Bernardino, and San Diego counties account for over half of all growth in California. Cultural resources are generally not preserved in areas where development occurs, and those individual sites that may end up in undeveloped or open space areas have lost their cultural context through fragmentation and isolation.

Historic legacies

While the Spanish missions have been preserved and incorporated into California's cultural heritage, the original land grants, ranchos, and the cultures they represent have not. Because the ranchos were located in the coastal and foothill areas, most were divided up, sold, and developed as the population of California grew during the late 1800s. Other ranchos, like San José del Valle, Cuyamaca, and Valle de San Felipe, are mostly undeveloped, but major highways bisect them, and their boundaries have been broken. Rancho Santa Margarita is the home of MCB Camp Pendleton. The military has limited development on this land, but its activities and construction projects have altered the land's condition. Other land grants in Orange and Los Angeles counties are unrecognizable due to development and urbanization. Rancho Guejito is the last undivided, undeveloped land grant in Southern California.

What happened to the ranch houses on these tracts of land? Did every rancho have a ranch house? These adobe structures, if not maintained, have crumbled into dust. In San Diego County, vestiges of less than a dozen of at least 30 known ranchos remain (Table 3). Only two original adobe ranch houses are open to the public, and the land grants—Los Peñasquitos and Guajome—have been fragmented over time and surrounded by development; thus, they have lost their cultural context. The other standing ranch houses are either privately owned or owned by agencies that have not opened them to the public.

2.4.2 Ecological Resources

In this chapter, we describe the status of ecological resource conservation using three different, but related approaches: (1) *gap analysis*, a spatially explicit determination of gaps in protection of specific resources, (2) *connectivity* evaluations, based on the configuration of conserved landscapes, and (3) *core area* identification, defining the size and other parameters necessary to support wildlife movement and natural ecological processes, such as fire and hydrologic regimes.

Gap analysis

The aim of natural resources conservation efforts is to protect biodiversity at all levels—ecosystems, biological communities, and genetically distinct taxa. Therefore, conservation efforts must capture a sufficient proportion of all resource types to adequately protect regional biodiversity. Gap analysis (Scott et al. 1993) is a coarse-filter approach for prioritizing conservation efforts—it examines the regional ownership, levels of protection, and management patterns, by vegetation communities and other indicators of regional biodiversity, to identify gaps in their protection, i.e., identify resources that are under-represented in protected areas.

Because the Gap program designations are not current for our study region, we used a combination of land ownership, land use, and land management information to identify three general categories of protected and public lands specifically managed for natural resources values (Figure 11):

Table 3. Status of adobe ranch houses on land grants in San Diego County.

Rancho	Ranch House	Status
Agua Hedionda	Several	Marron adobe in the family; Kelly adobe in the family; others exist as archaeological sites only
Buena Vista	1	Extensively modified, owned by City of Vista
Cañada de los Coches	1	No trace
Cañada de San Vicente	1	No trace
Cuca	1	No trace
Cuyamaca	0	
El Cajón	2	No trace
El Rincón del Diablo	1	No trace, archaeological site only
Guajome	1	Restored to original, owned by County of San Diego
Guejito	*1 plus outbuildings; Maxcy Ranch also*	*In ruins, restoration needed for all*
Jamacha	1	No trace
Jamul	2	Original destroyed, replacement modified and occupied by Daley family
Janal	1 possible	No trace
La Nación	1 possible	Extensively modified, or may be destroyed
La Punta and Melijo	1	No trace; under Interstate-5
Las Encinitas	1 or more	No trace, archaeological site only
Los Peñasquitos	2 19^{th} century	1 melted; 1 restored, owned by the County of San Diego
Los Vallecitos de San Marcos	0	
Misión San Diego	1 plus outbuildings	Mission complex (largely reconstructed) owned by the Church
Monserrate	1	Restored extensively, privately owned
Otay	1 possible	No trace
Pauma	1	Still standing, modified; privately owned
Peninsula de San Diego	0	
San Bernardo	1	Destroyed; location of Kit Carson Park
San Dieguito	1	Extensively modified and privately owned
San Felipe	0	
San José del Valle	Several	Warner's Ranch House is in ruins, restoration is planned; one (Cupa) is preserved at Warner's Resort as a guesthouse
Santa Margarita y las Flores		Las Flores asistencia still standing, ranch house extensively modified; both on Camp Pendleton
Santa María	3	One still standing in Ramona, extensively modified
Santa Ysabel	0	Original chapel is gone
Valle de San José	0	

Sources: Moyer 1969, Rush 1965.

Figure 11

-

Wilderness areas and biological reserves—known wilderness areas and areas known to be managed as Gap-1 lands (e.g., Santa Rosa Plateau, Santa Margarita Ecological Reserve, Otay Mountain Wilderness Area).

- Local, state, and federal conservation areas—state parks, state and local government-owned land conserved and managed as part of NCCP and Habitat Conservation Plan programs, and national wildlife refuges managed as Gap-2 lands (e.g., Palomar Mountain State Park, Crestridge Ecological Reserve, Ramona Grasslands, Otay-Sweetwater National Wildlife Refuge).
- Bureau of Land Management (BLM) and U.S. Forest Service lands—federally-administered multiple-use lands that are managed as Gap-3 lands (e.g., Cleveland National Forest and all other National Forests and BLM lands except Wilderness Areas).

Collectively these categories are equivalent to Gap categories 1, 2, and 3 of Scott et al. (1993) and management levels 1 and 2 of Davis et al. (1995). We define *conserved areas* as all land within any of these three protected/public land categories (Figure 11).

We examined patterns of resource conservation in the region, with a focus on vegetation communities in the Western Granitic Foothills and Palomar-Cuyamaca Peak subsections. The subsections are useful and meaningful stratification units for this analysis because they each represent unique assemblages of geologic, climatic, and ecological attributes. Because biological diversity correlates with environmental gradients, effective biodiversity conservation is dependent on the representation of such gradients in conservation reserve networks.

Conservation practitioners have derived conservation goals for coarse-filter targets such as vegetation communities in different ways with different results. For example, goal-setting approaches that use species-area relationships indicate that conservation of 30-40% of a continental area will conserve 80-90% of the species that occur in the area (Groves 2003). The Nature Conservancy has used goals ranging from 20-30% of the historic distributions of conservation targets in ecoregional planning assessments (Nachlinger et al. 2001), and Groves (2003) suggests that conservation goals in the 30-40% range should be adequate to conserve most species in the face of habitat fragmentation. For the purposes of this regional assessment, we defined under-protected resources as those where less than 40% of their *current* distribution is protected within conserved areas, looking both within the region as a whole and the two biogeographic subsections of interest (Appendix A), which is consistent with other conservation targets used in the region (Davis et al. 1995, CBI et al. 2004).

The conservation status of all vegetation alliances in the region is provided in Appendix C. Table 4 shows those vegetation alliances that are under-protected in the region. These include grasslands, various scrub alliances (particularly coastal scrub), three chaparral alliances (northern mixed chaparral is fairly well protected), wet meadow associations, several riparian associations, oak and walnut woodlands, and Coulter pine and white fir forests. The regional patterns of protection are generally mirrored by vegetation alliances in the Palomar-Cuyamaca ecological subsection, except that levels of protection of buckwheat and California sagebrush alliances in the Palomar-Cuyamaca subsection are above the 40% target goal. However, the level of

Table 4. Analysis of vegetation community representation in protected areas in the region and two subsections.

	REGION			WESTERN GRANITIC FOOTHILLS			PALOMAR-CUYAMACA PEAK		
Native Vegetation (>1,000 acres)	**Vegetation (acres)**	**Protected (acres)**	**% Protected**	**Subsection (acres)**	**Protected (acres)**	**% Protected**	**Subsection (acres)**	**Protected (acres)**	**% Protected**
Grasslands									
Annual Grassland	285,690	61,697	22%	32,876	2,770	8%	24,633	6,266	25%
Perennial Grassland	59,986	3,915	7%	4,295	187	4%	22,046	2,692	12%
Total Grasslands	345,676	65,612	19%	37,171	2,957	8%	46,679	8,958	19%
Scrubs									
Alluvial Fan Sage Scrub	2,007	508	25%	677	69	10%	120	0	0%
Basin Sagebrush	14,843	2,764	19%	15	0	0%	2,624	733	28%
California Sagebrush	366,691	121,178	33%	86,800	29,274	34%	3,507	1,440	41%
Buckwheat (White Sage)	127,682	44,959	35%	7,062	2,488	35%	7,935	3,572	45%
Coastal Cactus	3,771	1,437	38%	-	-	-	-	-	-
Coastal Scrub	25,472	1,409	6%	-	-	-	-	-	-
Desert Buckwheat	3,327	1,324	40%	202	1	1%	1,738	286	16%
Saltbush	2,440	805	33%	-	-	-	-	-	-
Total Scrubs	546,234	174,383	32%	94,757	31,833	34%	15,924	6,030	38%
Chaparrals									
Chamise-Redshank Chaparral	31,937	7,927	25%	-	-	-	-	-	-
Northern Mixed Chaparral	854,534	459,742	54%	197,521	77,311	39%	236,725	136,576	58%
Soft Scrub-Chaparral	9,000	2,457	27%	-	-	-	-	-	-
Total Chaparrals	895,471	470,126	53%	197,521	77,311	39%	236,725	136,576	58%
Wet Meadows/Marsh									
Tule - Cattail - Sedge	3,632	969	27%	149	119	80%	953	7	1%
Wet Meadow	7,020	694	10%	168	0	0%	4,686	338	7%
Total Meadows/Marsh	10,652	1,663	16%	317	119	38%	5,639	345	6%
Riparian									
Baccharis (riparian)	2,205	397	18%	702	91	13%	-	-	-
California Sycamore	3,662	1,611	44%	168	18	11%	21	8	39%
Montane Riparian	1,837	96	5%	-	-	-	-	-	-
Mixed Riparian Hardwoods	10,685	3,711	35%	2,412	560	23%	1,130	448	40%
Willow	17,233	4,771	28%	1,517	574	38%	983	131	13%
Total Riparian	35,623	10,587	30%	4,799	1,243	26%	2,134	587	28%

Table 4. Analysis of vegetation community representation in protected areas in the region and two subsections.

	REGION			WESTERN GRANITIC FOOTHILLS			PALOMAR-CUYAMACA PEAK		
Native Vegetation (>1,000 acres)	**Vegetation (acres)**	**Protected (acres)**	**% Protected**	**Subsection (acres)**	**Protected (acres)**	**% Protected**	**Subsection (acres)**	**Protected (acres)**	**% Protected**
Oak Woodlands									
Black Walnut	3,757	1,240	33%	-	-	-	-	-	-
California Black Oak	11,287	5,428	48%	61	0	0%	8,260	2,717	33%
Coast Live Oak	97,887	29,268	30%	31,553	6,855	22%	31,386	9,500	30%
Engelmann Oak	20,326	3,789	19%	10,695	1,839	17%	5,811	814	14%
Mixed Hardwoods	7,525	1,733	23%	758	451	59%	6,661	1,275	19%
Total Oak Woodlands	140,782	41,458	29%	43,068	9,145	24%	52,119	14,307	27%
Conifer Forests									
White Fir	3,297	1,199	36%	-	-	-	2,863	763	27%
Coulter Pine	26,458	8,947	34%	267	118	44%	23,462	6,683	28%
Total Conifer Forests	29,755	10,146	34%	267	118	44%	-	-	-

Source: CALVEG, FRAP 2003.

protection for many vegetation alliances within the Western Granitic Foothills subsection is low relative to that within the region as a whole. Grasslands, northern mixed chaparral, mixed riparian hardwoods, coast live oaks (*Quercus agrifolia*), and Engelmann oaks are less protected in the Western Granitic Foothills subsection than in the region as a whole.

Given their relatively limited distributions in the region and lack of protection within both the region and the Western Granitic Foothills subsection, grasslands (8% of 37,171 acres conserved), coast live oak woodlands (22% of 31,553 acres conserved), and Engelmann oak woodlands (17% of 10,695 acres conserved) are notably under-protected. These vegetation associations, and the diversity of species they support, should be high priority targets for regional conservation actions.

Connectivity analysis

The gap analysis illuminates representation. As essential in a conservation network is the configuration of the representative lands and waters, so that they can be managed for long-term viability. Federal, state, and local governments and private institutions have made significant conservation investments in the region, with over 1.9 million acres of natural areas in public or protected lands (Figure 11). The long-term value of these existing conservation investments relies on maintaining the lands' integrity and natural ecosystem functions by buffering them from habitat loss and degradation and maintaining connections to other intact areas. Although an explicit, regional connectivity analysis was not conducted, the myriad analyses that we present in this document address, either implicitly or explicitly, issues of connectivity and its role in retaining the function and integrity of existing conservation investments.

Core area analysis

Core areas are *areas where conservation of biodiversity, ecological integrity, wilderness, or similar values takes precedence over other values and uses* (Noss et al. 1999). Determining the size and locations of biological core areas has been the subject of much research and debate (Pressey et al. 1993, Noss et al. 1997, Soulé and Terborgh 1999, Groves et al. 2000, 2002; Noss 2002, Groves 2003, Margules and Pressey 2000, Carroll et al. 2001). For example, Noss et al. (1999) suggest three criteria to define core areas: vegetation representation, special elements, and focal species. We have discussed Rancho Guejito in the context of its contribution to vegetation representation, and we will discuss special elements and focal species in Chapter 3.2.2. In this chapter, we focus on the size of core biological areas and how Rancho Guejito contributes to core habitat functions.

While core biological areas must capture biodiversity targets and conservation values, they must also be viable over the long term to retain these targets and values. Thus, core biological areas must consist of functional landscapes spanning ecological gradients. To assess the size of core biological areas, we discuss two components of functional landscapes:

- Ecological disturbance processes and the minimum dynamic area necessary to support these processes; and

- Habitat needed to support minimum viable populations of large-area dependent species.

Ecological disturbance processes

Disturbance processes such as fire and floods operate across large landscapes and produce and maintain mosaics of habitat patches of varying ages, structures, and species composition. Habitat reserves should be large enough to minimize local extinction probabilities and maintain sources of species that can recolonize reserve areas following disturbance events. This size has been termed the *minimum dynamic area* (Pickett and Thompson 1978). Estimates have ranged from 50 times the mean disturbance area (Shugart and West 1981), to the maximum disturbance area expected over a 500-1,000-year period (Peters et al. 1997), to four times the largest disturbance area (Anderson 1999). While there is no consensus on determining minimum dynamic area (Groves 2003), all of these estimates are consistent with the idea that the minimum dynamic area must be specific to the disturbance regimes characteristic of particular biogeographic regions and must provide species refugia within habitat reserves in the face of infrequent, large-scale disturbances.

As wildfires represent the largest disturbance event in the South Coast Ecoregion, we assessed the size distribution of recorded fires (1900 to present) in Orange, Riverside, and San Diego counties as one measure of minimum dynamic area for the region (Table 5). The mean fire size over this period is 2,121 acres, and the maximum size recorded in the region was the 270,673-acre Cedar fire in 2003. Paleoecological data indicate that massive wildfires such as this have occurred in the South Coast Ecoregion several times per century over the last 560 years (Mensing et al. 1999 in Keeley and Fotheringham 2001).

Table 5. Size frequency distribution of recorded fires in Orange, Riverside, and San Diego counties from 1900-2004.

Fire Size (acres)	Frequency	Cumulative %
0 – 10	35	1.44%
11 – 50	235	11.11%
51 – 100	293	23.16%
101 – 500	906	60.43%
501 – 1,000	323	73.71%
1,001 – 5,000	443	91.94%
5,001 – 10,000	97	95.93%
10,001 – 50,000	81	99.26%
50,001 – 100,000	16	99.92%
100,001 – 500,000*	2	100.00%

* The two largest recorded fires in the region were the 2003 Cedar fire (270,673 acres) and the1970 Laguna Mountains fire (174,162 acres).

Shugart and West's (1981) minimum dynamic area recommendation of 50 times the mean disturbance area, in this case mean fire size, yields a minimum dynamic area of 106,000 acres. This size would accommodate 99.9% of the fires recorded in the region, but would be inadequate to provide refugia for many species in the face of the largest recorded fires. Using recommendations for minimum dynamic area based on maximum fire disturbance events (Baker 1992, Peters et al. 1997, Anderson 1999), the minimum dynamic area for the region would range from 270,000 to over 1,000,000 acres.

Large-area dependent species

The sizes of habitat blocks required to support viable populations of species with the largest home range requirements—referred to as large-area dependent species, such as mountain lions, anadromous fish, and many raptors—can be used to determine the size of conservation areas. The mountain lion is an especially good target species because it is wide-ranging in areas of intact habitat and, as a top predator, controls the structure of biological communities through top-down density regulation of prey species populations. Mountain lions in the Santa Ana Mountains have home ranges of over 100,000 acres (Beier and Barrett 1993). Beier (1993) simulated population dynamics of mountain lions and determined that an area of about 250,000 to 500,000 acres is required to support a viable population of 15 to 20 individual lions. If there is significant immigration of individuals, an area as small as 150,000 to 400,000 acres can support a viable population, but this assumes that safe wildlife movement corridors are available. Mountain lions are commonly killed crossing highways, and major highways separate large blocks of habitat in the region.

Summary

Considering these two metrics, a conservation area large enough to accommodate the natural disturbance regimes caused by wildfires and to maintain viable populations of mountain lions must be a minimum of about 300,000 to 400,000 acres and must be sufficiently linked to adjacent habitat blocks to allow immigration of individual mountain lions. There are very few patches of habitat of this size remaining in the region, particularly the western portion of the region. They have been virtually eliminated from the Southern California Coast section and Western Granitic Foothills subsection and are generally restricted to higher elevation areas in public ownership. Rancho Guejito is part of a 215,000-acre block of intact habitat, making it one of the few areas in the western half of San Diego County with a potential to support ecosystem functions within the natural range of variability. It retains significant connectivity to blocks of intact habitats associated with the Volcan Mountains and Hot Springs–Bucksnort–Beauty Mountains to the east, thereby increasing its importance to maintaining ecoregional landscape-scale processes. Lying at the westernmost portion of this habitat block, Rancho Guejito also serves as a demographic source for some species in smaller, less intact habitat fragments to the west, which is crucial for the long-term viability of coastal NCCP reserves.

3. CONSERVATION VALUES OF RANCHO GUEJITO

The cultural and biological resources of Rancho Guejito are representative of the original native cultures and communities that inhabited the hills and valleys of the area for thousands of years. This area was not touched directly by the Spanish and Mexican settlement of the San Diego backcountry, as the route traveled north by the padres in the early 1800s—Pamo to Santa Ysabel to Pala—bypassed the area (Figure 7). Because Rancho Guejito was not a missionary travel corridor, the ancient cultures there, and the resources they depended upon, have been preserved to a remarkable degree. The Guejito Valley may have been regarded as a refuge or safe haven from the missionaries. The archaeological sites have been left as they were when finally abandoned, and the biological communities remain generally intact since its days as a rancho. Further protection of the valley has been provided by the ranchers and land owners who have guarded their privacy and stewarded the land's precious resources.

3.1 Cultural Values

Four major eras are represented on Rancho Guejito: Indian, Spanish, Mexican, and the post-statehood period of California. The evidence of these eras is interwoven on the property as a rich continuum of cultural change, from the prehistoric to historic periods. The remarkable density and complexity of prehistoric and historic sites, and the state of their preservation, provide significant research and interpretive opportunities, as well as a captivating story of our past.

3.1.1 Importance of Rancho Guejito to Southern California Indigenous Cultures

Many culturally important areas in the vicinity of Rancho Guejito were traditionally recognized by the Ipai and Luiseño, and these locations continue to be held as traditional or sacred today. However, modern Luiseño Indians have limited knowledge of the Guejito area between the San Dieguito and San Luis Rey rivers, because the area is thought to be forbidden. It is possible that the story forbidding entry into the Guejito area has its source in the territorial conflicts that must have occurred between the Ipai and the Luiseño. Perhaps the Ipai finally claimed the area as their own, and the Luiseño were not allowed to enter, giving rise to its culturally forbidden status.

Wee'to or *Weyeto* is the Luiseño name for Pine Mountain, the highest peak on Rancho Guejito. *Wee'tut* is the Luiseño name for the Coulter pine (DuBois 1908), a stand of which occurs on Pine Mountain. Rancho Guejito took its name from this prominent, and spiritually powerful, natural feature. *Naavo Waheto* refers to the hills south of the San Luis Rey River, and *Weyeto* was one of the First People who became mountains and was regarded as having power. Rock art has been recorded on Pine Mountain, and there may have been—and may still be—shrines or other markers, such as rock piles or platforms, associated with the mountain (Bean 1976, Hudson and Underhay 1978).

Luiseño tradition holds that the hills south of Rincon, extending into Rancho Guejito, are where *Takwich* came down. *Takwich*, also known as *Chaup*, was a mortal shaman whose immortal physical presence is a meteor, and he is seen as ball lightning. *Takwich* is a spirit—sometimes he is called the devil (Laylander 2004). His association with the Judeo-Christian concept of the devil is from the influence of the missions. *Takwich's* principal house was near Tahquitz Peak in the San Jacinto Mountains; this is where he ate his victims (Beemer 1980, Boscana 1978). Luiseño informants told Eleanor Beemer that he ground up the bones of his victims on Palomar Mountain and other local high places (Beemer 1980). *Takwich* uses high points, caves, and cliffs as stopping places; both Pine Mountain and Rodriguez Mountain may have been regarded as his domain. To many Indians, including the Ipai and Luiseño, *Takwich* is a guardian spirit and a source of power.

The Luiseño name for the steep western cliffs of Rodriguez Mountain that extend south into Rancho Guejito is *Pu'chordival*. Nestling eagles were collected from this cliff for the eagle sacrifice (Beemer 1980). Possession of eagle nests was hereditary among the Luiseño (DuBois 1908), and it is likely that a clan claims this area as its traditional lands.

In addition to Ipai and Luiseño Indians, the area also was occupied by Kumeyaay Indians. Eighty-one Kumeyaay Indians from the San Diego mission were settled at the San Pasqual Indian pueblo after secularization of the missions in 1834 (Farris 1997). The Indians practiced agriculture and ranching on their pueblo lands. During the Mexican-American War, the Indians moved temporarily into the Guejito area during the Battle of San Pasqual, while rendering assistance to General Kearny and his troops during the battle (Farris 1997). Over time, portions of the pueblo lands were settled by non-Indians, and in 1878 the San Pasqual Indians were permanently expelled from their pueblo, and their homes and buildings were demolished. Only the cemetery and the ruins of their chapel remained. Today, the San Pasqual Indian Reservation is located north of Rancho Guejito.

Areas of cultural significance

It is extremely rare in California to find an entire settlement complex of villages that can be preserved undisturbed in its entirety in an intact natural landscape that also still supports the natural resources used and managed by the traditional cultures. With research and field surveys on Rancho Guejito, it may be possible to reconstruct the settlement pattern of the region.

Much of the archaeological information about the vicinity of Rancho Guejito comes from sites known to be on the Luiseño Indian reservations (La Jolla, Cuca, Rincon, and Pauma) along the San Luis Rey River to the north. Several large sites have also been recorded along the San Dieguito River to the south. Surveys have been conducted in nearby Boden Canyon and Pamo Valley (Cardenas and Cook 1984, WESTEC 1988), but the area south of Rancho Guejito has not been as completely studied as the northern boundary.

Areas of cultural significance are scattered across the entire Rancho Guejito property, from the valleys, to the chaparral ridges, to the sacred peak *Weyeto* (Figure 12, Appendix B). Only a small portion of Rancho Guejito, approximately 5%, has been surveyed for cultural resources.

Figure 12

Yet 87 archaeological sites have been identified or recorded with the State of California (Figure 12, Appendix B); some of these are described briefly below. Based on this sample, many more are expected on the property, a trove of undiscovered vestiges of the past.

Ethnographic villages

Rancho Guejito may be the location of two ethnographic villages—*Shakishmai* and *Naa'av*. The term *ethnographic village* is used by archaeologists to refer to a location that was occupied by traditional people at the time they were contacted by Europeans or other historic-era groups. These locations are of particular interest for research because of several reasons. First, they represent the final stage of pre-contact development of a people, before they were exposed to nonnative technology, material items, and culture. Second, they may have a name recorded in the historic record. This name may have been used by missionaries, ethnographers, explorers, or government agencies to record information about the people of the village at the time of contact. This information can be critical in understanding settlement patterns, land use, and movement of populations. For example, a court case may state that the entire population of Village X left each fall to go into the mountains for acorn harvesting and did not return until early winter. By then studying Village X, archaeologists can understand seasonal migrations, artifacts associated with these migrations, and other important research topics. The results can then be applied to other, similar sites that do not have this kind of direct evidence.

The remains of structures that were built at village sites are reported in the archaeological record as stone foundations and circles. *Shakishmai*, located on the old Maxcy Ranch, was most likely occupied by the Ipai during the early historic period. The precise location of this major village has not been identified (Kroeber 1970, Sparkman 1908). Discovery of its location would be an important contribution to regional prehistory and history, as most named villages occupied during the early contact period when non-Indians were entering the region have been destroyed.

Upper Rockwood Canyon likely contains many large prehistoric villages, as the resource base is quite rich, consisting of oak woodlands and forests, chaparral, and wetland/riparian areas. The village of *Puk-ke-dudl*, located on the east slope of Rockwood Canyon (Peet 1949), belonged to the Kumeyaay who came to the area from the coast during the latter part of the Late Prehistoric period (the prehistoric people in this area were the Ipai). Other village sites, and associated resource exploitation and seed processing sites on Rancho Guejito, are known from East Valley, West Valley, and Guejito Creek after it leaves the broad valley floor (Figure 12).

Upper Guejito Valley District

This is the only part of Rancho Guejito that has been systematically surveyed for cultural resources. The extent, integrity, and condition of the Upper Guejito Valley archaeological district, which may be the location of the ethnographic village known as *Naa'av* (Oxendine 1983), are unparalleled. In an area of approximately 950 acres, 66 prehistoric sites, 1 historic site, and 31 isolated artifacts have been recorded—an unusually high density of archaeological sites. Of the 66 prehistoric sites, many have more than one locus (associated cultural area), making the actual total number of areas used much higher (Appendix B). There are 7 large villages composed of several activity loci, many smaller villages, seasonal campsites, seed processing stations (including seed processing stations at Adobe Flats, Chimney Flats, Sycamore Flats, and Long Valley; Figure 12), ceremonial areas (including rock art), and stone tool production areas containing projectile points, hearths, shell, and pottery in an undisturbed condition. Photos 1 and 2 show examples of these artifacts, which are very similar to those present on Rancho Guejito. There has been very little, if any, collecting or vandalism at Rancho Guejito, activities that have destroyed scientific evidence at most other Southern California sites.

Photo 1. Late Prehistoric tools (bifaces, projectile points, drill).

Photo 2. San Diego Indian pottery (Brownware).

The presence of pottery, an unusual trait for hunter-gatherers, differentiates the Indians of San Diego County from most other California Indians. A pottery source is likely present on Rancho Guejito. One site contained fragments of a pottery figurine, whose purpose is unclear, an extremely rare and significant find. These figurines may have functioned as dolls, or they may represent spirits (Van Camp 1979). Two of the sites were noted as containing Lower Colorado Buff Ware pottery, a pottery type found in desert sites (Hildebrand et al. 2002). The presence of desert pottery is further evidence that this site complex may have been associated with the Ipai people, who had cultural connections with the desert Yuman groups.

Burned bone and shell were found at many of the Upper Guejito Valley sites as well as at West Valley. It is very likely that these represent human cremations. The presence of human remains at Rancho Guejito greatly increases its traditional cultural significance.

Rock art and cupules

Rock art consisting of pictographs (paintings) and cupules (small dish-shaped cups ground into rock) is abundant on Rancho Guejito. Rock art designs represent one manifestation of an entire complex system of traditional symbolism. The same designs were used for pottery, baskets, sand paintings, and tattoos. Rock art sites are *power spots, where individuals, usually shamans [religious leaders] conducted ritual activity in order to draw upon supernatural power which was believed to be concentrated in certain individuals, objects, and places in the cosmos* (Hedges and Hamann 1999).

There are two different known functions of rock art—the Spirit Helper complex and the Vision Quest complex (Whitley 2000). The Spirit Helper complex is thought to be associated with girls' and perhaps boys' puberty rites. During their puberty ceremonies, girls and boys may enter an altered state of consciousness during which they gain access to the supernatural—a Spirit Helper to guide them through their lives. This is a public ceremony witnessed by the village. Luiseño girls went through elaborate ceremonies marking their entry into womanhood. At the conclusion of the ceremonies, the girls raced to a specific rock and painted certain designs on the rock. These designs may have been diamond-shaped, with linked diamonds called rattlesnake designs. Rock art scholars believe that many of these designs were conducted in haste; linked diamonds, daubed finger and hand prints, and less elaborate marks could be the result of a girl racing to a rock and marking it in haste.

In contrast, the activities of the shaman during his Vision Quest are held in secret. The shaman gains access to power and the supernatural and expresses his experiences through painting on rocks. Shamanic paintings are usually hidden away from the village, perhaps in rock shelters. For example, Malcolm Rogers of the Museum of Man noted a red pictograph, a feathered *S* approximately 24 in. long, near the base of Pine Mountain (Rogers unpublished notes). Another local landmark known as Painted Rock is located in a northwestern branch of Rockwood Canyon. It is a large boulder over 30 ft high and 20 ft across, with a pictograph of rectilinear designs, including linked diamonds (Peet 1949, Hedges 1973). This site was mentioned and described by native people living in San Pasqual Valley in the early 1900s (Peet 1949).

The style of pictographs found on Rancho Guejito conforms to the San Luis Rey style, consisting mostly of geometric rectilinear designs painted in red (Smith and Freers 1994, True 1954). Occasionally, animal and anthropomorphic (human) figures were painted, although human figures are rare (True 1954). A rock art site in Long Valley, shown to D.L. True by a Luiseño elder, Henry Rodriguez, includes anthropomorphic figures. Photo 3 shows an example of an anthropomorphic rock art element. This style is associated with the Late Prehistoric and Historic Luiseño populations, although the style extends into neighboring territories.

Photo 3. Anthropomorphic figures in rock art.

Photo 4. Bedrock mortars and cupules.

Cupules—small, cup-shaped depressions that are pecked or ground onto a horizontal or vertical rock face (Photo 4)—were noted at many of the recorded Late Prehistoric sites at Rancho Guejito. These forms are found all over the world. In Southern California, they typically occur at occupation sites that contain Late Prehistoric artifacts (Hedges 1981, Whitley 2000). Cupules were not made by shamans, but were related to religious beliefs and sometimes proposed to be associated with fertility (Hedges 1981). Cupules can occur with pictographs in rock shelters. Sometimes they have grooves or incising between them or linking them, or they can be patterned, possibly to represent constellations or other astronomical phenomena. Cupules may also be associated with ringing rocks, which are unusual rocks that make a bell tone when struck (Hedges 1981), and with milling sites (Photo 4).

These finds represent a fraction of the resources at Rancho Guejito and the questions they raise concerning the importance of this area to regional prehistory. For example:

- What connections, if any, did the Ipai people have with the desert Yuman groups?
- What was the purpose of the many rock rings and rock piles in Upper Guejito Valley? Were they the base of a shade structure or ramada for the person using the milling feature (as suggested by Tom Lucas, Kwaaymii Indian, in Kyle 1988)?
- Why do we find metate slick milling features along the margins of a large grassland area? Do these reflect a specialization in processing certain types of seeds or plants?
- Did the Ipai and Luiseño people co-exist? What was their relationship? How were they different? How did their territorial boundaries change over time?
- Why is the site density at Rancho Guejito so high? Was the population especially large, or does the density reflect different settlement patterns over a period of time?
- Was Rancho Guejito occupied only during the Late Prehistoric period? Was there earlier occupation of this area by other peoples?
- What was the source for pottery clay, obsidian, chert, and other artifacts? Does their origin indicate trade or travel?
- Is the rock art of Rancho Guejito more similar to Luiseño or Ipai styles? Are the cupules concentrated in one area? Are the cupules associated with living sites?
- Why and when did the Indians leave the property? Did they continue to occupy this area as a refuge?

Only by protecting the cultural resources of Rancho Guejito, within their original physical and natural resources context, will we ever learn the answers to these questions.

Traditional values and relationship to the natural environment

Traditional Southern California Indian culture was an *integration of philosophy, theology, customs, material items, and environment* (Oxendine 1980). The Luiseño and Ipai Indians treasured their culture and their way of life. The Ipai were described as *passionately devoted to the customs of their fathers* (Kroeber 1970). Even after modern roads and settlements were built on their tribal lands, they continued to gather acorns, hold ceremonies, and use traditional ways. The Indians remained in the mountains of San Diego for decades after the coastal population had been removed to missions or ranches.

The people were organized into large groups (referred to as *rancherías*), each having base camps and an extensive territory exploited for specific resources. Examples of baskets and pottery from the 19th and early 20th centuries indicate a high level of artistic achievement and craftsmanship. Coulter pine needles, such as those on *Weyeto*, were used in basketry (Hedges and Beresford 1986).

Many different types of stone material were used for manufacturing tools, and exotic types were procured from other parts of the region. Obsidian flakes and projectile points made from material obtained from Obsidian Butte, a late source located at the southern end of the Salton Sea, were also found on many of the Guejito sites. Studies of Obsidian Butte material indicate that this source was not available to prehistoric tool makers while there was water in ancient Lake Cahuilla, but as the lake level receded, this source was revealed. Obsidian hydration dates for the source range from AD 1200 to 1800 (Dominici 1984, Laylander 1997).

Archaeologists are currently working to understand the importance of Indian management of grasslands and chaparral vegetation and to identify evidence for their use archaeologically. Prehistoric people managed the landscape to produce plant products needed for their activities. For example, wetlands produced the rushes needed to weave baskets; deergrass and sumac were used for textile manufacturing. There is abundant evidence that traditional land management included clearing and burning and encouraging the growth of beneficial plants, as well as weeding and transplanting desired species (Anderson 2005a). Burning and land management by California's Indians were noted by the earliest explorers and continued into the historic period. For over 10,000 years, the Indians of Southern California perfected their adaptation to this dry climate and, at the same time, altered and modified the environment to support a relatively large population of hunters and gatherers.

3.1.2 Ranching and the Origins of a Rancho

Rancho Guejito contains an intact historical landscape representing the earliest ranching in Southern California. The historic features and sites remain intact and relatively untouched, and still within their original setting, providing a once-in-a-lifetime opportunity for research, education, and interpretation.

In 1845, after the Spanish had left California and it was under Mexican rule, Governor Manuel Micheltorena granted *Rancho Guejito y Cañada de Palomía* to Jose María Orozco, who ran cattle on the rancho. Three leagues, or 13,299 acres (see original rancho boundary in Figure 12), were granted to Orozco (California State Parks 1974, Moyer 1969, Rush 1965). The boundaries and open land granted over 150 years ago remain intact today—no other Southern California rancho can make that claim.

After the Mexican-American War, the rancho became the property of George W. Hamley. There were a number of other owners after Hamley, but Jean C. Cazaurang, a red-haired Frenchman, purchased the ranch in the late 1800s. Cazaurang made additions to the original (c. 1845) Orozco Adobe located along Guejito Creek, and used it as his residence. While Cazaurang liked the peace and quiet of the ranch, his wife preferred social life and entertaining, and the two separated. In 1929, the rancher was shot and killed during a fight with a Nevada cowboy. Unfortunately, the rancho land was heavily mortgaged, and his widow was left impoverished.

The rancho was purchased in 1939 by Charles L. Powell, a Los Angeles engineer. He continued the property's ranching history by stocking it with 2,000 head of cattle. Powell modernized the Cazaurang adobe by adding electrical service from a small plant. When Powell died in 1959, the rancho continued to be owned by his estate through the 1960s, although it was leased out for cattle grazing. At one time, George Sawday and Oliver Sexton, famous San Diego cattlemen, ran cattle on Rancho Guejito. In 1974, the property was purchased from Powell's estate by Benjamin Coates, Sr. and was put in the name of the Rodney Corp. in 1988. Coates died in early 2005 at the age of 86, but the ranch continues to be used for cattle grazing to this day.

The Orozco-Cazaurang Adobe has been left as it was when it collapsed. Other nearby ranch buildings include a blacksmith shop and a bunkhouse. Restoration of this adobe and associated structures would provide a rare opportunity to see an authentic 19th century rancho intact. Other historic buildings (c.1850s) within the current ownership were part of Maxcy Ranch (Figure 12). Asher E. Maxcy purchased 160 acres southeast of Rancho Guejito in 1852; he ran cattle but also planted a vineyard and made wine at a winery (c.1880). The upper part of the old winery was eventually used as a bunkhouse. Maxcy Ranch is shown at the southern tip of the Rancho Guejito grant boundary on an 1872 map of San Diego County. Eventually, Maxcy's ownership increased to 4,400 acres. The ranch included a small post office named Vineyard, which continued to operate from 1884 until 1922. It is believed that the Vineyard post office was located near a citrus grove on the old trail to Pamo (WESTEC 1988). The only people who received mail at the post office were those who lived on the Guejito, Maxcy, and Orozco ranches. For many years the mail was delivered to the Vineyard post office by horse and buggy from Escondido (Anonymous 1962).

The 1879 plat map for Township 12 South, Range 1 East shows a number of trails linking Rancho Guejito to other parts of the county. There is still a dirt road near Boden Canyon that is marked Guejito Road. Investigations of these historic features and sites would no doubt yield a fascinating story of the area's early commercial and social activities.

3.1.3 Disappearing Ranchos, Disappearing Cultures

After California statehood, the new government had to verify and prove old land grant claims. Many of the claims had been made in haste when the Mexicans saw that the battle for California was not going to be won, and others never were well documented. As a result, the government made some (presumably unverified) land grants and unclaimed areas available for settlement. To begin this process, California surveyed its new territory in the 1850s. Many 49ers gave up prospecting for gold and began looking at ranching and farming as a way of life. Southern California was seen by many of the new Californians as a paradise: ideal weather, water, plenty of land, and abundant wildlife. Although land was claimed by settlers prior to the 1870s, it was not until after the Civil War that San Diego was officially surveyed and divided into parcels. Cattle and sheep grazing, established during the Spanish period as part of the trade in hides and tallow, continued on many of the large tracts of land left from the land grant system, although some areas experienced a dramatic demand for more intensive residential development.

The pattern of purchasing the old land grants and dividing them up for sale was practiced throughout Southern California, with the result that most of the historic ranchos no longer exist as whole properties. Often, the land grant changed hands many times over the years following California statehood. At first, many owners kept the old land grants in one piece, or sold off parcels around the edges as land values increased. As demand for land increased during the 1880 boom years, large properties used for cattle ranching began to be confined to the east county away from major and growing population centers.

The towns of Ramona, Valley Center and Escondido were established as agricultural communities nestled in San Diego's backcountry. Both Escondido and Ramona were part of old land grants, which were broken apart. For example, the Rancho Rincon del Diablo was purchased by a land company in 1882 and developed into the town of Escondido (Ryan 1970). As San Diego's population grew, blacksmiths, clergymen, and merchants settled in to support the farmers and ranchers. There were few if any schools in the backcountry before the 1870s, as most settlements were too far apart for children to attend.

It is an increasingly rare sight to see cowboys herding cattle on a San Diego ranch. As populations grow, the regional economies shift to favor more urban than agricultural land uses. Rising land values, their associated taxes, and the dissolution of supporting regional infrastructure combine to create an unrelenting pressure to develop ranchlands. The historic ranching way of life in the county and throughout Southern California is being replaced by sprawl.

With the fragmenting of large ranches by development, multi-generational ties to the land are severed. As resources are lost, so too are agrarian values and the essential commitment they place on the long-term health of the land. The agrarian way of life has been *overpowered by a clever, market-driven industrial mentality that perceives no natural limits and treats land as mere raw material. …that victory has impoverished senses of place, practical skills, and indeed entire categories of thought rooted in ecological competence* (Orr 2001). More than losing sources of knowledge about managing the land in a sustainable fashion (Knight et al. 2002), we are losing the land management systems themselves—such as the option to use prescribed grazing as a habitat management tool—that will likely prove essential for the stewardship of the ecological integrity of backcountry reserves and resources. In fact, recent studies have documented that native plant and faunal biodiversity is better maintained on working ranches than on low density residential developments, which favor nonnative species and species adapted to human-altered environments (Maestas et al. 2001).

3.2 Ecological Values

Rancho Guejito lies within a broad valley in the foothills of the Peninsular Ranges. Elevations range from 1,800 ft on the valley floor to about 3,800 ft and 4,200 ft at the tops of Rodriguez and Pine mountains, respectively. Guejito Creek is an intermittent stream that flows south from the higher elevation areas north of the valley through Rockwood Canyon to Santa Ysabel Creek in San Pasqual Valley. Downstream of Rockwood Canyon, Santa Ysabel Creek becomes the San Dieguito River, which flows into Hodges Reservoir, a City of San Diego-owned drinking water reservoir. The north slopes of Pine and Rodriguez mountains drain north into the San Luis Rey River. Soils on Rancho Guejito range from well-drained sandy loams derived from granite and granodiorite to gabbro-derived loams with clayey subsoils on the higher elevation areas at the north end of the property. Annual rainfall varies from 18 to 25 in. along an elevational gradient.

3.2.1 Richness and Diversity of Vegetation Communities

Ranch Guejito supports a diverse assemblage of over 20 vegetation communities (Table 6, Figure 13; this discussion uses vegetation communities as mapped by the County of San Diego—SANDAG 1995—which varies slightly from those mapped by FRAP 2003). The property is dominated by chaparral communities, abundant woodlands of Engelmann and coast live oaks, and large expanses of grasslands. The property also supports a stand of Coulter pine forest on top of Pine Mountain, alkali meadow in the upper valley, stream and pond aquatic habitats, vernal pools, several riparian and wetland communities, and coastal sage scrub communities, which are contiguous with coastal sage scrub in the San Pasqual Valley.

Alkali meadow, vernal pool, and Coulter pine forest communities represent biogeographically significant habitats in San Diego County. Alkali meadows are extremely rare in San Diego County, and the upper valley of Rancho Guejito supports over 27 acres of this habitat, 20% of the total alkali meadows mapped in San Diego County. Vernal pools are naturally rare and have been significantly reduced in their extent as a result of development (Bauder and McMillan 1998). Vernal pools in San Diego County exhibit regionally unique species assemblages, but it is unknown how the Rancho Guejito pools compare to other complexes in the county.

Oak woodlands and grasslands are two of the most important vegetation communities on Rancho Guejito from a regional conservation perspective. These communities are naturally rare in the South Coast Ecoregion and have been further reduced in extent via loss to development and type conversion (Oberbauer and Vanderwier 1991, Scott 1991). Rancho Guejito supports almost 5,000 acres of grasslands, including nearly 4,400 acres in two contiguous patches in the lower elevations and over 220 acres of native grassland at the higher elevations of the property (Figure 13). Large grassland patches are rare in San Diego County (Table 7), and the largest are not conserved for their biological values.

Large, intact grasslands provide habitat for declining species such as raptors, badgers, grasshopper sparrows (*Ammodramus savannarum*), burrowing owls (*Athene cunicularia*), and Stephens' kangaroo rats. These species, among others (Appendix D), are known to utilize the Rancho Guejito grasslands, confirming its regional importance for grassland species. Rancho Guejito also supports native grasses and forbs (PSBS et al. 1993), which contribute to the unique biodiversity of the county (Appendix D).

Table 6. Vegetation communities on Rancho Guejito.

Natural Vegetation (acres)	Rancho Guejito (acres)	San Diego Co. (acres)	% of San Diego Co.
Grasslands			
Valley and Foothill Grassland	618	58,993	1.05
Foothill/Mountain Perennial Grassland	169	25,590	0.66
Annual Grassland	4,078	87,197	4.68
Total Grasslands	4,865	171,780	2.83
Scrubs			
Diegan Coastal Sage Scrub	227	248,307	0.09
Flat-topped Buckwheat	179	6,903	2.60
Coastal Sage-Chaparral Scrub	186	37,243	0.50
Total Scrubs	592	292,453	0.20
Chaparrals			
Chaparral	2,878	93,853	3.07
Chamise Chaparral	68	61,345	0.11
Granitic Northern Mixed Chaparral	492	170,296	0.29
Southern Mixed Chaparral	3,965	162,682	2.44
Northern Mixed Chaparral	130	107,789	0.12
Total Chaparrals	7,533	595,964	1.26
Wet Meadows/Marsh			
Meadow and Seep	21	423	5.02
Alkali Meadow and Seep	27	134	19.99
Coastal and Valley Freshwater Marsh	39	1,563	2.49
Total Wet Meadows/Marsh	87	13,680	2.83
Freshwater	1	11,560	0.01
Riparian			
Mule Fat Scrub	3	11,222	0.03
Southern Willow Scrub	31	6,956	0.45
Southern Riparian Forest	12	11,114	0.11
Southern Coast Live Oak Riparian Forest	362	17,525	2.06
Total Riparian	408	46,817	0.87
Oak Woodlands			
Coast Live Oak Forest	56	442	12.67
Coast Live Oak Woodland	1,943	65,558	2.96
Engelmann Oak Woodland	5,209	35,248	14.78
Total Oak Woodlands	7,208	101,248	7.12
Conifer Forests-Coulter Pine	216	1,588	13.60
Agriculture	19	129,177	0.01
Developed/Disturbed	10	416,540	0.00

Source: SANDAG 1995

Figure 13

Table 7. Largest grassland complexes in San Diego County.

Location	**Approx. Size* (acres)**
Camp Pendleton	45,000
Lake Henshaw	16,000
Santa Ysabel/Mesa Grande	5,400
Rancho Guejito	*4,900*
Ramona	2,000
Otay/Sweetwater NWR	1,900

*Based on San Diego County vegetation data (SANDAG 1995).

The oak woodlands on Rancho Guejito (over 7,200 acres) represent 7% of all oak woodlands mapped in San Diego County. These woodlands include stands dominated by coast live oaks and Engelmann oaks, interspersed with chaparral, grasslands and other habitats. Oak woodlands on Rancho Guejito include both denser *forest* as well as more open *savanna* structures. In drainages, oak woodlands transition into southern coast live oak riparian woodlands.

As discussed in Chapter 2.4.2, grasslands and oak woodlands, both coast live oak and Engelmann oak woodlands, are not well represented within conserved areas in the region, in particular the Western Granitic Foothill biogeographic subsection (Table 4). Conservation of Rancho Guejito would contribute significantly to the conservation of these resources and the species they support (Table 8).

Grasslands

The grassland alliances on Rancho Guejito are under-conserved in the region and the two focal biogeographic subsections, with 22% of annual grasslands and 7% of perennial grasslands conserved in the region, 8% and 4% conserved within the Western Granitic Foothills, and 25% and 12% conserved within the Palomar-Cuyamaca Peak subsection (Table 8). The great majority of the grassland habitat at Rancho Guejito is located within the Western Granitic Foothills subsection. Rancho Guejito supports diverse native grassland; native grasses documented on Rancho Guejito include giant needlegrass (*Achnatherum coronatum*), California deergrass (*Muhlenbergia rigens*), foothill needlegrass (*Nassella lepida*), and purple needlegrass (*Nassella pulchra*) (PSBS et al. 1993). Conservation of the grasslands on Rancho Guejito would more than double the level of grassland conservation in the Western Granitic Foothills, to 18%.

Oak woodlands

Rancho Guejito supports three oak alliances—scrub oak (*Quercus berberidifolia*), coast live oak, and Engelmann oak—and oak woodlands represent the second largest vegetation community, after chaparral, on the property. The scrub oak alliance is well conserved in the region (83%) and within both subsections (71% and 69%), while very little of this alliance occurs on Rancho Guejito (59 acres) (Table 8). Conservation of the coast live oak alliance is not uniform

Table 8. Analysis of representation by vegetation communities on Rancho Guejito--in protected areas in the region and two subsections.

Natural Vegetation (>50 acres)	REGION Vegetation (acres)	REGION Protected (acres)	REGION % Protected	WESTERN GRANITIC FOOTHILLS Subsection (acres)	WESTERN GRANITIC FOOTHILLS Protected (acres)	WESTERN GRANITIC FOOTHILLS % Protected	PALOMAR-CUYAMACA PEAK Subsection (acres)	PALOMAR-CUYAMACA PEAK Protected (acres)	PALOMAR-CUYAMACA PEAK % Protected	RANCHO GUEJITO (acres)
Grasslands										
Annual Grassland	285,690	61,697	22%	32,876	2,770	8%	24,633	6,266	25%	5,181
Perennial Grassland	59,986	3,915	7%	4,294	187	4%	22,046	2,692	12%	29
Total Grasslands	345,676	65,612	19%	37,170	2,957	8%	46,679	8,958	19%	5,210
Scrubs										
California Sagebrush	366,690	121,178	33%	86,800	29,274	34%	3,507	1,440	41%	231
Buckwheat (White Sage)	127,682	44,959	35%	7,062	2,488	35%	7,935	3,572	45%	294
Total Scrubs	494,372	166,137	34%	93,862	31,762	34%	11,442	5,012	45%	526
Chaparrals										
Chamise Chaparral	217,135	122,535	56%	53,850	27,177	50%	62,992	38,302	61%	745
No. Mixed Chaparral	854,534	459,742	54%	197,520	77,311	39%	236,725	136,576	58%	7,080
So. Mixed Chaparral	38,371	20,468	53%	32,508	16,485	51%	1,865	1,774	95%	459
Total Chaparrals	1,110,040	602,745	54%	283,878	120,973	43%	301,582	176,652	59%	8,284
Wet Meadows/Marsh	7,023	1,003	14%	168	0	0%	4,686	338	7%	22
Riparian										
Mixed Riparian Hardwoods	10,685	3,711	35%	2,412	560	23%	1,130	448	40%	18
Willow	17,233	4,771	28%	1,517	574	38%	982	131	13%	3
Total Riparian	27,918	8,482	30%	3,929	1,134	29%	2,112	579	27%	20
Oak Woodlands										
Coast Live Oak	97,887	29,268	30%	31,553	6,855	22%	31,386	9,500	30%	2,612
Engelmann Oak	20,326	3,789	19%	10,695	1,839	17%	5,811	814	14%	4,154
Scrub Oak	33,467	27,806	83%	3,011	2,149	71%	6,044	4,170	69%	59
Total Oak Woodlands	151,680	60,863	40%	45,259	10,843	24%	43,241	14,484	33%	6,826
Conifers (Coulter Pine)	26,458	8,947	34%	267	118	44%	23,462	6,683	28%	171

Source: CALVEG, FRAP 2003.
Only vegetation communities that occur on Rancho Guejito are presented.

across biogeographic divisions of the region—30% conserved in the Palomar-Cuyamaca Peak subsection but only 22% conserved in the Western Granitic Foothills subsection. Conservation of the coast live oaks on Rancho Guejito would increase this level to almost 30% (Table 8).

The Engelmann oak alliance covers 4,154 acres of Rancho Guejito, distributed fairly evenly between the Western Granitic Foothills and Palomar-Cuyamaca Peak subsections (Table 8). These two ecological subsections support over 80% of the mapped Engelmann oaks in the world. Engelmann oak woodland is under-conserved regionally (19% conserved) and within both subsections (14-17% conserved). Conservation of the Rancho Guejito Engelmann oaks would raise the level of conservation in the region as a whole to 32%.

3.2.2 Special Elements and Focal Species

Rancho Guejito supports habitat for a variety of listed, sensitive, and regionally significant species (PSBS et al. 1993, Appendix D). These include grassland, scrub, woodland, and forest species; aquatic and riparian species; low elevation and montane species; and spatially restricted species (e.g., vernal pool species) and large-area dependent species (e.g., mountain lions, golden eagles). The County of San Diego's sensitive species predictive models (County of San Diego unpublished data) show sensitive species potentially occurring over every portion of Rancho Guejito. In the following sections, we focus our discussion on a few example species and species guilds that highlight the regional conservation significance of the property.

Grassland species

Stephens' kangaroo rat

The core of the Stephens' kangaroo rat's original distribution was the San Jacinto, Perris, and Temecula valleys and adjacent areas of western Riverside County, extending east to the Anza area (Figure 14, Appendix A). (Hereafter, this core range area is referred to as the San Jacinto or Riverside County core range, the largest area delineated on Figure 14.) The Stephens' kangaroo rat evolved within this large, relatively flat and arid inland basin, bounded by the Santa Ana Mountains on the west and the taller San Jacinto and San Bernardino mountains on the east. Genetic diversity in Stephens' kangaroo rat populations is greatest in the north-central portion of this area, in the vicinity of Perris and Quail Valley, with decreasing diversity moving away from this *evolutionary core area* to more peripheral populations (Metcalf et al. 2001).

The genetic patterns further suggest that the Stephens' kangaroo rat spread south from the San Jacinto Valley during a hotter, drier interglacial period, sometime within the last 6,000 years, into what are now the isolated grasslands of northern San Diego County (Lackey 1967, Metcalf et al. 2001, Metcalf personal communication). Although at finer geographic scales the genetics results are less certain, they suggest that the Stephens' kangaroo rat expanded south into San Diego County from southwestern Riverside County via two routes, split around Mount Palomar: (1) a western expansion from the Temecula area into the Pendleton/Fallbrook area, then up the San Luis Rey River Valley and terminating at Rancho Guejito; and (2) an eastern expansion from the Anza-Aguanga area of Riverside County into the Warner Basin and then south to the

Figure 14

Ramona grasslands (probably via smaller *stepping-stone* grasslands such as the Santa Ysabel and Ballena Valley grasslands).

Consistent with this dual expansion hypothesis, the Warner Basin population carries a subsample of the genes found in the Anza-Aguanga area, and the Ramona population appears to carry a still smaller subsample of the genes found in the Warner population (Metcalf personal communications and Metcalf et al. 2001). Similarly, populations in the Camp Pendleton and Fallbrook area carry a subsample of genetic variation found in the Temecula Valley (but different from the genetic subsample in the Warner Basin), and the Guejito population carries a subsample of the Pendleton/Fallbrook gene pool. Even though Rancho Guejito is less than 6 km from the Ramona population, it appears to be genetically unique from the Warner and Ramona populations (Metcalf et al. 2001, Metcalf personal communication). The steep, rocky slopes of the San Dieguito River Valley (Santa Ysabel Creek), separating Rancho Guejito from Ramona, are a probable dispersal barrier for the species (Spencer personal observations and Montgomery personal communication), which may explain the lack of genetic exchange between these two relatively close populations. Thus, despite being separated by only 6 km, the Guejito and Ramona populations appear to reflect a legacy of a two-pronged range expansion thousands of years ago, representing two different gene pools.

Regardless of how and when Stephens' kangaroo rats colonized San Diego County, subsequent vegetation changes isolated some populations within scattered grasslands now surrounded by generally inhospitable shrublands and forests, including the Warner Basin, Ramona Grasslands, and Rancho Guejito. What were once fairly extensive populations stretching along the lower San Luis Rey River watershed, from Oceanside toward Pauma Valley, were lost to agricultural and urban development and fragmentation during the 20th century, with a few remnant populations disappearing during the 1980s and 1990s (O'Farrell and Uptain 1989, USFWS 1997, San Diego Mammal Atlas unpublished database).

Threats and conservation priorities. Prior to the rapid development of Southern California during the 20th century, the large San Jacinto core range far surpassed all other portions of the species range in size, habitat contiguity, kangaroo rat population sizes, and genetic diversity (Price and Endo 1989, Burke et al. 1991, Metcalf et al. 2001). Unfortunately, roughly 60% of the habitat in this core range was already lost to urban and agricultural development by 1938 (Price and Endo 1989), and the remaining habitat was fragmented into isolated patches. By 1984, fragmentation was worse, with only 17% of the remaining habitat occurring in patches greater than 100 ha (250 acres) in size (Price and Endo 1989)—a size that Price and Endo (1989) considered the minimum necessary to sustain a breeding population of Stephens' kangaroo rats over at least the short term (say 30 years). This fragmentation of once contiguous habitat into numerous isolated patches, most of them too small to reliably support the species, was a major motivation behind the listing of the species as endangered in 1988 (USFWS 1988).

Based on detailed demographic modeling, Burke et al. (1991) estimated the minimum habitat area required to support a population of Stephens' kangaroo rats indefinitely (or more precisely, with a 95% probability of surviving for 100 years) at about 3,300 acres—either as fully contiguous habitat or as a series of close-together or connected habitat patches. This criterion appeared to be met by only two locations throughout the range during the 1980s (prior to the discovery of the Guejito population), with nearly all known extant populations restricted to areas of less than 1,000 acres (Burke et al. 1991). Except for the discovery of significant new populations in San Diego County since that time, the situation has only worsened. Behrends (personal communication) estimated an 85% loss of original habitat by about the year 2000, and the draft Stephens' kangaroo rat recovery plan (USFWS 1997) listed only three locations having more than 1,321 ha (about 3,200 acres) of suitable habitat—the Warner Basin and two reserves in Riverside County (the Lake Matthews-Estelle Mountain Core Reserve and the Lake Perris-San Jacinto Core Reserve). Notably, Rancho Guejito was hardly mentioned in the draft recovery plan, undoubtedly because its supposedly small population was considered inconsequential to recovery goals.

Perhaps ironically, Stephens' kangaroo rat populations in the more isolated grasslands of San Diego County have become extremely important to the species' conservation and recovery. Despite originally being smaller and less genetically diverse than the Riverside County populations, the San Diego populations are now among the largest and least fragmented (Table 9). The Warner Basin population (Lake Henshaw area) is by far the largest, most contiguous population of Stephens' kangaroo rat left in all the species' range (Table 9 and Figure 14).

Table 9. Approximate area of occupied Stephens' kangaroo rat habitat for the largest remaining habitat areas in Riverside and San Diego counties.

Location	Occupied Habitat	
	hectares	acres
Riverside County		
Lake Matthews-Estelle Mountain	1,726	4,264
Lake Perris-San Jacinto	1,528	3,775
Lake Skinner-Dominigoni Valley	805	1,988
Sycamore Canyon-March Air Force Base	548	1,355
Motte Rimrock-Steele Peak	484	1,195
San Diego County		
Lake Henshaw-Warner Basin	4,600	11,370
Rancho Guejito	*1,219*	*3,012*
Ramona Grasslands	~243	~600
Marine Corps Base Camp Pendleton	~160	~400
Fallbrook Naval Weapons Station	<160	<400

Source: USFWS (1997), Montgomery (2005), Ogden (1998), and S.J. Montgomery and W. Spencer unpublished data.

During the 1980s, O'Farrell and Uptain (1987) estimated this population at roughly 14,000 individuals on 11,370 acres of occupied habitat. Unfortunately, this population is not conserved, and there are no guarantees of appropriate management and monitoring to perpetuate the favorable habitat conditions there.

Role of Rancho Guejito population in species conservation. Montgomery (1991) first discovered the Rancho Guejito population in 1991. Based on a very cursory and spatially limited survey effort, the population was considered small (occupying less than 100 acres) and, at that time, was generally discounted or ignored in discussions of species recovery (e.g., USFWS 1997). However, Montgomery (2005) performed a more thorough survey during 2004 and found the Guejito population to be much larger than previously believed—apparently large enough to meet the 1,321 ha criterion. Montgomery mapped 2,310 ha (5,706 acres) as potential habitat, of which 1,219 ha (3,011 acres) were occupied (Figure 15); and much of the unoccupied but potential habitat could become occupied in the future with suitable management, such as increased grazing pressure (Montgomery 2005). These estimates elevate Rancho Guejito as second in size only to the Warner Basin area among the San Diego populations, and it appears comparable or slightly smaller (based on actually occupied habitat acreage) to the two largest Riverside County *core* populations (USFWS 1997). This, coupled with its potential for unique genotypes and its location in a largely intact and undeveloped landscape, make the Rancho Guejito population key to species conservation and recovery. It is possible that the 6,000 or so years of evolution in isolation have granted this population unique genetic adaptations that could prove useful to species persistence and recovery, particularly given ongoing global climate change.

Raptors

The raptor community using Rancho Guejito is particularly diverse. Surveys conducted for the County Water Authority's Emergency Water Storage Project detected 16 raptor species in the Rancho Guejito study area, a subset of the entire property (PSBS et al. 1993):

- Turkey vulture (*Cathartes aura*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Northern harrier (*Circus cyaneus*)
- Sharp-shinned hawk (*Accipter striatus*)
- Cooper's hawk (*Accipter cooperii*)
- Red-shouldered hawk (*Buteo lineatus*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Ferruginous hawk (*Buteo regalis*)
- Golden eagle (*Aquila chrysaetos*)
- American kestrel (*Falco sparverius*)
- Merlin (*Falco columbarius*)
- Prairie falcon (*Falco mexicanus*)
- Barn owl (*Tyto alba*)
- Great horned owl (*Bubo virginianus*)
- Western screech owl (*Otus kennicottii*)
- Burrowing owl (*Athene cunicularia*)

The San Diego Bird Atlas (Unitt 2004) cites two of these species—northern harrier and burrowing owl—as species with contracting ranges in San Diego County. All but three of these species are considered sensitive by the County of San Diego, and several are California species of special concern (Appendix D). Rancho Guejito appears to provide high quality habitat for wintering raptors (bald eagle, northern harrier, sharp-shinned hawk, ferruginous hawk, and merlin). All four owl species detected are known or suspected of breeding onsite, and the higher elevations, which have not been surveyed, may support the California spotted owl (*Strix occidentalis occidentalis*). A peregrine falcon (*Falco peregrinus*) has been reported to historically nest on Rodriguez Mountain (PSBS et al. 1993).

Figure 15

The burrowing owl is sparsely distributed in a few breeding sites in San Diego County and is in danger of being extirpated from San Diego County (Unitt 2004). Breeding sites are generally located in the southwestern portion of the county on North Island, Otay Mesa, and Imperial Beach, but a small number of breeding individuals use the grasslands in the Warner Basin (Unitt 2004). Maximum single-day counts of burrowing owls in the San Diego County Bird Atlas are 11 at Otay Mesa (square V14) and 7 at North Island Naval Air Station (square S8). The largest known breeding population in the county is probably 10-11 pairs at North Island Naval Air Station (Winchell personal communication).

The size of the population of burrowing owls at Rancho Guejito is unknown, but surveys found them in several locations in the western grassland area of the property, and the habitat quality was considered optimal for this species (PSBS et al. 1993). Successful breeding of this species appears to have occurred at Rancho Guejito, as numbers of individuals detected in the ca. 2,000-acre survey area increased from 2 to more than 5 individuals (PSBS et al. 1993). A breeding population of burrowing owls at Rancho Guejito would represent a regionally important location, being the only known breeding population naturally occurring in the Western Granitic Foothills biogeographic unit of San Diego County. [Captive-bred owls released in the Ramona Grasslands apparently successfully bred in 2005 (Lincer personal communication)]. The size and suitability of the Rancho Guejito grasslands for burrowing owls, the low number of breeding sites in northern San Diego County, and the rapid fragmentation and loss of grasslands in other areas of San Diego and precipitous decline of this species in the county make Rancho Guejito important to regional conservation of this species.

Badger

The size of the badger population on the property is not known, but based on the extent, type and quality of suitable habitat (uncultivated grasslands and savannas on friable soils), and availability of prey (primarily rodents), Rancho Guejito and surrounding areas, such as Pamo Valley where badgers also occur, may support one of the few sustainable populations remaining in San Diego County. Badgers use relatively large home ranges, with some estimates as large as >4,000 acres (Sargeant and Warner 1972), and young badgers have been recorded to disperse as far as 68 miles from their natal ranges (Lindzey 2003).

Engelmann oak woodlands

Oak woodlands provide habitat or food resources for a variety of species, including cavity nesting birds such as owls, bluebirds (*Sialia mexicana*), and woodpeckers; raptors such as Cooper’s hawk; arboreal salamanders (*Aneides lugubris*), and an important seasonal food source for mule deer (*Odocoileus hemionus fuliginata*) and small mammals. Much of the oak woodland on Rancho Guejito is dominated by Engelmann oaks, a Southern California endemic and regionally sensitive species.

The Engelmann oak is endemic to Riverside and San Diego counties and northern Baja California, with major populations centered in a 140-sq mi area around the Santa Rosa Plateau in Riverside County and a 300-sq mi area in the Santa Ysabel/Mesa Grande area of San Diego

County (Scott 1990) (Figure 16). Scott (1990) suggests that the Engelmann oak woodlands on mesas are vegetatively different from woodlands found on slopes, and that Engelmann oak woodlands on rocky slopes in San Diego County, such as occurs on Rancho Guejito, comprise a unique vegetation type.

The distribution of Engelmann oaks has been mapped somewhat differently by different sources. According to the California Department of Forestry and Fire Protection (FRAP 2003), the Engelmann oak woodland on Rancho Guejito represents approximately 20% of the total acreage of Engelmann oak-dominated woodland in the U.S. (a small portion of this species' range extends into northern Baja California). The SANDAG (1995) vegetation database indicates that Engelmann oak woodlands on Rancho Guejito represent approximately 15% of this vegetation community type in San Diego County, extending over 5,200 acres. Rancho Guejito supports some of the largest trees and largest stands of Engelmann oak woodlands in San Diego County (PSBS et al. 1993)—and also one of the largest remaining unprotected populations.

Aquatic and riparian species

Rancho Guejito supports a high diversity of aquatic and riparian habitat types that support a rich flora and fauna. Aquatic and wetland habitat types include vernal pools, ponds, springs, alkali meadows, and intermittent streams. The diversity of aquatic habitat types is reflected in the diversity of aquatic species that occur on the property, many of them under great threat in San Diego County. Fairy shrimp were not detected in surveys, but the property has a *reasonable potential* for supporting them (PSBS et al. 1993, Mayer personal communication). Sensitive amphibian species breed onsite—the arroyo toad in intermittent streams and the spadefoot toad (*Spea hammondii*) in seasonal/vernal pools. Large-blotched salamander (*Ensatina eschscholtzii klauberi*) is known to occur in the Santa Ysabel area (White personal observation) and may also occur on Rancho Guejito (PSBS et al. 1993). A viable population of arroyo chubs (*Gila orcutti*) is present in Guejito Creek, one of three native freshwater fishes to occur in San Diego County, although this species appears to have been introduced to the San Dieguito River watershed (Swift et al. 1993).

Riparian communities include marshes, riparian scrub, cottonwood-willow riparian forest, sycamore-willow woodland, and southern live oak riparian woodland (PSBS et al. 1993). The willow scrub and woodlands may not currently support sensitive riparian bird species because of disturbance from cattle grazing (PSBS et al. 1993), but riparian habitats respond rapidly to managed grazing and could be suitable for these species in the future. Given the presence of breeding populations of neotropical riparian bird species in the San Pasqual and San Luis Rey river valleys, including least Bell's vireo (*Vireo bellii pusillus*), yellow warbler (*Dendroica petechia*), yellow-breasted chat (*Icteria virens*), and southwestern willow flycatcher (*Empidonax traillii extimus*), there is a high potential for these species to use Rancho Guejito if riparian habitats along Guejito Creek are restored.

Arroyo toads occur throughout the South Coast Ecoregion in stream systems that are regularly disturbed by flooding and provide shallow slow-moving aquatic habitats for breeding and sparsely vegetated sand and gravel bars for juvenile rearing. Natural hydrologic regimes

Figure 16

involving episodic flooding and high groundwater tables are crucial for maintaining suitable habitat for this species. Arroyo toads make significant use of upland areas adjacent to riparian habitats for foraging and estivating and have been found as far as 1.2 mi. from streams (USFWS 1999). Thus, maintaining adequate connectivity to adjacent uplands is crucial for the long-term persistence of this species.

A total of 2,286 acres on Ranch Guejito have been designated as Critical Habitat for this endangered species (USFWS 2005), representing about 3% of Critical Habitat in the region (Figure 17). A modest population of 14 individuals was detected during surveys for the County Water Authority's Emergency Water Storage Project (PSBS et al. 1993). The intact watershed basins supported by Rancho Guejito make this a high priority location for the conservation of this species.

Montane species

The northern part of Rancho Guejito probably supports wildlife species associated with higher elevation habitats, such as red diamond rattlesnake (*Crotalus ruber ruber*), mountain quail (*Oreortyx pictus*), ringtail (*Bassariscus astutus*), and spotted owl. In San Diego County and other parts of Southern California, the California spotted owl occurs as a series of small, relatively isolated populations in montane, late-seral stage, closed-canopy woodlands of oaks and conifers. As a result of habitat loss and fragmentation, decline in habitat quality due to development, adverse effects to its habitat from groundwater drawdown (resulting from new rural development and use for bottled drinking water), and intolerance of human activity near nest sites, spotted owl populations in Southern California are declining, with only 25-50 pairs estimated in San Diego County (Noon and McKelvey 1992, LaHaye et al. 1994, Unitt 2004). This species is nonmigratory in San Diego County, with juvenile owls dispersing only short distances from their natal territories. For these reasons, the continued presence of suitable habitat on Rancho Guejito could contribute to the persistence of spotted owls in San Diego County.

3.2.3 Landscape-Scale Functions

As described earlier, enormous investments by federal, state, and local governments have been made in the acquisition and conservation of natural lands, and these investments will be jeopardized if the lands are not linked and managed within a network of conserved landscapes. In Chapter 2.4.2, we estimated that blocks of intact habitat ranging from 300,000 to 400,000 acres are necessary to support key landscape-scale ecological processes in the region, including large wildfires and viable populations of mountain lions.

Rancho Guejito is an important component of one of the last remaining core blocks of habitat capable of sustaining landscape-scale ecological processes in the region (Figure 10). The block of habitat containing Rancho Guejito—and including the areas of Santa Ysabel, Mesa Grande, Warner Valley, and Palomar Mountain—is 215,000 acres in size and is connected to adjacent habitat blocks to the east on Volcan and Hot Springs mountains. This habitat block is bisected by SR-76 and separated from adjacent blocks of habitat by SR-79, but still retains good

Figure 17

connectivity across these highways. It is virtually separated from adjacent blocks of habitat to the south by SR-78 and associated development and agriculture, except for a remaining connection to the south in the Santa Ysabel area. Much of this habitat block is comprised of individual roadless areas varying from 1,000 acres to over 10,000 acres (Figure 8) and high integrity watershed basins (Figure 9). Rancho Guejito is centered within one of the largest roadless areas (>10,000 acres) in this habitat block.

The importance of Rancho Guejito to landscape-scale functions is emphasized when considering the biogeographic distribution of core habitat blocks. Within the Western Granitic Foothills, there are basically three intact blocks of habitat: (1) Rancho Guejito-Mesa Grande (ca. 72,000 acres), (2) Eagle Peak-Capitan Grande Indian Reservation (ca. 105,000 acres), and (3) Otay Mountain Wilderness-Tecate Peak (ca. 100,000 acres), each of which is contiguous with adjacent intact habitat blocks within the Palomar-Cuyamaca Peak subsection. These three blocks of habitat are core areas of the regional system of natural lands in the western portion of San Diego County. Maintaining their core area functions is critical to maintaining biodiversity throughout the region, including the biodiversity of smaller patches of habitat within NCCP reserves to the west.

Based on the ecological integrity analysis (Figure 10), Rancho Guejito represents a large proportion of the northern habitat block within the Western Granitic Foothills subsection, extending from the Santa Ysabel Valley to the eastern edge of Valley Center, and includes existing conservation areas in the San Pasqual Valley, Boden Canyon, Santa Ysabel Ranch West, Hellhole Canyon, and National Forest land surrounding Pamo Valley. Rancho Guejito is critical to the connectivity of lower elevation conservation areas in the northern Western Granitic Foothills subsection to higher elevation conservation areas in the Palomar-Cuyamaca Mountains subsection, e.g., Cleveland Nation Forest, Palomar Mountain State Park, and Agua Tibia Wilderness. The high integrity habitats in these two ecological subsections are connected across the eastern portion of SR-76 and collectively total approximately 215,000 acres in size. Thus, Rancho Guejito is an integral component of a regionally important block of high integrity habitats.

3.2.4 Watershed Integrity

Rancho Guejito supports the westernmost watershed basins in San Diego County that have not been degraded by residential and agricultural development (Figure 9). It is also notable for having high groundwater elevations along stream channels, riparian areas, and meadows in the lower valley (PSBS et al. 1993). The high integrity watersheds on Rancho Guejito support a variety of sensitive aquatic and riparian resources, such as arroyo toads, alkali meadows, and various riparian and marsh communities that depend on intact hydrologic regimes, high water tables, and high quality water resources. Maintenance of intact hydrologic processes and high water quality is crucial to the long-term viability of these resources, and *loss or degradation of these values cannot be mitigated.*

The majority of Rancho Guejito lies within the San Dieguito River watershed (89%), and parts of the property also drain to the San Luis Rey River and Carlsbad watersheds. An enormous conservation investment has already been made in the San Dieguito River watershed downstream of Rancho Guejito—with more than 2,200 acres in the San Pasqual Valley alone already protected (Figure 11). Protection of the watershed functions and values of Rancho Guejito builds on these investments and contributes to their long-term protection.

The San Diego Regional Water Quality Control Board (RWQCB) has designated existing and potential beneficial uses for surface and ground waters in the region, which are intended to guide maintenance of appropriate water quality objectives to support those uses (San Diego RWQCB 1994). Rancho Guejito water resources support a variety of water supply, recreation, and habitat-related beneficial uses. Water quality for Rancho Guejito waterbodies and groundwater must meet the highest standards, given the designation of drinking water, contact recreation, and habitat beneficial uses. Furthermore, Hodges Reservoir, a City of San Diego drinking water reservoir, has been designated an impaired waterbody by the RWQCB under Clean Water Act section 303(d), due to its high levels of color, nitrogen, phosphorus, and total dissolved solids. Preventing degradation of water resources in the Guejito subbasin is imperative to preventing further degradation of water quality in Hodges Reservoir.

4. THREATS AND VULNERABILITY

Loss and fragmentation of habitats is the single greatest threat to biodiversity at global and regional scales (Myers 1997, Noss and Csuti 1997, Brooks et al. 2002). Over 80% of imperiled or federally listed species in the U.S. are at risk from habitat degradation and loss (Wilcove et al. 2000). It has been estimated that 32% of California's diverse flora and vertebrate fauna are at risk (Stein et al. 2000). Urban sprawl, defined as encroachment of low-density, automobile-dependent development into the natural areas outside of cities and towns, imperils 65% of species listed as Threatened or Endangered in California (Czech et al. 2001). Within the western South Coast region, the most commonly cited endangerment factors are residential and industrial development, introduction of exotic species, agricultural development, and heavy equipment (Flather et al. 1998).

Patches of habitat lying within a matrix of altered land cover experience edge effects in the form of altered physical conditions (Saunders et al. 1991, Pickett et al. 2001) and fire regimes (Keeley and Fotheringham 2001), increased invasions by exotic plant and animal species (Suarez et al. 1998, Brothers and Spingarn 1992), changes in vegetation structure (Pickett et al. 2001), loss of top predators and changes in inter-specific interactions (Bolger et al. 1991, Crooks 2002), and altered population dynamics (Soulé et al. 1992). Adverse edge effects are relatively greater on smaller patches of habitat than larger patches, but even relatively diffuse, low-density development is associated with adverse changes in the abundance of many native species.

4.1 Habitat Fragmentation

4.1.1 Encroachment Outside Rancho Guejito

North San Diego County has experienced extensive land cover changes, and the pace of these changes is accelerating. Much of the historic loss of natural habitats in North County was associated with agricultural development but, increasingly, residential development is the major land use change associated with habitat loss and fragmentation. With the exception of MCB Camp Pendleton, the cities of coastal North County have converted many of their greenhouses and agricultural fields to residential subdivisions, which now extend from the coastal zone into the inland valleys (Figures 3 and 8).

Rancho Guejito sits at the interface between the coastal development zone and the more rural backcountry of the county—within the last remaining block of intact natural open space in the foothills of north San Diego County. The Escondido-Valley Center area along the western border of Rancho Guejito is heavily roaded and parcelized (Figure 18). The trend over the past decade has been a transformation of rural agricultural land at the eastern edge of Valley Center and the northern part of Ramona and San Pasqual Valley to rural residential developments (Figure 18).

New development is being proposed along the major transportation corridors in the vicinity of Rancho Guejito—along SR-76 to the north, SR-78 to the south, and SR-79 to the east. Several

Figure 18

Indian tribes have casinos along SR-76 and have discussed expanding housing for tribal members on their reservations. Rural residential development is expanding east of Ramona along SR-78 to Santa Ysabel, threatening to sever habitat connectivity between open space to the north and south. The Santa Ysabel Indian Tribe has proposed a new casino off of SR-79, and rural residential development is proposed on private land adjacent to the reservation on Volcan Mountain.

4.1.2 Development Threat on Rancho Guejito

Although Rancho Guejito is currently zoned as General Agriculture (1 dwelling unit (du)/10, 40 acres), the proposed update to the General Plan (draft June 2005) would convert the property to a designation of Rural Lands (1 du/160 acres). If we assume that portions of the property with less than 15% slope are considered potential development areas, as allowed by the County's Resource Protection Ordinance, then 46% of the property is potentially developable (Figure 19). Under the proposed Rural Lands designation in the updated General Plan, Rancho Guejito has the potential to support up to 60 du in the ≤15% slope areas. However, a sprawling residential development is proposed for the property, with a proposed density of 1 du/40 acres, which could result in 240 dwelling units. Figure 19 shows the pattern of fragmentation that this type of development, under either density scenario, could produce.

The most developable areas of the property are also some of the most sensitive areas on the property—supporting several listed and sensitive species (e.g., arroyo toad, southwestern pond turtle, Stephens' kangaroo rat, burrowing owl, and Engelmann oak) and a large number of culturally significant sites (e.g., *Shakishmai*, Maxcy Ranch, the Adobe Complex, Upper Guejito Valley District, and Adobe Flats). Moreover, the addition of new dwelling units to an area of ecologically intact natural habitats would entail new infrastructure—roads, utilities, and a source of domestic water supply—resulting in further habitat loss, fragmentation, and indirect impacts.

Perhaps even more insidious than the direct impacts are the indirect impacts associated with rural residential development. Numerous studies have documented decreases in the numbers of native wildlife species and increases in the numbers of nonnative species (including butterflies, reptiles, birds, and mammals) tolerant of human-modified habitats along development gradients extending from natural open space to urban areas (e.g., Friesen et al. 1995, Blair 1996, Blair and Launer 1997, Germaine et al. 1998, Blair 1999, Rottenborn 1999, Germaine and Wakeling 2001, Maestas et al. 2001). The study conducted by Maestas et al (2001) is particularly revealing, documenting significant changes in animal species composition in habitats even at residential densities as low as 1 du/50 acres (Maestas et al. 2001). The indirect effects of residential developments include increased abundance of nonnative and human-tolerant plant and animal species, increased lighting and noise, changes in hydrology and water quality, increased human intrusion into remaining habitats, and looting and vandalism of cultural resources. Increased human access to this intact cultural landscape would be tragic and the impacts unmitigable.

This is not the first threat to Rancho Guejito—the San Diego County Water Authority previously considered Rancho Guejito as a surface water reservoir site (PSBS et al. 1993). This site was dropped as an alternative due to the magnitude of impacts to biological and cultural resources.

Figure 19

Even if the proposed residential development of Rancho Guejito is not implemented, without protection and management, the natural and cultural resources values of the property will remain at risk as urban development and human populations increase in Southern California.

4.2 Impacts to Watershed Processes

Because urbanization can reduce the integrity of the watershed and modify the magnitude, frequency, duration, timing, and rate of discharge of stream systems, aquatic and riparian communities that depend on a natural flow regime are ultimately affected. Urbanization increases the area of impervious surfaces (Paul and Meyer 2001), which increases storm runoff, peak discharges, and flood magnitudes, and decreases infiltration of precipitation to groundwater aquifers (Dunne and Leopold 1978, Gordon et al. 1992, Leopold 1994). Rancho Guejito is east of the County Water Authority boundary and, therefore, any new development must rely on groundwater. Use of groundwater on Rancho Guejito for domestic supply can dramatically lower groundwater elevations to the detriment of aquatic and riparian species. Urbanization also results in increased nutrient and contaminant loads, elevated water temperatures, increased invasion by nonnative aquatic species, and, ultimately, reduced abundance of native aquatic and riparian species (Paul and Meyer 2001). Rare wetland communities such as alkali meadows are particularly sensitive to hydrologic and water quality changes.

If the County Water Authority service area is extended to include Rancho Guejito, a different set of hydrologic changes can be expected. Importing water into an urban watershed for landscape irrigation has been shown to increase dry-season base flows, cause intermittent streams to become perennially flowing, and alter the composition of riparian vegetation communities (White and Greer 2006). Such a hydrologic modification could have profound implications to species such as the arroyo toad, by providing suitable habitat for bullfrogs, a nonnative predator that thrives in perennial water.

These impacts to watershed basins on Rancho Guejito will have cascading effects downstream in all three watersheds that drain Rancho Guejito—San Luis Rey, Carlsbad, and San Dieguito—but with the greatest potential impacts to the San Dieguito River watershed, which comprises over 18,000 acres of Rancho Guejito. As part of the MSCP, more than 2,200 acres have been conserved in the San Pasqual Valley, immediately downstream of Rancho Guejito. These habitats support one of the largest populations of arroyo toads within the MSCP area, at least 75 breeding pairs of least Bell's vireos, several breeding pairs of southwestern willow flycatchers, and a number of other neotropical migrant bird species that breed in San Diego County (CBI 2003). In addition, development will degrade the quality of water that ultimately drains to drinking water reservoirs—Hodges Reservoir, which has been designated a 303(d) impaired waterbody, and Lake Wohlford in the Carlsbad watershed. The State Water Resources Control Board has acknowledged that protection of high integrity watershed resources in upstream areas is the most cost-effective way of preventing degradation of downstream water resources, as demonstrated by conservation of habitats threatened by development in the Santa Maria Creek basin (CBI 2004).

4.3 Impacts to Fire Regimes

New residences on Rancho Guejito, built within a fire-adapted landscape, would be exposed to a high threat from wildfires. Increasing human presence in Southern California has been associated with an increased frequency of wildfire ignition from anthropogenic sources (Keeley and Fotheringham 2001). Even very low density development can greatly change the fire regime of an area, and thus the dynamics of this ecological process, by altering fire frequency and fire suppression/protection requirements, such as fuel modification of native habitats. Fire protection activities would change the natural fire regime of this and adjacent areas, such that they may no longer sustain natural ecological systems and processes.

4.4 Implications of Global Climate Change

Conservation scientists are concerned with the implications of global climate change for native biodiversity (Peters and Darling 1985, Kareiva et al. 1992, Malcolm et al. 2001). Climate models suggest that Southern California will experience increased winter precipitation, hotter and drier summers, and more severe El Niño events (Field et al. 1999). One consequence of these changes will likely be shifts in the distribution of vegetation communities and species ranges. The availability of contiguous habitat areas with broad elevational and other environmental gradients is critical to accommodating these shifts in species distributions. It has been suggested that areas with high physical heterogeneity will allow species greater *choices* in the face of changing conditions (Meffe and Carroll 1997). Thus, areas such as Rancho Guejito that connect a gradient of low-to-high elevation habitats may serve as species refugia during periods of climate flux.

5. CONSERVATION VISION

That the riches of Rancho Guejito are so undisputed is made more remarkable by how largely unexplored it is. Rancho Guejito remains one of the least explored areas of San Diego County. Rarely does a single property encompass so much—whether measured in terms of ecological systems, biological communities, and individual species it supports; or in its unique cultural heritage in an intact natural setting; or in the educational and recreational opportunities it could provide Californians in perpetuity. The challenge for conservation planning will be to recognize the interdependent ecological and cultural legacies of Rancho Guejito and their irreplaceable contributions to this society and the next.

This document is intended to articulate the general conservation values of Rancho Guejito. This chapter summarizes considerations for developing a conservation vision for the property, with a focus on:

- Natural resources and ecosystem functions—ecological systems, biological communities, species or species assemblages, physical or chemical characteristics and functions, and ecosystem processes;
- Contributions of Rancho Guejito to our understanding and appreciation of pre-historic and historic cultures;
- Educational, recreational, and wilderness values; and
- The role of Rancho Guejito in a regional reserve system.

5.1 Target-Based Conservation Planning

The Nature Conservancy's Landscape-Scale Conservation approach (TNC 2003) can guide the planning for conservation, management, and monitoring of landscapes such as Rancho Guejito. A premise of this approach is that both the conservation targets and the *key ecological attributes* that support them must be protected to achieve successful landscape-scale conservation. Key ecological attributes relate to the size (area or abundance), condition (composition, structure, and biotic interactions), and landscape context (ecological processes and connectivity) of conservation targets. Rancho Guejito supports a wide variety of conservation targets—ranging from intact ecological systems, to biogeographically rare and under-protected biological communities, to focal species of regional conservation interest. The viability of many targets depends on conservation investment both on Rancho Guejito and the vicinity; likewise, the conservation of many targets of the region—whether they occur on Rancho Guejito or not—depends upon the protection of Guejito. The presence of conservation targets at all of these hierarchical levels, in combination with their key ecological attributes, emphasizes the intact landscape of Rancho Guejito as critical to its conservation value and presents a special challenge for conservation planning.

5.1.1 Ecological Systems

Conservation planning for Rancho Guejito must consider the ecological functions of the landscape to which it belongs. Rancho Guejito is an essential part of a large block of high-integrity natural open space. It is one of only three such *core* habitat blocks within the Western Granitic Foothills subsection—Rancho Guejito-Mesa Grande, Eagle Peak-Capitan Grande Indian Reservation, and Otay Mountain Wilderness-Tecate Peak (Chapter 3.2). These core habitat blocks are of sufficient size and integrity to support natural disturbance regimes, like wildfires, and viable populations of large-area dependent species, such as mountain lions. Rancho Guejito supports high integrity watershed basins, which support headwater streams for three different watersheds. High integrity watershed basins are crucial to sustain natural hydrologic processes and maintain water quality—important drivers of habitat quality for a variety of species on Rancho Guejito. Such landscape and watershed integrity has been virtually eliminated in western San Diego County, and protecting these landscape-scale functions on Rancho Guejito is critical to preventing their continued degradation in northern San Diego County and thus maintaining the biological core functions of this region.

5.1.2 Biological Communities

Conservation planning must address the full range of biological diversity that characterizes a region. Thus, biological communities that are not well protected at a regional scale, and the key ecological attributes that sustain these communities, should be prioritized for protection. Several regionally important vegetation communities on Rancho Guejito are part of the functional ecological systems of the core habitat block discussed above.

Oak woodlands and grasslands occupy almost half of the 20,000-acre Rancho Guejito. In fact, Rancho Guejito supports the largest unprotected population of Engelmann oaks in San Diego County (about 5,200 acres) and the fourth largest contiguous grassland (about 5,000 acres) in the county (Table 6). Oak woodlands, particularly Engelmann oak woodlands, and grassland communities are not well represented in protected areas in the region or in the individual biogeographic areas supporting Rancho Guejito. Conservation of Engelmann oak woodlands and grasslands at Rancho Guejito would contribute significantly to the regional conservation of these community types, particularly within the two biogeographic regions of interest (Western Granitic Foothills and Cuyamaca-Palomar Mountain ecological subsections). The fact that these two communities generally co-occur, with Engelmann oak woodlands dominating in the northern part of Rancho Guejito and grasslands in the southern part, increases the conservation value of Rancho Guejito. The interspersion of the oak woodlands and grasslands with various special elements—aquatic habitats, riparian and wetland communities, alkali meadows, and vernal pools—also increases their habitat values and the property's diversity by forming a habitat mosaic that supports a wide variety of sensitive species.

Riparian and wetlands communities are very rare in Southern California but occupy approximately 500 acres on Rancho Guejito. At Rancho Guejito, these communities support arroyo toads, pond turtles (*Clemmys marmorata pallida*), spadefoot toads, two-striped garter snakes (*Thamnophis hammondii*), Cooper's hawks, and riparian songbirds and may support rare vernal pool plant and animal species. Maintaining the water quality and natural hydrology of these systems is critical to the sustainability of these species and their habitats. In addition, maintaining the processes sustaining these communities on Rancho Guejito is critical to sustaining ecological functions and water quality of downstream areas.

Potential stressors or threats to these communities vary across the property. Conservation planning in the northern, high-elevation forested part of the property will require coordination with conservation strategies on National Forest lands. Conservation along the western border will require particular attention to the potential for edge effects from residential and agricultural uses. Over the long term, an altered fire regime, either through increased fire frequency or fire suppression, may alter the composition and structure of vegetation communities and associated species. In addition, adjacent residences serve as point sources for exotic species introductions and are the source of irrigation runoff and altered hydrology. Roads and human activity in the area may ultimately result in displacement of regional movement corridors for wildlife.

5.1.3 Focal Species

The diversity of species on Rancho Guejito, along with the diversity of their ecological requirements, pose challenges for both conservation planning and management. The diversity of topography, geology, climate, and vegetation communities on Rancho Guejito contributes to its species richness, ranging from large-area dependent species such as mountain lions that use both the higher elevation and lower elevation habitats, to habitat specialists such as the spadefoot toad that occupies seasonal ponds and vernal pools at lower elevations. Regardless of their habitat requirements, all of these species rely on habitat connectivity and intact ecological processes for long-term viability in the face of natural variations in weather, fire, disease, etc.

Based on incomplete biological survey information, Rancho Guejito supports or has the potential to support at least 66 species considered rare, endangered, or otherwise sensitive in San Diego County (Appendix D):

- 15 plants, 3 invertebrates, 1 fish, 4 amphibians, 8 reptiles, 23 birds, and 12 mammals
- 14 species listed as endangered, threatened, rare, or fully protected by the federal and state governments, and therefore subject to special permitting requirements
- 16 species of raptors
- The second largest population of Stephens' kangaroo rats in San Diego County and probably one of the four or five largest populations anywhere in the species' geographic range. Over 3,000 acres of Rancho Guejito support Stephens' kangaroo rats, and an additional 2,800 acres have some potential for supporting the species.
- 15% of Engelmann oaks in San Diego County
- 2,286 acres of Critical Habitat for the endangered arroyo toad
- A grassland bird assemblage, including burrowing owls, grasshopper sparrows (*Ammodramus savannarum*), and horned larks (*Eremophila alpestris*), which have limited distribution in the region.

Conservation scientists often use *focal species* to prioritize reserve design or reserve management conditions. The focal species concept may encompass one or a combination of the following strategies to prioritize species or groups of species for conservation and management:

- Indicator species—species that are sensitive to changes in the characteristics or condition of an ecosystem and can therefore serve as indicators of key conditions or processes of interest (e.g., arroyo toad and arroyo chub, which require natural hydrologic regimes and good water quality conditions, or Stephens' kangaroo rat and burrowing owl, which require open grasslands for burrowing and foraging).
- Keystone species—species that have effects on ecosystems that are disproportionately large for their abundance (e.g., top predators such as mountain lions that control populations of herbivores or mesopredators, or rodents such as the Stephens' kangaroo rat whose burrowing activities influence physical and biological properties of soils).
- Umbrella species—a species that, if protected, results in the effective protection of other species with similar but less demanding needs (e.g., large-area dependent species such as the spotted owl or mountain lion).
- Flagship species—charismatic species that attract the attention and imagination of the general public and are therefore sometimes used to garner support for conservation programs (e.g., golden eagle; surveys should determine the nearest nesting locations).

By grouping focal species with similar habitat requirements—particularly vegetation communities or special elements that are limited in their distribution—we can begin to identify sets of spatially distinct resource values that can guide conservation and management planning. As illustrated by the assemblages below, focal species populations are distributed across all portions of Rancho Guejito. Therefore, comprehensive, multi-season and multi-year surveys of the entire property are needed before any decisions are made about future land use, conservation, or management strategies.

Potential focal species for conservation planning on Rancho Guejito

Grasslands
- Stephens' kangaroo rat
- Badger
- Burrowing owl
- Grasshopper sparrow
- Northern harrier
- Native grasses and forbs

Vernal pools
- Spadefoot toad
- Fairy shrimp
- Orcutt's brodiaea
- Native grasses and forbs

Scrub communities
- Rufous-crowned sparrow
- San Diego horned lizard

Aquatic and riparian
- Arroyo toad
- Least Bell's vireo
- Southwestern willow flycatcher

Oak woodlands
- Engelmann oak
- Cooper's hawk

Conifer forests
- Coulter pine
- Spotted owl

Area-dependent species
- Mountain lion
- Golden eagle

5.1.4 Cultural Resources

Just as ecosystem functions and biological communities can be used as targets for conservation planning, so are cultural context and an archaeological and historical record that is preserved in an intact setting important to the long-term value of individual cultural resources. The spiritual integrity of the site is critical to telling the story.

Rancho Guejito supports an entire settlement complex of Indian villages, entirely undisturbed, in an intact natural landscape that also still supports the natural resources used and managed by traditional cultures. It is the only remaining land grant that is still intact and retains its historic integrity, representing the earliest ranching period in Southern California. This makes Rancho Guejito unique and of enormous significance, because it provides the opportunity to interpret cultural and historic sites within their original setting and original context.

Although only a small portion of the property (approximately 5%) has been surveyed for cultural resources, 87 archaeological sites have been identified or recorded with the State of California (Appendix B) and, based on this sample, many more are expected on the property. The property holds the remains of two ethnographic villages and associated camp sites, seed processing stations, ceremonial areas, and stone tool production areas. The very large Upper Guejito Valley district in the center of the property supports other small village sites as well, with resource camps scattered along the borders of the property. Prehistoric rock art and historic ranch structures may be the most visible signs of the property's former inhabitants, and these will require special protection. As for biological resources, comprehensive surveys and interpretation of cultural and historic resources are needed before any decisions are made about future land uses, conservation, and management.

5.1.5 Educational and Recreational Opportunity

Opportunity to experience true wilderness values and appreciate the legacy of the land and people that came before us are as rare as the resources we strive to protect, and just as irreplaceable. Thus, the aesthetic, recreational, educational, and spiritual opportunities that open space and wilderness areas offer should be prioritized as a conservation target on Rancho Guejito, or we will lose them.

San Diego County prides itself as a place where these values are still evident in the matrix of public and protected lands we cherish, unlike other areas of Southern California where these opportunities can never be restored. Therefore, conservation planning should strive to satisfy the needs of socioeconomic and institutional systems by providing opportunities for public education, recreation, and research that respect the condition and integrity of the resources.

5.2 Significance in Regional Conservation Network

5.2.1 Core Area of North County MSCP

Rancho Guejito occupies 13% of the Pre-Approved Mitigation Area (PAMA) for the North County MSCP (Figure 20). The PAMA boundaries delineate lands within which the MSCP eventual reserve will be created. Therefore, it represents those lands that meet the conservation principles and goals of the NCCP program, including the following characteristics (County of San Diego 2002):

- Large, unfragmented blocks of habitat
- Supports large populations of target species
- Contributes to the preservation of wide-ranging species
- Supports a diverse representation of physical and environmental conditions
- Interconnected with other large blocks of habitat
- Roadless or otherwise inaccessible to human disturbance
- Maintains natural processes
- Supports major ecological gradients

Among a long list of species targeted for inclusion in the North County PAMA are species and special elements that receive particular focus because of their federal listing status and limited distribution. These include:

- Stephens' kangaroo rat
- Arroyo toad
- Golden eagle nesting sites
- California gnatcatchers (*Polioptila c. californica*) and cactus wrens (*Campylorhynchus brunneicapillus couesi*)
- Vernal pools
- Grasslands

Rancho Guejito supports at least 36 target species for the North County MSCP subarea plan (Appendix D). The North County plan prioritizes grasslands because they provide habitat for sensitive species and raptor foraging. In addition, it is recognized that the North County study area includes some of the last remaining major grassland patches in the county—Rancho Guejito and Ramona (County of San Diego 2002). Grassland habitat was prioritized based on patch size, slope, and edge effects in selection of the PAMA.

Rancho Guejito is one of two or three large unprotected areas within the PAMA that are part of a high or very high ecological integrity area in the county (Figure 10, Figure 21) and thus able to sustain ecological processes at a landscape scale. Of the other high integrity portions of the PAMA, one is between Camp Pendleton and the Cleveland National Forest, and another is in the Mt. Olympus area adjacent to the Agua Tibia Wilderness (Figure 21). Other portions of the PAMA form narrow corridors along stream channels or fringe the urban-wildland interface.

Figure 20

Figure 21

While these smaller areas of the PAMA are important for connectivity and buffering functions, the success of the North County MSCP will rely on conservation of large habitat areas that are part of a functional landscape. Thus, due to its size, integrity, central geographic location, resources, and intact ecological processes, conservation of Rancho Guejito, in its entirety, is essential to the success of the North County MSCP. Any development on Rancho Guejito would dramatically change this picture. The North County MSCP would lose this significant core area if development of ≤15% slope areas on Rancho Guejito were allowed, as shown in Figure 22.

5.2.2 Contribution to Existing Conservation Investments

Conservation of Rancho Guejito would exponentially enhance the conservation value and long-term viability of the adjacent Cleveland National Forest lands and other conservation investments. Complex resource management issues and recreational access conflicts in the highly fragmented western portion of the county are a testament to the difficulty of maintaining resource values in the face of human pressure. This large area of intact habitat at the wildland-urban interface not only buffers the National Forest land to the north and east, but it also is integral to its ecological functions. Moreover, the core habitat block that includes Rancho Guejito and protected public lands serves as a *lifeline* to the fragmented habitats to the west, which have been conserved as part of NCCP programs (Figure 10). Thus, loss of Rancho Guejito, located between the human-compromised areas of western San Diego County and the more rural and intact eastern portion of the county, would have profound impacts on multiple ecosystems to the west and east of the property. In fact, development of ≤15% slope areas on Rancho Guejito would essentially remove all 20,000+ acres of the property from inclusion in this high integrity habitat block (Figure 22).

5.2.3 A Uniquely Intact Archaeological District

The seamless integration of the natural and cultural resources at Rancho Guejito serves as an example of the original environmental conditions of the region, including the humans who both adapted to the environment and adapted it to their needs. Rancho Guejito supports a variety of sites still held as sacred to Indian cultures, many of which are tied to the physiography and biology of the property. The density, complexity, and ideal state of preservation of the prehistoric and historic sites on Rancho Guejito provide a unique opportunity to preserve an entire cultural area with its related components. Instead of saving one site here or there, conservation of Rancho Guejito as an archaeological district will save this complex in its entirety, including the major villages, milling areas, rock art and ceremonial sites, and seasonal camps. If this *ethnographic integrity* is fragmented, or resources in even one of these associated sites are destroyed, scientists will not be able to fully understand and reconstruct the prehistory of the region. In addition, research at Rancho Guejito will provide insight into the complex interactions between the Kumeyaay/Ipai and Luiseño cultures. Intentional preservation of a civilization at this level is rare in archaeology and will make the district unique in the region.

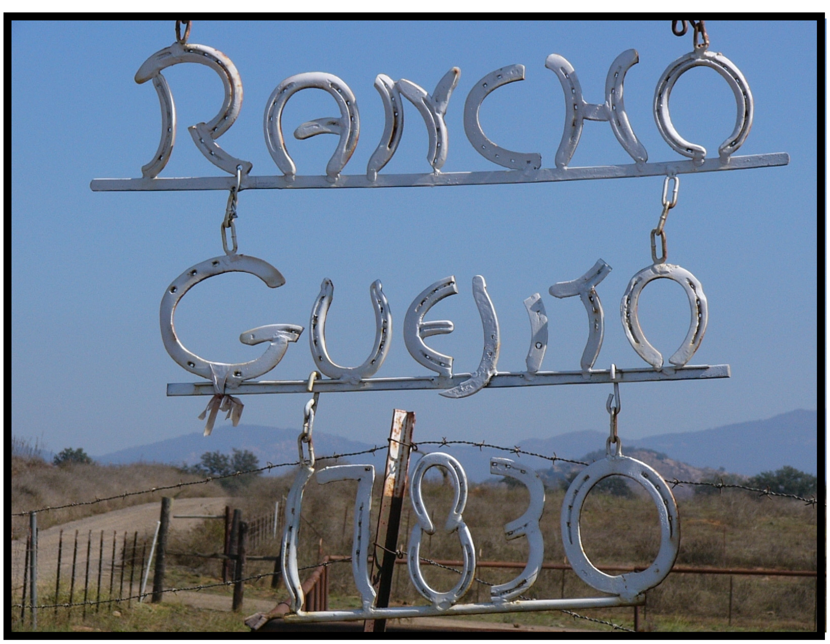
Figure 22

EPILOGUE

Rancho Guejito is a story begging to be told—the story of *Weyeto* and his embodiment in Pine Mountain, the spirits that lie hidden in the oak woodlands, the histories that have been ground into the rocks with the acorns, the color of the old adobes now crumbling in the valley, the cries of the golden eagles that soar over the grasslands, the path that the creek has followed for centuries. Generations of natural processes, communities, and cultures have shaped this land and these stories over thousands of years. So few places remain in Southern California so rich in stories to be told, where wilderness can function, and where wilderness can be experienced. So few places, anymore, transcend time.

Whether the stories of Rancho Guejito will be merely *told*, or be themselves experienced by future generations, is the decision we collectively face. Today, we turn the page on a new chapter in the epic that is Rancho Guejito—the conservation vision for Rancho Guejito will depend on land use decisions made over the next few years. We are fortunate in California to have the privilege to enjoy and appreciate the conservation vision of our predecessors—our County and State Parks, our National Forests. These privileges, however, are accompanied by very real obligations. We have the responsibility to sustain and enhance those investments in the face of crushing population pressure and land use change.

The destiny of Rancho Guejito should not be yet another residential estate development in the foothills of Southern California. Rancho Guejito is the *conservation jewel of San Diego County*—a county with more biodiversity and more imperiled species than any other in the continental United States. Indeed, Rancho Guejito belongs in the portfolio of reserves in the State of California that will convey the biological and cultural riches we inherited in California, forward. These riches, and their integrity, are irreplaceable.



REFERENCES

Anderson, M.G. 1999. Viability and spatial assessment of ecological communities in the Northern Appalachian Ecoregion. Ph.D. dissertation, University of New Hampshire, Durham, NH.

Anderson, M.K. 2005a. Tending the wild: native American knowledge and management of California's natural resources. University of California Press.

Anderson, M.K. 2005b. Traditional ecological knowledge: an important facet of natural resources conservation. USDA Natural Resources Conservation Service, National Plant Data Center Technical Note 1. http://npdc.usda.gov/pdf/0105_tek_report.pdf.

Anonymous. 1962. California Rancher. November-December.

Axelrod, D.I. 1978. The origin of coastal sage vegetation, Alta and Baja California. Amer. J. Bot. 65(10):1117-1131.

Bada, J.L. 1985. Aspartic acid racemization ages of California PaleoIndian skeletons. American Antiquity 50(3):645-647.

Bailey, R.G. 1995. Description of ecoregions of the United States. U.S. Forest Service Miscellaneous Publication Number 1391, USDA Forest Service, Washington, DC.

Baker, W.L. 1992. The landscape ecology of large disturbances in the design and management of nature reserves. Landscape Ecology 7:181-194.

Barbour, M.G., and J. Major (eds.). 1988. Terrestrial vegetation of California. California Native Plant Society Special Publication Number 9. 1030 pp.

Barbour, M.G., and R.A. Minnich. 2000. California upland forests and woodlands. *In* Barbour, M.G., and W.D. Billings (eds.), North American terrestrial vegetation. Cambridge University Press, Cambridge. 2nd edition.

Bauder, E.T., and S. McMillan. 1998. Current distribution and historical extent of vernal pools in Southern California and northern Baja California, México. Pages 56-70 *in* Witham, C.W. (ed.), Ecology, conservation, and management of vernal pool ecosystems. California Native Plant Society, Sacramento, CA.

Bean, L. 1976. Power and its applications in native California. Pages 13-34 *in* Bean, L., and T. King (eds.), Native Californias: a theoretical perspective. Ballena Press, Ramona, CA.

Beemer, E. 1980. My Luiseño neighbors. Acoma Books, Ramona, CA.

Beier, P. 1993. Determining minimum habitat areas and habitat corridors for cougars. Conservation Biology 7:94-108.

Beier, P. 1995. Dispersal of juvenile cougars in fragmented habitat. J. Wildlife Management 59:228-237.

Beier, P., and R.F. Noss. 1998. Do habitat corridors provide connectivity? Conservation Biology 12:1241-1252.

Beier, P., and R.H. Barrett. 1993. The cougar in the Santa Ana Mountain Range, California. Orange County Cooperative Mountain Lion Study Final Report.

Blair, R.B. 1996. Land use and avian species diversity along an urban gradient. Ecological Applications 6(2):506-519.

Blair, R.B. 1999. Birds and butterflies along an urban gradient: surrogate taxa for assessing biodiversity? Ecological Applications 9(1):164-170.

Blair, R.B., and A.E. Launer. 1997. Butterfly diversity and human land use: species assemblages along an urban gradient. Biological Conservation 80:113-125.

Bleich, V.C. 1973. Ecology of rodents at the United States Naval Weapons Station Seal Beach, Fallbrook Annex, San Diego County, California. M.A. thesis, California State University, Long Beach, CA.

Bleich, V.C. 1977. *Dipodomys stephensi*. Mammalian Species No. 73. American Society of Mammalogists. 3 pp.

Bolger, D.T., A.C. Alberts, and M.E. Soulé. 1991. Occurrence patterns of bird species in habitat fragments: sampling, extinction, and nested species subsets. American Naturalist 137:155-166.

Boscana, G. 1978. *Chinigchinich.* Translated by A. Robinson, annotated by J.P. Harrington. Malki Museum Press, Banning, CA.

Brooks, T.M., R.A. Mittermeier, C.G. Mittermeier, G.A.B. da Fonseca, A.B. Rylands, W.R. Konstant, P. Flick, J. Pilgrim, S. Oldfield, G. Magin, and C. Hilton-Taylor. 2002. Habitat loss and extinction in the hotspots of biodiversity. Conservation Biology 16:909-923.

Brothers, T.S., and A. Spingarn. 1992. Forest fragmentation and alien plant invasion of central Indiana old-growth forests. Conservation Biology 6(1):91-100.

Bull, C.S. 1983. Shaking the foundations: the evidence for San Diego prehistory. Casual Papers: Cultural Resource Management 1(3):15-64. San Diego State University, San Diego, CA.

Bull, C.S. 1987. A new proposal: some suggestions for San Diego prehistory. Pages 35-42 *in* Gallegos, D. (ed.), San Dieguito-La Jolla: chronology and controversy. San Diego County Archaeological Society Research Paper No. 1.

Burke, R.L., J. Tasse, C. Badgely, S.R. Jones, N. Fishbein, S. Phillips, and M.E. Soulé. 1991. Conservation of the Stephens' kangaroo rat (*Dipodomys stephensi*): planning for persistence. Bull. Southern Calif. Acad. Sci. 90(1):10-40.

California Department of Fish and Game (CDFG). 1993. Southern California coastal sage scrub NCCP conservation guidelines. Revised November.

California Department of Forestry and Fire Protection (FRAP). 2003. CALVEG data from 1997-2001 Landsat TM. http://frap.cdf.ca.gov/data/frapgisdata/select.asp.

California Legacy Project. 2002. First annual conservation priorities report. The Resources Agency, Sacramento, CA.

California Native Plant Society (CNPS). 2001. Inventory of rare and endangered plants of California. Tibor, D.P. (convening ed.), Rare Plant Scientific Advisory Committee, California Native Plant Society, Sacramento, CA. x + 388 pp. 6th edition.

California Natural Community Conservation Planning (NCCP) Act. 2002. California Fish and Game Code Section 2800-2835. Repealed and added by statutes 2002.

California State Parks. 1974. Rancho Guejito feasibility study. Department of Parks and Recreation, The Resources Agency, Sacramento, CA. 29 pp.

Cardenas, S., and J. Cook. 1984. Cultural resource inventory and evaluation for the Pamo reservoir project. Mooney-Lettieri and Associates, San Diego, CA.

Carroll, C., R.F. Noss, and P.C. Paquet. 2001. Carnivores as focal species for conservation planning in the Rocky Mountain region. Ecological Applications 11:961-980.

Christenson, L.E. 1990. The Late Prehistoric Yuman people of San Diego County, California: their settlement and subsistence system. Doctoral dissertation, Arizona State University.

Christenson, L.E. 1992. The Late Prehistoric Yuman settlement and subsistence system: coastal adaptation. Pages 217-230 *in* Jones, T. (ed.), Essays on the prehistory of maritime California. Center for Archaeological Research at Davis Publications No. 10.

Cody, M.L. 1986. Diversity, rarity, and conservation in Mediterranean-climate regions. *In* Soulé, M.E. (ed.), Conservation biology: the science of scarcity and diversity. Sinauer Associates, Inc., Sunderland, MA.

Conservation Biology Institute (CBI), Pronatura, and The Nature Conservancy. 2004. Las Californias Binational Conservation Initiative: a vision for habitat conservation in the border region of California and Baja California. Prepared for the San Diego Foundation, Resources Legacy Fund Foundation, and the International Community Foundation. September.

Conservation Biology Institute (CBI). 2003. Administrative draft habitat management plan for the Lake Hodges/San Pasqual Valley Open Space. Prepared for City of San Diego Multiple Species Conservation Program. February.

Conservation Biology Institute (CBI). 2004. Framework management and monitoring plan: Ramona Grasslands Open Space Preserve, San Diego County, California. Prepared for The Nature Conservancy. October.

Conservation International. 2005. Biodiversity hotspots revisited. Center for Applied Biodiversity Science at Conservation International. http://www.biodiversityhotspots.org/xp/Hotspots.

County of San Diego. 2002. Review of NCSAP preserve planning process and response to Independent Science Advisors (ISA) report. February 12.

Cowan, R.G. 1977. Ranchos of California. Historical Society of Southern California, Los Angeles, CA.

Crooks, K.R. 2002. Relative sensitivities of mammalian carnivores to habitat fragmentation. Conservation Biology 16:488-502.

Cuero, D. 1970. The autobiography of Delfina Cuero, a Diegueño Indian, as told to Florence C. Shipek. Malki Museum Press, Morongo Indian Reservation, CA.

Czech, B., K. Doyle, J. Kostyack, B. McNitt, G. Sugameli, C. Whitaker, K. Whitcomb-Blylock, J. Byrd, and G. Stall. 2001. Paving paradise: sprawl's impact on wildlife and wild places in California. National Wildlife Federation.

Davis, F.W., P.A. Stine, D.M. Stoms, M.I Borchert, and A.D. Hollander. 1995. Gap analysis of the actual vegetation of California. The Southwestern Region. Madroño 42:40-78.

Dominici, D.A. 1984. Calibration of the Obsidian Butte hydration rate and its implication regarding Late Prehistoric exchange. Unpublished Master's thesis, Department of Anthropology, San Diego State University, San Diego, CA.

DuBois, C.G. 1908. The religion of the Luiseño Indians of Southern California. University of California Publications in American Archaeology and Ethnology 8(3):69-186.

Dunne, T., and L.B. Leopold. 1978. Water in environmental planning. W.H. Freeman Co., San Francisco, CA.

ECOMAP. 1993. National hierarchical framework of ecological units. Unpublished paper, USDA Forest Service, Washington, DC.

Farmer, J. 2004. Southern California Luiseño Indian baskets. The Justin Farmer Foundation, Fullerton, CA.

Farris, G. 1997. Captain José Panto and the San Pascual Indian pueblo. The Journal of San Diego History 43(2):116-131.

Federal Aviation Administration and County of San Diego Department of Public Works. 2000. Ramona Airport integrated habitat management plan. Prepared by KEA Environmental and Conservation Biology Institute. September.

Field, C.B., G.C. Daily, F.W. Davis, S. Gaines, P.A. Matson, J. Melack, and N.L. Miller. 1999. Confronting climate change in California: ecological impacts on the Golden State. Union of Concerned Scientists, Cambridge, MA and Ecological Society of America, Washington, DC.

Flather, C.H., M.S. Knowles, and I.A. Kendall. 1998. Threatened and endangered species geography. BioScience 48:365-376.

Friesen, L.E., P.F.J. Eagles, and R.J. Mackay. 1995. Effects of residential development on forest-dwelling neotropical migrant songbirds. Conservation Biology 9:1408-1414.

Gallegos, D.R., S.M. Hector, and S.R. Van Wormer. 1987. San Dieguito-La Jolla: chronology and controversy. San Diego County Archaeological Society Research Paper No. 1.

Gallucci, K.L. 2001. From the desert to the mountains: Salton Brownware pottery in the mountains of San Diego. Master's thesis, Department of Anthropology, San Diego State University, CA.

Gastil, R.G., G. Morgan, and D. Krummenacher. 1981. The tectonic history of peninsular California and adjacent Mexico. Chapter 11 *in* Ernst, W.G. (ed.), The geotectonic development of California. Vol. 1. Prentice-Hall, Inc., Englewood Cliffs, NJ.

Germaine, S.S., and B.F. Wakeling. 2001. Lizard species distributions and habitat occupation along an urban gradient in Tucson, Arizona, USA. Biological Conservation 97:229-237.

Germaine, S.S., S.S. Rosenstock, R.E. Schweinsburg, and W.S. Richardson. 1998. Relationships among breeding birds, habitat, and residential development in greater Tucson, Arizona. Ecological Applications 8:680-691.

Gordon, N.D., T.A. McMahon, and B.L. Finlayson. 1992. Stream hydrology: an introduction for ecologists. John Wiley & Sons Ltd., Baffins Lane, Chichester, West Sussex, England.

Griffin, J.R., and W.B. Critchfield. 1972. The distribution of forest trees in California. USDA Forest Service Res. Paper PSW-82. Pacific Southwest Forest and Range Experimental Station, Berkeley, CA.

Grismer, L.L. 1994. The origin and evolution of the peninsular herpetofauna of Baja California, México. Herpetological Natural History 2(1):51-106.

Grismer, L.L. 2002. Amphibians and reptiles of Baja California, including its Pacific islands and the islands in the Sea of Cortés. University of California Press, Berkeley, CA. 399 pp.

Groves, C.R. 2003. Drafting a conservation blueprint: a practitioner's guide to planning for biodiversity. The Nature Conservancy. Contributing authors: M.W. Beck, J.V. Higgins, and E.C. Saxon. Island Press, Washington, DC.

Groves, C.R., D.B. Jensen, L. Valutis, K.H. Redford, M.L. Shaffer, J.M. Scott, J.V. Baumgartner, J.V. Higgins, M.W. Beck, and M.G. Anderson. 2002. Planning for biodiversity conservation: putting conservation science into practice. BioScience 52:499-512.

Groves, C.R., L. Valutis, D. Vosick, B. Neely, K. Wheaton, J. Touval, and B. Runnels. 2000. Designing geography of hope: a practitioner's handbook for ecoregional conservation planning. The Nature Conservancy, Arlington, VA.

Haynes, C.V. 1969. The earliest Americans. Science 166:709-715.

Hector, S.M. 1984. Late Prehistoric hunter-gatherer activities in southern San Diego County. Doctoral dissertation, University of California at Los Angeles, CA.

Hedges, K. 1973. Rock art in Southern California. Pacific Coast Archaeological Society Quarterly 9(4):1-28.

Hedges, K. 1975. Notes on the Kumeyaay: a problem of identification. Journal of California Anthropology 2:71-83.

Hedges, K. 1981. Cupule sites in San Diego County, California. Paper presented at the Southwestern Anthropological Association Annual Meetings, March, Santa Barbara, CA.

Hedges, K., and C. Beresford. 1986. Santa Ysabel ethnobotany. Ethnic Technology Notes 20. San Diego Museum of Man, San Diego, CA.

Hedges, K., and D. Hamann. 1999. Rock art on the Santa Margarita River: recording the pictographs at CA-SDI-9824. Manuscript on file at Camp Pendleton, CA.

Hildebrand, J.A., G.T. Gross, J. Schaefer, and H. Neff. 2002. Patayan ceramic variability. Pages 121-138 *in* Glowacki, D.M., and H. Neff (eds.), Ceramic production and circulation in the Greater Southwest. The Cotsen Institute of Archaeology, University of California, Los Angeles, CA.

Hill, M. 1984. California landscape. University of California Press, Berkeley, CA.

Hirsch, R.M., J.F. Walker, J.C. Day, and R. Kallio. 1990. The influence of man on hydrologic systems. *In* Wolman, W.G., and H.C. Riggs (eds.), Surface water hydrology. The geology of America, Vol. O-1. Geological Society of America, Boulder, CO.

Hohenthal, W.D. 2001. Tipai ethnographic notes.

Hudson, T., and E. Underhay. 1978. Crystals in the sky: an intellectual odyssey involving Chumash astronomy, cosmology, and rock art. Ballena Press, Socorro, NM.

Jelinek, A.J. 1992. Perspectives from the Old World on the habitation of the New. American Antiquity 57(2):345-347.

Johnson, J.R., T.W. Stafford, Jr., H.O. Ajie, and D.P. Morris. 2002. Arlington Springs revisited. Pages 541-545 *in* Brown, D.R., K.C. Mitchell, and H.W. Chaney (eds.), Proceedings of the Fifth California Islands Symposium. Santa Barbara Museum of Natural History, Santa Barbara, CA.

Jones, J.A., F.J. Swanson, B.C. Wemple, and K.U. Snyder. 2000. Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks. Conservation Biology 14:76-85.

Kareiva, P.M., J.G. Kingsolver, and R.B. Huey (eds.). 1992. Biotic interactions and global change. Sinauer and Associates, Sunderland, MA.

Keeley, J.E. 2000. Chaparral. Chapter 6 *in* Barbour, M.G., and W.D. Billings (eds.), North American terrestrial vegetation. Cambridge University Press. 2nd edition.

Keeley, J.E. 2001. Fire and invasive species in Mediterranean-climate ecosystems of California. Pages 81-94 *in* Gailey, K.E.M., and T.P. Wilson (eds.), Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species. Fire Conference 2000: The First National Congress on Fire Ecology, Prevention, and Management. Miscellaneous Publication No. 11. Tall Timbers Research Station, Tallahassee, FL.

Keeley, J.E., and C.J. Fotheringham. 2001. Historic fire regime in Southern California shrublands. Conservation Biology 15:1536-1548.

Klein, M. 2005. Harbison dun skipper database. Unpublished data.

Klein, R.D. 1979. Urbanization and stream quality impairment. Water Resources Bulletin 15:948-963.

Knight, R.L., W.C. Gilgert, and E. Marston (eds.). 2002. Ranching west of the 100th meridian—culture, ecology, and economics. Island Press, Washington, DC. 259 pp.

Kroeber, A. 1970. Handbook of the Indians of California. California Book Company, Berkeley, CA.

Kyle, C. 1988. Stone features in the Westwood Valley, San Diego, California: archaeological investigation at CA-CA-SDI-5938. Masters thesis, Department of Anthropology, San Diego State University, San Diego, CA.

Lackey, J.A. 1967. Biosystematics of Heermani group rats in Southern California. Trans. San Diego Soc. Nat. Hist 14:313-344.

LaHaye, W.S., R.J. Gutiérrez, and H. Reşit Akçakaya. 1994. Spotted owl metapopulation dynamics in Southern California. Journal of Animal Ecology 63:775-785.

Lathrop, E.W., and C.D. Osborne. 1990. From acorn to tree: ecology of the Engelmann oak. Fremontia 19(3):30-35.

Laylander, D. 1997. The last days of Lake Cahuilla: the Elmore site. Pacific Coast Archaeological Society Quarterly 33(1&2):1-138.

Laylander, D. (ed.). 2004. Listening to the raven: the Southern California ethnography of Constance Goddard DuBois. Archives of California Prehistory 51. Coyote Press, Salinas, CA.

Leopold, L.B. 1994. A view of the river. Harvard University Press, Cambridge, MA.

Lindzey, F.G. 2003. Badger. Pages 683-691 *in* Feldhamer, G.A., B.C. Thompson, and J.A. Chapman (eds.), Wild mammals of North America, biology, management, and conservation. The John Hopkins University Press, Baltimore, MD. 1216 pp.

Luomala, K. 1978. Tipai and Ipai. Pages 592-609 *in* Sturtevant, W.C., and R.F. Heizer, Handbook of the North American Indians: California. Vol. 8. Smithsonian Institution, Washington, DC.

Maestas, J.D., R.L. Knight, and W.C. Gilgert. 2001. Biodiversity and land-use change in the American Mountain West. The Geographical Review 91(3):509-524.

Malcolm, J.R., A. Markham, and R.P. Neilson. 2001. Can species keep up with global climate change? Conservation Biology in Practice 2(2):24-25.

Margules, C.R., and R.L. Pressey. 2000. Systematic conservation planning. Nature 405:243-253.

McDonald, M. 1993. The Late Prehistoric period—historic properties background study for the City of San Diego Clean Water Program. Brian F. Mooney Associates.

Meffe, G.K., and C.R. Carroll. 1997. Conservation reserves in heterogeneous landscapes. Chapter 10 *in* Meffe, G.K., and C.R. Carroll (eds.), Principles of conservation biology. Sinauer Associates, Inc. Sunderland, MA. 2nd edition.

Meighan, C.W. 1954. A late complex in Southern California prehistory. Southwestern Journal of Anthropology 10:215-227.

Meltzer, D.J. 1993. Pleistocene peopling of the Americas. Evolutionary Anthropology 1(5):157-168.

Mensing, S.A., J. Michaelsen, and R. Byrne. 1999. A 560-year record of Santa Ana fires reconstructed from charcoal deposited in the Santa Barbara Basin, California. Quaternary Research 51(3):295-305.

Metcalf, A.E., L. Nunney, and B.C. Hyman. 2001. Geographic patterns of genetic differentiation within the restricted range of Stephens' kangaroo rat, *Dipodomys stephensi*. Evolution 55:1233-1244.

Miles, S.R., and C.B. Goudey. 1997. Ecological subregions of California: section and subsection descriptions. USDA Forest Service, R5-EM-TP-005.

Minnich, R.A., and E. Franco Vizcaíno. 1998. Land of chamise and pines. Historical accounts and current status of northern Baja California's vegetation. University of California Press, Berkeley, CA. 166 pp.

Minnich, R.A., and R.J. Dezzani. 1998. Historical decline of coastal sage scrub in the Riverside-Perris plain, California. Western Birds 29(4):366-391.

Mittermeier, R.A., N. Myers, J.B. Thomsen, G.A.B. da Fonseca, and S. Olivieri. 1998. Biodiversity hotspots and major tropical wilderness areas: approaches to setting conservation priorities. Conservation Biology 12(3):516-520.

Mittermeier, R.A., N. Myers, P.R. Gil, and C.G. Mittermeier. 1999. Hotspots: earth's biologically richest and most endangered terrestrial ecoregions. Conservation International.

Montgomery, S.J. 1991. Unpublished results of a preliminary trapping survey for Stephens' kangaroo rats on the Guejito Ranch property east of Escondido, San Diego County, California. Prepared for Pacific Southwest Biological Services, National City, CA.

Montgomery, S.J. 2005. Results of 2004 field surveys for Stephens' kangaroo rats (*Dipodomys stephensi*) at Rancho Guejito, San Diego County, California. Prepared for Helix Environmental Planning. January.

Montgomery, S.J., J. Sawasaki, and D. Mitchell. 1996. Survey report for Stephens' kangaroo rat on Marine Corps Base Camp Pendleton, California. Prepared for U.S. Marine Corps Base Camp Pendleton, CA. August.

Moore-Craig, N.A. 1984. Distribution and habitat preference of Stephens' kangaroo rat on the San Jacinto Wildlife Area. Senior undergraduate thesis, University of California, Riverside, CA.

Moratto, M. 1984. California archaeology. Academic Press, New York, NY.

Moriarty III, J.R. 1966. Cultural phase divisions suggested by typological change coordinated with stratigraphically controlled radiocarbon dating at San Diego. Anthropological Journal of Canada 4:20-30.

Moriarty, III, J.R. 1969. The San Dieguito complex: suggested environmental and cultural relationships. Anthropological Journal of Canada 7(3):2-18.

Moyer, C.C. 1969. Historic ranchos of San Diego. Union-Tribune Publishing Company, San Diego, CA.

Myers, N. 1997. Global biodiversity II: losses and threats. Chapter 5 *in* Meffe, G.K., and C.R. Carroll (eds.), Principles of conservation biology. Sinauer Associates, Inc., Sunderland, MA. 2nd edition.

Nachlinger, J., K. Sochi, P. Comer, G. Kittel, and D. Dorfman. 2001. Great Basin: an ecoregion-based conservation blueprint. The Nature Conservancy, Arlington, VA.

Noon, B.R., and K.S. McKelvey. 1992. Stability properties of the spotted owl metapopulation in Southern California. Chapter 9 *In* Verner, J., K.S. McKelvey, B.R. Noon, R.J. Gutierrez, G.I. Gould Jr., and T.W. Beck (technical coordinators), The California spotted owl: a technical assessment of its current status. General Technical Report PSW-GTR-133. USDA Forest Service, Albany, CA.

Noss, R.F. 1987. Protecting natural areas in fragmented landscapes. Natural Areas Journal 7:2-13.

Noss, R.F. 1991. Landscape connectivity: different functions at different scales. Pages 91-104 *in* Hudson, W.E. (ed.), Landscape linkages and biodiversity. Island Press, Washington, DC.

Noss, R.F. 2002. A checklist for wildlands network designs. Conservation Biology 17(5):1270-1275.

Noss, R.F., and B. Csuti. 1997. Habitat fragmentation. Chapter 9 *in* Meffe, G.K., and C.R. Carroll (eds.), Principles of conservation biology. Sinauer Associates, Inc. Sunderland, MA. 2nd edition.

Noss, R.F., E. Dinerstein, B. Gilpert, M. Gilpin, B.J. Miller, J. Terborgh, and S. Trombulak. 1999. Core areas: where nature begins. *In* Terborgh, J., and M.E. Soulé (eds.), Continental conservation: scientific foundations of regional reserve networks. Island Press, Washington, DC.

Noss, R.F., M.A. O'Connell, and D.D. Murphy. 1997. The science of conservation planning: habitat conservation under the Endangered Species Act. Island Press, Washington, DC.

O'Farrell, M.J. 1998. *Dipodomys stephensi* (Merriam 1907): Stephens' kangaroo rat. Pages 78-79 *in* Hafner, D.J., E. Yensen, and G. Kirkland, Jr. (compilers and editors), North American rodents: status survey and conservation action plan. IUCN/SSC Rodent Specialist Group, IUCN, Gland, Switzerland, and Cambridge, UK. *x* + 171 pp.

O'Farrell, M.J., and C.E. Uptain. 1987. Distribution and aspects of the natural history of Stephens' kangaroo rat (*Dipodomys stephensi*) on the Warner Ranch, San Diego Co., California. Wasmann Journal of Biology 45(1-2):34-48.

O'Farrell, M.J., and C.E. Uptain. 1989. Assessment of population and habitat status of the Stephens' kangaroo rat (*Dipodomys stephensi*). Report of the State of California, The Resources Agency, Department of Fish and Game, Wildlife Management Division, Sacramento, CA.

Oberbauer, T.A., and J.M. Vanderwier. 1991. The vegetation and geologic substrate association and its effects on development in San Diego County. Pages 203-212 *in* Abbott, P.L., and W.J. Elliott (eds.), Environmental perils, San Diego Region. San Diego Association of Geologists, San Diego, CA.

Odling-Smee, F.J., K.N. Laland, and M.W. Feldman. 1996. Niche construction. American Naturalist 147:641-648.

Ogden Environmental and Energy Services Co., Inc. (Ogden). 1998. Stephens' kangaroo rat study for the Ramona airport expansion project, Ramona, California. Prepared for KEA Environmental. January.

Olson, D.M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underwood, J.A. D'Amico, I. Itoua, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, T.H. Ricketts, Y. Kura, J.F. Lamoreux, W.W. Wettengel, P. Hedao, and K.R. Kassem. 2001. Terrestrial ecoregions of the world: a new map of life on Earth. BioScience 51(11):933-938.

Orr, D.W. 2001. The urban-agrarian mind. Chapter 7 in Freyfogle, E.T. (ed.), The new agrarianism—land, culture, and the community of life. Island Press, Washington, DC. 291 pp.

Oxendine, J. 1980. The Luiseño girls' ceremony. Journal of California and Great Basin Anthropology 2(1): 37-50.

Oxendine, J. 1983. The Luiseño village during the Late Prehistoric era. Doctoral dissertation, Department of Anthropology, University of California at Riverside, CA.

Pacific Southwest Biological Services, Inc. (PSBS). 1991. Report of a biological assessment of the San Diego Water Authority optimal storage study sites. Prepared for Woodward-Clyde Consultants. February.

Pacific Southwest Biological Services, Inc. (PSBS), Kawasaki, Theilacker, Ueno and Associates, SJM Biological Consultants, and Brown-Berry Biological Consultants. 1993. San Diego County Water Authority emergency water storage project biological resource assessment. Reservoir sites. Vols. 1 and 2: Biological resource assessment and appendices. Prepared for Ogden Environmental and Energy Services and San Diego County Water Authority, San Diego, CA. September.

Paul, M.J., and J.L. Meyer. 2001. Streams in the urban landscape. Annual Review of Ecology and Systematics 32:333-365.

Peet, M.R. 1949. San Pasqual, a crack in the hills*.* The Highland Press, Culver City, NV.

Peters, R.L., and J.D.S. Darling. 1985. The greenhouse effect and nature reserves. BioScience 35:707-717.

Peters, R.S., D.M. Waller, B. Noon, S.T.A. Pickett, D. Murphy, J. Cracraft, R. Kiester, W. Kuhlmann, O. Houck, and W.J. Snape III. 1997. Standard scientific procedures for implementing ecosystem management on public lands. *In* Pickett, S.T.A., R.S. Ostfeld, M. Shachak, and G.E. Likens (eds.), The ecological basis of conservation: heterogeneity, ecosystems, and biodiversity. Chapman and Hall, New York, NY.

Pickett, S.T.A., and J.N. Thompson. 1978. Patch dynamics and the design of nature reserves. Biological Conservation 13:27-37.

Pickett, S.T.A., M.L. Casenasso, J.M. Grove, C.H. Nilon, R.V. Pouyat, W.C. Zipperer, and R. Costanza. 2001. Urban ecological systems: linking terrestrial ecological, physical, and socioeconomic components of metropolitan areas. Annual Review of Ecology and Systematics 32:127-157.

Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegaard, B.D. Richter, R.E. Sparks, and J.C. Stromberg. 1997. The natural flow regime: a paradigm for river conservation and restoration. BioScience 47:769-784.

Pressey, R.L., C.J. Humphries, C.R. Margules, R.I. Vane-Wright, and P.H. Williams. 1993. Beyond opportunism: key principles for systematic reserve selection. Trends in Ecology and Evolution 8:124-128.

Price, M.V., and P.R. Endo. 1989. Estimating the distribution and abundance of a cryptic species, *Dipodomys stephensi* (Rodentia: Heteromyidae), and implications for management. Conservation Biology 3:293-301.

Pryde, P.R. 2004. San Diego, an introduction to the region. Sunbelt Publications, San Diego, CA. 347 pp. 4th edition.

Raven, P.H., and D.I. Axelrod. 1995. Origin and relationships of the California flora. California Native Plant Society, Sacramento, CA. 4th edition.

Reed, A.R., J. Johnson-Barnard, and W.L. Baker. 1996. Contribution of roads to forest fragmentation in the Rocky Mountains. Conservation Biology 10:1098-1106.

Robinson, W.W. 1979. Land in California. University of California Press, Berkeley and Los Angeles, CA. 1st paperback edition.

Rogers, M.J. 1929. The stone art of the San Dieguito plateau. American Anthropologist 31(3)454-467.

Rogers, M.J. 1936. Yuman pottery making. San Diego Museum Papers No. 2. San Diego Museum of Man, San Diego, CA.

Rogers, M.J. 1939. Early lithic industries of the lower basin of the Colorado River and adjacent desert areas. San Diego Museum Papers No. 3. San Diego Museum of Man, San Diego, CA.

Rogers, M.J. 1945. An outline of Yuman prehistory. Southwestern Journal of Anthropology 1(1):167-198.

Rottenborn, S.C. 1999. Predicting impacts of urbanization on riparian bird communities. Biological Conservation 88:289-299.

Rush, P.S. 1965. Some old ranchos and adobes. Neyenesch Printers, San Diego, CA.

Ryan, F.B. 1970. Early days in Escondido. Published by Frances and Lewis Ryan, Escondido, CA.

Sampson, M.P., and S.M. Hector. 2005. Site preservation, community activism, and a future for California archaeology. Paper presented at the 39th annual meeting of the Society for California Archaeology, Sacramento, CA.

San Diego Association of Governments (SANDAG). 1995. San Diego County vegetation data. http://www.sandag.org/resources/maps_and_gis/gis_downloads/senlu.asp.

San Diego Regional Water Quality Control Board (RWQCB). 1994. Water quality control plan for the San Diego basin (9). September.

Sargeant, A.B., and D.W. Warner. 1972. Movements and denning habits of a badger. J. Mamm. 53:207-210.

Saunders, D.A., R.J. Hobbs, and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: a review. Conservation Biology 5:18-32.

Sawyer, J.O., and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento, CA. 471 pp.

Scott, J.M., F. Davis, B. Csuti, R.F. Noss, B. Butterfield, C.R. Groves, H. Anderson, S. Caicco, F. D'Erchia, T.C. Edwards, Jr., J. Ulliman, and R.G. Wright. 1993. Gap analysis: a geographic approach to protection of biological diversity. Wildlife Monographs No. 123. Supplement to the Journal of Wildlife Management 57(1).

Scott, T.A. 1990. Conserving California's rarest white oak: the Engelmann oak. Fremontia 18(3):26-29.

Scott, T.A. 1991. The distribution of Engelmann oak (*Quercus engelmannii*) in California. Pages 351-359 *in* USDA Forest Service General Technical Report, PSW-126.

Shugart, H.H., and D.C. West. 1981. Long term dynamics of forest ecosystems. American Scientist 69:647-652.

Smith, G.A., and S.M. Freers. 1994. Fading images: Indian pictographs of Western Riverside County. Riverside Museum Press, Riverside, CA.

Soulé, M.E., A.C. Alberts, and D.T. Bolger. 1992. The effects of habitat fragmentation on chaparral plants and vertebrates. Oikos 76:39-47.

Soulé, M.E., and J. Terborgh (eds.). 1999. Continental conservation: scientific foundations of regional reserve networks. Island Press, Washington, DC. 227 pp.

Sparkman, P.S. 1908. The culture of the Luiseño Indians. University of California Publications in American Archaeology and Ethnology 8(4):187-234.

Spellerburg, I.F. 1998. Ecological effects of roads and traffic: a literature review. Global Ecology and Biogeography Letters 7:317-333.

Spier, L. 1923. Southern Diegueño customs. University of California Publications in American Archaeology and Ethnology 20:295-358.

Stebbins, G.L., and J. Major. 1965. Endemism and speciation in the California flora. Ecological Monographs 35(1):1-35.

Stein, B.A., L.S. Kutner, and J.S. Adams (eds.). 2000. Precious heritage: the status of biodiversity in the United States. Oxford University Press, New York, NY.

Strittholt, J.R., N.L. Staus, and M.D. White. 2000. Importance of Bureau of Land Management roadless areas in the Western U.S.A. Prepared for the National Bureau of Land Management Wilderness Campaign by the Conservation Biology Institute. March.

Suarez, A.V., D.T. Bolger, and T.J. Case. 1998. Effects of fragmentation and invasion on native ant communities in coastal Southern California. Ecology 79:2041-2056.

Swift, C.C., T.R. Haglund, M. Ruiz, and R.N. Fisher. 1993. The status and distribution of the freshwater fishes of Southern California. Bull. Southern California Acad. Sci. 92(3):101-167.

The Nature Conservancy (TNC). 2003. Landscape-scale conservation—a practitioner's guide. G. Low (ed.). 35 pp + app. 4th edition.

Trombulak, S.C., and C.A. Frissell. 2000. Review of the ecological effects of roads on terrestrial and aquatic communities. Conservation Biology 14:18-30.

True, D.L. 1954. Pictographs of the San Luis Rey basin, California. American Antiquity 19(1):68-72.

True, D.L. 1958. An early complex in San Diego County, California. American Antiquity 23:255-263.

True, D.L. 1966. Archaeological differentiation of Shoshonean and Yuman speaking groups in Southern California. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Los Angeles, CA.

True, D.L. 1970. Investigation of a Late Prehistoric complex in Cuyamaca Rancho State Park. Archaeological Survey Monograph. University of California, Los Angeles, CA.

True, D.L. 1980. The Pauma complex in northern San Diego County: 1978. Journal of New World Archaeology 2:1-39.

True, D.L. 1993. Bedrock milling elements as indicators of subsistence and settlement patterns in northern San Diego County, California. Pacific Coast Archaeological Society Quarterly 29(2):1-26.

True, D.L., and G. Waugh. 1982. Proposed settlement shifts during San Luis Rey times, northern San Diego County. Journal of California and Great Basin Anthropology 4(1):34-54.

U.S. Department of Agriculture (USDA). 1973. Soil survey, San Diego area, California. Soil Conservation Service, Washington, DC. December.

U.S. Fish and Wildlife Service (USFWS). 1988. Determination of endangered status for Stephen's kangaroo rat. 53 FR 38465- 38469.

U.S. Fish and Wildlife Service (USFWS). 1997. Draft recovery plan for the Stephens' kangaroo rat. Region 1, Portland, OR. April.

U.S. Fish and Wildlife Service (USFWS). 1999. Arroyo southwestern toad (*Bufo microscaphus californicus*) recovery plan. U.S. Fish and Wildlife Service, Portland, OR. vi + 119 pp.

U.S. Fish and Wildlife Service (USFWS). 2005. Final Critical Habitat designation for the arroyo toad (*Bufo californicus*). 70 FR 19561-19633.

Unitt, P. 2004. San Diego County bird atlas. Proceedings of the San Diego Society of Natural History No. 39. October. Ibis Publishing Company.

Van Camp, G.R. 1979. Kumeyaay pottery. Ballena Press, Socorro, NM.

Warren, C.N. 1964. Cultural change and continuity on the San Diego coast. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Los Angeles, CA.

Warren, C.N. 1968. Cultural tradition and ecological adaptation on the Southern California coast. Pages 1-14 *in* Irwin-Williams, C. (ed.), Archaic prehistory in the Western United States. Eastern New Mexico University Contributions in Anthropology No. 1. Portales, AZ.

Warren, C.N. 1985. Garbage about the foundations: a comment on Bull's assertion. Casual Papers: Cultural Resource Management 2(1):82-90. Cultural Resource Management Center, San Diego State University, San Diego, CA.

Warren, C.N. 1987. The San Dieguito and La Jolla: some comments. Pages 73-85 *in* Gallegos, D., San Dieguito-La Jolla: chronology and controversy. San Diego County Archaeological Society, Research Paper No. 1.

Warren, C.N., G. Siegler, and F. Dittmer. 1993. PaleoIndian and Early Archaic periods. *In* Historic properties background study for the City of San Diego Clean Water Program. Brian F. Mooney Associates, San Diego, CA.

Waterman, T.T. 1910. The religious practices of the Diegueño Indians. University of California Publications in American Archaeology and Ethnology 8(6).

Waugh, M.G. 1986. Intensification and land-use: archaeological indication of transition and transformation in a Late Prehistoric complex in Southern California. Doctoral dissertation, Department of Anthropology, University of California at Davis, CA.

WESTEC Services, Inc. 1988. Cultural resource reconnaissance of Boden Canyon potential landfill sites. On file at South Coastal Information Center, San Diego State University, CA.

Western Regional Climate Center. 2005. Southern California climate summaries. http://www.wrcc.dri.edu/summary/climsmsca.html.

Westman, W.E. 1983. Xeric Mediterranean-type shrubland associations of Alta and Baja California and the community/continuum debate. Vegetatio 52:3-19.

White, M.D., and K.A. Greer. 2006. The effects of watershed urbanization on the stream hydrology and riparian vegetation of Los Peñasquitos Creek, California. Landscape and Urban Planning 74(2):125-138.

White, R.C. 1963. Luiseño social organization. University of California Publications in American Archaeology and Ethnology 48(2):91-194.

Whitley, D.S. 2000. The art of the Shaman—rock art of California. The University of Utah Press, Salt Lake City, UT.

Wilcove, D.S., D. Rothstein, J. Subow, A. Philips, and E. Losos. 2000. Leading threats to biodiversity: what's imperiling U.S. species? Chapter 8 *in* Stein, B.A., L.S. Kutner, and J.S. Adams (eds.), Precious heritage: the status of biodiversity in the United States. Oxford University Press, New York, NY.

Zedler, P.H., C.R. Gautier, and G.S. McMaster. 1983. Vegetation change in response to extreme events: the effect of a short interval between fires in California chaparral and coastal scrub. Ecology 64(4):809-818.

APPENDICES

Appendix A
Data Sources and Methods

A.1 Data Sources

GIS	Type	Scale	Date	Source
Arroyo toad critical habitat	Polygon	1:63,500	2005	U.S. Fish and Wildlife Service
County boundaries	Polygon	1:24,000	1995	U.S. Forest Service Region 5
Dams	Point	1:250,000	1994	CA Resources Agency Legacy Project
Digital Elevation Model—San Diego County	Raster	10m	mid-1970s	U.S. Geological Survey
Digital Elevation Model—Southern California	Raster	30m	varies	U.S. Geological Survey
Ecological section boundaries	Polygon	unknown	1994	U.S. Forest Service Remote Sensing Lab
Lakes	Polygon	1:100,000	1998	Teale Data Center
Land use—San Diego County	Polygon	unknown	2000	San Diego Assoc. of Governments
Protected areas—California	Polygon	varies	2004	CBI Protected Areas Database 2004
Protected areas—San Diego MSCP	Polygon	unknown	2004	MSCP HabiTrak
Protected areas—Orange County	Polygon	unknown	2004	GreenInfo Network
Protected areas—Riverside County	Polygon	unknown	unknown	Western Riverside County Regional Conservation Authority
Public ownership & protected areas—San Diego County	Polygon	unknown	2004	San Diego Assoc. of Governments
Roads	Line	1:100,000	1995	U.S. Geological Survey
Soils—by county	Polygon	1:24,000	2005	SSURGO
Streams	Line	1:100,000	1998	Teale Data Center
Urban areas—California	Polygon	1:100,000	2000	CA Resources Agency Legacy Project
Urban areas—Southern California	Polygon	unknown	2002	CA Dept. of Conservation FMMP
Vegetation—California	Polygon	unknown	1998	CA Gap Analysis Project
Vegetation—Riverside County	Polygon	unknown	unknown	CA Dept. of Fish and Game
Vegetation—San Diego County	Polygon	1:24,000	1995	San Diego Assoc. of Governments
Vegetation (CALVEG)—Southern California	Polygon	unknown	2003	CA Dept. of Forestry & Fire Protection
Watershed boundaries	Polygon	1:24,000	1999	CA Dept. of Forestry & Fire Protection

FMMP = Farmland Mapping and Monitoring Program
SSURGO = Natural Resources Conservation Service, Soil Survey Geographic Database

Cultural

South Coastal Information Center, San Diego State University
Malcolm Rogers notes, San Diego Museum of Man
San Diego Historical Society archives
Original surveyor's plat maps and land grant maps
Interviews with local experts

A.2 Methods

Land cover

We constructed a land cover dataset for the Southern California region from the following sources: CALVEG, the 1998 version of the California Gap Analysis Program (GAP) vegetation dataset, and the FMMP agricultural data. CALVEG was used as the primary data source, but the GAP vegetation was used to fill in small areas that were not covered by CALVEG. The extent of agricultural areas was updated with the FMMP data.

Conserved areas

We constructed a conserved areas dataset for the Southern California region from the following sources: SANDAG public ownership dataset updated in 2004 and newly acquired land for the MSCP from HabiTrak for San Diego County, public and quasi-public conserved lands dataset from the Western Riverside County Regional Conservation Authority for western Riverside County, and GreenInfo Network Southern California Public Lands Database for Orange and Los Angeles counties. The CBI Protected Areas Database for California was used to identify wilderness areas and other Gap-1 equivalent status areas. Public/protected lands were assigned the following codes based on land management status:

Management 1—strictly protected areas that are maintained in their natural state and within which natural disturbance events are either allowed to proceed without interference or are mimicked through management (e.g., Gap-1 equivalent areas).

Management 2—moderately protected public areas including NCCP reserves, regional parks, state parks, CDFG lands, and national wildlife refuges.

Management 3—most non-designated public lands including BLM or USFS.

Management 5—Military reserves.

Management 6—Indian reservations.

Ecological integrity

The ecological integrity of a landscape refers to the extent that it remains free of human modifications, which is an indication of the ability of ecosystems to function naturally. In our model, we used the distribution and extent of human land cover alteration from roads and urban and agricultural development to construct a simple cost surface over the region, which could be used to investigate ecological integrity within watershed units and across the terrestrial landscape. Costs ranged from 0 to 5, with cost and ecological integrity inversely related. Costs were assigned in the following manner:

1. The 1:100,000-scale USGS roads dataset was buffered according to road class and assigned the following scores (0 = no cost, 5 = high cost):

Road class	Buffer	Cost
Class 1 (major highways)	30m (98 ft)	5
Class 2 (major roads)	20m (66 ft)	5
Class 3 (minor roads)	5m (16 ft)	3
Classes 4,5 (streets and trails)	2m (6 ft)	3

2. Land cover categories in the land cover dataset were assigned costs in the following manner:

Land cover type	Cost
Urban	5
Agriculture	3
Natural habitats	0

Watershed integrity

Total area-weighted costs were calculated for each individual 6th field basin in the study area, producing a final cost of 0 (high integrity) to 5 (low integrity) for each basin. Watershed integrity scores (Figure 9) were divided into five classes:

Watershed integrity	Cost range
Very high	0 - 0.25
High	0.26 - 1.0
Moderate	1.01 – 2.0
Low	2.01 – 3.0
Very low	3.01 – 5.0

Terrestrial integrity

A grid with 5,000 ft^2 cells was placed over the region. Total area-weighted costs were calculated for each grid cell, and each cell was assigned a final score from 0 (high integrity) to 5 (low integrity). Terrestrial integrity scores (Figure 10) were divided into 5 classes:

Terrestrial integrity	Cost range
Very high	0 - 0.10
High	0.11 – 0.5
Moderate	0.51 – 1.0
Low	1.01 – 2.5
Very low	2.51 – 5.0

Vegetation representation analysis

We used the land cover and conservation areas datasets to assess the representation of vegetation associations in conserved areas in the region and in the Western Granitic Foothills and Cuyamaca-Palomar Mountain ecological subsections. We considered only management types 1, 2, and 3 as conserved areas in the analysis. We calculated the acres and the percentage of each vegetation association from the land cover data that were included in conserved areas within the three geographic units.

Roadless areas

The major drawback of the USFS Inventoried Roadless Areas dataset is that it covers only roadless areas within National Forests. Therefore, we developed a method to determine the location of roadless areas across entire landscapes based on existing roads data. Roadless areas were mapped for the Southern California region using the USGS 1:100,000-scale roads coverage. We identified all of the contiguous areas that are located more than 500 m (1,640 ft) from a road. We then reselected all of these areas that were greater than 500 acres in size and buffered the polygons by 400 m (1,312 ft). This resulted in a roadless areas dataset for the entire study area at a scale of 1:100,000. A finer-scaled roads dataset may result in fewer and/or smaller roadless areas.

Habitat evaluation model for the Stephens' kangaroo rat

Wayne Spencer (CBI) prepared and refined a habitat evaluation model for the Stephens' kangaroo rat based on vegetation, soils, and slope (Figure 14). He first developed an early version of the model for the Santa Maria Valley (Ramona area) in 1998, shortly after he and Steve Montgomery first discovered the Ramona Stephens' kangaroo rat population. He later expanded and refined this model as part of conservation planning efforts for the North San Diego County MSCP plan, which has targeted Stephens' kangaroo rat as a priority species for reserve design. This version of the model was reviewed in 2001 by an independent scientific advisory panel, which included Dr. Patrick Kelly, a recognized authority on Stephens' kangaroo rat and other kangaroo rat species. Most recently, this model was expanded to cover all of San Diego County for purposes of depicting the known and likely distribution of Stephens' kangaroo rat in the county. This was done as part of the San Diego County Mammal Atlas, a collaborative effort to update information on all San Diego mammal species. Expert opinion and limited field reconnaissance is currently being used to edit the resulting countywide map to show all known Stephens' kangaroo rat populations and other habitat areas likely to support Stephens' kangaroo rat.

The following factors were combined to create the Stephens' kangaroo rat model:

1. <u>Soils</u>. Soils were ranked as having High, Medium, or Low potential to support Stephens' kangaroo rat based on physical soil characteristics as described in the San Diego Area Soil Survey (USDA 1973). The Stephens' kangaroo rat generally requires well-drained soils that allow easy burrowing to at least about 24 in. or as deep as 46 in. The soil must also be able to support a burrow (e.g., pure sands collapse too easily). The soil rankings considered the full description of soil attributes, with a bias toward potentially over-representing soil value to Stephens' kangaroo rat for soil types having highly variable characteristics (i.e., leading to potential errors of commission rather than omission). The following general guidelines were used in assigning value to each soil type in the study area (a full listing of ranks is available upon request):

    High—Generally, any deep to very deep loamy soils (including sandy loams, loamy sands, loams, and silt loams that are generally deeper than about 32 in.), with relatively low gravel, rock, or cobble content, and that are friable and not often saturated.

Moderate—Generally, soils that don't quite qualify as high due to higher potential for saturation or impediments to burrowing, such as loamy soils that are moderately deep (about 16-32 in.) or that have hard subsoils. Soil types in a soil series otherwise classified as *High* were decremented to *Moderate* if they have very high rock, cobble, or gravel content. Soil series otherwise ranked as *Low*, but having potential inclusions of deep, friable loams, were incremented to *Moderate*.

Low—Non-loam soils (sands, clays, silts) or otherwise very hard soils (e.g., some clay loams or sandy clays that are classified as very hard or extremely hard); shallow or very shallow soils (less than 12 in. to a very hard subsoil or 16 in. to an impenetrable layer); soils in floodplains subject to periodic inundation; or predominantly unsuitable soils that may have smaller inclusions of suitable soils (e.g., clays with occasional sandy loam hillocks).

None—All non-suitable soils or non-soil surfaces, including rock quarries, tidal flats, open water, gravel pits, etc.

2. Vegetation**.** The Stephens' kangaroo rat is strongly associated with open grasslands or very sparse coastal sage scrub. It is a pioneering species that may invade fallow agricultural fields or the edges of active agricultural areas (such as cattle pasture or edges of row crops). Vegetation was therefore ranked for Stephens' kangaroo rat as follows:

   High—Grasslands (includes both native perennial and nonnative annual grasslands, which are not differentiated in the vegetation database).

   Moderate—Most Extensive Agriculture (includes row crops, pastures, fallow lands, etc.). Extensive agricultural areas on highly suitable soils may rank *High*.

   Low—Coastal Sage Scrub (most coastal sage scrub in the study area is likely too dense to support the species, although Stephens' kangaroo rat may occupy openings in coastal sage scrub or invade following disturbances, such as fire).

   None—All other vegetation communities, Developed lands, or Intensive Agriculture (greenhouses, orchards, etc.).

3. Slope**.** Gentler slopes (less than 30%) were ranked as high, and slopes over 30% were ranked as low. Although Stephens' kangaroo rat may sometimes occupy steeper slopes, it is most abundant on gentler slopes and seems to prefer slopes less than about 11%.

All possible combinations of soils, vegetation, and slope rankings were assigned a value of *Very High, High, Moderate*, or *Low* (Table A-1). Grasslands on high quality (deep loam) soils and gentle slopes rank *Very High*. As with most burrowing rodents, habitat suitability falls off quickly with decreasing soil suitability; and quality falls off as vegetation becomes denser or slopes steeper. The intent of the model is to differentiate those areas most capable of supporting Stephens' kangaroo rat populations over the long-term, and thereby which are most important to species conservation. This model is therefore not overly conservative (as it should be if the intent were to predict possible occurrence of Stephens' kangaroo rat for regulatory reasons). The model might predict low or no habitat value in some areas that actually support small numbers of Stephens' kangaroo rat in some years. For example, although it is possible some Stephens' kangaroo rats occur in the region on steep coastal sage scrub slopes having clay loam soils (e.g., along road berms), these should not be considered priority conservation areas for Stephens' kangaroo rats relative to more open, gentle grasslands on deep loams.

On the other hand, it should be noted that available soils and vegetation maps are fairly coarse, relative to the scale at which the Stephens' kangaroo rat selects habitats, and contain some inaccuracies. For example, there is a great deal of variation in the physical soil characteristics within a polygon mapped as a single soil series or type. Soil types that generally are not very good for Stephens' kangaroo rats may have inclusions of high quality areas (e.g., pockets of deep sandy loams within otherwise heavier clay loams); and soil types that are generally good for Stephens' kangaroo rats may contain large, unsuitable areas (e.g., where erosion has removed deeper loams). Thus, assignment of value to specific soil types was generally very conservative, tending to over-rate rather than under-rate some soils types. Field verification of on-the-ground soil and vegetation attributes is essential to determining actual Stephens' kangaroo rat habitat potential.

Table A-1. Stephens' kangaroo rat habitat suitability rankings.

<30% slope

	Soil Suitability			
Vegetation Type	**High**	**Moderate**	**Low**	**None**
Grassland	Very High	Moderate	Low	None
Extensive agriculture	High	Moderate	Low	None
Coastal sage scrub	Low	Low	None	None
Other	None	None	None	None

>30% slope

	Soil Suitability			
Vegetation Type	**High**	**Moderate**	**Low**	**None**
Grassland	Moderate	Low	None	None
Extensive agriculture	Low	Low	None	None
Coastal sage scrub	Low	Low	None	None
Other	None	None	None	None

Appendix B
Known Archaeological Sites in the Vicinity of Rancho Guejito

SDI Site #	Location	Type	Description
710	Adobe Flats	Resource camp	Bedrock mortars, small midden deposit; adjacent adobe ruin
753	East Valley	Seed grinding station	Bedrock metate slicks
754	East Valley	Seed grinding station	Bedrock metate slicks
755	East Valley	Seed grinding station	Bedrock metate slicks, may be additional materials but visibility is poor
1012	East Valley	Resource camp	Late Prehistoric camp—tools, midden bedrock mortars, pottery
264	Guejito Creek	Resource camp	Bedrock mortars, metate slicks, small midden deposit
279	Guejito Creek	Resource camp	Bedrock metate slicks used for seed processing
280	Guejito Creek	Resource camp	Bedrock metate slicks used for seed processing
281	Guejito Creek	Small village	Flakes, midden, pottery, shellfish, bone; Late Prehistoric site
282	Guejito Creek	Small village	Slick and basin metates, flakes, midden, potsherds; Late Prehistoric site
756	Guejito Creek	Resource camp	Late Prehistoric campsite with midden and flakes
1013	Guejito Creek	Resource camp	Late Prehistoric camp—tools, midden bedrock mortars, pottery
709	Long Valley	Resource camp	Bedrock mortars, some very large; midden, flakes
711	Long Valley	Pictographs	Rock art site w/ anthropomorphic figures. Henry Rodriguez, Luiseño, provided information about site to D.L. True, 1960.
712	Long Valley	Small village	Midden, flakes, bedrock mortars
713	Long Valley	Resource camp, stone circles	Bedrock mortars, midden; ring of stones in a circle on bedrock, pottery present. Late Prehistoric.
SDM-W-273	Pine Mountain (Weyeto)	Pictograph	Feathered "S" painting at base of the mountain
None	Rockwood Canyon	Pictograph	Large boulder with paintings
263	Sycamore Flats	Resource camp	Bedrock mortars and midden deposit
11900	Upper Guejito Valley	Village	Milling features, flakes, pottery, groundstone, possible human bone, fragments of a pottery figurine. Late Prehistoric
13330	Upper Guejito Valley	Large village	3 loci—milling features, flakes, groundstone, pottery, tools; multiple locations representing a Late Prehistoric village. Chert and burned shell (abalone) indicate trade.
13331	Upper Guejito Valley	Large village	4 loci—bedrock milling, projectile points, pottery, stone tools and flakes. Late Prehistoric.
13332	Upper Guejito Valley	Large village	7 loci—milling, bone, obsidian flakes, projectile points, groundstone, bedrock milling, many stone tools. Pottery and point types support a Late Prehistoric date.
13333	Upper Guejito Valley	Small village or camp	2 loci—bedrock milling, groundstone, pottery, and projectile points. Late Prehistoric

SDI Site #	Location	Type	Description
13334	Upper Guejito Valley	Village	3 loci—milling features, stone tools, projectile points, pottery. Late Prehistoric
13335	Upper Guejito Valley	Milling features and rock circles	3 loci, 2 rock circles and bedrock slicks and mortars; quartz flakes
13336	Upper Guejito Valley	Small village or camp	Bedrock milling, flakes, tools, projectile points, pottery (Tizon Brown Ware and Colorado Buff Ware), shell. Late Prehistoric
13337	Upper Guejito Valley	Village	6 loci—bedrock milling, flakes, groundstone artifacts
13338	Upper Guejito Valley	Historic dam and debris	Cobble and cement dam with early 20th century artifacts nearby
13339	Upper Guejito Valley	Lithic camp	Flaking station with chert and quartzite
13340	Upper Guejito Valley	Seed processing station	Bedrock metate slicks; 1 mano
13341	Upper Guejito Valley	Large village and rock art	4 loci—milling features, groundstone, flakes, burned bone, rock features, midden. 1 rock circle. Rock art in the form of cupules. Pottery and projectile points date site to Late Prehistoric period.
13342	Upper Guejito Valley	Lithic camp	Flakes from tool manufacturing
13343	Upper Guejito Valley	Seed processing station	Bedrock metate, 1 Late Prehistoric projectile point made from quartz crystal.
13344	Upper Guejito Valley	Camp with hearth	Hearth feature—manos, metate fragments, cores and flakes
13345	Upper Guejito Valley	Seed processing station	Metate slicks, mortars, projectile point, flakes
13346	Upper Guejito Valley	Seed processing station	Metate slicks, flakes, rock feature in the form of a pile of stones
13347	Upper Guejito Valley	Seed processing station	Metate slicks
13348	Upper Guejito Valley	Seed processing station	Metate slicks
13349	Upper Guejito Valley	Camp for seed processing	Metate slicks, mortars, flakes, a pestle, pottery; Late Prehistoric
13350	Upper Guejito Valley	Large village site	5 loci—milling features, pottery (Tizon Brown Ware and Colorado Buff Ware), groundstone, flakes including obsidian, and tools. Late Prehistoric.
13351	Upper Guejito Valley	Seed processing station	Metate slick
13352	Upper Guejito Valley	Small seed processing camp	Metate slicks, biface, and flakes
13353	Upper Guejito Valley	Seed processing station	Metate slicks, flakes, tool
13354	Upper Guejito Valley	Resource camp	Metate slick, quartz biface, flakes, scraping tool, hammerstone; this may be a basket fiber processing station
13355	Upper Guejito Valley	Lithic processing station	Quartz and volcanic stone flakes
13356	Upper Guejito Valley	Extended camp or small village	2 loci with metate slicks and mortars, flakes, pottery, groundstone, biface
13357	Upper Guejito Valley	Seed processing station	Metate slicks

SDI Site #	Location	Type	Description
13358	Upper Guejito Valley	Seed processing station	Metate slick
13359	Upper Guejito Valley	Resource processing station	Mortars and bedrock metates, flakes
13360	Upper Guejito Valley	Resource processing station	Metate slicks, groundstone, and flakes
13361	Upper Guejito Valley	Resource camp	Milling features including slicks, basins, metates; pottery, flakes including obsidian, bone, projectile point. Late Prehistoric
13362	Upper Guejito Valley	Resource camp	Metate slicks, mortars, flakes; possible midden
13363	Upper Guejito Valley	Village	5 loci—midden milling features, manos, flakes, a pestle, pottery, burned bone, and shell. Late Prehistoric.
13364	Upper Guejito Valley	Large village	3 loci. Bedrock outcrop w/ milling and 4 rock circles, pottery including an incised potsherd, bifaces, tools, burned bone and burned shell; extensive midden deposits. Late Prehistoric
13365	Upper Guejito Valley	Seed processing station	Metate slicks, flakes
13366	Upper Guejito Valley	Small village or camp	Two loci consisting of midden with hearth feature, milling features, pottery, mano, projectile point. Late Prehistoric.
13367	Upper Guejito Valley	Milling station	Metate slicks and mortars
13368	Upper Guejito Valley	Milling feature	One metate slick
13369	Upper Guejito Valley	Large village and rock art site	5 loci—midden, mortars and slicks, flakes, burned bone, flakes, groundstone, tools, pottery, cupule rock art. Late Prehistoric.
13370	Upper Guejito Valley	Seed processing station	Metate slicks
13371	Upper Guejito Valley	Seed processing station	Metate slicks and basins
13372	Upper Guejito Valley	Seed processing station	Metate slick and basin
13373	Upper Guejito Valley	Lithic artifact scatter	Bedrock metate and basin, biface, and flakes
13374	Upper Guejito Valley	Seed processing station	Metate slick
13375	Upper Guejito Valley	Lithic artifact manufacturing	Flakes and shatter
13376	Upper Guejito Valley	Seed processing station	Metate slick
13377	Upper Guejito Valley	Lithic artifact manufacturing	Flakes and shatter
13378	Upper Guejito Valley	Resource camp	Midden site with milling features, flakes, groundstone artifacts
13379	Upper Guejito Valley	Seed processing station	Metate slick
13380	Upper Guejito Valley	Seed processing station	Metate slick
13381	Upper Guejito Valley	Seed processing station	Metate slicks

SDI Site #	Location	Type	Description
13382	Upper Guejito Valley	Lithic artifact manufacturing	Flakes and shatter
13383	Upper Guejito Valley	Seed processing station	Metate slicks
13384	Upper Guejito Valley	Resource camp	Midden site—dense concentration of milling features, flakes, metate fragments, pottery. Late Prehistoric.
13385	Upper Guejito Valley	Historic reservoir	Early 20^{th} century reservoir made of earth, various pieces of farm equipment and machine parts
13386	Upper Guejito Valley	Seed processing station	Metate slicks
13387	Upper Guejito Valley	Lithic artifact scatter	Flakes, tools (scrapers), and cores
13388	Upper Guejito Valley	Resource camp	Milling features (slicks, basins, and mortars), flakes, groundstone, biface and other tools
13389	Upper Guejito Valley	Small camp	Bedrock milling features, rock cairn, flakes, pottery, projectile point. Late Prehistoric.
13390	Upper Guejito Valley	Resource camp	2 loci. Midden site with flakes, tools, and groundstone artifacts
13391	Upper Guejito Valley	Seed processing station	Metate slicks and basins
13392	Upper Guejito Valley	Seed processing station	Metate slicks and one flake
13394	Upper Guejito Valley	Seed processing station	Metate slicks and a core
13395	Upper Guejito Valley	Seed processing station	Metate slick
13396	Upper Guejito Valley	Seed processing station	Metate slick
13409	West Valley	Village site	2 loci including groundstone, bifaces, pottery, flakes including obsidian, shell, burned bone

Appendix C

Analysis of vegetation community representation in protected areas in the region and two subsections.

Native Vegetation	REGION Vegetation (acres)	Protected (acres)	% Protected	WESTERN GRANITIC FOOTHILLS Subsection (acres)	Protected (acres)	% Protected	PALOMAR-CUYAMACA PEAK Subsection (acres)	Protected (acres)	% Protected
Grasslands									
Annual Grassland	285,690	61,697	22%	32,876	2,770	8%	24,633	6,266	25%
Perennial Grassland	59,986	3,915	7%	4,295	187	4%	22,046	2,692	12%
Scrubs									
Alluvial Fan Sage Scrub	2,007	508	25%	677	69	10%	120	0	0%
Basin Sagebrush	14,843	2,764	19%	15	0	0%	2,624	733	28%
California Sagebrush	366,691	121,178	33%	86,800	29,274	34%	3,507	1,440	41%
Buckwheat (White Sage) Scrub	127,682	44,959	35%	7,062	2,488	35%	7,935	3,572	45%
Coastal Cactus Scrub	3,771	1,437	38%	-	-	-	-	-	-
Coastal Scrub	25,472	1,409	6%	-	-	-	-	-	-
Coastal Bluff Scrub	199	30	15%	-	-	-	-	-	-
Desert Buckwheat Scrub	3,327	1,324	40%	202	1	1%	1,738	286	16%
Desert Scrub	126,062	87,080	69%	-	-	-	-	-	-
Desert Succulent Shrub	3,419	1,953	57%	-	-	-	-	-	-
Encelia Scrub	133,446	103,559	78%	-	-	-	124	34	28%
Mixed Desert Wash Scrub	683	662	97%	-	-	-	-	-	-
Saltbush Scrub	2,440	805	33%	-	-	-	-	-	-
Chaparrals									
Chamise Chaparral	217,135	122,535	56%	53,850	27,177	50%	62,992	38,302	61%
Chamise-Redshank Chaparral	31,937	7,927	25%	-	-	-	-	-	-
Curlleaf Mountain Mahogany	20	20	100%	-	-	-	-	-	-
Foothill Mixed Chaparral	22,321	11,442	51%	3,171	1,720	54%	74	74	100%
Manzanita Chaparral	4,173	2,098	50%	-	-	-	3,183	1,132	36%
Mixed Chaparral	33,950	24,278	72%	-	-	-	-	-	-
Montane Mixed Chaparral	19,148	11,924	62%	-	-	-	14,683	8,364	57%
Northern Mixed Chaparral	854,534	459,742	54%	197,521	77,311	39%	236,726	136,576	58%
Semi-desert Chaparral	84,712	60,637	72%	-	-	-	3,318	1,090	33%
Red Shank Chaparral	213,031	121,469	57%	10	0	0%	59,017	35,202	60%

Appendix C

Analysis of vegetation community representation in protected areas in the region and two subsections.

	REGION			WESTERN GRANITIC FOOTHILLS			PALOMAR-CUYAMACA PEAK		
Native Vegetation	Vegetation (acres)	Protected (acres)	% Protected	Subsection (acres)	Protected (acres)	% Protected	Subsection (acres)	Protected (acres)	% Protected
Soft Scrub-Chaparral	9,000	2,457	27%	-	-	-	-	-	-
Southern Mixed Chaparral	38,371	20,468	53%	32,508	16,485	51%	1,865	1,774	95%
Sumac Shrub Chaparral	11,318	6,166	54%	-	-	-	90	87	97%
Wet Meadows/Marsh									
Arrowweed	72	42	59%	-	-	-	28	0	0%
Pickleweed - Cord Grass	2,141	1,647	77%	-	-	-	-	-	-
Saline Emergent Wetland	1,268	556	44%	-	-	-	-	-	-
Tule - Cattail - Sedge	3,632	969	27%	149	119	80%	953	7	1%
Water	29,026	13,202	45%	2,743	257	9%	3,287	55	2%
Wet Meadow	7,020	694	10%	168	0	0%	4,686	338	7%
Riparian									
Baccharis (riparian)	2,205	397	18%	702	91	13%	-	-	-
California Sycamore	3,662	1,611	44%	168	18	11%	21	8	39%
Desert Wash	5,917	2,495	42%	-	-	-	-	-	-
Fremont Cottonwood	919	340	37%	-	-	-	20	6	27%
Montane Riparian	1,837	96	5%	-	-	-	-	-	-
Mixed Riparian Hardwoods	10,685	3,711	35%	2,412	560	23%	1,130	448	40%
Valley-Foothill Riparian	7,710	5,573	72%	-	-	-	-	-	-
White Alder	60	48	79%	-	-	-	4	4	100%
Willow	17,233	4,771	28%	1,517	574	38%	983	131	13%
Woodlands									
Black Walnut	3,757	1,240	33%	-	-	-	-	-	-
California Bay	33	12	37%	-	-	-	33	7	21%
California Black Oak	11,287	5,428	48%	61	0	0%	8,260	2,717	33%
Canyon Live Oak	17,631	12,124	69%	982	320	33%	7,238	3,291	45%
Coast Live Oak	97,888	29,267	30%	31,553	6,856	22%	31,386	9,501	30%
Coastal Live Oak	210	0	0%	-	-	-	-	-	-

Appendix C

Analysis of vegetation community representation in protected areas in the region and two subsections.

	REGION			WESTERN GRANITIC FOOTHILLS			PALOMAR-CUYAMACA PEAK		
Native Vegetation	Vegetation (acres)	Protected (acres)	% Protected	Subsection (acres)	Protected (acres)	% Protected	Subsection (acres)	Protected (acres)	% Protected
Engelmann Oak	20,326	3,789	19%	10,696	1,839	17%	5,811	814	14%
Interior Live Oak	416	358	86%	-	-	-	54	0	0%
Mixed Hardwoods	7,525	1,733	23%	758	451	59%	6,661	1,275	19%
Scrub Oak	33,467	27,806	83%	3,011	2,149	71%	6,044	4,170	69%
Conifer Forests									
Bigcone Douglas-Fir	11,429	8,205	72%	742	433	58%	6,966	4,114	59%
Closed-Cone Pine-Cypress	2,665	2,665	100%	-	-	-	-	-	-
Coulter Pine	26,458	8,947	34%	267	118	44%	23,462	6,683	28%
Cuyamaca Cypress	91	91	100%	-	-	-	91	91	100%
Jeffrey Pine	18,510	14,627	79%	-	-	-	14,164	12,412	88%
Knobcone Pine	53	53	100%	-	-	-	-	-	-
Limber Pine	449	449	100%	-	-	-	-	-	-
Lodgepole Pine	159	159	100%	-	-	-	-	-	-
Mixed Conifer - Fir	24,750	22,364	90%	-	-	-	4,189	2,610	62%
Mixed Conifer - Pine	22,649	13,485	60%	-	-	-	709	341	48%
Ponderosa Pine	29	29	100%	-	-	-	-	-	-
Subalpine Conifers	1,703	1,703	100%	-	-	-	-	-	-
Tecate Cypress	5,384	5,171	96%	4,401	4,240	96%	57	57	100%
Torrey Pine	122	122	100%	-	-	-	-	-	-
White Fir	3,297	1,199	36%	-	-	-	2,863	763	27%
Desert Communities									
Blackbush	1,708	1,487	87%	-	-	-	-	-	-
Catclaw Acacia	8,205	6,931	84%	-	-	-	198	6	3%
Cheesebush	4,663	4,610	99%	-	-	-	-	-	-
Cholla	5,109	5,028	98%	-	-	-	-	-	-
Coyote Brush	246	77	31%	-	-	-	-	-	-
Creosote	62,585	52,077	83%	-	-	-	-	-	-
Desert Willow	1,047	936	89%	-	-	-	-	-	-

Appendix C

Analysis of vegetation community representation in protected areas in the region and two subsections.

Native Vegetation	REGION Vegetation (acres)	REGION Protected (acres)	REGION % Protected	WESTERN GRANITIC FOOTHILLS Subsection (acres)	WESTERN GRANITIC FOOTHILLS Protected (acres)	WESTERN GRANITIC FOOTHILLS % Protected	PALOMAR-CUYAMACA PEAK Subsection (acres)	PALOMAR-CUYAMACA PEAK Protected (acres)	PALOMAR-CUYAMACA PEAK % Protected
Dune	112	88	79%	-	-	-	-	-	-
Fan Palm	77	31	41%	-	-	-	-	-	-
Joshua Tree	1,058	606	57%	-	-	-	-	-	-
Mesquite	3,354	2,987	89%	-	-	-	1	0	0%
Mixed Desert Shrub	249,237	205,278	82%	-	-	-	25	17	69%
Mixed Desert Succulent	5,893	5,630	96%	-	-	-	25	0	0%
Ocotillo	3,378	3,297	98%	-	-	-	-	-	-
Palo Verde	3,281	2,122	65%	-	-	-	-	-	-
Rabbitbrush	8	3	43%	-	-	-	-	-	-
Scalebroom	579	65	11%	-	-	-	-	-	-
Smoke Tree - Desert Willow	2,909	2,439	84%	-	-	-	4	0	0%
White Bursage	32,996	32,079	97%	-	-	-	-	-	-
Pinyon-Juniper Woodlands									
California Juniper	48,942	45,688	93%	-	-	-	1	0	0%
Juniper	8,501	8,462	100%	-	-	-	-	-	-
Four-needle Pinyon Pine	264	197	75%	-	-	-	88	53	60%
Pinyon-Juniper	27,008	25,439	94%	-	-	-	-	-	-
Singleleaf Pinyon Pine	33,469	31,419	94%	-	-	-	-	-	-
Barren/Rock	32,195	25,172	78%	853	422	49%	739	227	31%

Source: CALVEG, FRAP 2003.

Appendix D

Selected Rare and Endangered Species Known to Occur or Potentially Occur on Rancho Guejito

SCIENTIFIC NAME	COMMON NAME	REGULATORY STATUS[1]	STATUS ON RANCHO GUEJITO[2]
Plants			
Acanthomintha ilicifolia	San Diego thornmint	FT/SE/1B/MSCP	Vicinity (CNDDB)
Arctostaphylos rainbowensis	Rainbow manzanita	1B/MSCP	County model
Baccharis vanessae	Encinitas baccharis	FT/SE/1B/MSCP	County model
Brodiaea orcuttii	Orcutt's brodiaea	FSC/1B/MSCP	Potential (PSBS), County model, Vicinity (CNDDB)
Clarkia delicata	Delicate clarkia	1B	Vicinity (CNDDB)
Horkelia truncata	Ramona horkelia	1B	Onsite (CNDDB)
Machaeranthera juncea	Rush chaparral-star	4	Potential (PSBS), Vicinity (PSBS)
Monardella hypoleuca ssp. *lanata*	Felt-leaved monardella	1B	Vicinity (CNDDB)
Nolina cismontana	Chaparral beargrass	FSC/1B/MSCP	County model
Ophioglossum lusitanicum ssp. *californicum*	California adder's-tongue fern	4	Potential (PSBS)
Polygala cornuta ssp. *fishiae*	Fish's milkwort	4	Potential (PSBS), Vicinity (PSBS)
Quercus engelmannii	Engelmann oak	MSCP	Onsite (PSBS)
Satureja chandleri	San Miguel savory	1B/MSCP	County model
Senecio ganderi	Gander's butterweed	FSC/SR/1B/MSCP	County model, Vicinity (CNDDB)
Tetracoccus dioicus	Parry's tetracoccus	FSC/1B/MSCP	County model
Invertebrates			
Euphyes vestris harbisoni	Harbison's dun skipper	FSC/MSCP	Potential—*Carex spissa* onsite (PSBS), Vicinity (Klein)
Streptocephalus woottoni	Riverside fairy shrimp	FE	Potential—vernal pools onsite (PSBS)
Branchinecta sandiegonensis	San Diego fairy shrimp	FE/MSCP	Potential—vernal pools onsite (PSBS)
Fish, Reptiles, Amphibians			
Gila orcutti	Arroyo chub	SSC	Onsite (PSBS, CNDDB)
Taricha torosa torosa	California newt	SSC/MSCP	County model
Bufo californicus	Arroyo toad	FE/SSC/MSCP	Onsite (PSBS, CNDDB), Vicinity (CNDDB)
Spea hammondii	Western spadefoot	FSC/SSC/MSCP	Onsite (PSBS)
Rana aurora draytonii	California red-legged frog	FT/SSC	County model
Clemmys marmorata pallida	Southwestern pond turtle	FSC/SSC/MSCP	Onsite (PSBS), County model

Scientific Name	Common Name	Regulatory Status[1]	Status on Rancho Guejito[2]
Phrynosoma coronatum blainvillei	San Diego horned lizard	FSC/SSC/MSCP	Onsite (PSBS), County model, Vicinity (CNDDB)
Aspidoscelis hyperythrus	Orange-throated whiptail	FSC/SSC/MSCP	County model
Eumeces skiltonianus interparietalis	Coronado skink	SSC	Onsite (PSBS)
Thamnophis hammondii	Two-striped garter snake	SSC	Onsite (PSBS)
Crotalus ruber ruber	No. red diamond rattlesnake	SSC	Onsite (PSBS)
Anniella pulchra pulchra	Silvery legless lizard	SSC	Potential (PSBS)
Salvadora hexalepis virgultea	Coast patchnose snake	SSC	Potential (PSBS)
Birds			
Haliaeetus leucocephalus	Bald eagle	FE/SE/SFP/MSCP	Onsite (PSBS)
Aquila chrysaetos	Golden eagle	SSC/SFP/MSCP	Onsite (PSBS)
Accipiter cooperii	Cooper's hawk	SSC/MSCP	Onsite (PSBS)
Circus cyaneus	Northern harrier	SSC/MSCP	Onsite (PSBS)
Accipiter striatus	Sharp-shinned hawk	SSC	Onsite (PSBS)
Buteo regalis	Ferruginous hawk	SSC	Onsite (PSBS)
Athene cunicularia hypugaea	Burrowing owl	FSC/SSC/MSCP	Onsite (PSBS), County model
Strix occidentalis occidentalis	California spotted owl	SSC	Vicinity (Unitt 2004)
Falco columbarius	Merlin	SSC	Onsite (PSBS)
Falco mexicanus	Prairie falcon	SSC	Onsite (PSBS)
Polioptila californica californica	California gnatcatcher	FT/SSC/MSCP	County model, Vicinity (CNDDB)
Campylorhynchus brunneicapillus couesi	Cactus wren	SSC/MSCP	Vicinity (CNDDB)
Aimophila ruficeps canescens	Rufous-crowned sparrow	FSC/SSC/MSCP	Onsite (PSBS), County model
Amphispiza belli belli	Bell's sage sparrow	SSC/MSCP	Onsite (PSBS), County model
Ammodramus savannarum perpallidus	Grasshopper sparrow	FSC/MSCP	Onsite (PSBS), County model
Eremophila alpestris actia	California horned lark	SSC	Onsite (PSBS)
Agelaius tricolor	Tricolored blackbird	FSC/SSC/MSCP	County model
Icteria virens	Yellow-breasted chat	SSC/MSCP	Potential (PSBS), County model
Dendroica petechia	Yellow warbler	SSC	Onsite (PSBS)
Vireo bellii pusillus	Least Bell's vireo	FE/SE/MSCP	County model, Vicinity (CNDDB)
Empidonax trailii extimus	Southwestern willow flycatcher	FE/MSCP	County model, Vicinity (CNDDB)
Sialia mexicana	Western bluebird	MSCP	Onsite (PSBS)
Lanius ludovicianus	Loggerhead shrike	SSC	Onsite (PSBS), County model

SCIENTIFIC NAME	COMMON NAME	REGULATORY STATUS[1]	STATUS ON RANCHO GUEJITO[2]
Mammals			
Eumops perotis californicus	California mastiff bat	SSC	Onsite, roost in vicinity (PSBS)
Antrozous pallidus	Pallid bat	SSC	Onsite (PSBS)
Plecotus townsendii	Townsend's big-eared bat	SSC	Potential (PSBS)
Taxidea taxus	American badger	SSC	Onsite (PSBS), County model
Bassariscus astutus	Ringtail	SFP	Potential (PSBS), Vicinity (PSBS), County model
Lepus californicus bennettii	Black-tailed jackrabbit	FSC/SSC/MSCP	Potential (PSBS), County model
Chaetodipus californicus femoralis	California pocket mouse	SSC	Onsite (PSBS)
Chaetodipus fallax fallax	San Diego pocket mouse	SSC	Onsite (PSBS, CNDDB)
Neotoma lepida intermedia	San Diego desert woodrat	SSC	Potential (PSBS)
Dipodomys stephensi	Stephens' kangaroo rat	FE/ST/MSCP	Onsite (PSBS, CNDDB), County model
Odocoileus hemionus fuliginata	Southern mule deer	MSCP	Onsite (PSBS), County model
Felis concolor	Mountain lion	MSCP	Onsite (PSBS)

[1] FE = federally listed as endangered.
FT = federally listed as threatened.
FSC = federal species of concern.
SE = state listed as endangered.
ST = state listed as threatened.
SR = state listed as rare.
SSC = state species of concern.
SFP = state fully protected.
1B = CNPS List 1B—rare or endangered in California and elsewhere (CNPS 2001).
4 = CNPS List 4—plants of limited distribution (CNPS 2001).
MSCP = sensitive species addressed by North County MSCP subarea plan.

[2] Onsite = records from CNDDB, PSBS et al. 1993.
Potential = potential to occur onsite based on suitable habitat (PSBS et al. 1993, Klein 2005, and D. Mayer personal communication).
County model = predicted to occur on Rancho Guejito by County species model (does not include entire list of species predicted by model).
Vicinity = documented (CNDDB, PSBS et al. 1993, Klein 2005) within extent of area mapped on Figures 12, 13, 15, and 19, or just outside (e.g., spotted owl, Unitt 2004).

Appendix E
Property Information

Site Name
Rancho Guejito

Owner
Rodney Company NV
c/o Jaminco Management Corporation
PO Box 119
Midland Park, NJ

Geographic Location and Description
San Diego County, east of Valley Center, north of Ramona, between Highways 78 and 76; bordered by Cleveland National Forest on the east.

1974 Purchase Price: $10 million

Township, range, and sections

Township/Range	Sections
T10S R01E	34,35,36
T10S R01W	33,34,35,36
T11S R01E	1,2,3,4,5,6,7,8,9,11,12,13,14,17,18,19,22,23,24,25,26,27,28,30,32,33,34,35,36
T11S R01W	1,2,3,4,9,10,11,12,13,14,15,16,21,22,23,24,25,26,27,28,33,34,35,36
T12S R01E	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30
T12S R01W	2,3,4,9,10,11,12,13,14,15,16,21,22,23,24,25,26,27,28

Parcels (95)

Total acreage = approx. 20,794

APN	Acreage
191-010-34	80.00
191-010-33	80.00
191-080-02	320.00
191-180-11	640.00
191-030-04	40.00
240-070-09	639.71
191-060-04	20.31
190-120-14	77.35
192-030-03	51.39
240-150-12	65.02
243-070-06	472.57
190-120-17	80.00
242-080-07	123.84
192-09-001	312.44
191-030-03	257.83
243-020-09	13.02
192-070-01	640.00
191-060-05	113.43
240-280-01	320.00
191-211-02	559.56
243-110-01	80.00
243-020-07	116.17
240-280-12	160.00
191-170-01	40.00
243-070-01	160.00
191-210-02	80.00
240-280-09	40.00
244-020-04	120.00
190-160-12	61.98
243-110-05	569.98
240-070-08	165.22
191-230-09	40.00

APN	Acreage
190-070-23	171.72
191-170-04	77.51
192-030-01	626.81
191-010-43	61.94
191-111-01	511.52
191-101-03	233.80
243-030-02	159.70
191-080-05	320.00
242-031-01	80.00
240-150-02	280.00
192-01-001	606.22
242-080-01	80.00
191-010-44	26.26
191-230-08	81.76
190-120-05	2.00
240-280-08	440.00
240-280-07	143.62
191-010-40	240.55
240-150-13	7.76
243-020-08	629.90
191-171-01	419.42
191-100-02	40.00
242-031-03	320.00
240-070-01	27.85
243-150-01	120.00
192-050-01	160.00
240-150-03	63.43
240-061-04	40.00
242-031-04	80.00
191-150-01	640.00
191-080-03	320.00
240-150-14	16.38

APN	Acreage
243-020-04	16.83
243-070-10	20.00
192-010-03	640.00
242-030-02	80.00
190-120-10	240.00
243-070-07	173.63
190-120-15	79.35
192-070-02	636.80
243-020-01	232.25
191-010-24	181.93
243-070-09	100.00
243-110-06	80.00
191-180-04	289.63
191-150-02	640.00
243-110-04	80.00
240-150-10	632.24
191-100-06	80.00
191-080-04	313.90
240-07-002	100.62
191-100-08	200.13
192-03-102	80.00
243-070-08	120.00
240-150-11	4.15
190-070-19	408.60
191-211-01	640.00
191-101-01	56.88
191-101-02	206.07
243-150-05	653.18
240-150-15	40.00
242-030-07	80.00
243-020-05	120.00