



Draft

San Gabriel Watershed and Mountains

Special Resource Study and Environmental Assessment

September 2011

Produced by the Pacific West Regional Office
Park Planning and Environmental Compliance
National Park Service
San Francisco, California

U.S. Department of the Interior
Washington, DC



Top, left to right: Frank G. Bonelli Regional Park, NPS photo; Inspiration Point, Angeles National Forest, NPS photo.
Bottom: Eaton Canyon Natural Area, NPS photo.



California Broom Sage, Santa Clara River near Acton. Photo courtesy of BonTerra Consulting.

Table of Contents

Abstract	v		
Executive Summary	vi	6: Alternatives	159
1: Introduction	1	INTRODUCTION	161
PURPOSE AND NEED	3	ISSUES ADDRESSED IN THE ALTERNATIVES	161
ISSUES ADDRESSED IN STUDY	4	OVERVIEW OF THE ALTERNATIVES	162
STUDY AREA	4	ALTERNATIVES CONSIDERED BUT DISMISSED	163
STUDY PROCESS	6	ITEMS COMMON TO ALL ACTION ALTERNATIVES	164
RELATED PLANS AND STUDIES	9	DESCRIPTION OF THE ALTERNATIVES	165
2: Resource Description	11	Continuation of Current Management (No Action Alternative)	165
NATURAL RESOURCES	13	Alternative A: San Gabriel Mountains National Recreation Area	171
CULTURAL RESOURCES	52	Alternative C: San Gabriel Watershed National Recreation Area	175
RECREATIONAL RESOURCES	81	Alternative D: San Gabriel Region National Recreation Area	184
3: Resource Significance	97	7: Environmental Consequences	199
CRITERIA FOR NATIONAL SIGNIFICANCE	99	INTRODUCTION	201
NATIONAL SIGNIFICANCE OF THE SAN GABRIEL WATERSHED AND MOUNTAINS STUDY AREA	99	METHODS AND ASSUMPTIONS	201
NATIONAL SIGNIFICANCE CRITERIA	100	ANALYSIS ASSUMPTIONS	201
OVERALL CONCLUSIONS	116	IMPACT CRITERIA	203
OTHER SIGNIFICANT RESOURCES WITHIN THE STUDY AREA	116	POTENTIAL ENVIRONMENTAL IMPACT TOPICS	204
4: Suitability	121	EFFECTS ON BIOLOGICAL RESOURCES	206
INTRODUCTION	123	EFFECTS ON CULTURAL RESOURCES	214
NPS THEMEATIC FRAMEWORK - NATURAL AND CULTURAL THEMES	123	EFFECTS ON RECREATION USE AND VISITOR EXPERIENCE	217
COMPARISON OF SIMILAR AREAS BY THEME	125	SOCIOECONOMIC EFFECTS	223
SAN GABRIEL MOUNTAINS	125	LAND USE	233
PUENTE HILLS	144	EFFECTS ON WATER RESOURCES	239
SUMMARY: SUITABILITY	148	GOALS OF THE ALTERNATIVES	244
5: Feasibility and Need for NPS Management	149	ENVIRONMENTALLY PREFERRED ALTERNATIVE	245
INTRODUCTION	151		
EVALUATION OF FEASIBILITY FACTORS	151		
NEED FOR NPS MANAGEMENT	157		

8. Consultation & Coordination 253

PUBLIC INVOLVEMENT	255
AGENCIES AND ELECTED OFFICIALS TO WHOM COPIES OF THE REPORT WERE SENT	259

Appendices 265

APPENDIX A: STUDY LEGISLATION	267
APPENDIX B: SPECIES TABLES	268
APPENDIX C: NEW AREA STUDIES ACT	287
APPENDIX D: 2006 NPS MANAGEMENT POLICIES (SECTIONS 1.2 AND 1.3)	289
APPENDIX E: NATIONAL HISTORIC LANDMARK CRITERIA SEC. 65.4	292
APPENDIX F: ALTERNATIVE B: SAN GABRIEL PARKS AND OPEN SPACE NETWORK	294

Acronyms & Abbreviations 295

Glossary 296

References 301

Preparers 316

Tables

Table 1: Significant Earthquakes Within or Near the Study Area	24
Table 2: Groundwater Basin	32
Table 3: Inventory of Cultural and Archeological Resources within the Study Area - Representation of National Park Service Themes	75
Table 4: Agencies Administering Parks and Open Space in the Study Area	81
Table 5: Approximate Acreage of Study Area Parks and Open Space	84
Table 6: Summary of National Significance	119
Table 7: Summary of Areas Suitable for Inclusion in the National Park System	148
Table 8: Feasibility Factors Issues and Conclusions	156
Table 9: National Recreation Area Annual Operating Budgets	181
Table 10: National Recreation Area Annual Operating Budgets	189
Table 11: Summary of Alternatives	192
Table 12: Potential Environmental Impact Topics	204
Table 13: Threats to Federal and State Listed Threatened and Endangered Plant and Animal Species	209
Table 14: Visitation to Major Recreation Destinations within the Study Area	218
Table 15: Standards for Parks and Open Space	219
Table 16: Children's park access in seven major cities	220
Table 17: Population	225
Table 18: Social and Cultural Characteristics	226
Table 19: Income and Unemployment	227
Table 20: Tourism	228
Table 21: Spending and Economic Impacts of Visitors to NPS Partnership Parks on Local Economics, 2008	230
Table 22: Payroll Impacts of National Park Partnership Parks without Visit Counts, FY 2008	230
Table 23: Impaired Surface Waters within the Study Area	241

Table 24: Groundwater Basin Water Quality	241
Table 25: Summary of Environmental Consequences	246
Maps	
Local Communities	10
Topography	15
Generalized Geology	18
Generalized Geology Legend	19
Regional Faults	23
Mineral Resources - Major Commodities and Oil Provinces	27
Watersheds	29
Flood Protection Facilities	31
Groundwater Basins and Water Supply Facilities	33
Vegetation	37
Federally-Listed Threatened and Endangered Species	45
Designated Critical Habitat	46
Land Use	50
Native American Groups in the Region	54
Ranchos	59
Cultural Resources	80
Parks and Open Space	82
Trails, Bikeways and Scenic Highways	87
Nationally Significant Regions	101
National Park Biophysiological Regions	124
Statewide California Walnut Woodland and Forest Distribution	147
Continuation of Current Management (No Action)	170
Alternative A: U.S. Forest Service National Recreation Area	174
Alternative C: San Gabriel Watershed National Recreation Area	182
Alternative C: San Gabriel Watershed National Recreation Area River Corridor Detail	183
Alternative D: San Gabriel Region National Recreation Area: A Partnership Linking Significant Resources and Recreation	190

Alternative D: A Partnership Linking Significant Resources and Recreation Area Detail - River Corridor and Puente Hills	191
Acres of Parks Per 1,000 Residents	221

Figures

Figure 1: Location and Context	6
Figure 2: Median Household Incomes	227

Abstract

The National Park Service (NPS) prepared the *Draft San Gabriel Mountains and Watershed Special Resource Study* to determine whether all or part of the study area is significant, suitable, and feasible for designation as a unit of the national park system. Congress authorized this study in 2003. The study area covers approximately 700,000 acres of land in the greater Los Angeles metropolitan region, including urban communities, local and regional parks and open space, and 415,000 acres of the Angeles National Forest.

Through the special resource study process, the NPS made the following determinations about the study area:

- Natural and cultural resources of the San Gabriel Mountains and Puente-Chino Hills are **nationally significant**, in that they meet all four of the NPS criteria for national significance.
- The study area is **suitable for inclusion** in the national park system because it represents natural and cultural resource types that are not already adequately represented in the national park system or protected by another land managing entity.
- The NPS determined that a **collaborative partnership-based park unit** which respects the complex mix of land use, ownership, and regulatory authority in the study area **would be a feasible addition** to the national park system. A large traditional national park unit, owned and operated solely by the National Park Service, is not feasible.
- **Need for NPS Management:** NPS management in partnership with existing agencies and organizations is the best option for enhancing protection of significant resources, for improving access to recreational opportunities in the region, and for providing coordinated interpretation and education about significant resources.

The NPS evaluated four alternatives in the draft study, two include a role for the NPS:

No Action Alternative: Continuation of Current Programs and Policies. This is the “no action” alternative for this study, and assumes that current programs, policies, conditions, and trends would continue.

- **Alternative A: San Gabriel Mountains National Recreation Area (A U.S. Forest Service Designation).** In this alternative,

Congress would designate the San Gabriel Mountains unit of the Angeles National Forest a National Recreation Area (NRA) that would continue to be managed solely by the U.S. Forest Service.

- **Alternative B- San Gabriel Parks and Open Space Network (Dismissed):** *This alternative was dismissed from further consideration after public review of the preliminary alternatives (Newsletter 4). Some components of alternative B were incorporated into alternative D.*
- **Alternative C: San Gabriel Watershed National Recreation Area.** This alternative proposes a river-based national recreation area that would raise the visibility of the San Gabriel River watershed, offer new educational and interpretive opportunities along the river and throughout the watershed, and improve river-based recreation. This would be collaboratively-managed, partnership-based national park unit. Partnership arrangements among federal and state agencies, local governments, non-profit organizations, and area landowners would achieve the conservation, recreational, and educational goals of the national recreation area. The NPS would take a lead role in management of the partnership, particularly in the area of interpretation and education.
- **Alternative D: San Gabriel Region National Recreation Area (A Partnership Linking Significant Resources and Recreation).** In this alternative, Congress would designate a larger scale national recreation area that would recognize and protect the significant resources associated with the San Gabriel Mountains and Puente-Chino Hills, explore opportunities to protect and enhance interconnected ecosystems, provide important open space connections for recreation, and offer new educational and interpretive opportunities. The management approach of alternative D would be collaborative, as in alternative C. The NPS would take a lead role in management of the partnership, particularly in the area of interpretation and education.

The NPS prepared an environmental assessment to identify and analyze the potential environmental and socioeconomic consequences of the four alternatives. The NPS concluded that alternative D would be the environmentally preferable alternative because it would protect resources over a significantly larger area, provide greater opportunities for recreation and visitation, provide greater socioeconomic benefits, and foster a larger framework for cooperative management as compared to alternatives A and C.

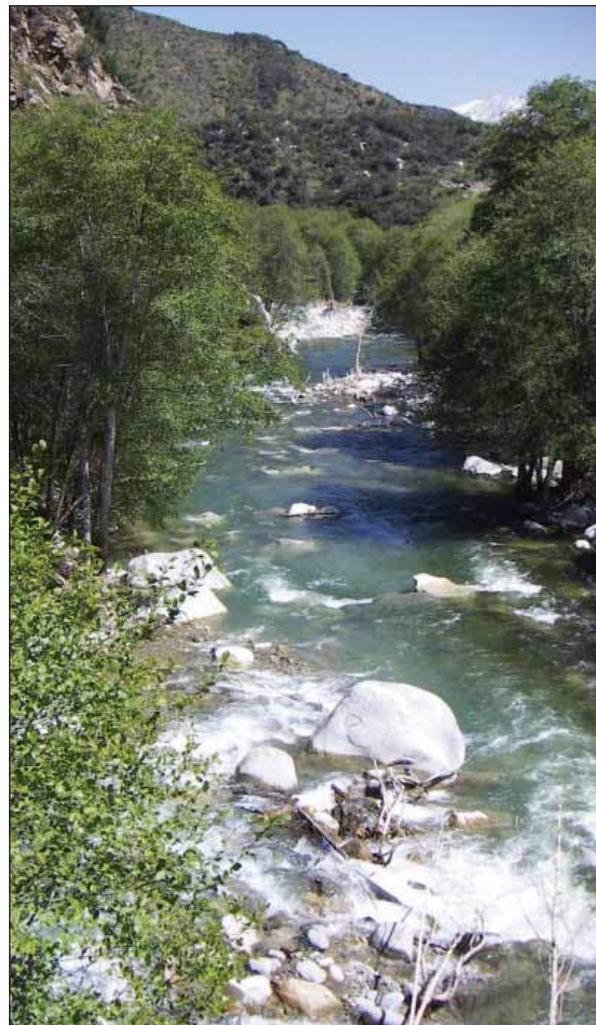
Executive Summary

Background and Study Process

The San Gabriel River Watershed Study Act (PL 108-042, July 2003) directed the National Park Service (NPS) to conduct a special resource study of (1) the San Gabriel River and its tributaries north of and including the city of Santa Fe Springs, and (2) the San Gabriel Mountains within the territory of the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC).

The San Gabriel River Watershed Study Act also directed the NPS to consult with the RMC and other appropriate federal, state, and local government entities in conducting the study. Additionally, the study act directed the NPS to consider regional flood control and drainage needs and publicly-owned infrastructure such as wastewater treatment facilities.

The purpose of this special resource study is to determine whether any portion of the San Gabriel Watershed and Mountains study area is eligible to be designated as a unit of the national park system. Through the study process, the NPS identified alternative strategies to manage, protect, or restore the study area's resources, and to provide or enhance recreational opportunities. These alternatives explore partnerships and efforts to protect important resources in ways that do



West Fork of the San Gabriel River. 2005. NPS photo.



not necessarily require the commitment of funds and staff by the NPS. This study will provide information to aid Congress, the U.S. Department of the Interior, and the NPS in determining whether designation of a unit of the national park system is desirable and appropriate.

Study Area

The study area covers more than 1,000 square miles (over 700,000 acres) in the greater Los Angeles metropolitan region. It is one of the most densely populated and diverse areas of the United States. Most of the study area is located in Los Angeles County (approximately 85%), the remainder lies in Orange and San Bernardino counties. The U.S. Forest Service currently manages approximately two-thirds of the study area (415,000 acres in the San Gabriel Mountains) as part of the Angeles National Forest (ANF). With the exception of private inholdings and access facilities for flood protection structures and other utilities, the ANF remains primarily undeveloped. In close proximity to highly urban areas, the ANF provides a refuge for wildlife and recreational opportunities for the greater Los Angeles metropolitan region.

Legislative and Policy Direction

The National Park System New Area Studies Act and NPS management policies establish the basic process for evaluating potential new additions to the national park system. According to NPS management policies, a proposed addition to the national park system will receive a favorable recommendation from the NPS only if it meets all of the following four criteria for inclusion:

1. it possesses nationally significant natural or cultural resources;
2. it is a suitable addition to the system;
3. it is a feasible addition to the system; and
4. it requires direct NPS management, instead of alternative protection by other public agencies or the private sector.

These criteria are designed to ensure that the national park system includes only the most outstanding examples of the nation's natural and cultural resources, while recognizing that there are other management alternatives for preserving the nation's outstanding resources.

National Park Service management alternatives are developed for study areas that meet all four of the criteria for inclusion, as listed above. Further definition of these criteria is provided in the related sections of this study.

Public Involvement

Throughout the study process, the planning team conducted extensive public outreach. The NPS held numerous public and stakeholder meetings throughout the region. Four newsletters were published at various stages of the study process and distributed to the study mail and e-mail lists. The study mailing list includes approximately 2,000 addresses and the study e-mail list includes approximately 900 addresses. The NPS has made all information sent by mail and e-mail available on the study website, www.nps.gov/pwro/sangabriel. Additionally, numerous articles and opinion pieces covering the study have appeared in area newspapers.

The NPS initiated this special resource study in January 2005 with a newsletter describing the study process and opportunities for the public to participate. Public scoping meetings were held in March 2005 in the communities of Claremont, Diamond Bar, Downey, Rosemead, and Acton. The NPS published the results of the public scoping process in a second newsletter.

In early 2006, the NPS refined the study area to add portions of the Rio Hondo River watershed and to remove cities within the Gateway Cities Council of Governments jurisdiction. In addition, the NPS revised the study scope to directly address concerns about potential impacts on local land use control and agency authorities. The NPS committed to producing a study that would respect property rights and the authorities that currently belong to existing local, state, and federal agencies. The NPS continued to consult with public land management agencies and elected officials throughout the study process.

Between 2006 and 2008, the NPS analyzed resources and developed preliminary alternatives. The NPS worked with local agencies and resource experts in analyzing the significance of the study area resources. In 2007-2008, the NPS worked on development of the preliminary alternatives, consulting with other recreation and land conservation agencies within the study area. More information about outreach efforts during this time period is included in Chapter 8 of the study report, *Consultation and Coordination*.

In fall of 2009, the NPS released draft alternatives for public review and comment in a fourth newsletter. The study team produced and distributed over 3,000 newsletters to organizations and individuals on its mailing lists, partner agencies, and at public and stakeholder meetings. Between

August and October 2009, the study team held six public meetings at locations throughout the study area including Diamond Bar, El Monte, Santa Clarita, Glendora, Palmdale, and Tujunga. In addition to the public meetings, the NPS study team held meetings with local, state and federal government agencies, organizations, communities, and Congressional offices. The NPS received approximately 4,800 comments. Additional stakeholder meetings were held with various agencies in early 2010 to address specific concerns.

Publication, Review and Transmittal

Publication of the *Draft San Gabriel Watershed and Mountains Special Resource Study* will be followed by a public comment period. The NPS study team will then revise the report if needed, and transmit it to the Secretary of the Interior. The Secretary will transmit the report to Congress, along with the Secretary's recommendation for the area.

Significance

The National Park Service (NPS) uses four basic criteria to evaluate the national significance of proposed areas. These criteria, listed in the National Park Service *Management Policies*, state that a resource is nationally significant if it meets all of the following conditions:

- It is an outstanding example of a particular type of resource.
- It possesses exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage.
- It offers superlative opportunities for public enjoyment, or for scientific study.
- It retains a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource.

The NPS evaluates national significance for cultural resources by applying the national historic landmarks (NHL) criteria contained in 36 CFR Part 65.

National Park Service professionals consult with subject matter experts, scholars, and scientists, in determining whether a study area is nationally significant. Natural and cultural resource experts and scholars, locally and within the NPS, contributed expertise, research, and technical review of the statement of significance. See Chapter 8, *Consultation and Coordination*, in the draft study report for more information on subject matter experts and their role in this portion of the study process.

Within the large and diverse landscape of the study area, two regions were found to be nationally significant: the San Gabriel Mountains and the Puente-Chino Hills. Because these regions have not been as heavily urbanized as the lowland valleys and floodplains of the study area, they are outstanding examples of the native southern California landscape. The San Gabriel Mountains are also culturally rich, with a long history of human use. Nationally significant cultural resources in the San Gabriel Mountains include the Mount Wilson Observatory and the San Dimas Experimental Forest.

There are significant resources in other portions of the study area. However, these resources are highly fragmented and surrounding development has, in many cases, negatively impacted their integrity.

San Gabriel Mountains

The San Gabriel Mountains and foothills are nationally significant for their geologic resources, high biodiversity, dynamic river systems, and the long history of scientific study and discovery. Early conservation of the San Gabriel Mountains ensured that these areas were protected from rapid urbanization, which began in the late 19th century. Within a short distance, the mountains and foothills feature coastal, desert, montane, and sub-alpine ecological communities. This diverse landscape provides habitat for an abundance of rare and endemic plants and wildlife. In addition, the San Gabriel Mountains contain significant waterways and riparian areas, some of which are eligible National Wild and Scenic River segments. Nationally significant cultural resources include the San Dimas Experimental Forest, which contains some of the earliest and most comprehensively and continuously monitored research watersheds, and the Mount Wilson Observatory, which includes large telescopes that were used in significant astronomical discoveries.

MOUNTAIN BUILDING AND DIVERSE GEOLOGY

- The San Gabriel Mountains are among the fastest growing mountains in the world. Forces from the San Andreas Fault to the north and a series of thrust faults on their south face are causing the San Gabriel Mountains to rise as much as 2 inches a year. This distinction makes the San Gabriel Mountains an excellent location to research or study mountain-building.
- Among the most geologically diverse ranges in Southern California, the San Gabriel Mountains are comprised of rock units from all the major geologic eras. The San Gabriel Mountains

contain the most extensive, best-exposed, and most completely studied exposures of several geologic formations including the San Gabriel Mountains anorthosite massif, the Mount Lowe plutonic suite, and Pelona schist. Some of the oldest rocks (over one billion years old) on the west coast of the United States are located in the San Gabriel Mountains.

- There is a long history of scientific study of the San Andreas Fault in southern California. Several historically significant geologic discoveries occurred in the San Gabriel Mountains.
- The dramatic change in elevation from sea level to 10,000 feet, coupled with striking landforms such as the Devil's Punchbowl, makes for a highly scenic landscape of contrasts.

HIGH LEVELS OF BIODIVERSITY

- The topographically and geologically diverse mountains contain high levels of biodiversity. The plant communities in the San Gabriel Mountains provide habitat for 67 plant species and 105 wildlife species considered sensitive, rare, threatened or endangered.
- Outstanding examples of rare southern California ecological communities in the San Gabriel Mountains and foothills include: alluvial fan sage scrub, bigcone Douglas-fir, coastal sage scrub, relict juniper communities, riparian areas, and subalpine habitat.

DYNAMIC RIVER SYSTEMS

- River systems within the San Gabriel Mountains meet the eligibility criteria for National Wild and Scenic River designation. Free-flowing sections of Little Rock Creek and the North, East, and West forks of the San Gabriel River retain high levels of integrity and support sensitive wildlife.
- Some of the best remaining alluvial fan sage scrub vegetation in the Los Angeles Basin is found within the study area.
- The San Gabriel Mountains are among one of the richest areas for freshwater fishes in southern California.

SCIENTIFIC RESEARCH AND DISCOVERY

- Data collected in the San Dimas Experimental Forest since 1933 represents some of the earliest and most comprehensive records from continuously monitored U.S. Forest Service experimental watersheds in the United States. In 1976, the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Man and the Biosphere Program recognized the San Dimas Experimental Forest as a "Biosphere Reserve." The San Dimas Experimental Forest contains structures that are excellent examples of Forest Service architecture constructed and maintained through Depression-era relief programs, as well as a lysimeter facility that is the largest structure of its type ever built.
- The Mount Wilson Observatory, established in 1904, includes five significant telescopes that laid the technological foundation for all large modern telescopes. Many of the major advances, such as the Big Bang theory and the greatest names in 20th-century astronomy, are associated with the observatory.

Puente-Chino Hills

The Puente-Chino Hills in the Los Angeles basin contain rare native plant communities. Although this area is somewhat of an island of open space surrounded by urbanized areas, the Puente-Chino Hills and the Santa Ana Mountains to the southeast together encompass about 500,000 acres of wildlands containing significant biological resources.

HIGH LEVELS OF BIODIVERSITY

- The Puente-Chino Hills are part of a biologically diverse regional wildlife corridor that provides habitat for ecological communities with an abundance of endemic, threatened, and rare plants and animals.
- Outstanding examples of southern California communities in the Puente-Chino Hills include coastal sage scrub, one of the most endangered plant communities in California, and the best remaining stands of California walnut-dominated forests and woodlands south of Ventura County.



Puente Hills and the San Gabriel Mountains. 2006. Photo by Bruce Perry, Department of Geological Sciences, CSU Long Beach.

Suitability

To be considered suitable for addition to the national park system, an area must represent a natural or cultural resource type that is not already adequately represented in the national park system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

The National Park Service determined that the San Gabriel Mountains and Puente-Chino Hills portions of the study area are suitable for inclusion in the national park system, based upon evaluation of the study area resources and their relative quality, character, and rarity. Together, the San Gabriel Mountains and Puente-Chino Hills contain a combination of themes and resources not found in any national park unit or comparably managed area.

San Gabriel Mountains

The overall combination of cultural and natural resource values and themes represented by the San Gabriel Mountains is not comparable to any other national park unit or comparably managed areas. Represented within these themes are unique geological features and dramatic geologic processes, a wide diversity of rare habitats located in close proximity given the dramatic changes in topography, and technological advances in the

areas of astronomy, chaparral ecosystems, and watersheds.

The close proximity of the San Gabriel Mountains to urban areas of the Los Angeles region means that this area has excellent potential for interpretation, education, and continued scientific study.

Puente-Chino Hills

The Puente-Chino Hills have resources that are outstanding representations of habitat types not widely found in other national park units or comparably managed sites. Represented within these themes are coastal sage scrub habitat and California walnut woodlands, both of which support rare and endangered plants and wildlife. Although coastal sage scrub is protected at several national park units, no other existing national park unit or comparably managed area protects a significant amount of the rare California walnut woodlands. Protected status for the Puente-Chino Hills within the study area would expand and enhance existing resource protection and ensure long term conservation of the larger Puente-Chino Hills corridor.

Located in close proximity to urban populations of the Los Angeles basin, universities and colleges, the Puente-Chino Hills provide excellent opportunities for interpretation, education, and scientific study.

Feasibility

To be feasible as a new unit of the national park system, an area must be: (1) of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment (taking into account current and potential impacts from sources beyond proposed park boundaries), and (2) capable of efficient administration by the National Park Service at a reasonable cost. In evaluating feasibility, the NPS considers a variety of factors for a study area, such as the following:

- size
- boundary configurations
- current and potential uses of the study area and surrounding lands
- landownership patterns
- public enjoyment potential
- costs associated with acquisition, development, restoration, and operation
- access
- current and potential threats to the resources
- existing degradation of resources
- staffing requirements
- local planning and zoning
- the level of local and general public support (including landowners)
- the economic/socioeconomic impacts of designation as a unit of the national park system

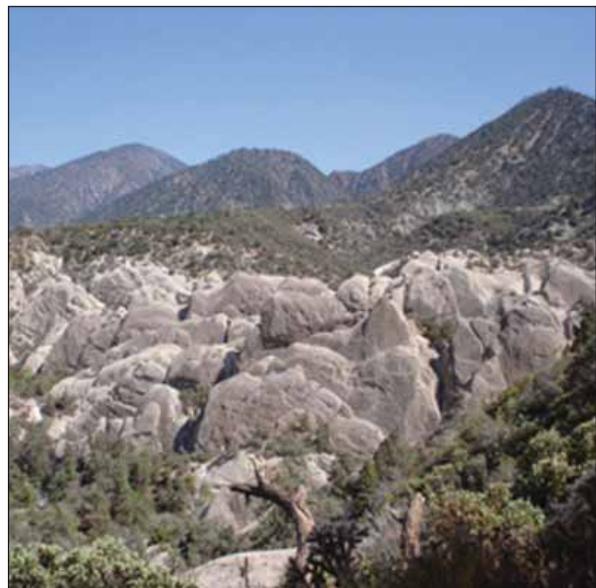
The feasibility evaluation also considers the ability of the NPS to undertake new management responsibilities in light of current and projected availability of funding and personnel.

The NPS finds that a collaborative partnership-based park unit is feasible, as one that respects the complex mix of land use, ownership, and regulatory authority in the study area. Opportunities for collaborative management with local, state and federal managers to protect natural and cultural resources, provide recreation, public access, interpretation and educational opportunities, and other compatible uses in an NPS partnership-based park unit have been demonstrated to exist. A large traditional national park unit, owned and operated solely by the National Park Service is determined to be infeasible, based on the complexity of existing land use and ownership patterns.

Need for NPS Management

The need for direct NPS management is the final criterion for a favorable recommendation for a proposed unit of the National Park System. The criterion requires a finding that NPS management would be superior to other potential alternative management arrangements by other entities.

The NPS finds that a collaborative-based management approach which includes a leadership role for the National Park Service is a superior management option for meeting the complex conservation and recreation needs of the study area.



Photos (top to bottom): 1. West Fork Trail, Angeles National Forest. NPS photo. 2. Devil's Punchbowl. San Gabriel Mountains. 2006. NPS photo.

Alternatives

Four management alternatives are evaluated in this special resource study. One alternative is the “no action” alternative which serves as a baseline of existing conditions. Alternatives A, C, and D, the action alternatives, emphasize cooperative management of existing public lands and federal designation of a national recreation area. Alternative B, San Gabriel Parks and Open Space Network, was dismissed from further consideration after public review of the preliminary alternatives in 2009 (Newsletter 4). Some components of alternative B were incorporated into alternative D.

The three action alternatives do not propose large federal land acquisitions as the majority of the land is already owned and managed by the U.S. Forest Service and other public recreation and conservation agencies. Each action alternative seeks to enhance the capabilities of existing agencies by leveraging resources, sharing information, and through cooperative planning and administration.

Through the scoping process, numerous stakeholders including public agencies, citizens, organizations, and elected officials, identified specific issues and concerns that should be considered in the study process. Based on this input, issue statements were developed by the study team to describe the context for this study. The alternatives explore various approaches to addressing the issues identified:

- Additional *funding* is needed to meet resource protection and recreation objectives.
- There are sufficient *barriers to outdoor recreation* for some communities including lack of close-to-home recreational opportunities, poor access to recreational areas, and personal safety concerns.
- The Los Angeles region continues to experience tremendous population growth causing *increasing demands on existing recreation areas*.
- Greater protection is needed for the region's *rare and threatened ecological communities*.
- The study area's *cultural resources* would benefit from further documentation, protection, and/or interpretation.
- The *study area lacks a clear sense of identity* that could help connect communities to the natural and cultural resources of the San Gabriel Mountains and the Puente-Chino Hills.
- The region's natural, cultural, and recreational resources *lack a comprehensive management plan* and could benefit from a regional planning structure.
- There is an ongoing need to protect and restore riparian ecosystems and provide appropriate recreational use of waterways while *improving water quality, enhancing efficiency of water storage and use, and providing flood protection*.



Santa Fe Dam Recreation Area. 2004. NPS photo.

Items Common to All Action Alternatives

A PARTNERSHIP APPROACH

The National Park Service recognizes that many other public agencies, private conservation organizations, and individuals successfully manage important natural and cultural resources and recreational opportunities within the study area. The NPS applauds these accomplishments and actively encourages the expansion of conservation activities by state, local, and private entities and by other federal agencies. The alternatives presented retain existing management and build on existing efforts by suggesting new partnerships, funding sources, and technical assistance opportunities.

U.S. FOREST SERVICE MANAGEMENT

U.S. Forest Service management and ownership of existing Angeles National Forest lands would be maintained in all of the alternatives. U.S. Forest Service policies would continue to be applied to management of these lands.

NATIONAL RECREATION AREA (NRA)

Each of the three action alternatives proposes a national recreation area designation to increase the capacity to protect significant resources and to provide improved recreational opportunities for the region. Two of the national recreation area alternatives would include the establishment of a national park unit to be managed in partnership with existing agencies. The other would be a U.S. Forest Service national recreation area applied to existing Angeles National Forest lands. The NPS would have no role in that alternative (alternative A).

RETENTION OF LOCAL LAND USE AND EXISTING REGULATORY AUTHORITIES

The designation of a NPS national recreation area would not establish additional regulatory or land use authorities over local governments. The NPS is not a regulatory agency. NPS land management policies and regulations would only apply to lands that the NPS acquires. The NPS would only consider acquiring land on a limited basis from willing sellers.

All of the alternatives would respect existing general plans and local zoning, as well as state and local laws and policies for lands that are not federally owned.

PROTECTION OF WATER SUPPLY, FLOOD PROTECTION, AND SANITATION INFRASTRUCTURE FACILITIES AND FUNCTIONS

The Los Angeles metropolitan region has highly complex systems of public infrastructure to transport and store local and regional water supplies. In addition, numerous facilities are necessary to treat wastewater and manage solid waste. No alternative presented would change existing water rights, water supply operations, water treatment operations, flood protection efforts, or other agency functions necessary to maintaining public infrastructure essential for public health and safety.

All the proposed alternatives would retain existing and future water rights. Management of water supply and treatment plants would continue under current authorities. The NRA designation would not entail any new or future beneficial uses or requirements for water supply, water quality, or air quality regulations.

This study recommends that any resulting legislation ensure that existing sanitation facilities and operations such as landfills and water treatment plants would continue to be operated and regulated by existing agencies and would not be affected by the NRA designation.

PRIVATE PROPERTY RIGHTS

Any legislation proposed to implement this study should specify that eminent domain would not be used for land acquisition within the NRA. The NPS would only consider acquiring land on a limited basis from willing sellers. Designation would not impact local land use authority over lands not owned by the NPS.

FIRE PROTECTION

Fire protection would remain the responsibility of existing federal, state, and local agencies (Los Angeles County, U.S. Forest Service, California Department of Forestry and Fire Protection). The NRA partnership could work together to take a pro-active approach to coordinated resource management to reduce catastrophic fires.

No Action Alternative: Continuation of Current Management

CONCEPT

The no action alternative is required by the National Environmental Policy Act (NEPA) to provide a baseline with which to compare action alternatives. Under this alternative, the NPS would have no role in the study area beyond the existing national park units (segments of two national historic trails), and existing financial and technical assistance programs such as the Land and Water Conservation Fund grant program, the Rivers, Trails and Conservation Assistance Program, the National Historic Landmark program, and the Route 66 corridor program. This alternative assumes that current programs and policies of existing federal, state, county, and non-profit conservation organizations would continue at existing levels and current conditions and trends would continue.

MANAGEMENT

Existing cooperative management efforts between agencies would continue. Current efforts to protect wildlife corridors and provide new recreational opportunities would continue to occur on a case-by-case basis as existing funding allows.

Public land management agencies would continue their land management, visitor services, public education, and interpretation programs at approximately the current levels of activity and funding, according to current plans.

Cities and unincorporated areas would continue to conserve open space and provide recreational opportunities where possible. Local agencies would continue to provide services as funding allows. Coordination and communication between local governments would continue to occur on a case-by-case basis.

Non-profit conservation activities would continue at current levels.

EDUCATION AND INTERPRETATION

Existing national forest lands, national historic landmarks, museums, visitor centers, parks, and other sites owned by state and local agencies and nonprofit organizations would continue to be interpreted as they are today. Existing national park units would continue to provide interpretation and education opportunities. Improvements in interpretive programs and media may occur as funding becomes available. Coordinated efforts to interpret the significant resources of the San Gabriel Watershed and Mountains would not occur.

Education and interpretation efforts would continue to occur on a project-by-project basis.

RECREATIONAL OPPORTUNITIES AND ACCESS

New recreational opportunities and access would occur through existing agencies, organizations, and governments as funding permits.

RESOURCE PROTECTION (ECOLOGICAL COMMUNITIES AND CULTURAL RESOURCES)

Protection of natural and cultural resources under the management of existing agencies would continue. Government grant programs, California state land conservancies, local governments, and non-profit land conservancies/trusts throughout the study area would continue to conserve and restore native ecosystems and habitat. It is assumed that these efforts would continue at current levels. Existing planning efforts to link habitat connections such as the South Coast Missing Linkages Project would continue. Implementation would be the responsibility of existing agencies and landowners.

OPERATIONS AND MAINTENANCE

Operations and maintenance of existing parks and open space would be assumed to remain at current levels. For some agencies, more resources are available for the acquisition of lands than are available for operations and management.



Whittier Narrows Recreation Area. NPS photo.

Alternative A: San Gabriel Mountains National Recreation Area: A U.S. Forest Service Designation

CONCEPT

Congress would designate the San Gabriel Mountains unit of the Angeles National Forest (ANF) as a U.S. Forest Service National Recreation Area (NRA) that would continue to be managed solely by the U.S. Forest Service. The designation would bring additional recognition, tools, and resources to the ANF in order to steward watershed resources and ecosystems, and improve recreational opportunities.

Legislation establishing the NRA would reaffirm the primary importance of the ANF in preserving watershed and natural resources and emphasize future management practices that are compatible with resource protection. Authorizing legislation would also recognize the importance of the NRA for its recreational value and establish mechanisms to increase funding for facilities, maintenance, ecological restoration, visitor management, educational programming, and stewardship activities.

No unit of the national park system would be established.

PROPOSED AREA

The NRA would encompass the existing Angeles National Forest lands associated with the San Gabriel Mountains.

MANAGEMENT

The U.S. Forest Service would continue to manage the NRA according to existing management policies. The legislation establishing the NRA would provide the ANF with new authorities that would allow the U.S. Forest Service to partner with organizations to provide additional resources for recreation, resource protection, maintenance, and safety.

NPS Role

No unit of the national park system would be established. Existing units of the NPS would continue current management. The Santa Monica Mountains National Recreation Area would continue to partner with the U.S. Forest Service, as it currently does, on an informal basis. The NPS would continue to provide technical and financial assistance to local communities through existing programs.



Antelope Valley. 2007. NPS Photo.

Existing Agencies and Authorities

The designation would only apply to lands currently owned and managed by the U.S. Forest Service. Private lands and inholdings would continue to be regulated by local land use authorities.

EDUCATION AND INTERPRETATION

The Angeles National Forest would be recognized for its nationally significant resources associated with the San Gabriel Mountains. New partnership efforts and additional funding for education and interpretation staff would allow for interpretive media and programs within the ANF.

The NRA could explore new opportunities for education and research associated with the San Dimas Experimental Forest.

RECREATIONAL OPPORTUNITIES AND ACCESS

Existing recreational opportunities would remain on the Angeles National Forest. New partnership opportunities may assist the Angeles National Forest in fundraising for improved recreational experiences and planning for recreational connections. Enhanced recreational experiences would include improved visitor management in heavily used recreational areas as a result of more forest rangers, better facilities, improved trail connections and trailheads, and new educational and interpretive efforts.

RESOURCE PROTECTION (ECOLOGICAL COMMUNITIES AND CULTURAL RESOURCES)

The U.S. Forest Service would continue balancing use and resource protection in accordance with its multiple-use policy. The authorizing legislation would direct that any proposed new uses would need to be compatible with protecting watershed and significant resources.

The NRA would bring additional recognition, tools, and resources to the ANF in order to steward significant resources associated with the San Gabriel Mountains. Legislation would authorize the U.S. Forest Service to enter into cooperative management agreements with other agencies to protect habitat and ecosystems that cross jurisdictional boundaries. Ecological restoration would be emphasized.

New resources would be allocated to document, protect, and interpret cultural resources in the San Gabriel Mountains.

OPERATIONS AND MAINTENANCE

Authorizing legislation would direct additional

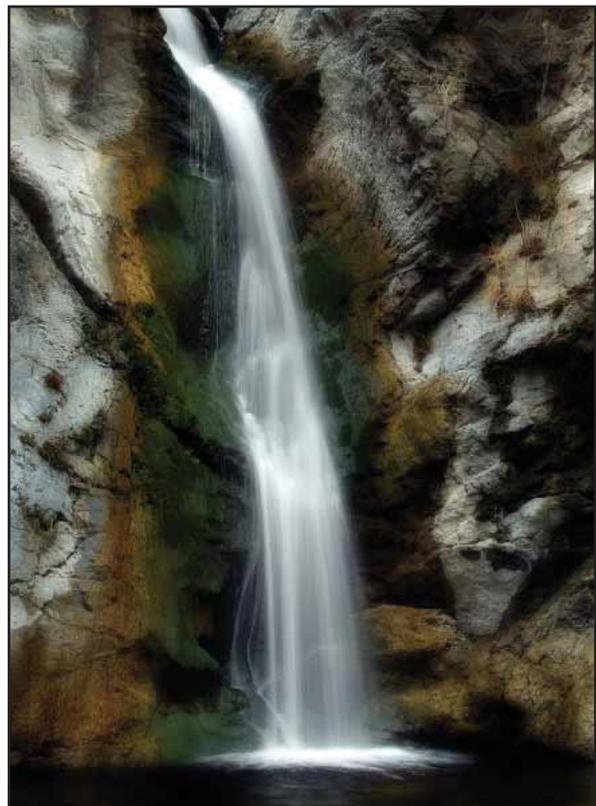
funding for operations and maintenance of the NRA allowing the ANF to provide more rangers and other staff in heavily used visitor areas. New volunteer programs would be developed to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources.

The NRA would also have dedicated staff to coordinate new partnerships and volunteer efforts.

FUNDING AND COSTS

In order to accomplish the goals of the NRA, substantial additional funding would be required, either through appropriations, partnerships, or philanthropy.

Legislation could allow the forest to receive direct donations and provide a mechanism for establishing a nonprofit fundraising or “friends of the forest” group. The elevated visibility and attention of a new designation, coupled with an increased sense of identity for the area’s significant resources, would enhance the ability of the ANF to raise private funds and seek special appropriations for particular projects.



Eaton Falls. Photo by Eric Lowenbach.

Alternative C: San Gabriel Watershed National Recreation Area

CONCEPT

Alternative C proposes a river-based national recreation area (NRA) that would serve to raise the visibility of the San Gabriel River watershed, offer new educational and interpretive opportunities throughout the watershed, and improve existing river-based recreation.

The NRA would be established by an act of Congress, which would provide the U.S. Forest Service, the NPS, and other land management agencies and organizations with guidance and direction to collaborate in protecting significant resources, providing new recreational opportunities, and improving visitor use of existing recreation areas.

Very little land would need to be acquired for direct management by the National Park Service. Instead, partnership arrangements among federal and state agencies, local governments, non-profit organizations, and area landowners would achieve the conservation, recreational, and educational goals of the NRA.

PROPOSED AREA

The NRA would encompass the upper San Gabriel River Watershed within the Angeles National Forest and a half-mile corridor around the San Gabriel and Rio Hondo Rivers, south to Santa Fe Springs. This is the same corridor width used for the San Gabriel River Master Plan. The NRA would include approximately 178,000 acres of land; 89% of this area is already protected by existing agencies and organizations.

MANAGEMENT

NRA Partnership

The NRA would be managed by a voluntary partnership that would include agencies and organizations with land and interests in the area.

In existing public land areas, inter-agency agreements could augment agency staffing to manage highly used areas such as the San Gabriel Canyon, providing higher levels of visitor services, education, and safety.

The NRA would partner with existing environmental education centers, school districts, visitor centers, and youth organizations to provide ranger programs and opportunities to engage children and residents of all ages in learning about environmental stewardship and the natural and

cultural significance of the San Gabriel River Watershed.

NPS Role

The primary role of the NPS would be: 1) coordinating the formal partnership that would manage activities within the NRA, and 2) providing interpretation and education. The NPS would also take the lead in coordinating a voluntary information network throughout the San Gabriel Watershed to provide interpretive and educational messages about significant resources.

Through cooperative management agreements, the NPS could provide assistance to partner agencies with visitor management and protection, interpretation and education. The NPS would also have a lead role in coordinating interpretive and educational messages about significant resources.

Existing Agencies and Authorities

The designation of the NRA would not apply additional regulatory or land use authorities over existing agencies or local governments. Each partner and jurisdiction would retain land ownership, management, and decision-making authorities for lands that they own. NPS land management policies and regulations would only apply to lands that the NPS acquires. Privately-held lands would continue to be regulated by local land use authorities.

EDUCATION AND INTERPRETATION

The NRA would partner with existing environmental education centers, school districts, visitor centers, and youth organizations to provide ranger programs and opportunities to engage children and residents of all ages in learning about environmental stewardship and the natural and cultural significance of the San Gabriel River Watershed.

The NRA partnership would provide interpretive programs at existing recreation areas, schools, interpretive centers, and historical sites/areas within the NRA. The NRA partnership would also coordinate a voluntary, shared information network in which sites within the San Gabriel Watershed would deliver coordinated interpretive messages about the watershed.

RECREATIONAL OPPORTUNITIES AND ACCESS

Recreational uses and activities would be determined by the existing land management agency. The NRA partners would work together to improve and enhance the quality of existing

recreational experiences through facility improvement, additional staff (rangers and interpreters), monitoring efforts, and cooperative planning.

Within the NRA, the partnership would work to foster new recreational opportunities that are compatible with maintaining watershed values, water supply, flood protection, and habitat values. The NRA partnership would explore opportunities for improved transportation and trail connections to destinations within the NRA.

RESOURCE PROTECTION

The NRA partnership would seek additional funding for resource protection and would facilitate opportunities to work collaboratively to conserve and enhance resources along the San Gabriel River and its upper watershed through research, cooperative management, and ecological restoration. New resources would be allocated to document, protect, and interpret cultural resources within the NRA.

OPERATIONS AND MAINTENANCE

Existing agencies would continue to be responsible for the operation and maintenance of their lands and facilities. Through cooperative management agreements, the NRA agency partners would be able to share staff, facilities, and funding to assist in the operations and maintenance of heavily used visitor areas. The NPS would coordinate new partnerships and facilitate the development of more volunteer programs to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources.

The NPS would require funding for staff including administration, interpreters, planners, law enforcement, outreach coordinator, education specialists, and resource management specialists. Job training programs could be incorporated into staffing and volunteer programs. Given NPS budget constraints, it is likely that the NRA would initially have a small staff that would increase over time as funding is available. A general management plan would identify park priorities, management emphases, and required staffing for a 15-20 year timeframe.

The NPS would share office space with partner agencies or lease office space in or near the NRA for operations and administration. The NPS could also seek use of existing buildings for visitor serving facilities. Specific operational and visitor facility needs would be identified through a general management plan.

Land Acquisition

The majority of land within the NRA is owned and managed by public agencies. Lands within the NRA would remain under their current ownership and jurisdictions, with each land management agency continuing to fund its own operations. The need for land acquisition by the NPS would be small, targeted for protection of significant resources, and subject to available funding. Partner agencies would also contribute funds for land acquisition within the NRA.

COSTS AND FUNDING

The NPS would receive federal funding for its administrative, educational, technical assistance, and interpretive roles. Based on the size of the area, and the types of services and assistance offered, the NPS budget for the NRA might fall between \$1 to \$3 million. The NRA designation may also enhance funding or fundraising opportunities for the U.S. Forest Service.

The NRA partnership would be a coordinating body for existing grant programs, and could work together to leverage funds from a variety of sources (e.g. state bonds, Land & Water Conservation Fund) to increase funding for projects in the NRA.



Bigcone Douglas fir. Photo courtesy of BonTerra Consulting.

Alternative D: San Gabriel Region National Recreation Area (A Partnership Linking Significant Resources and Recreation)

CONCEPT

Alternative D represents a combination of ideas from the preliminary alternatives that were presented to the public in fall 2009. Alternative D proposes a larger scale national recreation area (NRA) that would recognize and protect the significant resources associated with the San Gabriel Mountains and Puente Hills, explore opportunities to protect and enhance interconnected ecosystems, provide important open space connections for recreation, and offer new educational and interpretive opportunities. Ecological restoration would be emphasized.

The management approach of alternative D would be the same as alternative C. The NPS, U.S. Forest Service, and numerous other agencies and organizations with land and interests in the area would work collaboratively to protect significant resources and improve recreational opportunities. Very little land would be need to be acquired for direct management by the NPS.

Unlike the other alternatives, in Alternative D the NPS and the partnership would offer technical assistance to willing surrounding communities for conservation planning to extend open space connections and form a network of parks, habitats, and open spaces.

PROPOSED AREA

Alternative D proposes the largest NRA of the three action alternatives, providing more opportunities for resource protection, inter-agency coordination, and recreation. The NRA would include the San Gabriel Mountains, portions of the San Gabriel and Rio Hondo Rivers, and a portion of the western Puente Hills.

Within the San Gabriel Mountains, the NRA would include the Angeles National Forest (ANF) adjacent foothill areas with ecological resource values, and areas near the San Andreas Fault. Areas with ecological resource values include designated critical habitat for federally listed threatened or endangered species, and/or areas within one of the Los Angeles County proposed significant ecological areas. Below the ANF, the NRA would include a half-mile corridor around the San Gabriel and Rio Hondo rivers corridors, south to Santa Fe Springs. Portions of the western Puente Hills with ecological resource value and recreational potential (areas

west of Harbor Boulevard) would also be included. This primarily includes lands owned and managed by the Puente Hills Landfill Native Habitat Authority and lands proposed by Los Angeles County to be included in the Puente Hills Significant Ecological Area.

MANAGEMENT

NRA Partnership

The management structure of alternative D would primarily be the same as alternative C, but with some broader functions. The NPS and the partnership would offer conservation planning assistance to interested communities to extend open space connections and form a network of parks, habitats, and open spaces.

In the more urban areas associated with the river corridors, the NRA partnership would work with interested surrounding communities to increase the amount and variety of public open space, parks and recreational lands, particularly in under-served areas, and to enhance public transportation access between urban populations and the public lands of the NRA.

In rural areas such as Soledad Basin, Antelope Valley, or Mt. Baldy, where future growth pressures may threaten open space and the rural quality of life, the NRA would work with communities to preserve additional open space and improve recreational trail connections and staging areas.

In existing public land areas, interagency agreements could augment agency staffing to manage highly used areas such as the San Gabriel Canyon, providing higher levels of visitor services, education, and safety.

NPS Role

The NPS role in alternative D would primarily be same as alternative C, but with the addition of a technical assistance program to provide conservation and recreation planning to interested public agencies, private landowners, and organizations beyond the NRA boundaries to create and connect parks, conserve habitat, and provide new recreational experiences.

Existing Agencies and Authorities

The designation of the San Gabriel Region NRA would not apply additional regulatory or land use authorities over existing agencies or local governments. Each partner and jurisdiction would retain landownership, management, and decision-making authorities for lands that they own.

NPS land management policies and regulations would only apply to lands that the NPS acquires. Private lands would continue to be regulated by local land use authorities.

EDUCATION AND INTERPRETATION

Educational and interpretive programming would primarily be the same as alternative C, except that with a larger NRA in alternative D, a wider array of interpretive topics and themes, as well as on-site interpretive and educational programming, would occur throughout the San Gabriel Mountains, along the San Gabriel River, and in the Puente-Chino Hills.

RECREATIONAL OPPORTUNITIES AND ACCESS EDUCATION AND INTERPRETATION

Within the NRA, a variety of recreational opportunities would be available to the public. Allowable recreational uses and activities would continue to be determined by the existing land management agency. In alternative D, the NRA partnership would seek to improve recreational access and opportunities in urban areas that are deficient in recreation and park lands by offering assistance in planning for close-to-home recreational opportunities, better trail access, and improved public transportation options to recreational areas. Additionally, the partnership would explore opportunities to restore vacant or unused land to provide new recreational opportunities.

RESOURCE PROTECTION

The NRA partnership would facilitate opportunities to work in collaboration with partner agencies to conserve and enhance significant resources associated with the San Gabriel Mountains, watershed, and the Puente Hills through research, cooperative management, and ecological restoration.

The NRA partnership would seek to leverage additional funding for wildlife and habitat management and offer conservation technical assistance when requested. Coordinated cultural resource management would be the same as in alternative C, but would cover a broader area.

OPERATIONS AND MAINTENANCE

Existing agencies would continue to be responsible for the operation and maintenance of their lands and facilities. Through cooperative management agreements, the NRA agency partners would be able to share staff, facilities, and funding to assist in the operations and maintenance of heavily used visitor areas. The NPS would coordinate new

partnerships and facilitate the development of more volunteer programs to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources.

Required NPS staff for the NRA would be similar to alternative C. However, with a larger land area and a broader set of programs, alternative D would be expected to require slightly higher staffing levels. Job training programs could be incorporated into staffing and volunteer programs.

The NPS would share office space with partner agencies or lease office space in or near the NRA for operations and administration. The NPS could also seek use of existing buildings for visitor serving facilities. Specific operational and visitor facility needs would be identified through a general management plan.

Land Acquisition

The majority of land in the proposed NRA is owned and managed by public agencies. Lands within the NRA would remain under their current ownership and jurisdictions, with each land management agency continuing to fund its own operations. The need for NPS land acquisition would be small, targeted for protection of significant resources, and subject to funding availability. Partner agencies would also contribute funds for land acquisition within the NRA when funding is available.

COSTS AND FUNDING

Costs and funding needs for alternative D would be similar to alternative C. However, a larger NRA would require more from the NPS in terms of its administrative, educational, and interpretive assistance to the partnership. The NPS budget for the NRA could be between \$2 and \$4 million based on analysis of comparable park units.

Environmental Assessment

Background

Before taking an action, the National Environmental Policy Act (NEPA) requires federal agencies to identify a range of alternatives for that action and to analyze the potential environmental impacts of that action, including any potential adverse environmental effects that cannot be avoided if the proposed action is implemented. The NPS prepared the environmental assessment (EA) for the *Draft San Gabriel Watershed and Mountains Special Resource Study* to identify and analyze the potential environmental and socioeconomic consequences of each of the alternatives considered in the study.

Impacts

Consequences are determined by comparing likely future conditions under each alternative with the existing baseline conditions as described in the “no action” alternative. The analysis includes consideration of the context, intensity, and duration, of direct and indirect effects of all the alternatives. The NPS based analysis and conclusions on a review of existing literature, information provided by experts within the NPS, as well as outside organizations, analysis of case studies of existing programs in other locations, and the professional judgment of the study team members.

The impact analysis for this study is necessarily broad to avoid speculation as to site-specific types of impacts given the broad nature of the study. The outcome of the study will be a recommendation to Congress. If Congress takes action, then new environmental analysis would be undertaken prior to specific implementation actions. This new analysis would propose specific actions, whose site or area specific impacts would be assessed prior to implementation of the plan.

The NPS finds that there would be no significant impacts associated with the proposed alternatives. The summary table which follows provides a summary of environmental consequences by specific impact topics.

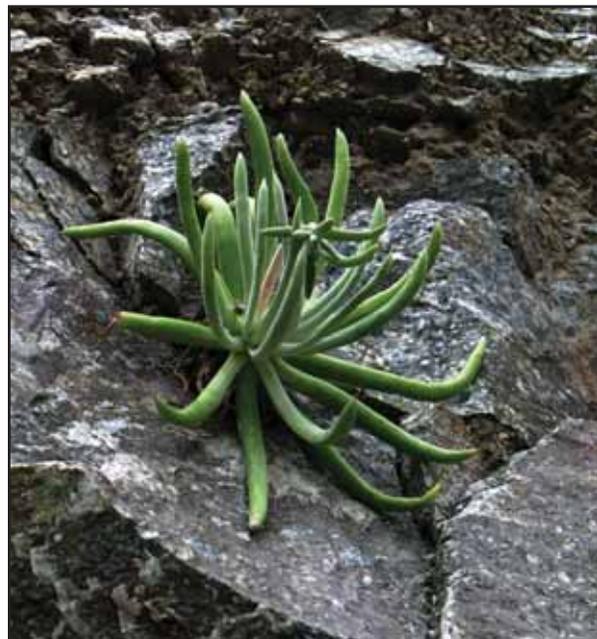
Environmentally Preferred Alternative

The NPS is required to identify an “environmentally preferred alternative” in an EA. The environmentally preferred alternative is determined by applying criteria set forth in the National Environmental Policy Act, as guided by direction from the Council on Environmental Quality.

The environmentally preferable alternative should not be viewed as the National Park Service’s preferred alternative. The Director of the National Park Service is required under law and policy to identify which alternative or combination of alternatives would be most effective and efficient in protecting significant resources and providing for visitor enjoyment. The Director will make this finding after the publication of the draft special resource study / environmental assessment, considering public and stakeholder comment. This finding will be included in the study package forwarded to the Secretary of the Interior.

The environmentally preferred alternative is the alternative that:

- Fulfills the responsibilities of each generation as trustee of the environment for succeeding generations.
- Ensures for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- Attains the widest range of beneficial uses of the environment without degradation, risk of health



San Gabriel Mountain dudleya. Photo courtesy of Gabi McLean.

or safety, or other undesirable and unintended consequences.

- Preserves important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieves a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities
- Enhances the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Based on the aforementioned criteria, the NPS has determined alternative D to be the environmentally preferable alternative. Alternative D best meets the NEPA criteria because it would protect natural and cultural resources over a larger area, provide greater opportunities relating to recreation and visitation, and foster a larger framework for cooperative management (as compared to alternatives A and C).

Goals Analysis

The following summary describes impacts as they relate to the goals established for the alternatives and the specific impact topics required by law and policy. The goals were developed by the study team based on the public input received. They represent values that appeared to be shared by the majority of the respondents in the various public input opportunities throughout the study process.

ADDRESS CURRENT AND FUTURE RECREATION AND OPEN SPACE NEEDS

All three action alternatives (A,C, and D) seek to address recreation and open space needs within the study area. Alternative A would primarily improve the quality of recreation within the San Gabriel Mountains portion of the ANF. However, it would do little to address the needs of nearby urban communities that are currently deficient in parks and open space. Without addressing this need, increasing demands on the ANF to provide local recreational opportunities could diminish the visitor experience over time.

Alternative C would provide more recreation and open space opportunities for communities along the San Gabriel River and improve the recreational experience in the highly used San Gabriel River Canyon.

Alternative D would provide the greatest ability to address current and future recreation and open space needs. A larger area is included in the NRA and technical assistance programs would allow the NRA to assist local communities in making connections to NRA resources and in developing more close-to-home recreation. Alternative D would also provide more resources for regional open space conservation.

PROTECT OR RESTORE SIGNIFICANT NATURAL RESOURCES AND IMPORTANT HABITATS

Alternative A would provide improved protection of nationally significant resources within the San Gabriel Mountains. Significant native habitat would be improved by greater restoration efforts and improved planning and partnerships with other agencies to protect wildlife corridors. Alternative C would do the least in terms of protecting and restoring significant natural resources and important habitats as it contains the smallest amount of nationally significant resources and native habitat found within the study area. Restoration and protection would occur in the San Gabriel River upper watershed and along the river corridor to Santa Fe Springs. However, significant resources located in other areas of the San Gabriel Mountains and Puente Hills would not benefit.

Alternative D provides the greatest opportunity to protect and restore natural resources and important habitats on a regional scale. The proposed NRA would contain most of the nationally significant regions identified in the resource analysis. Additionally, the NRA partnership would work regionally to protect and restore wildlife corridors and habitat. Studies have shown that protection of wildlife corridors enhances ecological diversity and provides protection from threats from nonnative species, altered fire regimes, and the effects of climate change.

PRESERVE HISTORIC AND CULTURAL RESOURCES

Most of the nationally significant cultural resources in the study area are located in the San Gabriel Mountains. As such, alternatives A and D provide the most potential for protecting significant cultural resources within the study area. Alternative C would allow for greater preservation of cultural resources associated with the San Gabriel River, including historic mining sites, the site of the original San Gabriel Mission, and the Pio Pico State Historical Park. However, alternative C would preserve cultural resources to a lesser degree than alternatives A and D due to its narrower geographical focus.

**MAINTAIN OR IMPROVE WATER QUALITY,
WATER CONSERVATION AND FLOOD
PROTECTION**

All of the alternatives would respect existing management and structures necessary for flood protection and water conservation. However, each of the action alternatives would have the potential to improve water quality. Alternative D would provide the most opportunities to improve water quality through improved visitor education, visitor management, and restoration opportunities throughout the San Gabriel Mountains and along the San Gabriel River.

Alternative A would provide regional benefits to water quality and conservation. The early conservation of the San Gabriel Mountains was intended for watershed protection and this would be reaffirmed in both Alternatives A and D. Protection of watershed resources and additional restoration throughout the mountains would improve water quality both in the mountains and downstream. Alternative C would have benefits to the San Gabriel River watershed, through enhanced visitor management and education and restoration opportunities within the NRA. However, it would do nothing to improve the water quality of other watersheds located within the study area, such as the Los Angeles River, the Santa Clara River, and rivers that drain into the Antelope Valley.



Day use activities, Angeles National Forest. NPS photo.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY IMPACT TOPICS

Impact Topics	No Action	Alternative A
<p>Biological Resources - Native Plants</p>	<p>Trends that currently have an adverse impact on native plants, such as invasive species, altered fire regimes, and habitat loss, would continue to have minor to moderate adverse effects on native plant communities.</p>	<p>Protection and awareness of native plants through enhanced interpretation and educational efforts due to the new designation would have beneficial effects on native plant communities.</p> <p>There would be opportunities for increased staff and funding dedicated to the control of nonnative species.</p> <p>The USFS would have additional authorities to work with other land management agencies to protect important wildlife connections to the forest. Protection of habitat corridors enhances species diversity and resilience to threats such as altered fire regimes, invasive species, and climate change.</p>
<p>Biological Resources - Wildlife</p>	<p>Many of the study area native habitat types are severely reduced from their former range.</p> <p>Threats such as habitat loss and fragmentation as a result of development, air pollution, water pollution, and altered fire regimes would continue to have moderate adverse effects on the viability of many species and communities including those that are threatened or endangered.</p>	<p>In alternative A, the proposed designation would bring more resources to the USFS for habitat restoration, conservation, research, and planning for wildlife corridors.</p> <p>Designation would ensure that proposed new or future uses on the national forest would be compatible with the protection of significant resources and watershed values. This would have an overall beneficial effect on protecting wildlife resources within the ANF.</p>
<p>Cultural Resources</p>	<p>Trends that adversely impact cultural resources including, archeological and historical resources within the study area would continue.</p> <p>Within the ANF, cultural resources would continue to be threatened by erosion, fire, flood, vandalism, looting, and land use practices. Additional threats to cultural resources throughout the study area include flooding, water erosion, off-road vehicle use, unauthorized collecting of artifacts, and industrial activities such as mining.</p> <p>Such threats would continue to have minor to moderate adverse effects on cultural resources.</p>	<p>In alternative A, more resources would be available to the USFS for documentation, education, and interpretation of cultural resources within the ANF. The ANF may also be better able to form new partnerships for the protection of cultural resources.</p> <p>Beyond the ANF, existing threats to cultural resources would continue to have minor to moderate adverse effects on cultural resources as a result of natural deterioration of some historic resources due to lack of maintenance and preservation measures and loss of some sites over time.</p> <p>No dedicated federal funds would be available to document and interpret cultural resources in a comprehensive manner outside of the ANF.</p>

SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY IMPACT TOPICS

Alternative C	Alternative D
<p>Alternative C would provide beneficial effects on native plant protection and education along the San Gabriel River and in the highly visited upper watershed. This would occur through coordinated interpretive efforts, new resources for conservation, and new agency partnerships focused on conservation and restoration of native plant communities.</p> <p>Information centers located throughout the study area could also provide an opportunity for greater awareness with regard to native plant protection.</p> <p>As in alternative A, a component of native plant protection would be to focus on the control of nonnative species.</p>	<p>Alternative D would have the greatest benefit for native plant habitat as it recognizes and promotes protection of habitat in the San Gabriel Mountains, Puente Hills, and along the San Gabriel River corridor. The NPS would provide technical assistance on a voluntary basis to conserve wildlife corridors and native habitats.</p> <p>The larger NRA would also provide coordinated interpretive efforts, new resources for conservation, and new agency partnerships focused on conservation of native plant communities.</p>
<p>In Alternative C, the proposed designation would bring more resources to both the ANF and the San Gabriel River corridor for wildlife protection. Additionally, partnering entities would work to leverage greater funding for conservation along the San Gabriel River.</p> <p>Designation would ensure that proposed new or future uses on the national forest would be compatible with the protection of significant resources and watershed values. This would have an overall beneficial effect on protecting wildlife resources within the ANF.</p> <p>The potential for increased water and land-based recreation opportunities could result in a minor adverse effect on wildlife and wildlife habitat. This would be mitigated through visitor education programs, monitoring, and restoration efforts.</p>	<p>Designation would ensure that proposed new or future uses on the national forest would be compatible with the protection of significant resources and watershed values. This would have an overall beneficial effect on protecting wildlife resources within the ANF.</p> <p>Through partnerships, new funding, and technical assistance programs, alternative D would provide the greatest opportunity to protect habitat and connect wildlife corridors important for significant resources.</p> <p>The potential for increased recreation opportunities, in areas where previous use has been light or nonexistent, could result in a minor adverse effect on wildlife and wildlife habitat. This would be mitigated through visitor education programs, monitoring, and restoration efforts.</p>
<p>In alternative C, NPS technical assistance for cultural resource protection would reinforce best management practices for protecting structures, landscapes, archeological resources, and ethnographic resources.</p> <p>Coordinated protection of cultural resources would be enhanced through NRA partnership agreements.</p> <p>Coordinated interpretation and education would have beneficial effects on the protection and understanding of cultural resources.</p> <p>An increase in coordinated land conservation efforts would also likely enhance the protection of cultural and ethnographic resources on lands that are as yet undisturbed.</p>	<p>Alternative D would be fundamentally the same as alternative C, but it would expand the protective boundaries and cover more sites and cultural themes since the area includes the entire San Gabriel Mountains portion of the ANF, the Puente Hills, and the San Gabriel River corridor.</p> <p>Alternative D would provide the most comprehensive and coordinated effort to protect cultural resources throughout the study area through:</p> <ul style="list-style-type: none"> • More NPS technical assistance • More research and documentation of broader areas • More comprehensive interpretation and education of broad cultural themes throughout the NRA. • Expanded partnerships, coordination and consultation with stakeholder groups, including Native Americans.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY IMPACT TOPICS

Impact Topics	No Action	Alternative A
<p>Recreation Use and Visitor and Experience</p>	<p>Higher demands would be placed on existing recreation areas with current trends in population growth.</p> <p>Inequities in recreation opportunities would likely continue.</p> <p>Recreational opportunities would occur only through existing agencies and local governments as funding permits. Lack of resources and personnel for recreation management would continue.</p> <p>Coordinated interpretation for significant resources would not occur.</p> <p>Interpretation and educational programs in the ANF would continue to be greatly limited by current funding and staffing, having a moderate adverse impact on visitor experience.</p>	<p>In alternative A, more USFS staff would be available within the new NRA to manage visitors.</p> <p>Additional funding for improved recreational facilities and more interpretive and educational programming would have a beneficial effect on the visitor experience within the ANF.</p> <p>Alternative A would do little to ameliorate the lack of recreational opportunities available to urban areas that are currently deficient in parks and open space.</p>
<p>Socioeconomics</p>	<p>Current trends in property values, economic activity, income, population, employment, recreation use and distribution, tourism, community relationships (as affected by local federal land use) would continue.</p> <p>Areas identified as experiencing recreational high use would continue to be congested and noisy, with negative impacts on visitor experience and infrastructure.</p>	<p>The NRA designation and improved recreational opportunities would cause small increases in visitation over time.</p> <p>Increased visitation would have modest beneficial effects on surrounding local communities which would provide services to such visitors.</p> <p>Increased investment in the ANF to provide more staffing for visitor services, planning, and restoration could result in additional jobs for the region.</p>
<p>Socioeconomics -Socially and Economically Disadvantaged Populations</p>	<p>The existing lack of open space, lack of effective transportation, lack of culturally advantageous facilities or opportunities, and lack of knowledge about recreation and natural resources would continue to have moderate adverse impact on socially and economically disadvantaged populations.</p>	<p>Alternative A would have a generally beneficial impact on socially and economically disadvantaged populations. However, it would likely represent only a minor improvement for communities that are currently underserved for opportunities to access natural resources and open space.</p>

SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY IMPACT TOPICS

Alternative C	Alternative D
<p>There would be more targeted planning efforts and leveraged funds to create recreational opportunities along the San Gabriel River. More trail connections and new transit options designed to connect communities to the NRA would improve access to recreational areas and open space.</p> <p>Through cooperative agreements, agencies would share staff to assist in visitor management. The NPS would also be able to provide staff assistance and visitor management technical assistance throughout the NRA.</p> <p>The voluntary information network would provide more opportunities to provide interpretive and educational programs about the resources of the San Gabriel River Watershed.</p> <p>Alternative C could also provide public health benefits to those communities near the San Gabriel River corridor.</p>	<p>Alternative D would have the greatest beneficial effect on recreational opportunities and visitor experience. More trail connections and new transit options would improve access to recreational areas and open space.</p> <p>The NPS would provide technical assistance to improve open space and recreation planning in surrounding communities.</p> <p>Through cooperative agreements, agencies would share staff to assist in visitor management. The NPS would also be able to provide staff assistance for visitor management throughout the NRA.</p> <p>The larger NRA and voluntary information network would allow for coordinated interpretive and educational opportunities throughout the study area providing the greatest beneficial effects on the visitor experience.</p> <p>Alternative D would have a greater beneficial effect on public health for communities throughout the region, through providing the most new opportunities for outdoor recreation.</p>
<p>Small increases in visitation to NRA destinations could have modest beneficial effects on surrounding local communities which would provide services to such visitors.</p> <p>The new designation would result in additional jobs to support the NRA. Job training would be incorporated into staffing and volunteer programs. Such effects would be negligible in the regional context.</p>	<p>Small increases in visitation over time could have modest beneficial economic effects on surrounding local communities which would provide services to such visitors.</p> <p>With a larger designation, and a greater emphasis on education and job training, alternative D may provide slightly more benefits than the other alternatives in terms of creating jobs. Such effects would be negligible in the regional context.</p>
<p>Alternative C would have a greater beneficial impact on socially and economically disadvantaged populations, with efforts applied specifically in urban areas close to the San Gabriel River.</p> <p>Alternative C provides job training and opportunities within these communities which has the potential both to improve access for recreation, but also to build programs to provide training and job opportunities.</p> <p>The development of effective and diverse partnerships would also serve to build programs and cooperative agreements with organizations that represent disadvantaged populations.</p>	<p>With regional technical assistance programs, job training, and improved transportation connections to recreation and open space, alternative D presents the most resources and assistance for providing such communities with better access to recreational opportunities.</p> <p>As in C, alternative D provides job training and career opportunities for local communities.</p> <p>As in alternative C, the development of effective and diverse partnerships would also serve to build programs and cooperative agreements with organizations that represent disadvantaged populations.</p>

SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY IMPACT TOPICS

Impact Topics	No Action	Alternative A
<p>Land Use</p>	<p>Existing efforts to protect and conserve lands would continue at current levels. Regional growth and development, and lack of regional or coordinated planning efforts would continue to challenge local agencies and organizations in their efforts conserve open space.</p> <p>Traffic and congestion would continue to be affected primarily by regional growth and development. However, localized congestion at heavily used recreation sites would continue to have moderate adverse impacts on traffic patterns in these areas.</p>	<p>Improved recreation opportunities and land conservation within the ANF would have an overall beneficial effect on urban life and the built environment for surrounding communities.</p> <p>Alternative A would have very little effect on traffic patterns throughout the study area. However, with increases in visitation, alternative A could add a negligible adverse impact to local traffic patterns associated with popular recreation areas.</p> <p>Alternative A actions would apply only to national forest lands. There would be no impact on land use managed by existing agencies and local jurisdictions.</p>
<p>Water Resources</p>	<p>Water quality would vary greatly from location to location throughout the study area, depending primarily on the level of development and land uses.</p> <p>Limited funding for restoration, planning, and public education to address water quality impacts would result in continuing minor to moderate adverse impacts on water resources.</p> <p>The water quality of rivers and creeks in certain areas would continue to be a public health and safety concern.</p>	<p>Additional emphasis on restoration and the protection of watershed resources would have a beneficial effect on water resources in the ANF.</p> <p>Additional resources for visitor education and more rangers on-site in heavily used recreation areas could reduce pollution caused by recreational use thus having a beneficial effect on water resources in the ANF.</p> <p>Improved water quality would have an indirect beneficial effect on public health and safety.</p>

SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY IMPACT TOPICS

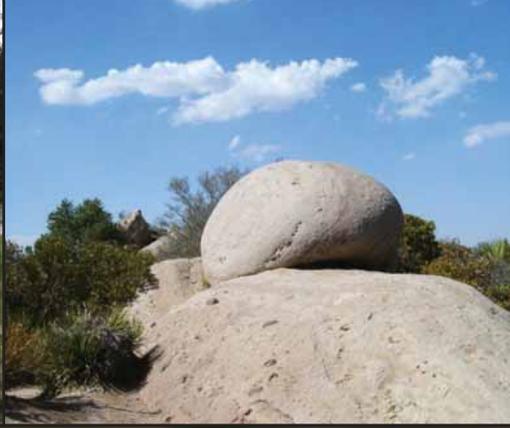
Alternative C	Alternative D
<p>Alternative C would have a beneficial impact on the availability of open space along the San Gabriel River corridor, having a beneficial effect on urban quality and the built environment in these areas.</p> <p>When placed in the context of current transportation patterns, which are primarily affected by regional land use, growth and development, alternative C would have very little effect. Transportation improvements to destinations within the NRA, if implemented, could alleviate traffic congestion in high use recreation areas. Such effects would be negligible in the regional context.</p> <p>NPS management policies would apply only to NPS-owned lands. There would be no impact on land use managed by existing agencies and local jurisdictions.</p>	<p>By emphasizing and protecting interconnected ecosystems within and among urban zones, providing more recreational opportunities, and protecting open spaces, alternative D would have the greatest beneficial effect on open space availability, urban quality, and the built environment.</p> <p>With a broader emphasis on connecting people to recreation, providing more close-to-home recreation opportunities for urban communities, and improving transportation to major recreational destinations, alternative D could have beneficial effects on reducing traffic congestion in high use recreation areas. Such effects would be negligible in the regional context.</p> <p>NPS management policies would apply only to NPS-owned lands. There would be no impact on land use managed by existing agencies and local jurisdictions.</p>
<p>Over time, restoration opportunities funded by the NRA partnership would have a beneficial effect on San Gabriel River water quality.</p> <p>Alternative C would provide additional resources for visitor education, and more rangers on-site in heavily used recreation areas along the main corridors of the San Gabriel River. Additional resources for visitor education and more rangers on-site in heavily used recreation areas could reduce pollution caused by recreational use thus having a beneficial effect on water resources where current impairments are a result of recreational use.</p> <p>The increased emphasis on river-based recreation, and potentially on other recreation uses throughout the expanded NRA, holds the potential for additional impacts on water resources. However, this would be mitigated through more visitor education programs and more on-site staff to manage visitation.</p> <p>Improved water quality would have an indirect beneficial effect on public health and safety.</p>	<p>Alternative D would provide more restoration opportunities throughout the San Gabriel Mountains, along the San Gabriel River, and Puente Hills. Over time, these efforts would have greater beneficial effects on water resources than in alternative C.</p> <p>Alternative D would have similar beneficial effects to alternative C for water quality on rivers and creeks that are primarily impacted by recreational use.</p> <p>Additionally, the NRA would provide regional technical assistance for improved recreational planning and restoration opportunities, providing the opportunity to focus on broader watershed restoration efforts.</p> <p>The increased emphasis on river-based recreation, and new recreational opportunities throughout the expanded NRA, holds the potential for additional impacts on water resources. However, this would be mitigated through more visitor education programs and more on-site staff to manage visitation.</p> <p>Improved water quality would have an indirect beneficial effect on public health and safety.</p>

Next Steps

After the distribution of the *Draft San Gabriel Watershed and Mountains Special Resource Study* there will be a minimum 90-day review period. The NPS study team will then revise the report if needed, and transmit it to the Secretary of the Interior. The Secretary will transmit the report to Congress, along with the Secretary's recommendation for the area.



The San Gabriel Mountains with the Los Angeles urban area in the foreground. Photo © David Liu.



Introduction

1

Photos (clockwise): 1. Jackson Lake, Angeles National Forest. NPS Photo. 2. Devil's Punchbowl. NPS Photo. 3. Fishing in the San Gabriel River, NPS Photo. 4. Quail, Angeles National Forest. Photo by Eric Lowenbach.

Chapter 1: Introduction

Purpose and Need

The San Gabriel River Watershed Study Act (PL 108-042, July 2003) directed the National Park Service (NPS) to conduct a Special Resource Study of (1) the San Gabriel River and its tributaries north of and including the city of Santa Fe Springs, and (2) the San Gabriel Mountains within the territory of the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC).

The Act also directed the NPS to consult with the RMC and other appropriate federal, state and local government entities, and to consider regional flood control and drainage needs and publicly-owned infrastructure such as wastewater treatment facilities.

This legislation was sponsored by former Congresswoman Hilda L. Solis and co-sponsored by twenty other congressional representatives in order to explore environmental and recreational opportunities in the region. NPS representatives met with Congresswoman Solis prior to initiating the study. The Congresswoman expressed her hopes that the study would lead to more open space and recreational opportunities to urban communities in the San Gabriel Valley that currently have inadequate recreational access and fewer opportunities to enjoy open space. Another desired outcome was to explore ways to provide a better quality of life for urban communities by addressing clean air and water, as well as health-related issues such as obesity and diabetes. The Congresswoman also expressed a desire to see a National Park Service experience, including rangers along the San Gabriel River, who would be made available to these urban communities.

The purpose of this special resource study is to determine whether any portion of the San Gabriel Watershed and Mountains study area is eligible to be designated as a unit of the national park system. Through the study process, the NPS identified alternative strategies to manage, protect, or restore the study area's resources, and to provide or enhance recreational opportunities. These alternatives explore partnerships and efforts to protect important resources in ways that do not necessarily require the commitment of funds and staff by the NPS. This study will provide information to aid the Congress, the United States Department of the Interior, and the NPS in determining whether designation of a unit of the national park system is desirable and appropriate.

The National Park System New Area Studies Act (PL 105-391, 16 U.S.C. Sec. 1a-5) requires that these studies be prepared in compliance with the National Environmental Policy Act (NEPA). At the beginning of the study process, the NPS initiated a notice of scoping in the Federal Register (Vol. 70, No. 12, pp. 3064-3065). Through this public scoping process, the NPS study team identified a range of issues to address through the study and impacts of concern to the public.

Following public comment on the preliminary study alternatives, the study team determined that an environmental assessment (EA) is a sufficient level of environmental analysis for this study. No significant impacts are anticipated from the findings and recommendations of this study. The majority of the public concerns centered around potential impacts to local land use control, property rights, water rights, and the authority of existing regulatory agencies. To address this concern, the NPS committed to providing study recommendations that respect property rights and the authorities that currently belong to existing local, state and federal agencies and jurisdictions.

In initiating the study, the NPS study team launched an extensive public scoping process to determine needs and issues that should be considered in carrying out the study. The comment period extended from January 2005 to May 2005. During this time, the NPS received comments from cities, agencies, organizations, elected officials, and community members regarding the scope of the study.

Following this extensive public process, the NPS study team further refined the study's emphasis and scope to address public interests and concerns. Acknowledging the characteristics of this study area which includes densely populated urban areas managed by many different landowners, agencies, and jurisdictions, the NPS study team emphasized opportunities for collaborative management and partnerships with local, state and federal governments and other entities, in order to:

1. Address current and future recreation and open space needs;
2. Protect or restore significant natural resources and important habitats;
3. Preserve historic and cultural resources; and
4. Maintain or improve water quality, water conservation and flood protection.

Furthermore, the National Park Service considered only those management alternatives which respect property rights and the authorities that currently belong to existing local, state and federal agencies.

Issues Addressed in Study

Through the scoping process, numerous stakeholders including public agencies, citizens, organizations, and elected officials, identified specific issues and concerns that should be considered in the study process. The following issues were developed by the study team based on public and stakeholder input. These issues are described more fully in Chapter 6, *Alternatives*.

- Additional *funding* is needed to meet their resource protection and recreation objectives.
- There are sufficient *barriers to outdoor recreation* for some communities including lack of close to home recreational opportunities, poor access to recreational areas, and personal safety concerns.
- The Los Angeles area continues to experience tremendous population growth *causing increasing demands on existing recreation areas*.
- Greater protection is needed for the region's threatened *ecological communities*.
- The study area's *cultural resources* would benefit from further documentation, protection, and/or interpretation.
- The *study area lacks a clear sense of identity* that could help connect communities to the natural and cultural resources of the San Gabriel Mountains and the Puente-Chino Hills.
- The region's natural, cultural, and recreation resources *lack a comprehensive management plan* and could benefit from a regional planning structure.
- There is an ongoing need to protect and restore riparian ecosystems and provide appropriate recreational use of waterways while *improving water quality, enhancing efficiency of water storage and use, and providing flood protection*.

Study Area

The study legislation directed the NPS to conduct a Special Resource Study of the following areas: (1) the San Gabriel River and its tributaries north of, and including, the city of Santa Fe Springs; and (2) the San Gabriel Mountains within the territory of the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy. The NPS defined the area for study, through examining the study act's legislative history and intent, and through the public scoping process.

The study area covers more than 1,000 square miles (over 700,000 acres) in the greater Los Angeles metropolitan region. It is one of the most densely populated and diverse areas of the United States. Most of the study area is located in Los Angeles County (approximately 85%), the remainder lies in Orange and San Bernardino counties. In addition to the portions of San Gabriel River Watershed, the study area also includes portions of the Los Angeles River, the Santa Clara River, and the Antelope Valley watersheds, as well as very small portions of the Santa Ana River and Mojave watersheds. A map of the study area watersheds is provided in Chapter 2, *Resource Description*.

The U.S. Forest Service manages approximately two thirds of the study area (450,000 acres in the San Gabriel Mountains) as part of the Angeles National Forest (ANF). With the exception of private inholdings and access facilities for flood protection structures and other utilities, the forest remains primarily undeveloped. In close proximity to highly urban areas, the forest provides a refuge for wildlife and recreational opportunities for the greater Los Angeles metropolitan region.

Over fifty communities are located in the study area with approximately 1.5 million residents as of 2000 census (see Map: Local Communities). The Los Angeles metropolitan region is home to over 16 million residents. The largest communities in the study area south of the San Gabriel Mountains include Pomona and Santa Clarita with populations near 150,000. The City of Palmdale is the largest community at the northern end of the study area with approximately 115,000 residents.

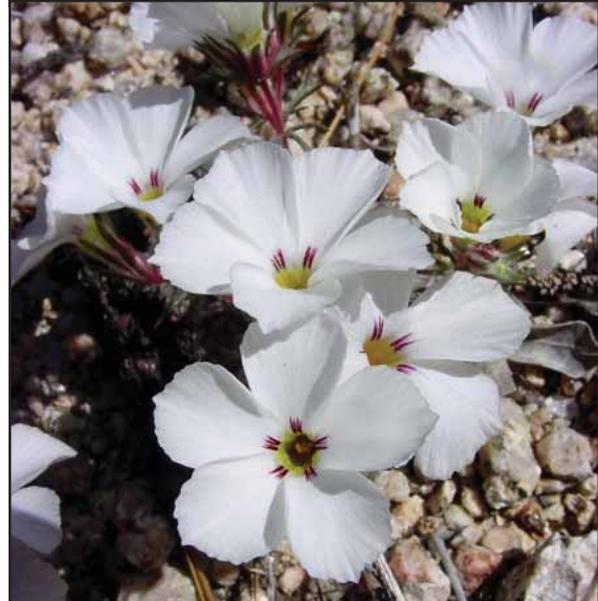
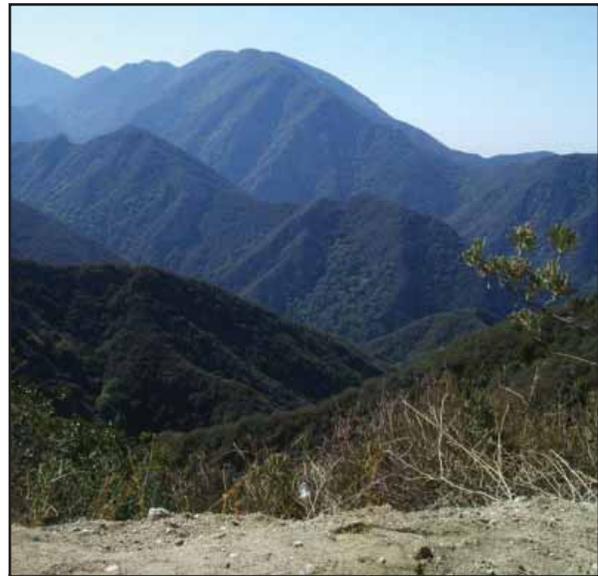
The study area is part of a complex landscape where the geomorphic provinces of the Transverse Ranges and Peninsular Ranges come together. The mountains, hills, and valleys of these provinces characterize the regional landscape. Major topographic features include the San Gabriel Mountains, the San Jose Hills, and the Puente-Chino Hills. The mountains and hills define valleys,

including the Santa Clarita, Antelope and San Gabriel valleys, and other portions of the Los Angeles basin and coastal plain. The northern limit of the study area includes the southwestern extent of the Mojave Desert in the Antelope Valley (See Figure 1: Location and Context).

The San Gabriel Valley and the Los Angeles basin are highly urbanized areas. Much of the San Gabriel River and its tributaries downstream of the mountains and the foothills have been altered for flood control purposes and water conservation. Despite their altered state, these urbanized channels still serve as habitat for birds and mammals. The urbanized channels also provide opportunities for public enjoyment. Small tracts of open space, recreational areas, and a 39-mile bike trail along the San Gabriel River corridor provide existing outdoor recreational opportunities.

The San Jose and Puente-Chino Hills contain lower density urban development and still retain areas with significant open space. Areas in the southern San Gabriel foothills are also developed at a lower density than the highly urbanized areas in the valleys and coastal plains. These foothills function as the urban/wildland interface, and provide wildlife connections to river and stream corridors. The northern slopes of the San Gabriel Mountains are comprised of low density, rural communities with farms and ranches, although urban development has begun to spread to the Soledad basin and the Antelope Valley in recent years.

The San Gabriel River and mountains played an important role in the history and heritage of California. The first recorded inhabitants of the study area were the Gabrieleno/Tongva, Fernandeño, and Chumash Native Americans. There are a number of culturally significant properties within the study area, including hundreds of archeological sites within the Angeles National Forest. Many sites are eligible for, or listed on, the National Register of Historic Places. Mission Vieja, the original site of the San Gabriel Mission, is located on the Rio Hondo River. Engineered sections of the San Gabriel River were constructed as early as the 1930's, and may be historically significant. Three national trails cross the study area: the Juan Bautista de Anza National Historic Trail, the Old Spanish National Historic Trail, and the Pacific Crest Trail.



Photos (top to bottom): 1. View to Brown Mountain, Angeles Crest. 2007. NPS photo. 2. Rio Hondo, Puente Hills with the San Gabriel Mountains in the distance. Photo by Bruce Perry, Department of Geological Sciences, CSU Long Beach. 3. Lianthus. Photo courtesy of Michael Charters.

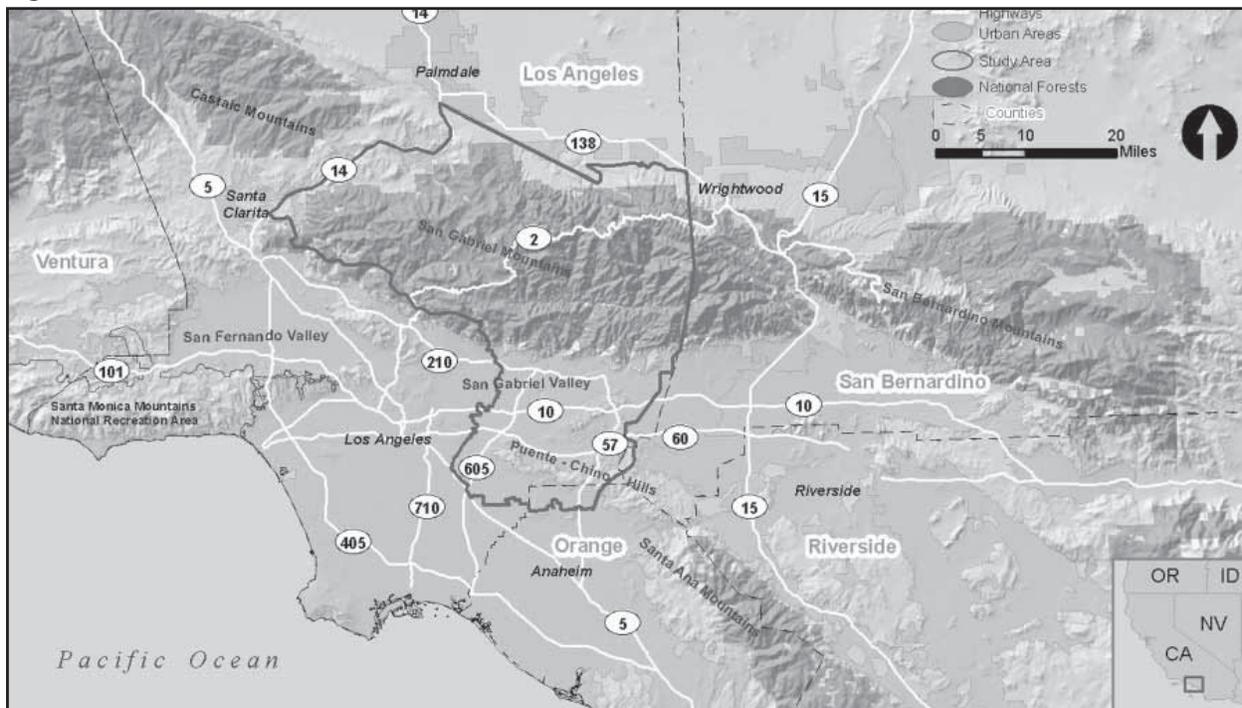
Access

Interstate 5 is the main access route from the north as it winds through the Tejon Pass in the Tehachapi Mountains to enter the Los Angeles basin from the north. Interstate 5 runs southeasterly through the Los Angeles basin and continues south along the coast to San Diego. Highway 101 is the main coastal access route from the northwest. Access to the Los Angeles basin via Highway 101 is through the Santa Monica Mountains.

Other access routes to the study area include Highway 14, which follows the Soledad basin along the northwestern base of San Gabriel Mountains from Santa Clarita to the Antelope Valley. The Angeles Crest Highway (Highway 2) is the only major route that winds north through the heart of the rugged San Gabriel Mountains connecting Pasadena to the town of Wrightwood and ultimately to Highway 138. However, portions of Highway 2 in the Angeles National Forest are often closed for repair.

Interstate 10 is the major east-west access route through the study area. Additional east-west highways through the Los Angeles basin include Interstate 205, State Route 60, and Interstate 405. Highway 138 is the major east-west corridor north of the San Gabriel Mountains. Regional north-south freeways include Interstate 710, Interstate 605, which follows the San Gabriel River, and State Route 57, which runs along the eastern end of Los Angeles County.

Figure 1: Location and Context



Study Process

LEGISLATIVE AND POLICY DIRECTION

Several laws and policies outline criteria for units of the national park system. The National Park System New Area Studies Act (PL 105-391, 16 U.S.C. Sec. 1a-5) establishes the basic process for NPS studies of potential new national park areas. NPS management policies provide further guidance. According to NPS management policies, a proposed addition to the national park system will receive a favorable recommendation from the NPS only if it meets all of the following four criteria for inclusion:

1. it possesses nationally significant natural or cultural resources;
2. it is a suitable addition to the system;
3. it is a feasible addition to the system; and
4. it requires direct NPS management, instead of alternative protection by other public agencies or the private sector.

These four criteria are designed to ensure that the national park system includes only the most outstanding examples of the nation's natural and cultural resources. They also recognize that there are other management alternatives for preserving the nation's outstanding resources.

Alternatives for National Park Service management are developed for study areas that meet all four of the criteria for inclusion, as shown above. Further definition of each of these criteria is provided in the related sections of this report.

PUBLIC INVOLVEMENT

The NPS San Gabriel Watershed and Mountains Special Resource Study process was initiated in January 2005 with a series of meetings with public agencies. Public scoping meetings were held in March 2005 in Claremont, Diamond Bar, Downey, Rosemead, and Acton. A newsletter was published to announce the start of scoping, describe the study process, and to provide information on how the public and stakeholders could participate in the study process.

The scoping comment period extended until May 20, 2005. The NPS continued discussions with affected agencies and jurisdictions through the fall of 2005 to address specific concerns. To share the results of scoping with the public, the study team distributed a second newsletter with a summary of the comments received by the NPS during the public scoping period.

In early 2006, the National Park Service revised the study scope to address comments and concerns received during the scoping process. The revised scope refined the study area to include portions of the Rio Hondo River and removed from the study area the cities within the Gateway Cities Council of Governments jurisdiction as was intended in the legislation. The revised study scope also addressed concerns about potential impacts on local land use control and agency authorities. The NPS committed to producing a study that would respect property rights and the authorities that currently belong to existing local, state and federal agencies. The NPS study team produced a third newsletter to notify the public and stakeholders of the revised study scope.

Between 2006 and 2008, the NPS conducted resource analysis and developed preliminary alternatives. The NPS worked with local agencies and resource experts in analyzing the significance of the study area resources. In 2007-2008, the NPS worked on development of the preliminary alternatives, consulting with other recreation and land conservation agencies within the study area. More information about outreach efforts during this time period is included in Chapter 8 of the study report, Consultation and Coordination.

In fall of 2009, the NPS study team released draft alternatives for public review and comment. The study team produced and distributed over 3,000 newsletters to organizations and individuals on its mailing list, partner agencies, and at public and stakeholder meetings. A limited number of newsletters translated into Spanish were also distributed. The newsletter was also available for

comment on the study website. Between August and October 2009, the study team held six public meetings at locations throughout the study area including Diamond Bar, El Monte, Santa Clarita, Glendora, Palmdale, and Tujunga.

All of the meetings were well attended by diverse groups of community members (approximately 450 total) despite the fact that the Station Fire, which significantly affected the Angeles National Forest and surrounding communities, was burning during this time. In addition to the public meetings, the NPS study team held meetings with local, state and federal government agencies, organizations, communities, and Congressional offices. The NPS study team received approximately 4,800 comments. Most of these comments were submitted via written letters and through e-mail. The NPS revised the alternatives based on the public comments. Additional stakeholder meetings were held with various agencies in early 2010 to address specific concerns.

Throughout the study process, all information sent by mail was made available on the study website, www.nps.gov/pwro/sangabriel. Numerous articles and opinion pieces about the study appeared in area newspapers.

RESOURCE ANALYSIS

The study team used information gathered from the scoping process, public databases, environmental impact reports, land and resource management agencies, and other resource specialists to assess the significance and suitability of the area's resources and to develop alternatives for the study area. The NPS found resources within the San Gabriel Mountains and Puente-Chino Hills to be of national significance and suitable for inclusion in the national park system. A summary of the preliminary findings and alternatives were presented in Newsletter #4. Chapters 3 and 4 provided the full analysis of significance and suitability.

FEASIBILITY

The National Park Service determined that a collaborative partnership-based park unit which respects the complex mix of land use, ownership, and regulatory authority in the study area is feasible. While a large traditional national park unit, owned and operated solely by the NPS would likely be infeasible, opportunities for collaborative management with local, state and federal managers to protect natural and cultural resources, provide recreation, public access, interpretation and educational opportunities, and other compatible uses in an NPS partnership-based park unit have

been demonstrated to exist. Chapter 5, *Feasibility*, contains the full feasibility analysis.

DEVELOPMENT OF ALTERNATIVES

Four alternatives are presented in this study report, including the “no action” alternative which describes the continuation of current management and serves as a baseline for comparison for the other three action alternatives. Two of the three action alternatives include designation of a national park unit. All three alternatives respect private property rights and existing agency authority. The NPS alternatives propose collaborative management models that do not require extensive land management by the NPS. See Chapter 6, *Alternatives*, for a full description of the study alternatives.

REPORT PUBLICATION, REVIEW AND TRANSMITTAL

Publication of the *Draft San Gabriel Watershed and Mountains Special Resource Study and Environmental Assessment* will be followed by a 90-day public comment period. The NPS study team will then revise the report if needed, and transmit it to the Secretary of the Interior. The Secretary will transmit the report to Congress, along with the Secretary’s recommendation for the area.

Related Plans and Studies

This section describes regional or coordinated planning efforts have recently been completed and which provided guidance and resource information for the study.

SOUTHERN CALIFORNIA NATIONAL FORESTS LAND MANAGEMENT PLAN, ANGELES NATIONAL FOREST STRATEGY (2005)

The Land Management Plan guides forest managers in site-specific planning and decision-making for the Angeles National Forest, including policies for the types of activities and special designations that can occur within each national forest. Project-level decisions that are subsequently designed and implemented must be consistent with the direction described in the plan.

SAN GABRIEL RIVER MASTER PLAN (2005)

The San Gabriel River Master Plan represents a shared vision for the San Gabriel River corridor. A steering committee representing cities, other public agencies, water groups, and community and environmental groups developed this shared vision of the river and a plan for how to achieve it.

The master plan integrates many objectives, including: habitat, recreation, open space, flood control, water supply and economic development, and identifies priorities, provides guidance, and coordinates multiple goals of the many jurisdictions and other stakeholders that share the river, reflecting the consensus of all these stakeholders.

GREATER LOS ANGELES COUNTY INTEGRATED REGIONAL WATER MANAGEMENT PLAN (2006)

The purpose of the Greater Los Angeles County Integrated Regional Water Management Plan (IRWMP) is to improve water supplies, enhance water supply reliability, improve surface water quality, preserve flood protection, conserve habitat, and expand recreational access in the Los Angeles Region. The IRWMP also defines a comprehensive vision for greater Los Angeles County which will generate local funding, position the region for future state bonds, and create opportunities for federal funding.

COMMON GROUND: FROM MOUNTAINS TO THE SEA (2001)

Common Ground is a joint plan undertaken by two California state land conservancies, the San Gabriel and Lower Los Angeles rivers and Mountains Conservancy and the Santa Monica Mountains Conservancy. The Common Ground plan articulates a vision for the watersheds of the San Gabriel and Los Angeles Rivers and provides a framework for future watershed and open space planning. The overall vision is to “restore balance between natural and human systems in the watershed.” The key component of the plan is a set of guiding principles, which provide over-arching goals for future open space planning in the dual watersheds.

PUENTE HILLS LANDFILL NATIVE HABITAT PRESERVATION AUTHORITY RESOURCE MANAGEMENT PLAN (2007)

The Resource Management Plan (RMP) was designed to guide the preservation and recreational uses of land managed and/or owned by the Habitat Authority. The main components of the RMP include habitat restoration, fuel modification management, a trails plan, an interpretive element and cultural resource management - all within the Puente Hills.

Emerald Necklace Park Vision and Accord - Amigos de los Rios (2005)

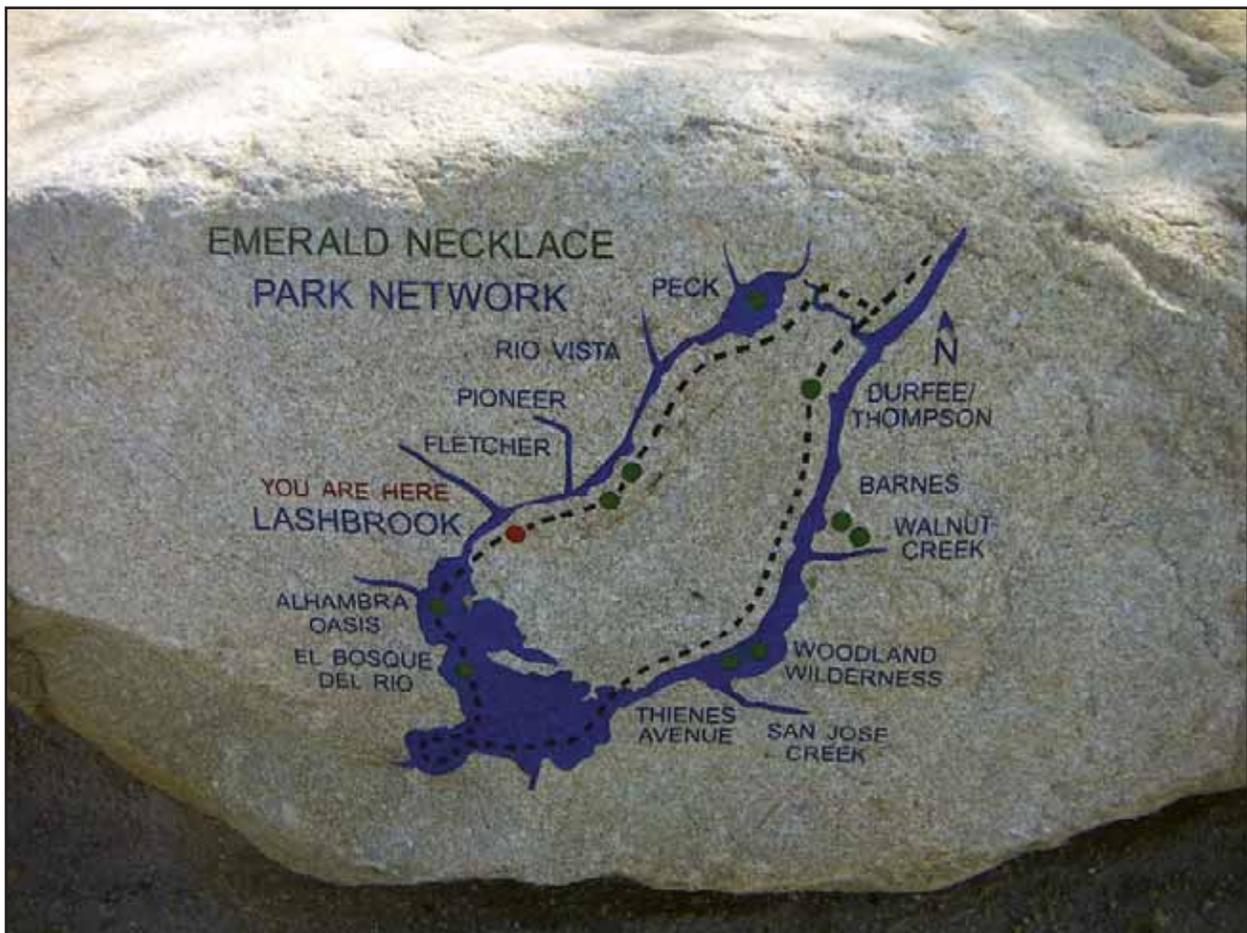
The Emerald Necklace is a vision for a 17-mile loop of parks and greenways connecting 10 cities and nearly 500,000 residents along the Río Hondo and San Gabriel rivers. The Emerald Necklace Accord is an agreement among agencies and cities of the region to preserve the rivers and tributaries for recreational, open space, and native habitat conservation and restoration purposes.

Los Angeles County Draft 2035 General Plan

The Los Angeles County 2035 General Plan provides the policy framework for how and where the unincorporated county will grow through the year 2035. Comprising approximately 2,650 square miles, unincorporated Los Angeles County is home to over one million people. The Los Angeles County 2035 General Plan accommodates new housing and jobs within the unincorporated area in anticipation of population growth in the county and the region.

America's Great Outdoors: A Promise to Future Generations (February 2011)

In April 2010, President Obama launched the America's Great Outdoors Initiative. Listening sessions were held in communities throughout America to initiate a dialogue about conservation. *The America's Great Outdoors report: A Promise to Future Generations* is a result of that dialogue. The outlines ways in which the federal government will help empower local communities to accomplish their conservation and recreation priorities. Many of the initiatives and recommendations overlap with the goals of this study including: 1) connecting Americans to the great outdoors; 2) conserving and restoring America's great outdoors; and 3) working together for America's great outdoors.



Emerald Necklace Park Network location map. NPS Photo.



Resource Description

2

Photos (clockwise): 1. Equestrian, San Gabriel River. NPS Photo. 2. Hiking, Puente Hills. NPS Photo. 3. Santa Fe Dam Recreation Area. NPS Photo. 4. Dried grasses and chaparral on a ridge in the San Gabriel Mountains. Photo © Gary Ferguson.

Chapter 2: Resource Description

Natural Resources

Climate

The Los Angeles region has a Mediterranean type climate associated with areas located between the 30th and 45th parallels of latitude and on western continental borders (Bailey 1966). These areas are affected by subtropical high pressure masses that create a drought environment during summer, but shrink in winter, allowing storms to enter along the coast. Only two percent of the earth's surface has this type of climate. Other locations with this climate include areas in southern Europe and North Africa on the Mediterranean Sea, Chile, South Africa, and Australia. The climate is highly affected by marine influences. Marine air keeps the coast cool in the summer and prevents it from getting very cold in the winter (Miller and Hyslop 1983).

At times, offshore winds from the east influence the climate. Between September and March, a high pressure system over the Great Basin, combined with a low pressure system to the southwest, creates warm, dry winds that circulate through the region. Known as the Santa Ana winds, these winds have a significant impact on the local climate. After the long dry summers, the Santa Ana winds contribute to the fire regime, which begins in the summer season and continues until the wet winter ensues.

The mountains and coastal ranges block the moist sea air, creating an arid, desert climate north of the San Gabriel Mountains. Since the mountain ranges and hills completely surround the valleys, temperature inversions create conditions where smog stays in the environment. The mountains and hills further this condition by preventing horizontal air movements. The San Gabriel Valley, with mountains to the north and hills to the south, is particularly impacted by smog (Miller and Hyslop 1983).

MICROCLIMATES

Although the Los Angeles region is known for its year-round mild climate, there are many different microclimates in the valleys, mountains, hills, and coastal areas of the study area. Average rainfall and temperature varies significantly throughout the study area based on the local microclimate. For example, average annual precipitation is 32.9 inches for the San Gabriel Mountains, 15.5 inches for the

Los Angeles basin, and 7.8 inches for the Antelope Valley (LADPW 2006c). Within the study area, there are seven defined microclimates.

Semi-marine Climatic Zone

Areas south of the Puente-Chino Hills are under the influences of sea breezes from the coast. Frost is rare and summers are mild.

Air Drainage Thermal Climatic Zone

The Puente-Chino Hills are in this climate zone where summer temperatures are warmer than in the semi-marine climate zone. The topography of the hills drains cold air on winter nights, protecting this area from frost.

Valley Margin Climate

The high ground at the base of the surrounding hills and mountains of the San Gabriel Valley are located far enough from the ocean that they experience hot summer days while nights remain relatively cool.

Valley Floor Climate

On the San Gabriel Valley floor, summer days are hot and sunny and nights are relatively cool. In winter, the valley floor is subject to frost as cool air tends to collect on the valley floors.

Transitional Mountain Climate

The southern face of the San Gabriel Mountains is a transition zone between the valley margins and alpine climates. As elevation increases, precipitation increases and temperatures decrease.

Alpine Climate

Above 4,000 feet, the alpine environment is characterized by distinct seasonal differences in temperature and features the highest precipitation in the region. Winters are very cold and summer temperatures are still relatively high.

High Desert

At the northern base of the San Gabriel Mountains, the high desert climate of the Antelope Valley is characterized by less than ten inches of rainfall a year. Summers are extremely hot and winters are unusually cold (Miller and Hyslop 1983).

Topography

SAN GABRIEL MOUNTAINS

The San Gabriel Mountains are part of the Transverse Ranges geomorphic province which includes geologic structures along the southern California coastline that lie east-west or “transverse to” the prevailing northwest-trending character of the west coast. Additional mountain ranges within the Transverse Range province include the Santa Ynez Mountains, the Santa Monica Mountains, and the San Bernardino Mountains. The northern extent of the study area follows the San Andreas fault, which also serves as the boundary between the Transverse Ranges and the Mojave Desert geomorphic province (See Map: Topography).

The San Gabriel Mountains are about 50 miles long and 15 miles wide. With the exception of a small portion in San Bernardino County, most of the mountain range is within the study area. The San Gabriel Mountains are some of the highest and most rugged of all the mountains in the Transverse Ranges. The highest peak, located in the eastern portion of the mountains, is Mt. San Antonio. Also known as “Mt. Baldy” or “Old Baldy,” this peak reaches a height of 10,064 feet. Mountains on the western end of the range are lower in elevation, around 4,000 to 6,000 feet in height.

The steep, high relief of the San Gabriel Mountains forms the dramatic mountainous backdrop of the Los Angeles basin. The San Gabriel Mountains rise quickly from the foothills; slopes are as steep as 65-70%. This can be attributed to the fact that the San Gabriel Mountains are a young mountain range growing at a rapid rate. They are considered one of the fastest growing mountain ranges in the world, rising as much as 2 inches per year (LADPW 2006b).

The San Gabriel Mountains and San Bernardino Mountains form the divide between the Pacific Ocean drainage area and rivers that drain to the Mojave Desert. Most of the mountains drain to the Pacific Ocean through the Santa Clara, Los Angeles, San Gabriel, and Santa Ana Rivers. The northeastern areas drain to the Mojave Desert.

LOS ANGELES BASIN

The mountains of the Transverse and Peninsular Ranges surround the Los Angeles basin, the low area that stretches south of the San Gabriel Mountains to the coast. The Los Angeles basin is a large flood plain and alluvial fan which lies at the northern extent of the Peninsular Ranges geomorphic province. The Puente-Chino Hills form an east-west chain that cuts through the Los

Angeles basin extending from the Chino Hills west to Elysian Park in Los Angeles. This range separates the San Gabriel Valley and from the southern coastal plain of the basin that stretches west to the Pacific Ocean. Within the study area, the Puente-Chino Hills reach 1,388 feet at Workman Hill north of Whittier. The San Jose Hills, which lie north of the Puente-Chino Hills, are a smaller range that trends southwest. Buzzard Peak (1375 feet) is the highpoint of the San Jose Hills. Whittier Narrows is a natural gap between the Puente and Montebello Hills where the San Gabriel and Rio Hondo Rivers converge.

SOLEDAD BASIN/ SANTA CLARITA VALLEY

The Soledad basin lies at the northwestern base of the San Gabriel Mountains. On the north it is defined by the Sierra Pelona Range. The San Andreas fault and the San Gabriel fault bound the basin on its northeast and southwest borders. The upper Santa Clara River and its headwaters drain from both the San Gabriel Mountains and the Sierra Pelona Range into the Soledad basin and Santa Clarita Valley.

ANTELOPE VALLEY/MOJAVE DESERT

North of the San Gabriel Mountains lies the Antelope Valley, high desert terrain in the southernmost extent of the Mojave Desert. The Antelope Valley is comprised of a great alluvial fan which has been created by years of deposition from rivers in the San Gabriel Mountains. This area's topography is also characterized by the San Andreas rift zone which includes a series of northwest-trending trough-like valleys and bordered by linear ridges (Mattison and Barrows 2003). The California Aqueduct traverses the northernmost point of the study area where it crosses through the San Andreas rift zone.

South of the fault lies Lake Palmdale, a natural sag pond that was later modified to serve as a reservoir (Mattison and Barrows 2003). Big Rock, Little Rock, and Mescal creeks drain from the San Gabriel Mountains into the Antelope Valley and the Mojave Desert.

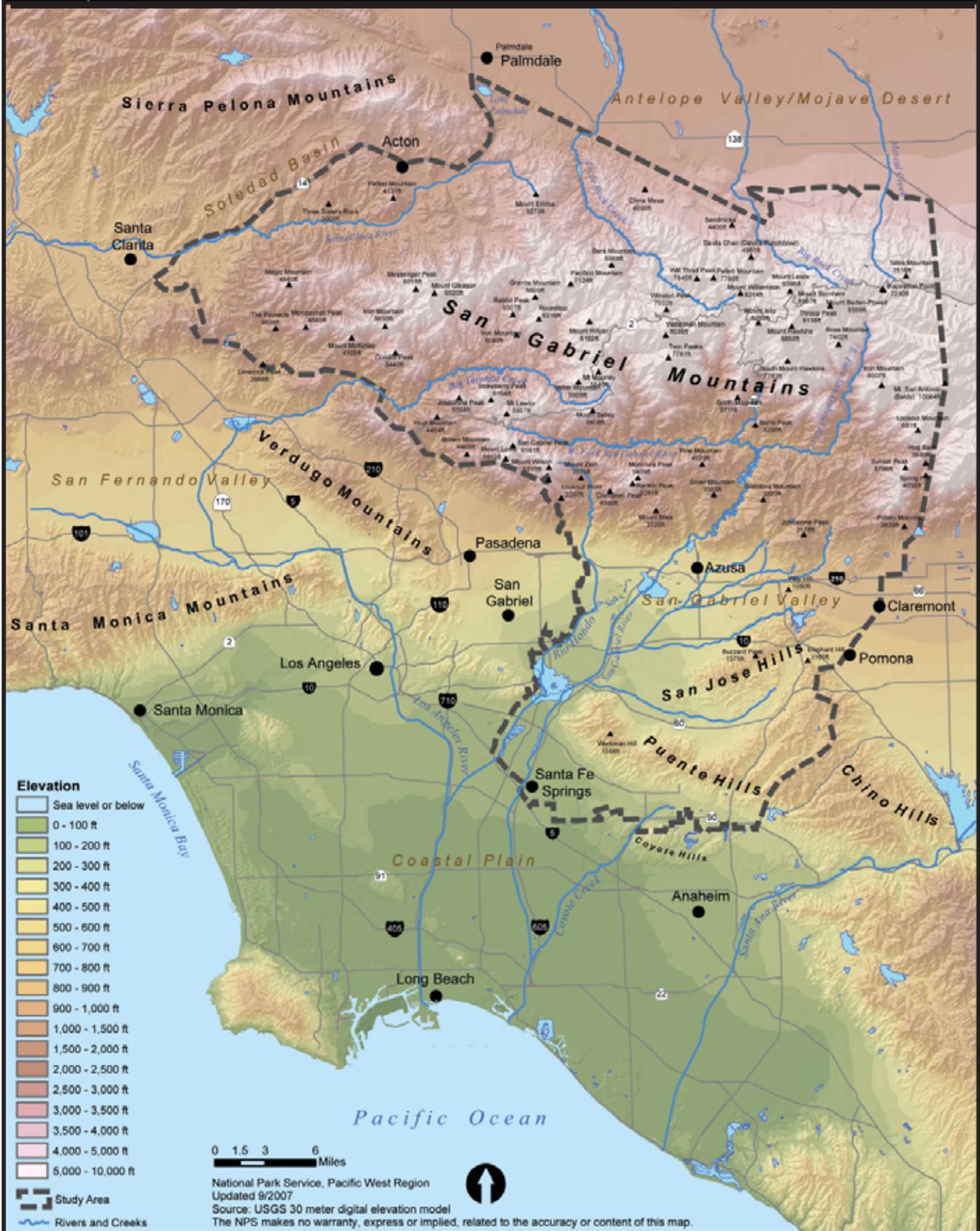
Geologic Resources

The assemblage of rocks in the study area is quite diverse with the San Gabriel Mountains featuring some of the oldest rocks in California. The region is experiencing active mountain-building and the San Gabriel Mountains are some of the fastest growing mountains in the world. This is contrasted with the Los Angeles basin which consists primarily of recent alluvium deposited across the basin by the series of

Topography

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



rivers that run from the San Gabriel Mountains to the Pacific Ocean. This alluvium, which is thousands of feet deep in many locations, is a repository for petroleum resources. Hill formations on the Los Angeles basin are also relatively young and rich in petroleum.

The following section describes the geologic history of the region, rock formations, faults, and modern geological processes such as erosion, landslides, and earthquakes.

GEOLOGIC HISTORY

The geologic history of the San Gabriel Mountains and the Los Angeles basin involves vertical and lateral movements of great magnitude. The San Gabriel Mountains are a remarkable range that provides a window deep into the ancient crust of the earth and a key for understanding the evolution of the San Andreas fault in southern California. These movements are largely a result of plate tectonics. The San Andreas fault is the location where the Pacific Plate meets the North American Plate, also known as a transform plate boundary. When these plates collide or converge, they create geologic phenomena such as earthquakes, volcanic eruptions, and tsunamis. In addition to plate tectonics, the region has experienced geological changes from erosion, deposition, and volcanic activity (USGS 2006).

The following section provides an overview of the area's geologic history according to eras of the geologic time scale developed by the Geological Society of America.

Precambrian History (3800 – 543 million years ago)

The oldest rocks in California are associated with the early to middle eras of the Proterozoic age (2500 to 543 million years ago). These ancient rocks have been thrust to the surface areas of the San Gabriel Mountains by great periods of mountain-building. Although these rocks are not as old as the 3.6 billion-year old Archean rocks of the Lake Superior region, they do form part of the Precambrian craton generally found in the core of the North American continent (Norris and Webb 1990, Oakeshott 1971, Schoenherr 1992).

Paleozoic History (543-248 million years ago)

During the Paleozoic era, the Mojave region formed the continental margin. The lands that would one day form the San Gabriel Mountains and the Los Angeles basin were covered by the ocean. During

this time, the sea level fluctuated across the Mojave region. Evidence of marine life is preserved in rocks of the eastern Mojave Desert (USGS 2006).

Mesozoic History (248-65 million years ago)

The great mountain systems of California began to form during the Mesozoic era when the Pacific Plate dove under the North American Plate, a process known as subduction. This rising caused a spreading of the Pacific Ocean floor which, in turn, pushed the Pacific Plate into the North American plate. This action also formed a series of volcanoes along the continental margin. The magma that intruded into the North American plate formed what is known as a batholith (a deep rock mass). This batholith forms the base of the southern Sierra Nevada, the Mojave region, and portions of the Peninsular Ranges (Schoenherr 1992).

Cenozoic History (65 million years ago to present)

The Cenozoic era brought long periods of erosion and sedimentation and the evolution of the San Andreas transform fault system. During the early Tertiary period (65 million years ago to approximately 1.8 million years ago), subduction of the Pacific Plate under the North American Plate continued and the southern California region experienced great uplifts and erosion.

Paleogene-Neogene Epochs (65 to 23 million years ago). During this early period of the Cenozoic era, the San Gabriel Mountains and Los Angeles basin lie beneath swampy sea-marshes and lagoons receiving sediment from the ancestral Nevadan mountains (Los Angeles Almanac 2005).

Paleocene-Eocene-Oligocene Epochs (34 to 24 million years ago). Uplift and erosion during this time period formed a landscape of rolling lowlands with a few mountains. West of the mountains were shallow embayments. Rivers and streams carried down sediments from the mountains depositing them on the continental margin and in offshore basins.

Miocene Epoch. During the early Miocene epoch, (24 to 5 million years ago) modern coastal California began to emerge. Seas spread more and more widely over the western Transverse Ranges and a deep trough developed in the Los Angeles basin and Channel Islands. About 16 million years ago, the San Gabriel Mountains began to elevate (McCulloh, Beyer, and Morin 2001; Oakeshott 1971; Schoenherr 1992).

The middle Miocene was a time of great volcanism in the Transverse Ranges. Some of the thickest rocks are associated with this epoch. The Glendora volcanics occur along the southern front of the San Gabriel Mountains (Oakeshott 1971). Paleomagnetic data in the volcanic rocks of this age found in the San Gabriel Mountains, Santa Monica Mountains, and Channel islands indicate that these features rotated about 90 degrees clockwise (Schoenherr 1992). This rotation, caused by the collision of the North American and Pacific plates, began about 20 million years ago.

Pliocene Epoch. During the Pliocene epoch (5 - 1.8 million years ago), the Los Angeles basin subsided at an accelerated rate. As the Los Angeles basin continued sinking, sediments were deposited in as much as 6,000 feet of water. By the end of the epoch, more than 10,000 feet of sediment were deposited in the basin (Norris and Webb 1990).

Pleistocene Epoch. In the early Pleistocene epoch (1.8 million - 8,000 years ago), the central Los Angeles basin continued to receive marine deposits as high sea-levels and inland bays covered the coastal plains and lowlands of southern California (Norris and Webb 1990).

By the middle Pleistocene the shoreline of the basin sea probably extended to the southern margin of the Santa Monica chain and along the Whittier fault zone (Norris and Webb 1990). This period also saw sea level rises associated with the melting of polar ice caps from an ice age that occurred 20,000 years ago, flooding the Los Angeles basin (Schoenherr 1992). The Los Angeles basin experienced more subsidence. However, the surrounding mountain ranges underwent considerable uplift. Dramatic uplifting continues in the region today (Norris and Webb 1990). The rapid uplift of the mountains caused erosion and created the dramatically steep slopes of the San Gabriel Mountains.

The thick marine sediments of the Los Angeles basin that were deposited during the Pliocene and Pleistocene epochs formed vast deposits of fossil fuels. The Los Angeles basin is California's most prolific oil producing district in proportion to its size (Yerkes, McCulloh, Schoellhamer and Vedder 1965; Norris and Webb 1990).

The modern rivers of the region also developed during the Pleistocene epoch. Major rivers of the Los Angeles basin predate the Puente-Chino and Repetto Hills. These hills are so young, geologically speaking, that they literally formed around the rivers. This is evident in the series of gaps found in the Los Angeles basin hill systems. Whittier Narrows

is an excellent example of this kind of water gap. As the young Puente-Chino Hills began to rise, the smaller creeks in the basin which had drained to the ocean changed course and some became tributaries of the San Gabriel River. Because of the force of the San Gabriel River channel itself, the hills rose around the river forming Whittier Narrows (Sharp 1975). By the end of this time, the shoreline recedes to approximately where it is today.

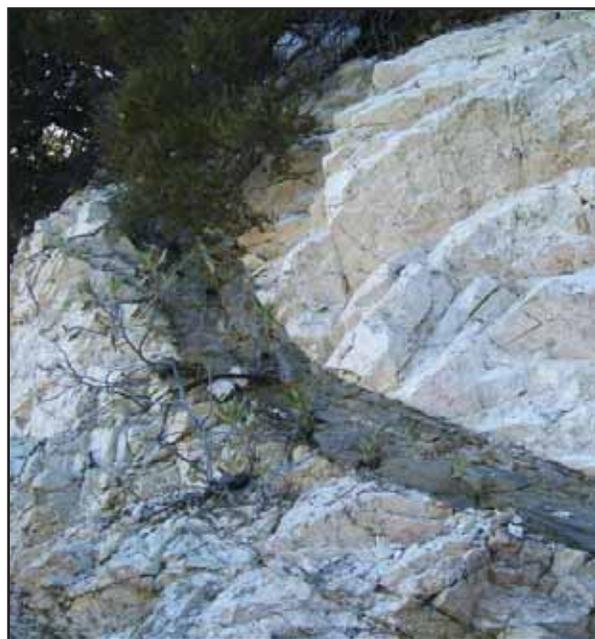
Holocene Epoch. (8,000 years ago to present. Uplift of the mountains and deposition of alluvium continues to shape the landscape (USGS 2006).

ROCK FORMATIONS

Rock formations in the study area, particularly in the San Gabriel Mountains, are quite diverse in age and composition. The following section highlights some of the major geologic formations and features of the study area.

The San Gabriel Mountains rock formations range from Precambrian igneous and metamorphic rocks to recent alluvium deposited by streams and rivers (see Map: Generalized Geology). Bedrock units in the San Gabriel Mountains are comprised primarily of crystalline basement rocks which range in age from the Precambrian to Mesozoic eras. Cenozoic beds are located only along the range's margins.

A significant geologic structure, the Vincent thrust, separates two distinct sets of crystalline basement rocks in the San Gabriel Mountains. During the



Mt. Lowe Pluton Unit with monzogranite or mylonitic dike. NPS photo.

Geology Legend

Cenozoic Era (65 million years ago to present)

-  Qs - Extensive marine and nonmarine sand deposits
-  Qls - Selected large landslides - early to late Quarternary
-  Qrv - Holocene volcanic flow rocks
-  Q - Pleistocene-Holocene alluvium
-  Qg - Pleistocene-Holocene glacial till and moraines
-  Qv - Quarternary volcanic flows
-  P - Pliocene sandstone, siltstone, shale and conglomerate
-  QPc - Pliocene and/or Pleistocene sandstone, shale, and gravel deposits
-  M - Sandstone, shale, conglomerate, and breccia
-  Mc - Miocene sandstone, shale, conglomerate, and fanglomerate
-  Tc - Undivided tertiary sandstone, shale conglomerate, breccia, ancient lake deposits
-  Tv - Tertiary volcanic flow rocks
-  Tvp - Tertiary pyroclastic and volcanic mudflow deposits
-  O - Oligocene sandstone, shale and conglomerate
-  Oc - Oligocene sandstone, shale and conglomerate
-  E - Eocene shale, sandstone, conglomerate, minor limestone
-  Ti - Tertiary intrusive rocks; mostly shallow
-  grCz - Cenozoic (tertiary) granitic rocks
-  Ep - Paleocene sandstone, shale and conglomerate

Mesozoic Era (248 to 65 million years ago)

-  Ku - Upper Cretaceous sandstone, shale, and conglomerate
-  Kl - Lower Cretaceous sandstone, shale, and conglomerate
-  Mzv - Undivided Mesozoic volcanic and metavolcanic rocks
-  grMz - Mesozoic granite, quartz, monzonite, granodiorite and quartz diorite
-  J - Jurassic shale, sandstone, m conglomerate, chert, slate, limestone; pyroclastic rocks
-  KJf - Franciscan complex: Cretaceous and Jurassic sandstone w/ shale, chert, limestone, conglomerate
-  um - Ultramafic rocks, mostly serpentine
-  Tr - Triassic shale, conglomerate, limestone, dolomite, sandstone, slate
-  K - Undivided Cretaceous sandstone, shale, and conglomerate
-  gr-m - Granitic and metamorphic rocks, mostly gneiss, Mesozoic to Precambrian.
-  gb - Gabbro and dark dioritic rocks, chiefly Mesozoic

Paleozoic Era (544 to 248 million years ago)

-  Pm - Permian shale, conglomerate, limestone, dolomite, chert, hornfels
-  sch - Schists of various types; mostly Paleozoic or Mesozoic age; some Precambrian
-  m - Undivided pre-Cenozoic metasedimentary and metavolcanic rocks
-  mw - Undivided pre-Cenozoic metavolcanic rocks
-  gr - Undated granitic rocks
-  C - Carboniferous marine sedimentary rocks
-  is - Limestone, dolomite, and marble whose age is uncertain but probably Paleozoic or Mesozoic
-  D - Devonian marine sedimentary rocks
-  Pz - Undivided Paleozoic metasedimentary rocks
-  Pzv - Undivided Paleozoic metavolcanic rocks
-  grPz - Paleozoic and Permo-Triassic granitic rocks
-  Ca - Cambrian marine sedimentary rocks

Precambrian Era (4500 to 544 million years ago)

-  pC - Conglomerate, shale, sandstone, limestone
-  pCc - Complex of Precambrian igneous and metamorphic rocks
-  grpC - Precambrian granite, syenite, anorthosite, and gabbroic rocks in the San Gabriel Mountains
-  Tributaries
-  Major Tributaries
-  NPS Study Area
-  Santa Monica Mountains NRA

late Cretaceous period (99 to 65 million years ago), the Vincent thrust fault brought upper and lower-plate masses together. This occurred on a regional scale; however, the event is best-exposed and most evident in the San Gabriel Mountains. Basement rocks of the Western San Gabriel Mountains consist primarily of rocks associated with the upper plate of the Vincent thrust while the eastern San Gabriel Mountains basement rocks are associated with the lower plate. Intruded throughout the San Gabriel Mountains are Mesozoic granitic rocks which make up nearly half of the range's basement rocks. Gneiss is the most widespread metamorphic rock in the San Gabriel Mountains (Ehlig 1982).

Western San Gabriel Mountains (including Soledad Basin)

Basement rocks exposed in the western San Gabriel Mountains, the upper-plate rocks of the Vincent thrust, include Mendenhall gneiss, augen gneiss, and the anorthosite-syenite-gabbro complex. Augen gneiss in the western San Gabriel Mountains have been dated as the oldest rocks in the Transverse Ranges (1.7 billion years). Triassic granitic rocks associated with the Mount Lowe plutonic suite are also exposed here (Dibblee 1982; Norris and Webb 1990). The anorthosite complex includes an anorthosite pluton, syenite, and mafic rocks of a Proterozoic age. This complex is rare, particularly in a relatively young geological landscape (Dibblee 1982).

Soledad basin contains various tertiary rock units. The marine Martinez formation of Paleocene age is the oldest sedimentary unit in the region. This formation is overlaid by the Oligocene Vasquez formation of andesite volcanic rocks, non-marine red beds, sedimentary breccia, claystone, mudstone, and limestone. The Vasquez formation is spectacularly displayed at Vasquez Rocks County Park just north of the study area (Weigand 1982).

Overlying the Vasquez formation is the Miocene Tick Canyon formation, which is comprised of conglomerate sandstone and siltstone of fluvial origin (Oakeshott 1971).

The most widespread formation in the Soledad basin is the Mint Canyon formation. These distinctive reddish beds of arkosic and conglomerate sandstone formed from silt deposits in an ancient Miocene lake. A considerable number of fossils have been identified in the Mint Canyon formation. The Miocene Castaic formation contains shallow marine sandstone and shale. This formation is distinctive as it contains about 100 species of fossils, mostly mollusks that are commonly associated with the Miocene epoch (Stanton 1966).

Younger tertiary formations include the Pliocene Towsley formation, which consists of interbedded marine siltstone, mudstone and conglomerate, and the non-marine Plio-Pleistocene Saugus formation, which contains arkosic sandstone, sandy conglomerate, and siltstone. The Pleistocene Pacoima formation contains non-marine silty sandstone and pebble boulder conglomerate (Wilson and Haydon 1998).

In the southwest corner of the mountains, the Tujunga Terrane, named for rocks exposed in lower Tujunga Canyon, contains basement rocks such as gneisses, late quartz diorite, and granodiorite-quartz, as well as metasedimentary rocks associated with the pre-Triassic Placerita formation.

Central San Gabriel Mountains

A main feature of the central San Gabriel Mountains is the Triassic Mount Lowe plutonic suite (also known as Lowe Granodiorite or the Lowe Igneous Pluton). This large pluton extends from upper Soledad basin to Little Rock Canyon. Isolated remnants are also found near Crystal Lake (Dibblee 1982). The Mount Lowe plutonic suite consists of four zones that include hornblende, potassium feldspar, garnet, and biotite (Joseph, Criscione, Davis, and Ehlig 1982).

A diversity of rock types occur along the active San Andreas fault zone. In the Little Rock Creek area, the non-marine Pliocene-Miocene Anaverde formation is exposed in terrain between the Little Rock fault and the San Andreas fault. The oldest rocks north of the San Andreas fault zone consist of Holcomb quartz monzonite that is exposed in the ridges of Little Rock fault and along the California Aqueduct west of Little Rock Wash.

Quaternary formations along the San Andreas fault zone include the Juniper Hills formation, crushed pebbly sandstone, and the Harold formation with its fine-grained, silty to sandy, moderately well-stratified fluvial, alluvial fan, and playa deposits.

Eastern San Gabriel Mountains

Most of the northeastern San Gabriel Mountains are characterized by lower plate rocks of the Vincent thrust. These include the Paleozoic or Mesozoic metamorphosed sedimentary and volcanic rocks known as Pelona schist. Two distinct blocks of the Pelona schist are separated by the Punchbowl strand of the San Andreas fault, the Blue Ridge block, and the Lytle Creek block. Pelona schist is overlain by Mylonitic metamorphic rocks of the Vincent thrust fault zone. This structure is well-exposed in eastern San Gabriel Mountains just



Photos (top to bottom): 1. Glendora Volcanics, Central San Gabriel Mtns 2. Augen gneiss boulder, Western San Gabriel Mtns 3. Anorthosite, Angeles Crest Highway, Western San Gabriel Mtns . NPS Photos.

south of the Punchbowl fault (Morton and Miller 2003 Dibblee 1982).

Between the Punchbowl and San Andreas faults are the tertiary Punchbowl and San Francisquito formations. The San Francisquito formation consists of marine sedimentary rock of Paleocene age. It is composed of shale in its upper part and sandstone in its lower part (Dibblee 1982). The lower Pliocene/upper Miocene Punchbowl formation, which overlays the San Francisquito formation, forms striking exposures known as the "Devil's Punchbowl" (Morton and Miller 2003). The scenic Devil's Punchbowl consists of magnificently exposed ridges and ravines etched into steeply tilted and folded sandstone. Movement along the San Andreas and Punchbowl faults down-dropped the Devil's Punchbowl formation into areas of older crystalline rocks.

Basement rocks of the southeastern San Gabriel Mountains include Mesozoic quartz diorite and monzonite and quartz diorite mylonite (Dibblee 1982). Also present in this area are Proterozoic garnet-pyroxene-bearing quartz, feldspathic gneiss, marble and calc-silicate rocks, Mesozoic, and Cretaceous granitic rocks.

The Glendora volcanics are exposed in areas along the southwestern front of the San Gabriel Mountains. Primarily comprised of rhyolite and basalt, flow rock and volcanic breccia and tuff, these volcanic rocks are the only Tertiary rocks in the San Gabriel Mountains on the south side of the range. The Glendora volcanics have been correlated with the El Modeno volcanics exposed on the northwest end of the Santa Ana Mountains (Weigand 1982).

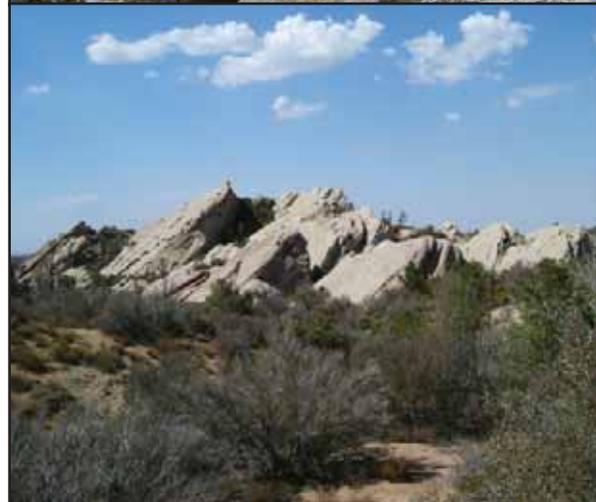
Surficial alluvium of varying ages can be found overlaying basement and subjacent rocks in creek beds and valleys throughout the San Gabriel Mountains. Broad alluvial fans are prominent along the flanks of the San Gabriel Mountains. Many of the foothill communities south of the San Gabriel Mountains are located on these alluvial fans.

Los Angeles Basin

The Los Angeles basin is separated from the San Gabriel Mountains by the Sierra Madre fault zone. Basement rocks of the Los Angeles basin portion of the study area include Glendora volcanics and the Miocene Puente formation, both of which are exposed in the Puente and San Jose Hills. The Puente formation, primarily composed of sandstone, siltstone, and shale, is one of the most important oil-producing units of the Los Angeles basin (Morton and Miller 2003). The Puente

formation is overlain by the Pliocene-Fernando formation, which consists of interbedded fine to coarse clastic marine strata.

Most of the Los Angeles basin area consists of alluvium, thousands of feet deep in some areas, compiled from years of deposits from rivers and streams. Petroleum exploration holes drilled thousands of feet below the surface have uncovered basement rocks beneath the alluvium. These basement rocks have been identified as the



Photos (top to bottom): 1. Pelona schist. Eastern San Gabriel Mountains. 2. Devil's Punch Bowl. Eastern San Gabriel Mountains. NPS photos.

Puente formation, Mountains Meadows dacite, Glendora volcanics, and Topanga volcanics.

The Oligocene Mountain Meadows dacite consists of biotite rhyolite, quartz latite, and dacite porphyry dikes and dike-form bodies. Outcrops of the Mountain Meadows dacite are exposed at the Mountain Meadows Country Club in Pomona. A recent investigation of the Oligocene Mountain Meadows dacite concluded that a subsurface region of the Mountain Meadows dacite in the northeastern Los Angeles basin ties together the northern Los Angeles basin, the San Gabriel Mountains, San Rafael Hills, and the Verdugo Mountains (McCulloh, Beyer, and Morin 2001).

MAJOR FAULTS IN THE STUDY AREA

A number of significant fault systems are located in the Los Angeles region and in the NPS study area (see Map: Regional Faults). The following section provides a short description of the study area's major faults. The San Gabriel Mountains are bounded by fault systems including the San Andreas fault system to the north and the Cucamonga-Sierra Madre fault complex to the south and southwest. On the east the mountains are bound by faults in the San Jacinto fault zone, an extension of the San Andreas fault system. The San Gabriel fault zone cuts through the heart of San Gabriel Mountains and extends northwest through the Sierra Pelona mountains.

Major faults in the Los Angeles Basin portion of the study area include the Raymond fault and the Whittier-Elsinore fault.

In addition to these major faults, the region contains blind thrust faults. Blind thrust faults are shallow-dipping reverse faults which lie below the earth's surface. While many of these faults remain unknown, two regional examples are the Elysian Park Thrust, which runs underneath downtown Los Angeles and the Northridge thrust fault, which ruptured in the 1994 Northridge earthquake.

San Andreas Fault System

The San Andreas fault system formed along the translational boundary between the North American and Pacific Plates. As one of the few places on Earth where a transform-fault plate-boundary occurs on land rather than beneath the sea, the San Andreas fault system is one of the most studied structural features on the planet. Convergent transform movements are responsible for the mountain-building activities which continue to form the San Gabriel Mountains and other Transverse Ranges. Although the rate of movement varies over time,

geologists believe that the Pacific Plate is currently moving northwest at a rate of almost 5 centimeters per year.

The unique assemblage of rocks in the San Gabriel Mountains has helped geologists determine the magnitude and rate of movement along the San Andreas fault. The Vincent Thrust has played a particularly important role in understanding plate tectonics and movement along the San Andreas fault. Remnants of the Vincent Thrust fault and the associated upper plate and lower plate rocks are located in the Orocopia and Chocolate Mountains, located 150 miles to the south on the opposite side of the San Andreas fault in Riverside and Imperial Counties. Correlations between Pelona Schist associated with the Vincent thrust and the Chocolate and Orocopia Mountain thrusts indicate that the central Transverse Ranges have been displaced by 100 to 150 miles (estimates vary) of movement along the main trace of the San Andreas fault. Cross-fault correlations with other distinct units such as the San Gabriel anorthosite, the Mount Lowe plutonic suite, Precambrian augen gneiss, and Cenozoic sedimentary and volcanic rocks have further strengthened this analysis (Norris and Webb 1990; Ehlig 1982; Nourse 2002).

Restoration of these ancient rock units of the San Gabriel Mountains along faults of the San Andreas system uniquely constrains overall displacements on the faults of the San Andreas system. In addition, debris shed from these distinctive rock units as they were exhumed and displaced record the

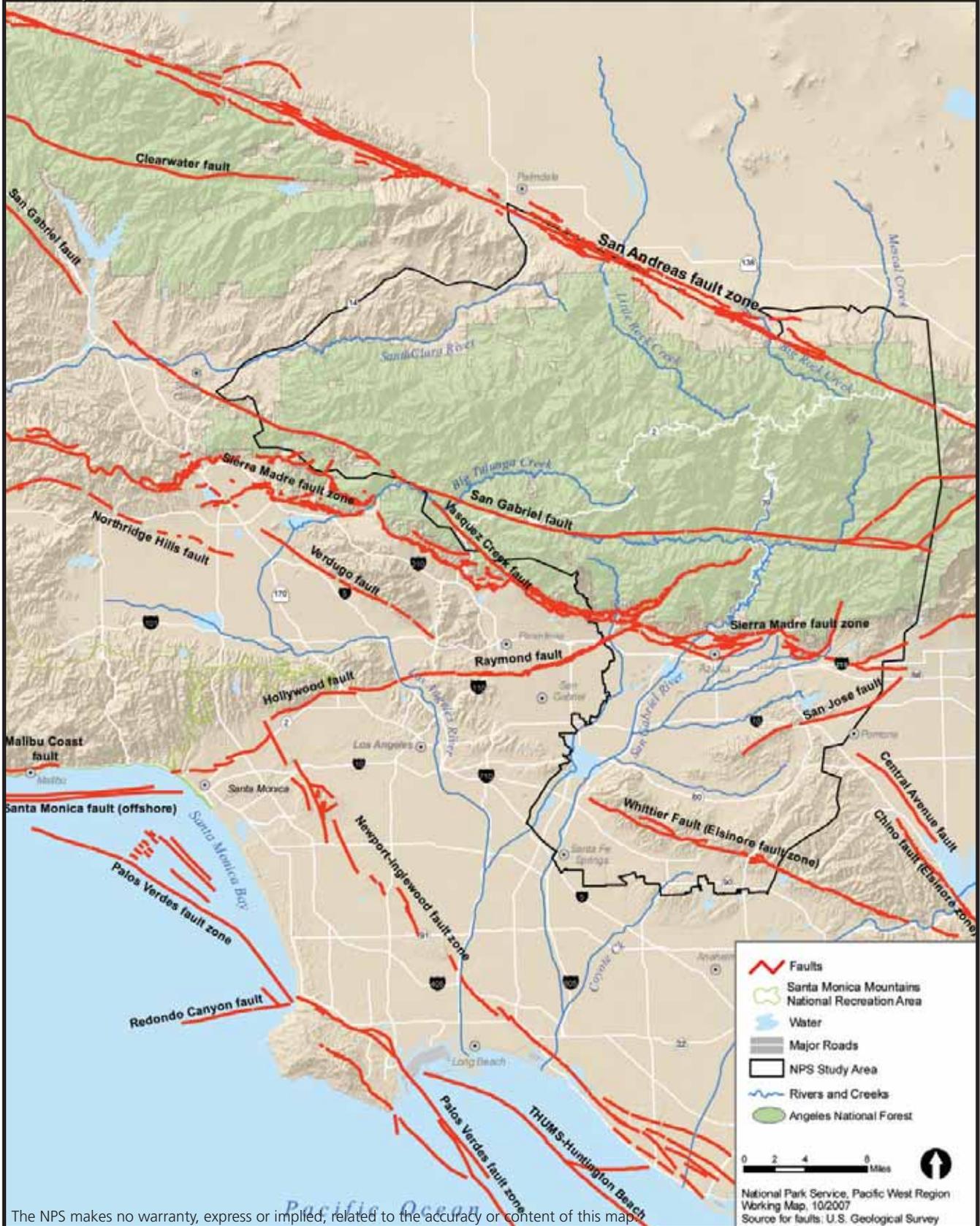


San Andreas fault, north of the San Gabriel Mountains. NPS photo.

Regional Faults

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



The NPS makes no warranty, express or implied, related to the accuracy or content of this map.

timing of movement along the faults. This body of information continues to grow as geologists learn more about the complex San Gabriel Mountains geologic units (Powell 1993).

Throughout the year the San Andreas fault experiences many small earthquakes as the Pacific Plate continues its journey north. Large earthquakes are also associated with this fault. Activity along the San Andreas fault zone has caused some of the largest landslides in California. Examples include Crystal Lake in the San Gabriel Mountains, Cow Canyon, Manker Flats, and Coldwater Canyon (USFS 2005).

Several miles north of the study area, the Fort Tejon earthquake of 1857 (8.0 magnitude) was one of the largest earthquakes experienced in southern California. An extensive rupture was accompanied by the greatest right-lateral offset yet observed on the San Andreas system, 9m /30ft (Norris and Webb 1990).

The **San Gabriel fault** is an older strand of the San Andreas fault system. Credited with defining the general east-west trend of Transverse Range structure, the San Gabriel fault strikes southeast from Frazier Mountain and enters the San Gabriel Mountains on the western end. It appears to be offset in the San Antonio Canyon by north-south trending San Antonio and Stoddard canyon faults, with the eastern segment terminating against the San Jacinto fault. The San Gabriel fault's wide crush zone has strongly affected topography and drainage. For example, the east and west forks of the San Gabriel River follow the fault for most of their lengths.

During the last 12 million years, the San Gabriel fault is estimated to have undergone about 60

kilometers/40 miles of right slip movement, which is thought to have ceased about 5 million years ago. The San Gabriel fault has also experienced varying degrees of vertical displacement. Along the southwest side of the Ridge Basin, vertical displacement is as much as 14,000 feet. The San Gabriel fault has experienced only minor activity in recent times (Norris and Webb 1990).

OTHER FAULT SYSTEMS

The **Sierra Madre fault zone** and its eastern counterpart, the Cucamonga fault, are steep, north dipping, front-range faults along which most uplift of the San Gabriel Mountains has occurred. Activity on this fault is very recent (Norris and Webb 1990).

The San Fernando earthquake of 1971 (6.6 magnitude) was one of the strongest earthquakes experienced in modern times. The earthquake caused over \$500 million in property damage and 65 deaths. Although this earthquake was set off by the San Fernando fault zone to the west of the study area, seismologists have shown that the San Fernando earthquake defined a north-dipping reverse fault that corresponded to the surface breaks observed along segments of the Sierra Madre fault zone. The San Fernando earthquake alone caused a three-foot uplift of the San Gabriel Mountains (Norris and Webb 1990).

The **Vasquez Creek fault** runs along the south face of the San Gabriel Mountains between the San Gabriel fault and segments of the Sierra Madre fault zone near Pasadena. It is estimated that this fault has seen as much as 14 kilometers in right slip-movement.

Soledad Basin Faults

Numerous northeast-striking faults cut across the

Table 1: Significant Earthquakes Within or Near the Study Area

Date	Magnitude	Name, Location, or Region Affected	Loss of Life and Property
1857, Jan. 9	7.9	Great Fort Tejon earthquake	1 dead; damage from Monterey to San Bernardino County
1899, July 22	6.4	Wrightwood	Chimneys knocked down; landslides reported
1933, Mar. 11	6.4	Long Beach	115 dead; \$40 million in property damage
1971, Feb. 9	6.6	San Fernando	65 dead; more than 2,000 injured; \$505 million in losses
1987, Oct. 1	6.0	Whittier Narrows	8 dead; \$358 million in property damage to 10,500 homes and businesses
1994, Jan. 17	6.7	Northridge	57 dead; more than 9,000 injured; about \$40 billion in property damage

Source: California Geological Survey 2004.

sedimentary and basement rocks of the Soledad basin including the **Lone Tree** and **Soledad faults** (Wilson and Hernandez 2003).

The **Soledad fault** runs through Soledad basin where it brings the crystalline basement rocks of the San Gabriel Mountains in contact with tertiary rocks to the west.

Los Angeles Basin Faults

The **Raymond fault** extends north from the Santa Monica Mountains to the Sierra Madre-Cucamonga fault zone near Arcadia. This fault produces a very obvious south-facing scarp along much of its length. Early explorers noted springs all along the Raymond fault.

The **Elsinore fault zone** is one of the largest in southern California. It spans from the mountains east of San Diego northwest to the Los Angeles basin where it bifurcates into the **Chino fault** on the northeast and the **Whittier fault** on the southwest. The Whittier fault runs directly underneath the Puente Hills (Norris and Webb 1992).

The 1987 Whittier Narrows earthquake (6.0 magnitude) that struck the southern San Gabriel Valley and surrounding communities of southern California was caused by slip on a blind thrust fault near the northern end of the Whittier fault. It has been proposed that the event occurred on an extension of the recently recognized **Puente Hills thrust fault** system.

The **San Jose fault** runs beneath the San Jose Hills trending northeast to the Sierra Madre-Cucamonga fault zone.

LANDSLIDES

Landslides form widespread and important physiographic elements in the highly fractured rocks of the San Gabriel Mountains. Some of the largest landslides in southern California (including Crystal Lake) are located in the Angeles National Forest. Large landslides are infrequent occurrences but demonstrate the potential hazards to development below unstable areas (USFS 2005).

EROSION AND DEBRIS FLOWS

The highly erosive steep slopes of the San Gabriel Mountains produce considerable amounts of sand, mud, and aggregate that form debris flows. Fire episodes clear steep slopes of vegetation. During the rainy season, the soil from these cleared slopes form debris flows which can be highly destructive to anything in its path.

Los Angeles County has constructed a series of massive debris basins along the San Gabriel Mountains foothills to protect foothill residents from debris flows. Even these giant basins can be ineffective in stopping debris flows.

MINERAL RESOURCES

The study area is rich in a variety of mineral resources. The map, Mineral Resources, provides an overview of the mineral commodities in the study area.

Petroleum

The study area overlies the Los Angeles and Ventura oil basins, geologic areas well known for their petroleum resources. The source of oil resources is primarily lower Pliocene and upper Miocene strata. The Miocene Puente formation is particularly rich in oil resources. The richness in oil resources is due to millions of years of sediment build-up. During the Miocene epoch, high organic content was trapped and preserved in sediments which led to the formation of petroleum.

The oldest producing field in California is in Pico Canyon just west of the study area near Newhall. Oil was collected here as early as 1850 (Norris and Webb 1992). In the 1920s, Los Angeles County was the world's fifth largest oil producer. Presently, oil production is not nearly as prevalent as it was almost a century ago. Substantial oil fields are located in the Puente and Montebello Hills. However, many of these fields are now inactive. Small-scale oil production still occurs in the Santa Clarita Valley and some portions of the Puente and Montebello Hills (Los Angeles County Department of Regional Planning 2008).

Sand and Aggregate

The highly erosive slopes of the San Gabriel Mountains provide a seemingly endless source of aggregate which is a necessary ingredient in building roads and concrete structures. Sand, gravel, and other rock products are the most significant mineral resources, exclusive of petroleum, in the Transverse Ranges (Morton 1982; Dibblee 1982). There are multiple sand and gravel operations in the study area. Some of the largest are located near the Santa Fe Dam in Irwindale, and in the Soledad basin. The Santa Clara River also has several aggregate mining operations.

San Gabriel Mountains

The San Gabriel Mountains are rich in both metallic and non-metallic mineral resources. Most notably, Placerita canyon, located on the northwestern slopes of the San Gabriel Mountains was the discovery site for gold in 1842. Both lode and placer gold are associated with the Vincent thrust. Placer gold has been harvested in Lytle Creek and the San Gabriel River (USFS 2005).

The two largest gold mines are the Allison Mine on the south flank of Iron Mountain and the Big Horn Mine on the east side of Mt. Baden-Powell (Ehlig 1982).

Old terranes in the western San Gabriel Mountains have also been mined for gold. Active gold mining still takes place near Acton where there are quartz vein gold deposits (Morton 1982). Historically, minor amounts of gold were obtained from the Mount Lowe plutonic suite southwest of Soledad Pass (Dibblee 1982). While small amounts of gold were mined in basement rocks prior to 1940, most have not been profitable.

Other Mineral Resources

Other known commodities in the San Gabriel Mountains include aluminum, asbestos, asphalt, barite, clays, beryllium, copper, diatomite, feldspar, graphite, iron, limestone products, manganese, mica, oil and gas, platinum, silica, slab rock, silver, titanium, tungsten, uranium, and zirconium (See Map: Mineral Resources).

PALEONTOLOGICAL RESOURCES

Paleontological resources are fossilized remains of non-human organisms. Many paleontological sites include remains of species that are now extinct. Southern California has important paleontologic (fossil) resources that are sought by collectors, universities, and museums. Some of these scientifically important fossil resources are being lost to rapid deterioration and decomposition when exposed on the surface, and others are being lost to unauthorized collecting.

Significant paleontological resources are associated with the Mint Canyon in Soledad basin, the Puente formation in the Puente Hills, and La Habra formations (SCAG 2008). Vertebrate fossils in the Mint Canyon formation indicate an age of late Miocene to early Pliocene. This fauna includes merychippus, hipparion, alticamelus, rhinoceroses, antelopes, and carnivores (Mount 1971). Fossils associated with the Puente formation include fish and leaves (SCAG 2008).

Water Resources

HISTORICAL ECOLOGY

Rivers and creeks in the study area, primarily in the Los Angeles basin, have undergone significant changes since European settlement. Because changes are most significant in the Los Angeles basin, this discussion focuses primarily on the pre-settlement hydrology of the Los Angeles basin.

Early explorers and surveyors provided detailed descriptions of water features on the Los Angeles basin. Rivers ran freely across the plain in braided channels. Cienegas (swampy areas), many of which were fed by springs, were abundant, creating lush wet areas throughout the landscape. A series of springs were associated with the feature we now know as the Raymond fault.

Rivers and creeks were wide, gravelly channels referred to as washes. Many were a half a mile wide or more. Within these wide beds, the channels would shift during times of flooding and heavy rains. At the base of the San Gabriel Mountains, the deep gravels and groundwater basins absorbed water draining from the mountains. Waterways would “disappear” into the gravels and rise to the surface south of Whittier Narrows (Crespi 2001). There are also many historical accounts of how the San Gabriel and Los Angeles Rivers often changed their courses, creating new channels during floods. Early maps show both an “Old” and “New” San Gabriel River. Coyote Creek, now a tributary to the Lower San Gabriel River, drained directly from the Puente Hills through the coastal plain to Los Alamitos Bay (Hall 1888).

SURFACE WATER

The study area contains portions of five major watersheds in the Los Angeles region: the San Gabriel River watershed, the Los Angeles River watershed, the Santa Clara River watershed, the Antelope Valley watershed, and a very small portion of the Santa Ana River watershed. (See Map: Watersheds).

In the mountains and foothills, coastal watersheds feature natural streams with year-round flow and high quality habitat. Downstream, the urbanized Los Angeles basin features river systems that have been engineered to protect homes and businesses from flooding.

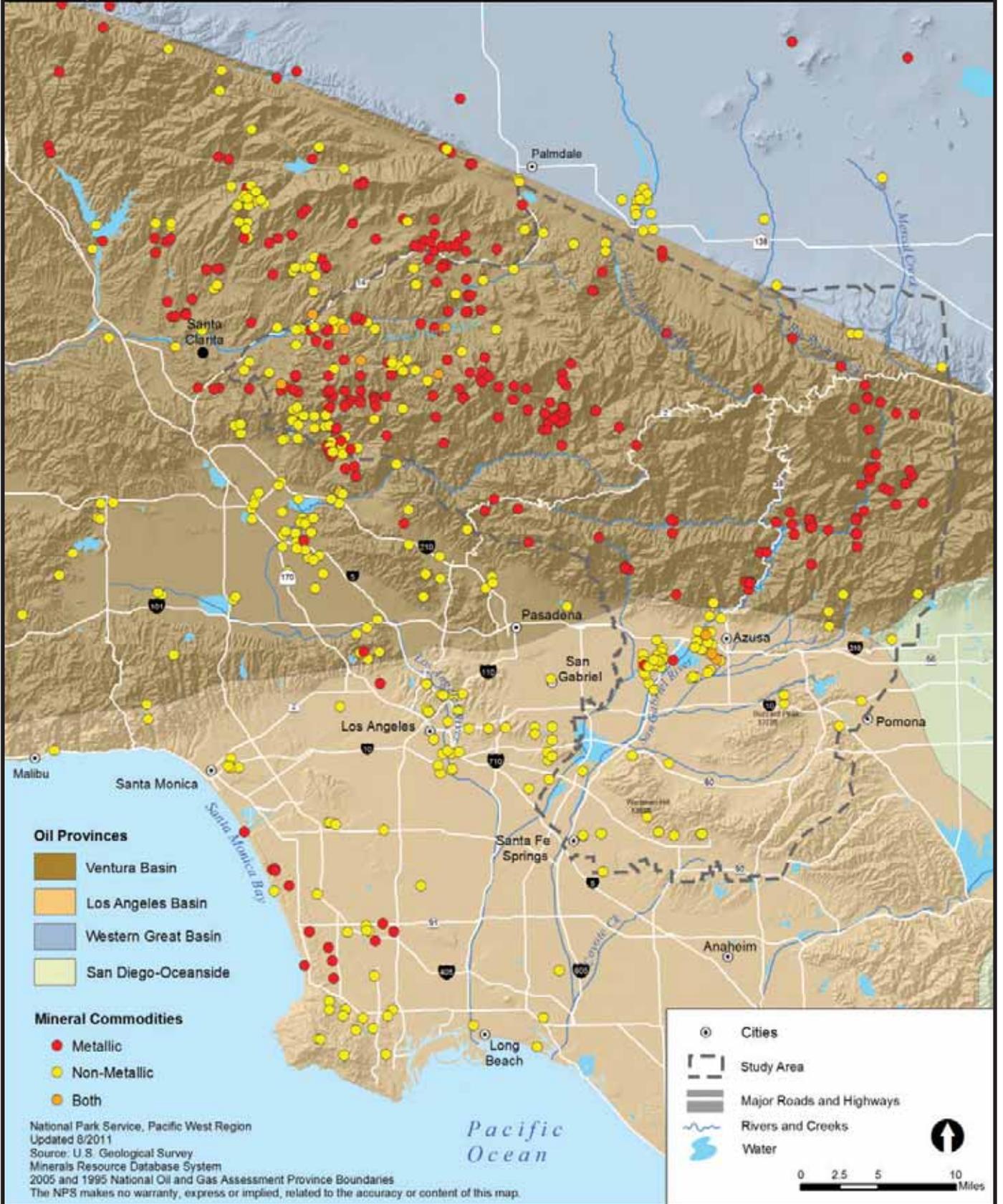
San Gabriel River Watershed

The San Gabriel River watershed encompasses 661 square miles. Its headwaters are in the San Gabriel Mountains and the river reaches the Pacific Ocean

Mineral Resources - Major Commodities and Oil Provinces

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



at Los Alamitos Bay. The upper San Gabriel River subwatershed, Walnut Creek subwatershed, San Jose Creek subwatershed, and a small portion of the Coyote Creek watershed, are included in the study area. The upstream tributaries of the watershed have year-round flow provided by springs and still retain high quality habitat (California Coastal Conservancy 2001; California Regional Water Quality Control Board 2000).

There are 26 dams in the San Gabriel River watershed. Most of the major dams were built after the 1930, such as Cogswell Dam (1934), Morris Dam (1934), San Gabriel Dam (1939), Santa Fe Dam, and Whittier Narrows Dam (1957). The lower part of the river (the area generally below Santa Fe Dam) is channelized and developed for much of its length except at recharge basins where the bottom is gravelly.

Los Angeles River Watershed

The Los Angeles River watershed drains 830 square miles of land from the Santa Monica Mountains, the San Gabriel Mountains, and the Los Angeles basin, reaching the Pacific Ocean in Long Beach. Featuring one of the most extensive flood protection systems, virtually all of the main channel has been channelized and paved to protect downstream urban areas from flooding. Portions of the watershed in the San Gabriel Mountains have year-round water supplied by springs and support high quality habitat for plants and animals.

The study area contains only the northeastern portion of the watershed. This includes portions of the upper Tujunga, Pacoima, Arroyo Seco, and Rio Hondo subwatersheds. The upper watersheds are characterized by steep sloping channels that are some of the most prolific sediment-producing channels in the world. Major upstream dams within the study area include the Pacoima and Big Tujunga Dams.

The Rio Hondo River formerly meandered across the basin as a channel to the San Gabriel and Los Angeles Rivers. The Rio Hondo has now been engineered as a permanent tributary to the Los Angeles River for flood control purposes.

The Los Angeles River and San Gabriel River watersheds are hydrologically connected by the Rio Hondo River through the Whittier Narrows Reservoir. Much of the Rio Hondo River and its tributaries have been channelized and paved. Dams in the Rio Hondo drainage area include the Eaton, Sierra Madre, Big Santa Anita, and Sawpit Dams (LADPD 2006b; California Coastal Conservancy 2001).

Santa Clara River Watershed

The Santa Clara River is the largest river system in southern California that remains in a relatively natural state. Approximately 1,200 square miles of this watershed drains to the Santa Clara River Estuary in Ventura County. The only major dams in the watershed are located outside of the study area in the Sierra Pelona Range. No major dams have been located on the main river channel. The Santa Clara River is the last unchannelized riparian and wildlife corridor in the region, providing the primary remaining east-west biological connection between the San Gabriel Mountains and the Pacific Ocean (California Coastal Conservancy 2001).

Portions of the Upper Santa Clara River watershed are located in the study area where the Santa Clara River originates in the San Gabriel Mountains. The Upper Santa Clara River is a large ephemeral stream. As the river exits the confinement of the mountains, it has braided stream geomorphology characterized by the frequent shifting network of channels and the intervening bars, and the broad floodplain area, and typical of braided stream deposits (LADPW 2005).

Santa Ana River Watershed

The Santa Ana River watershed encompasses 2,800 square miles. Channelization of the river with high levee banks and other flood control measures characterize much of the main channel south of the mountains. The only portion of the watershed located within the study area is the San Antonio Creek in the far eastern end of the study area. Below San Antonio Dam, San Antonio Creek is channelized.

Antelope Valley Watersheds

Rivers that drain to the Antelope Valley include Little Rock, Big Rock, and Mescal Creeks. All of these creeks have intermittent flow. Little Rock and Big Rock Creek also have subsurface flow, important to dry lakes in the Mojave Desert (PCR Services Corporation 2000a). Little Rock Creek has its headwaters in Cooper Canyon and drains to the Mojave Desert. It is free-flowing and very scenic from its upper reaches to Little Rock Reservoir.

Lakes

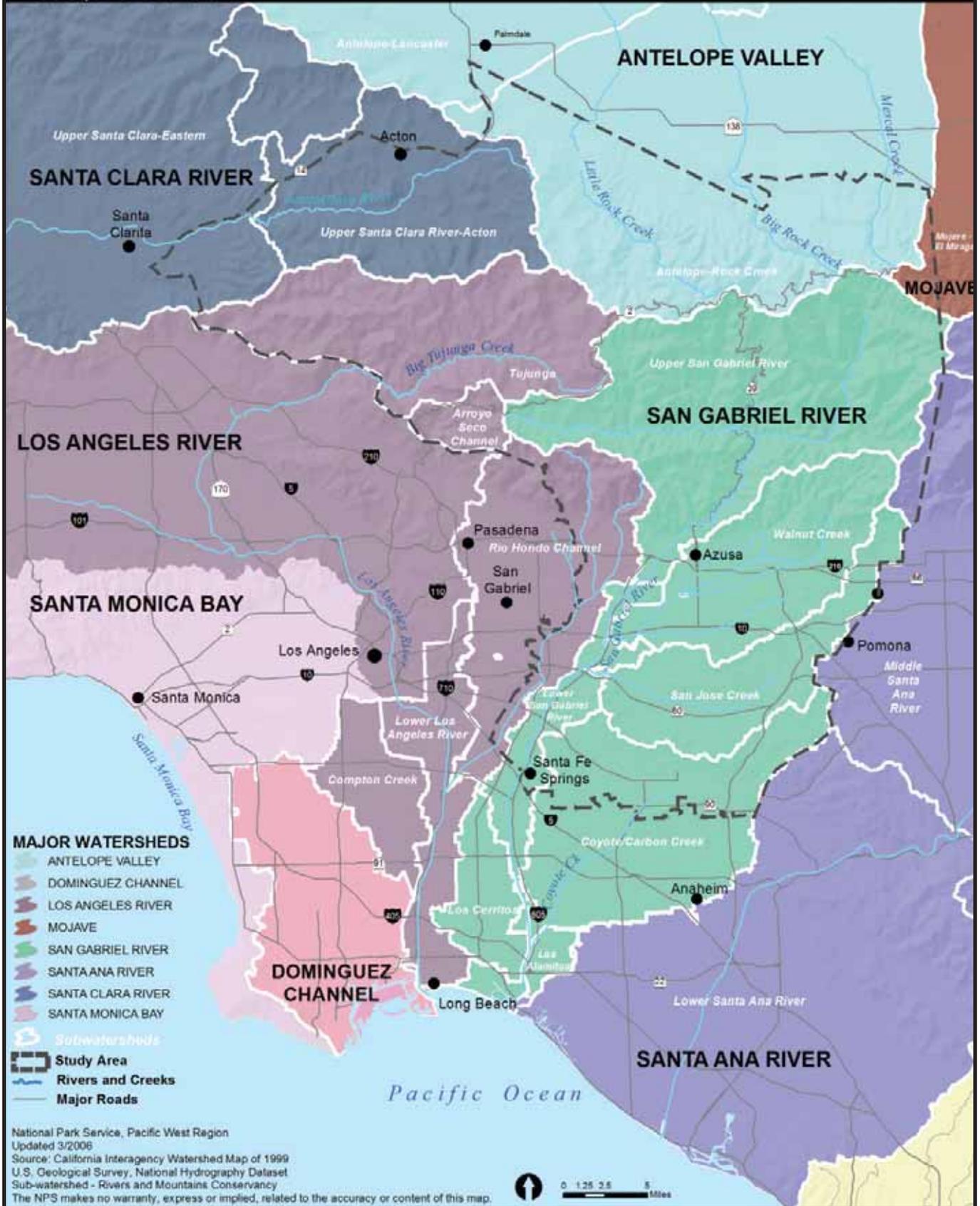
The San Gabriel Mountains and San Andreas rift zone contain natural lakes. These lakes were formed by natural sag ponds on the San Andreas fault and by landslides in the mountains.

Una Lake is a natural sag pond, which is an enclosed depression formed where active or recent

Watersheds

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



fault movement along the San Andreas fault resulted in impounded drainage. This area has extensive wetlands and provides important wildlife habitat.

Lake Palmdale was a natural sag pond that was impounded in 1924 to create the Harold Reservoir. This reservoir provides water for local agriculture.

Jackson Lake, located in the Angeles National Forest near the town of Wrightwood, is also a natural sag pond in the San Andreas rift zone.

Crystal Lake is an alpine lake found high in the San Gabriel Mountains. This natural lake formed from one of the largest landslides known in southern California. The Crystal Lake area was once a major recreational complex of the Angeles National Forest. The water is now off limits for swimming because of biological contamination. A major fire in 2001 destroyed much of the forests around the lake. It remains a popular fishing destination.

FLOOD PROTECTION AND WATER STORAGE

Flood protection and water conservation planning began in the early part of the 20th century following a disastrous flood event in 1914. A total of 14 dams were built to control waters from the San Gabriel Mountains. A brief history of Los Angeles County flood protection and water conservation system is described under *Cultural Resources*.

Extensive flood protection and water conservation systems were constructed by Los Angeles County and the Army Corps of Engineers throughout the first half of the 20th century. These structures are a dominant feature of the Los Angeles Basin landscape. Within the study area there are 29 dams and debris basins (See Map: Flood Protection Facilities).

The San Gabriel River has five major dams, all of which have the dual purpose of both flood protection and water supply and storage. Other major dams on the southern slopes of the San Gabriel Mountains include Tujunga, Big Santa Anita, Santa Anita, Sawpit, Big Dalton, San Dimas, Live Oak, and Puddingstone Dams. Little Rock Dam and Harold Reservoir (Lake Palmdale) are the only major dams on the north slope of the San Gabriel Mountains. Harold Reservoir, created from a natural sag pond on the San Andreas fault, is the study area's oldest dam (1891).

In addition to dams, many of the rivers and creeks throughout the basin were straightened (channelized) and hardened to confine the flow of channels during heavy rains.

WATER CONSERVATION AND SUPPLY

The importance of the San Gabriel Mountains as a water source was apparent to early settlers who relied on the mountains to feed water from the canyons to farmlands (Robinson 1991). The City of Pasadena petitioned the California Board of Forestry in 1888 to protect the San Gabriel Mountains for its watershed values. During this time, excessive timbering was impacting water quality and destroying mountain springs and watercourses used to irrigate the San Gabriel Valley. The State of California established the San Gabriel Forest Reserve in 1891. Watershed protection was the primary impetus for establishing the reserve.

Groundwater

Groundwater basins, or aquifers, are natural underground formations filled with sediment, including sand and gravel. Beneath the study area are portions of seven major groundwater basins. Wells drilled into the basins provide water for municipal use. Local groundwater basins provide 30% of the region's water supply on average. These basins will supply up to 60% during drought years (LADPW 2006a and 2006b). For most of these basins, only a portion is located in the study area. Table 2 provides a description of the groundwater basins within the study area. Also, see Map: Groundwater Basins and Water Supply Facilities.

Spreading grounds artificially recharge groundwater to aquifers by spreading imported water, local runoff (including the water impounded by the upstream dams during storms), and recycled water. Los Angeles County Department of Public Works manages 27 spreading facilities throughout Los Angeles County.

San Gabriel River Water Conservation System

The largest water conservation facilities in Los Angeles County are located on the San Gabriel River, just south of San Gabriel Canyon and in the San Gabriel Valley near Whittier Narrows. The San Gabriel River water conservation system begins in the San Gabriel Mountains with the capture of storm runoff and snow melt in the reservoirs of Cogswell, San Gabriel, and Morris Dams. Water released through valves or passing over spillways when the reservoirs are full can be diverted at the mouth of the canyon to the San Gabriel Canyon Spreading Grounds or can continue downstream in the unlined San Gabriel River toward the Santa Fe Dam. In the upper portion of the Santa Fe Reservoir is the Santa Fe Reservoir Spreading Grounds. Releases from Santa Fe Dam can be spread in the

Flood Protection Facilities

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



unlined San Gabriel River downstream with large flows continuing to Whittier Narrows Dam. Water can also be diverted just below Santa Fe Dam and routed via Sawpit Wash to Peck Road Spreading Basin and the beginning of the Rio Hondo water conservation system.

The Whittier Narrows Dam is at the northern boundary of the Montebello Forebay. San Gabriel River flows arriving in the reservoir can be directed either to the San Gabriel Coastal Basin Spreading Grounds and the downstream unlined San Gabriel River, or to the Rio Hondo Coastal Basin Spreading Grounds. Any water released from Whittier Narrows Dam that is not captured in the Coastal Plain spreading facilities flows on to the ocean (LADPW 2004)

Imported Water

Municipal water for the greater Los Angeles metropolitan region is supplemented by water imported from northern California through the State Water Project and from the Colorado River.

The Metropolitan Water District of Southern California, a consortium of 26 cities and water

districts, receives water from the State Water Project.

Recycled Water

Recycled water is used for municipal use such as irrigation, industrial applications, environmental uses, groundwater replenishment, or maintenance of seawater barriers to groundwater basins along the coast. The remainder is discharged into creeks and rivers, supporting riparian habitat in some locations.

The Sanitation Districts of Los Angeles County manage three Water Reclamation Plants (WRP) within the study area. These locations include the San Jose WRP, the Whittier Narrows WRP, and the Pomona WRP.

WATER RIGHTS AND SUPPLY MANAGEMENT

Water rights determine who can draw upon water from rivers and groundwater basins and how much can be allocated to each user per year. Most water supply resources within the study area are fully appropriated, meaning the State Water Resource Control has determined that all of the water is

Table 2: Groundwater Basins

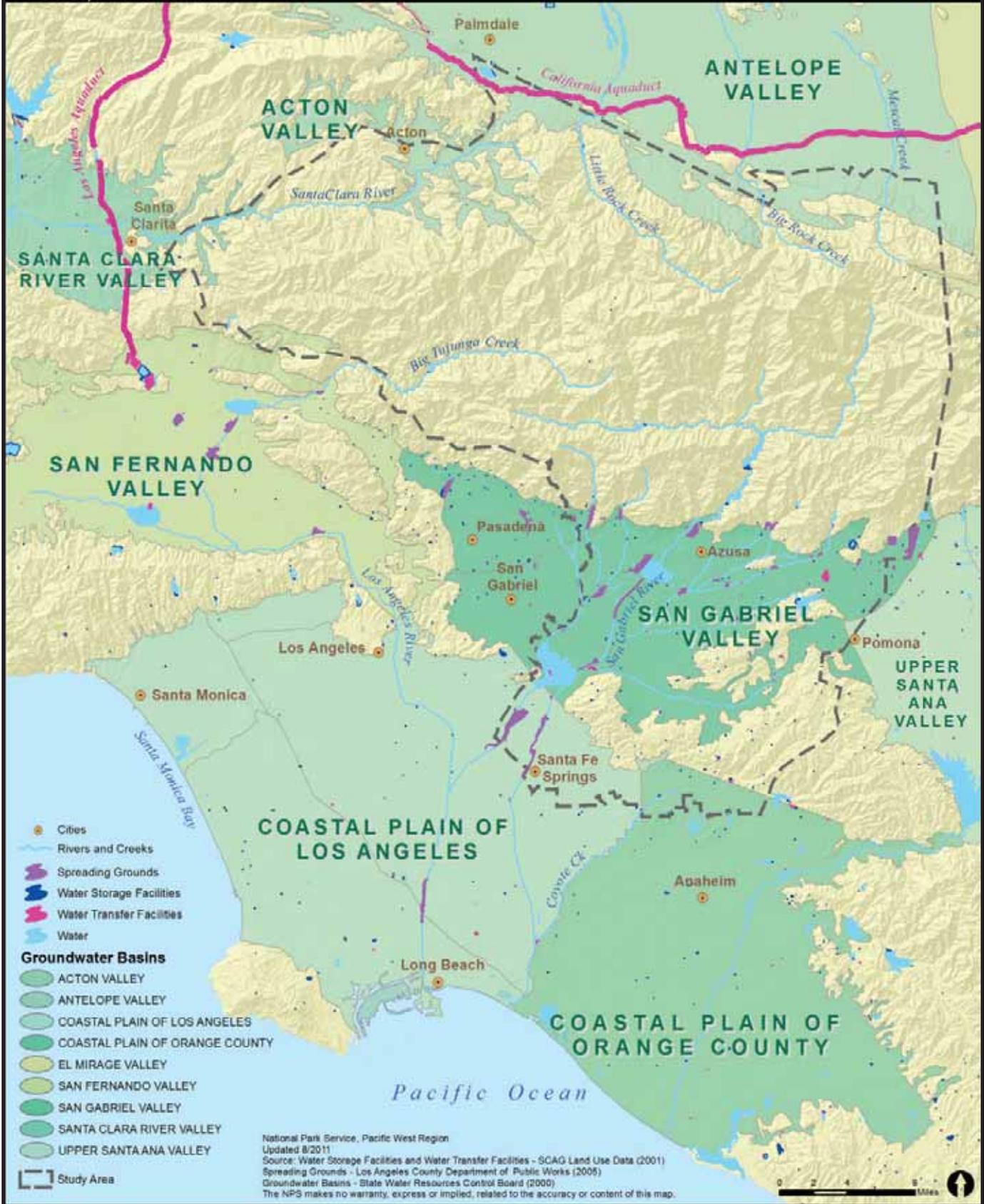
Groundwater Basin	Surface Area	Storage Capacity	Recharge Areas
Coastal Plain of Los Angeles, Central Subbasin	177,000 acres	13,000,000 acre feet	Precipitation, surface inflow at Whittier Narrows, , imported water, recycled water from Whittier and San Jose Treatment Plants, underflow from San Gabriel Valley.
San Gabriel Valley	154,000 acres	10,740,000 acre feet	Precipitation, runoff from surrounding mountains, imported water from San Gabriel River, treated sewage effluent, subsurface flow from Chino subbasin and fracture systems along San Gabriel Mountain front.
Raymond	26,200 acres	1,450,000 acre feet	Precipitation, streamflow from Arroyo Seco, Eaton Creek, and Santa Anita Creek, spreading grounds, San Gabriel Mountain front fracture systems.
Upper Santa Ana Valley, Chino Subbasin	154,000 acres	18,300,000 Acre feet	Precipitation, underflow from adjacent basins, recharges facilities at Deer Creek, Day Creek, East Etiwanda, San Sevaine, and Victoria.
San Fernando Valley	145,000 acres	3,670,000 acre feet	Spreading from imported water at the Pacoima, Tujunga, and Hanson spreading grounds. Runoff and streamflow from mountains, precipitation, reclaimed wastewater, and industrial discharges.
Acton Valley Groundwater Basin	8,270 acres	40,000 acre feet	Precipitation in the valley, runoff from Santa Clara River and its tributaries, and subsurface inflow.
Antelope Valley	1,100,00 acres	68,000,000 acre feet	Primarily perennial runoff from surrounding mountains and hills, percolation through alluvial fan systems. Big Rock and Little Rock Creeks contribute 80% of runoff into the basin.

California Department of Water Resources, 2003

Groundwater Basins and Water Supply Facilities

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



owned by water rights holders. The Antelope Valley Groundwater Basin has not been adjudicated. At the state level, water rights are managed by the State Water Resources Control Board. At the local level, agencies and organizations that are involved in administering water rights within the study area include:

- San Gabriel River Water Committee
- Main San Gabriel Basin Watermaster
- San Gabriel Valley Protective Association
- San Gabriel River Watermaster
- Central Basin Watermaster
- West Coast Basin Watermaster
- Six Basins Watermaster
- Upper Los Angeles River Area Watermaster

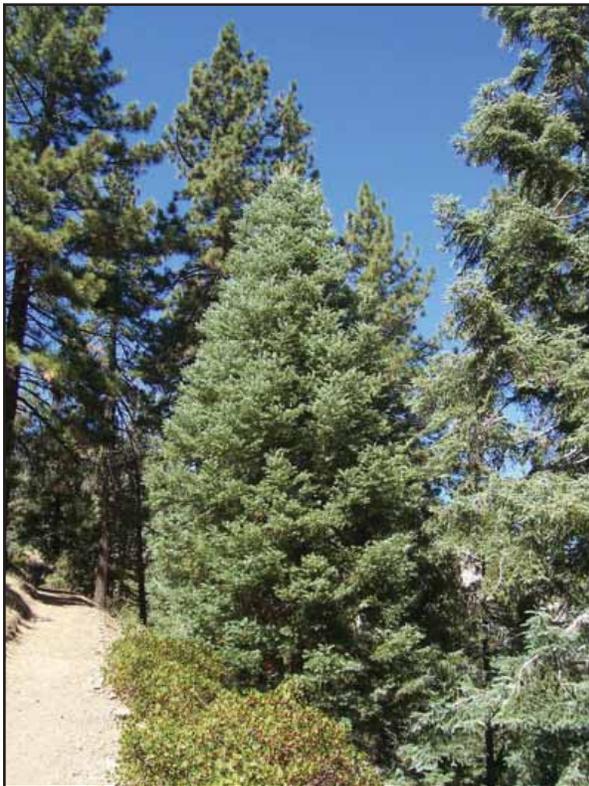
Numerous agencies, water districts, and water companies are also involved in water supply management such as buying, selling, pumping, delivery, and clean-up (LADPW 2006b).

Vegetation

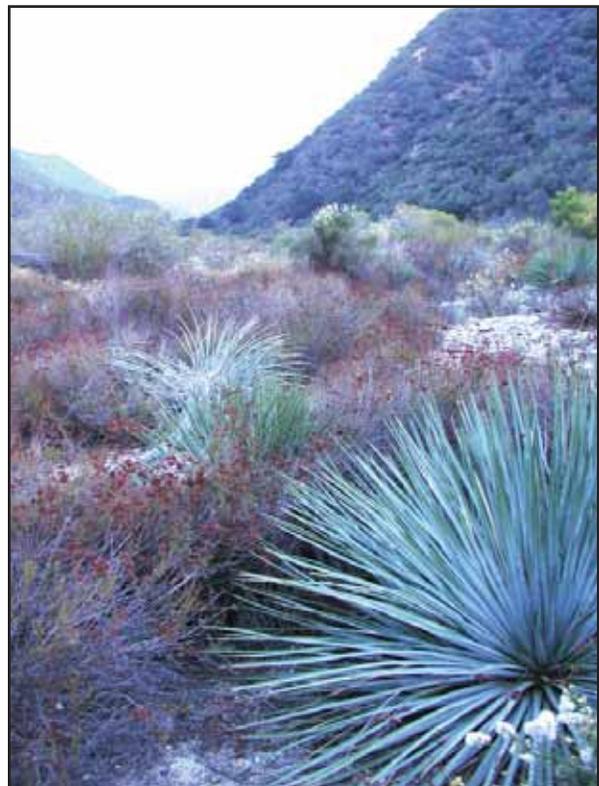
INTRODUCTION

The diverse landscape of the study area contains examples from most of the vegetation types and wildlife that are found in Southern California today. From the high peaks of the San Gabriel Mountains to the low coastal plain south of the Puente-Chino Hills, differences in climate, soils, and geology set the stage for a wide array of plant communities. Alpine, coastal, and desert communities can all be found within relatively short distances. These plant communities provide habitat to an abundance of wildlife.

The study area includes habitat within two distinct ecoregions as defined by Jepson, the coastal Southwestern ecoregion and the Mojave Desert ecoregion (see Map: Vegetation). The Southwestern ecoregion includes the transverse and peninsular ranges and is bordered by the Mojave and Colorado deserts to the east and the Mexican border to the south. Common plant communities include coastal strands and bluff, lagoons, coastal sage scrub, chaparral, foothill woodlands, and coniferous forests in the mountains. Chaparral is the dominant native plant community in the study area and throughout southern California's national forest



White fir, Islip Saddle, San Gabriel Mountains. Photo courtesy of Ryan Gilmore.



Alluvial fan scrub, Big Tujunga Canyon. Photo courtesy of JC Dittes.

system. These chaparral systems are important for watershed conservation in southern California (Halsey 2008).

The Mojave ecoregion lies north and east of the study area and includes one-fifth of the state. Plant communities include desert scrub, Joshua trees, and pinyon/juniper woodlands.

Many of the region's native plant communities have been displaced due to grazing, agriculture, and ultimately, urban development. Almost all of the native plant communities that remain contain sensitive, rare or endangered flora and fauna.

This section describes the native and wildlife vegetation that existed in the study area when European settlers arrived and provides an overview of existing vegetation and wildlife found within the study area today.

NATIVE VEGETATION

Although no comprehensive inventories and studies of the region's native vegetation were conducted by early Spanish explorers, diaries kept during expeditions help paint a picture of the pre-European landscape.

Accounts from Early Explorers

The first detailed accounts of study area vegetation were from the overland expedition led by Captain Gaspar de Portola in 1769-1770. Diaries kept by Juan Crespi, a padre in the expedition, provide some of the most detailed early descriptions of the study area's native vegetation. Crespi describes the San Gabriel Valley as lush with dense woodlands of willow and oak trees and other species such as rose bushes, sage, thistles, grapevines, cumin, and holy thistles. He also describes a great swamp, watered by a spring-fed river, with many plants and "good grasses." Crespi writes that this area would make a "*grand, excellent spot for a very large plenteous mission*" (Crespi 2001).

As the Portola expedition continued north and west, they crossed the western San Gabriel Mountains and descended into the Soledad Basin. Crespi describes the Santa Clara River valley as an area having good grass-grown soil and areas with large cottonwoods, sycamores, white oaks, willows, and vineyards (Crespi 2001).

Early Surveys

In the 1940s, the U.S. Forest Service created a detailed map of California's native vegetation. The California State Board of Forestry, in its publication, *An Historico-Ecological Study of the*

Range Resource of California, amended this map after consulting historical records by pioneers, travelers, and early residents that observed vegetation. According to this document, native plant communities of the study area would have included: California prairie in the valleys and coastal plain; sagebrush in the Puente-Chino Hills; sagebrush, chaparral, coniferous woodland, and forest in the San Gabriel Mountains; and desert scrub in the Antelope Valley (Burcham 1957).

The vegetation that has changed most dramatically since European contact is the *California prairie*. California prairie was found along alluvial areas in Southern California in elevations 50 to 500 feet above sea level. Soils in these areas are similar to soils which underlie Midwestern prairies. In the study area, California prairie habitat would have dominated in the San Gabriel Valley and coastal plain areas south of the Puente-Chino Hills. Dominant species were perennial bunchgrasses such as purple needlegrass and nodding needlegrass. Herbaceous plants such as wildflowers, sedges, and bulbs were also common. Today there is virtually no remnant of this community apparent in the Los Angeles region. Native grasses are typically found intermixed with nonnative species introduced from Europe. This is a result of the California prairie being well suited for grazing and irrigated agriculture (Burcham 1957).

John Muir, in his famous book, *The Mountains of California*, describes the vegetation of the San Gabriel Valley as flourishing with white sage in the valleys and low hills, black sage on the mountains and streamsides with melilotus, columbine, collinsia, verbena, zauschneria, wild rose, honeysuckle, philadelphus, and lilies. Wild buckwheat was also in great abundance (Muir 1894). Steep hillsides in the Puente-Chino, San Jose Hills, and southern San Gabriel Mountains foothills would have been covered in chaparral and coastal sage scrub. Coastal sage scrub, in particular, has been severely reduced from its former range as this habitat was very suitable for agriculture and ranching.

The other dominant community that has been dramatically altered since European settlement is the foothill woodland which would have intermingled with California prairie and chaparral communities. The foothill woodlands were profuse in the deep alluvial soils of lower flats and hills in the Santa Clara River Valley (Soledad basin) and the Los Angeles basin. This would include woodlands of walnut and oak found in canyons and hillsides, and broad corridors of willow, alder, sycamore, and mulefat along rivers and creeks (Schiffman 2005).

EXISTING VEGETATION AND HABITAT

The vegetation and habitat of the study area are primarily described according to the California Wildlife Habitat Relationships System (CWHR) habitat classification scheme which has been developed to support the CWHR System, a wildlife information system and predictive model for California's regularly-occurring birds, mammals, reptiles, and amphibians.

Grassland

Annual grassland habitat primarily occupies what was once California prairie. Introduced annual grasses are the dominant plant species in this habitat including wild oats, soft chess, red brome, wild barley, true clovers, and many others. Remnants of native plants and grasses are also found in this habitat including California poppy and purple needlegrass, and Idaho fescue.

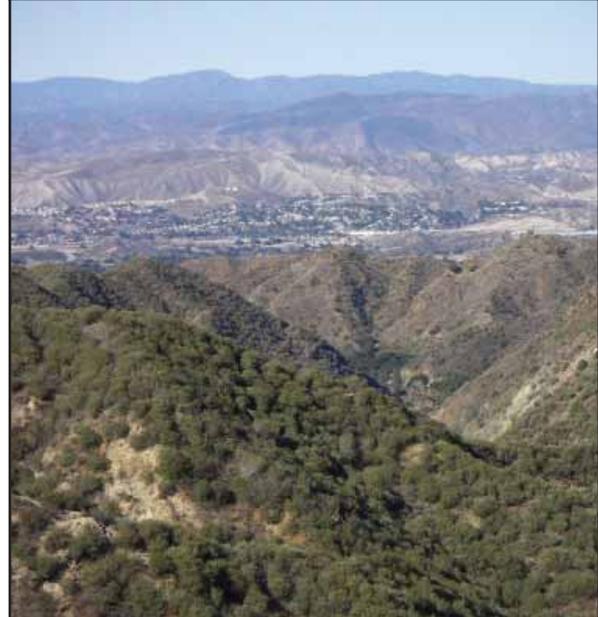
Characteristic wildlife associated with annual grassland include the western fence lizard, common garter snake, and western rattlesnake, California ground squirrel, California vole, badger, coyote, burrowing owl, short-eared owl, and western meadowlark. This habitat also provides important foraging habitat for raptors such as the northern harrier and the prairie falcon (CDFG 2008a).

Within the study area, fragmentary representatives of native grasslands exist in the Antelope Valley, along the Santa Clara River, eastern San Gabriel Valley, San Jose Hills, Puente Hills, and the San Gabriel Canyon. The native grasslands in these areas are typically occurring in scattered patches.

Vernal pools, small depressions with a hardpan soil layer, are also found in grassland habitat. Vernal pool systems are extremely rare in Los Angeles County. There are only two verified vernal pools currently recognized in the region – Cruzan Mesa and Plum Canyon. However, there is at least one small seasonal pond with typical vernal pool characteristics within the study area. Located in the upper Placerita-Sand Canyon watershed in the Angeles National Forest, this pool supports Riverside fairy shrimp and western spadefoot toad (PCR Services Corporation 2000a).

Scrub and Chaparral Communities

Coastal Sage Scrub is found at elevations below 2,500 feet in climates with mild temperatures and maritime influence. Shrubs are knee high with soft flexible leaves that are often drought-deciduous (they lose their leaves during the summer dry season). Common species include California sagebrush, brittle-bush, California buckwheat, and

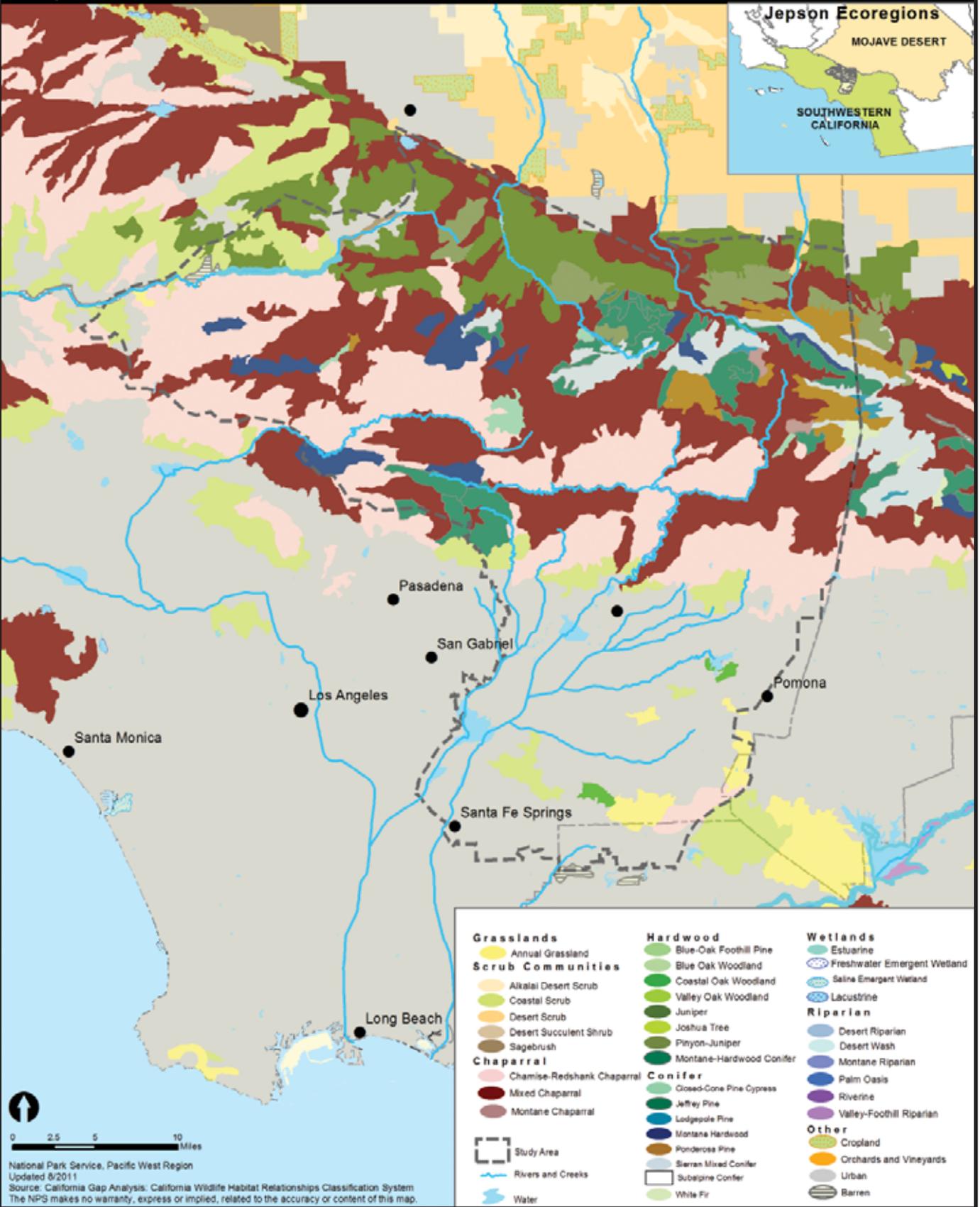


Photos (top to bottom): 1. Walnut grove, Puente Hills. NPS photo. 2. Rabbitbrush and sub-alpine vegetation on Pine Mountain, Angeles National Forest. Tom Chester photo at: <http://tchester.org/sgm/plants/pix/rabbitbrush.html>. 3. Chaparral, Angeles National Forest. NPS photo.

Vegetation

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



various types of sage. Coastal sage scrub is one of the most threatened communities in California. At least 13 rare, threatened and endangered species are associated with this habitat (Schoenherr 1992).

The study area contains a wide range of coastal sage scrub communities. Three classifications of coastal sage scrub are typical of the Southwestern ecoregion as classified by Axelrod: Venturan, Riversidian, and Diegan. A fourth representation, coastal sage scrub-chaparral, typically found in transitional areas near mountain foothills, has been defined by Holland. All four variations are represented in the study area. Riversidian coastal sage scrub is primarily located in the upper Santa Clara River watershed. Venturan is found in the San Jose Hills, Puente Hills, and San Gabriel Mountains foothills. Diegan coastal sage scrub is found in the eastern Puente Hills. The Puente Hills represent a transition between Venturan and Diegan coastal sage scrub. Many of these areas are designated habitat for the federally threatened coastal California gnatcatcher (Puente Hills Landfill Native Habitat Preservation Authority 2007; Davis, et al. 1994, Axelrod 1978).

Desert scrub includes a number of widely spaced formations of shrubs and subshrubs which occur on open, sandy soils where groundwater is inaccessible to all but a few deep-rooted species. Dominant species include sagebrush, antelope bush, creosote bush, saltbush, rabbitbrush, cheesebush, sages, winterfat, and burrobrush. This community often inter-grades with juniper and Joshua tree woodlands. Primary resident species include Couch's spadefoot toad, desert tortoise, a variety of lizards and snakes including desert iguana, kingsnake, black-throated sparrow, kangaroo rats, and pocket mice (CDFG 2008). Within the study area, desert scrub is found on lower slopes within the San Andreas rift zone on north facing slopes that transition onto the Antelope Valley floor, interspersed with grasslands (PCR Services 2000a).

Alkali desert scrub communities tolerate alkaline soils by absorbing salt and water. Common plants include saltbushes, desert holly, sagebrush, and alkali golden bush. In the study area, it is found in the Antelope Valley and the northern foothills of the San Gabriel Mountains. Wildlife associated with desert scrub includes the pallid kangaroo mouse, chisel-toothed kangaroo rat, zebra-tailed lizard, and the San Emigdio blue butterfly (CDFG 2008a, Schoenherr 1992, Mayer and Laudenslayer 1988, Davis et al 1998, PCR Services Corporation 2000a).

Alluvial wash and alluvial fan sage scrub generally consists of a mixture of shrubs which colonize and

persist within infrequently scoured and flooded terrain such as floodplains, alluvial plains, or along seasonal streams. The dominant shrub in most washes is scalebroom. Alluvial fan sage scrub type is found in alluvial plains and washes in the Antelope Valley, in canyons adjacent to the San Gabriel Valley and throughout the alluvial plains and washes of the Santa Clara River. It is extremely reduced from its historic range as a result of alterations to river channels for flood protection.

Alpine dwarf scrub is restricted to elevations about 10,000 feet in southern California. In the San Gabriel Mountains, common species include draba, Parish's alumroot, creambush, rock-cress, and species of buckwheat. At its lower extent it interfaces with subalpine conifer, closed cone pine/cypress, Sierran mixed subalpine forest, and southern California subalpine forest. Resident wildlife associated with alpine dwarf scrub includes blue grouse, pika, rufous hummingbird, and mountain sheep (Mayer and Laudenslayer 1988, USFS 2005).

Sagebrush typically occurs at a wide range of middle to high elevations. This habitat is dominated by sagebrush, rabbitbrush, horsebrush, mahogany, gooseberry, and western chokeberry. Wildlife associated with sagebrush include: migrating mule deer, pronghorn, sage grouse, jackrabbit, and ground squirrels. Within the study area it is found in the Soledad basin and Antelope Valley areas (CDFG 2008a, Davis et.al. 1994).

Chaparral is the most prolific plant community in the study area. This community consists of sclerophyllous (hard-leaved), medium to tall shrubs that form a dense cover on steep slopes, usually below 5,000 feet in southern California. Dominant species found within this community include scrub oaks, chamise, manzanita, wild lilac, toyon, and western mountain-mahogany. The study area contains chamise-redshank chaparral, mixed chaparral, and montane chaparral.

Chamise-redshank chaparral consists of nearly pure stands of chamise or redshank. Wildlife species associated with this chaparral are similar to those associated with sagebrush and coastal sage scrub. Within the study area it is abundant in the San Gabriel Mountains and southern foothills, the upper Santa Clara River watershed, and a few stands in canyons of the Puente-Chino Hills (CDFG 2008a, Davis et.al. 1994).

Mixed chaparral is floristically diverse and contains approximately 240 species. This is the dominant type of habitat in the study area and comprises over

170,000 acres or 25% of the study area landcover. Typically associated shrubs include chamise, silk-tassel, toyon, yerba-santa, California fremontia, scrub oak, chaparral oak, and species of ceanothus and manzanita. Species found here are those that are found in other chaparral habitat, coastal sage scrub, and sagebrush. Within the study area, mixed chaparral is mostly restricted to the San Gabriel Mountains and higher elevations of the Antelope Valley (CDFG 2008a, Davis et.al. 1994).

Montane chaparral is typically associated with coniferous habitats such as ponderosa pine, mixed conifer forests, Jeffrey pine, red fir, and lodgepole pine. In the San Gabriel Mountains, it is typically found at elevations over 7,000 feet. Common species include ceanothus, manzanita, huckleberry oak, mountain mahogany, toyon, and California buckthorn. Montane chaparral provides habitat for a wide variety of wildlife including rabbits and hares, many types of bird species, and important foraging habitat for deer. This habitat is found in upper watershed of the San Gabriel River (CDFG 2008a, Davis et.al. 1994).

Woodlands and Forests

Coastal oak woodlands are common to coastal foothills and valleys. Dominant species in southern oak woodlands and forests include coast live oak, interior live oak, Engelmann oak, and southern California walnut woodlands and forests. Coastal oak woodlands provide habitat to a wide variety of wildlife including at least 60 mammal and 110 bird species in some areas (CDFG 2008a).

In the Puente-Chino Hills area, the dominant oak species is the coast live oak. It is found scattered throughout many hillsides, drainages, and broad valleys. It is most prevalent on north facing slopes and in drainage bottoms. Large complexes of oak woodland are found in Powder Canyon, Brea Canyon, and Tonner Canyon. Throughout the San Gabriel Valley and southern San Gabriel Mountains foothills, oak woodland is found scattered on north facing slopes and in drainage bottoms. The upper Santa Clara River watershed contains coast live oak woodlands, usually along the margins of canyon bottoms and on lower slopes in chaparral and coastal sage scrub understory habitats.

Often intergrading with oak woodlands are *walnut woodlands*. Dominated by the southern California black walnut, which grows 10 to 30 feet high, walnut woodlands are common on the hillsides of Brea and Tonner canyons where they form some of the best developed examples of their type south of Ventura County in southern California

and represent the state's last remaining extensive stand of southern California black walnut. Walnut woodlands are also found throughout the eastern San Gabriel Valley in the San Jose and South Hills (PCR Services Corporation 2006, Schoenherr 1992, PCR Services Corporation 2000 and 2000d, Quinn 1990).

Closed-cone cypress is found scattered among chaparral and hardwood forests. Typically, dominated by single species of closed-cone pines or cypress, this habitat grows in areas with rocky and infertile soils. Dominant species include Piute cypress, cuyamaca, and species common to chaparral habitat. Great-horned owls and red-tailed hawk roost in this habitat (CDFG 2008a).

Joshua tree woodland is dominated by Joshua trees with numerous smaller shrub species such as creosote bush and sagebrush interspersed. Joshua trees provide nesting and perching sites for birds associated with desert scrub habitat. Within the study area, Joshua trees are located on the lower slopes in the San Andreas rift zone at the northern base of the San Gabriel Mountains (PCR Services Corporation 2000a, CDFG 2008).

Juniper woodlands are dominated by California juniper, often with an understory of desert scrub species including foothill yucca and buckwheat. Within the study area, juniper woodlands are typically found on northern slopes of the San Gabriel Mountains, lower slopes within the eastern portion of the upper Santa Clara River watershed, and on lower slopes in the San Andreas rift zone where it is mixed with Joshua tree woodland and chaparral. Juniper berries are an important food source to bird species and the foliage is consumed by some mammal species (CDFG 2008a, PCR Services Corporation 2006, Davis et.al. 1994).

Pinyon-juniper woodland consists of a mixture of single needle leaf pinyon pine and California juniper, with mountain mahogany, buckwheat, squawbush, foothill yucca, penstemons, and native grasses. This habitat is found in the upper Santa Clara River watershed and along the northern slopes of the San Gabriel Mountains at middle elevations (PCR Services Corporation 2006).

Montane hardwood occurs at middle to high elevations in the transverse and peninsular ranges. Within the study area, it is found in the San Gabriel Mountains. At higher elevations, formations typically have an overstory of conifers such as pines, bicone Douglas fir, incense-cedar, and California black oak. At lower elevations, overstory species typically include oaks, white alder, bigleaf

maple, bigcone Douglas-fir, and California-laurel. Understory vegetation usually is dominated by chaparral species such as coffeeberry, manzanita, and ceanothus. A wide variety of wildlife relies on this habitat including jays, woodpeckers, squirrel, black bear, mule deer, and various reptiles and amphibians (CDFG 2008a, Davis et.al. 1994).

Montane hardwood-conifer includes both hardwood and coniferous trees with very little understory. Dominant species include canyon live oak, Pacific madrone, ponderosa pine, sugar pine, and incense-cedar. A transitional habitat between mixed chaparral, dense coniferous woodlands, montane hardwood, and open woodlands, montane hardwood-conifer provides important forage for birds and mammals. Amphibians are found in more mesic areas of this habitat. Within the study area, this habitat is found throughout the San Gabriel Mountains (CDFG 2008a, Davis et.al. 1994).

Jeffrey Pine forest occurs in the San Gabriel Mountains between subalpine conifer and pinyon-juniper habitat. The dominant species is Jeffrey pine. However, it is also associated with other pines, firs, incense-cedar, and black cottonwood. Its understory primarily includes scrub oak, ceanothus, Sierra chinquapin, and manzanita. The species richness of Jeffrey pine exceeds that of surrounding habitat. Jeffrey pine seeds, bark, and foliage are important to wildlife (CDFG 2008, Davis et.al. 1994).

Lodgepole pine forests occur at high elevations in the San Gabriel Mountains. Lodgepole pine forests are dominated by this species but occasionally will include aspen and mountain hemlock. Understories are sparse, consisting of scattered scrubs and herbs. Wildlife includes reptiles, amphibians, birds, and mammals. Species richness is highest adjacent to mountain meadows (CDFG 2008a, Davis et.al. 1994).

Ponderosa pine includes forests with 50% or more of this species. Shrub layer species include mountain-misery, manzanita, ceanothus, and Pacific dogwood. This habitat is important for migratory deer and California condors. It occurs at higher elevations in the eastern San Gabriel Mountains (CDFG 2008a, Davis et.al. 1994).

Sierran mixed conifer forests are typically found in the Sierra Nevada range. Stands in the San Gabriel Mountains and other areas in southern California are disjunct populations. Dominant species include Douglas-fir, white fir, ponderosa pine, sugar pine, incense-cedar, and California black oak. Understory includes a mixture of deerbrush, manzanita, chinquapin, gooseberry, rose, and mountain-misery. This habitat has a high degree of

species richness, providing habitat for 355 species of animals (CDFG 2008a).

White fir stands are forests which typically include 80% or more of this species. Located at high elevations in the upper San Gabriel River watershed, white fir provides habitat for insect-gleaning birds such as grosbeaks, chickadees, *western tanagers*, and *warblers* (CDFG 2008, Davis et.al. 1994).

Subalpine coniferous forest occurs at the highest elevations of the San Gabriel Mountains and is dominated by lodgepole pine, limber pine, and white fir. A few alpine plants in southern California are narrow endemics (native to and restricted to a relatively limited area) while others are widely distributed with disjunct populations on peaks in the Sierra Nevada Mountains, Great Basin, and even in the Rocky Mountains (USFS 2005, Major and Taylor 1988, Stephenson and Calcarone 1999).

On high peaks such as Mount San Antonio (10,500 feet), lodgepole pine forms krummholz, a term used for woodlands made up of deformed trees growing in widely spaced, low-growing, multi-stemmed prostrate mats. Krummholz is an environmental response to the harsh alpine growing conditions (Major and Taylor 1988; Thorne 1988).

Riparian Communities

The study area contains a wide range of riparian habitats including Mojave riparian forest, southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern mixed riparian forest, southern riparian scrub, and southern sycamore alder riparian woodland (Davis et. al. 1998).

Much of the remaining intact riparian habitat in the study area is in the San Gabriel Mountains and foothills and the upper Santa Clara watershed.

In the San Gabriel Valley and Los Angeles coastal plain, riparian areas exist along river corridors and creeks in the Puente-Chino Hills. It is estimated that approximately 75% of the historical riverine areas associated with the lower San Gabriel River have been lost to urbanization and alterations for flood protection. The greatest losses have occurred in the Whittier Narrows area (Stein et al 2007). Remaining riparian areas support a high diversity of wildlife including threatened and endangered species.

Wetlands

Lacustrine wetlands or *freshwater marsh* develop in areas of still or slow-moving permanent freshwater and is dominated by the perennial, emergent cattail. Small areas of freshwater marsh are found

in Puente Hills valleys, along major drainages, in scattered locations along the shorelines of reservoirs and natural lakes in the San Gabriel Mountains, along slow-flow portions of the river and tributaries within the upper Santa Clara River, adjacent to artificially created impoundments used to water livestock, and in scattered ponds and irrigation ditches throughout the Antelope Valley.

Wet Meadows. The San Gabriel Mountains support small, widely scattered, montane meadows. Montane meadows are grass- and herb-dominated plant communities within lower and upper montane conifer and mixed hardwood-conifer forests. Montane meadows are restricted to sites where there is a combination of gentle slope gradient, relatively impervious bedrock, high soil moisture retention, shallow depth to groundwater, and fine-textured soils. Many meadows form along fault zones or other geologic contact points that impound groundwater. Some San Gabriel Mountains meadows serve as popular recreation areas (Stephenson and Calcarone 1999).

Other Types of Vegetation

Agricultural lands in the study area include orchards, irrigated croplands, and ranchlands. Most agricultural areas are located in the Antelope Valley, although a few areas of the Puente and San Jose Hills still have cattle-grazing. Most of the lands in the San Gabriel Valley and Los Angeles Coastal Plain are developed. *Urban woodlands* that consist primarily of ornamental trees such as eucalyptus, Canary Island pine, and jacaranda dominate these areas (Schiffman 2005).

Disturbed or barren areas either completely lack vegetation or are dominated by ruderal species. Ruderal vegetation includes grasses and “weedy” herbaceous species, including doveweed, mustards, wire lettuce, sow thistle, telegraph weed, Russian thistle, dock, yellow star thistle, Australian saltbush, and cocklebur. Disturbed areas primarily occur throughout the Soledad basin and in the Antelope Valley.

SPECIAL STATUS PLANTS

The diverse range of plant communities in the study area contains suitable habitat for 77 plant species considered sensitive, rare, threatened or endangered. Of these 77 species, 53 are endemic (See Tables B1 and B2 in Appendix B). The study area provides habitat for 5 federally-listed threatened (FT) or endangered (FE) plant species described below. See maps: Federally-Listed Threatened and Endangered Species and Designated Critical Habitat.

Braunton’s milk vetch (FE)

Braunton’s milk vetch (*Astragalus brauntonii*) is associated with fire dependent chaparral habitats. Populations are found only on limestone or wash sites following a fire event. Known only to Ventura, Los Angeles, and Orange Counties, the remaining populations contain no more than approximately 20 to 30 individuals and the current total number of individuals is estimated to be fewer than 100. Within the study area, specimens have been found in Monrovia (Clamshell Canyon) and in the Puente-Chino Hills. The Clamshell Canyon area is designated critical habitat for this species. Threats to this species include direct loss from urban development, fragmentation of habitat and reduced capabilities for sustained ecologic processes, fragmented ownership of single populations resulting in different landscape treatments, alteration in fire cycles, and extinction from naturally occurring events due to small population size and low numbers of individuals (USFWS 2006b).

California Orcutt Grass (FE)

California Orcutt grass (*Orcuttia California*) is an annual grass associated with vernal pool systems in Los Angeles, Riverside, and San Diego Counties. Listed as endangered by both federal and state governments, this species is in decline. Several specimens have been located in the upper Santa Clara watershed (CDFG 2000). Threats include habitat loss and degradation due to urban and agricultural development, livestock grazing, off-road vehicle use, trampling, invasions from weedy nonnative plants, and other factors (USFWS 1998).

Nevin’s barberry (FE)

Nevin’s barberry (*Berberis nevinii*) is an evergreen shrub in the barberry family that is endemic to southern California. Naturally, this species occurs in scattered locations in association with alluvial scrub, chaparral, coastal sage scrub, oak woodland, and/or riparian scrub or woodland. Specimens in the study area are located in the foothills of the San Gabriel Mountains. Threats to the long-term survival of Nevin’s barberry include the introduction of invasive, nonnative plants that compete with native species and contribute to combustible fuel loads, and fire management strategies that alter natural fire processes. Designated critical habitat is located on U.S. Forest Service and Bureau of Land Management lands in Riverside County (USFWS 2008).

Slender-horned Spineflower (FE)

Slender-horned spineflower (*Dodecahema leptoceras*) is an annual in the buckwheat family. Its habitat is older alluvial scrub habitat in southern California. Within the study area, populations occur in the Santa Clara, Tujunga, and Santa Ana River watersheds. Remaining populations are primarily threatened by development projects, flood control activities, sand and gravel mining, and recreational uses (CDFG 2000).

Thread-leaved brodiaea (FT)

Thread-leaved brodiaea (*Brodiaea filifolia*) is a perennial herb typically found on gentle hillsides, valleys, and floodplains in mesic, southern needlegrass, grassland plant communities. It is threatened by urban development, off-road vehicle use, grading, alteration of existing hydrologic conditions resulting from flood control structures, over-grazing, and competition from non-native plant species. Designated critical habitat areas are located in the southern foothills of the San Gabriel Mountains near Glendora and San Dimas where they are associated with grassland, coastal sage scrub, and mixed chaparral (USFWS 2005c).

Wildlife

Early explorers described the Los Angeles region as being rich in wildlife. Father Crespi and Pedro Fages of the Portola Expedition described vast numbers of antelope, hares, and tracks of other very large animals that were present in the San Gabriel Valley. Large mammals included coyote, wolf, fox, and mantugar (described as a sucking pig). There were also many reptiles and amphibians (Crespi 2001, Fages 1919). Fages described numerous varieties of birds including various kinds of thrushes, and a few birds of prey quail, sparrows, mocking birds, woodpeckers, vultures, pelicans, herons, ducks, divers, mud hens, and others (Fages 1919).

California prairie was also home to both grizzly and black bears, ground squirrels, and many other small mammals. William H. Brewer, a botanist and member of the Whitney geological survey expedition, described the San Gabriel Mission as being the “adobe for myriads of ground squirrels.” Additional prairie animals would have included the badger, long-tailed weasel, western meadowlark, horned lark, and ferruginous hawk. Small native mammals and bears created the soil disturbances that constituted an important ecological component of the prairie ecosystem (Schiffman 2005).

Today, native wildlife still constitutes the majority of the faunal species in the Los Angeles basin. These

species are recent immigrants from the natural chaparral and woodlands on the hillsides and in the canyons adjacent to the urbanized plains and valleys. Some of these native animal species are probably more widespread today than they were at the time of European contact (Schiffman 2005).

WILDLIFE CORRIDORS

The San Gabriel Mountains are the largest contiguous protected open space area in Los Angeles County. Because of the diversity of habitat in the mountains, they are a refuge for native wildlife. Species include large predators such as black bears, mountain lions and numerous coyote. Other large mammals include the state-protected bighorn sheep and mule deer. Insects include ants, grasshoppers, and butterflies. Riparian areas feature rare and endangered fish and amphibian species. The only known location for mountain yellow-legged frog is in the San Gabriel Mountains. Other reptiles and amphibians that reside here include the San Gabriel Mountains slender salamander (endemic), western spadefoot toad, coast range newt, and the coast horned lizard. Wildlife connections to the adjacent Castaic and San Bernardino Mountains are important for wildlife diversity and migration.

Another important regional wildlife corridor is the connection between the San Gabriel Mountains and the Sierra Pelona Range. The Agua Dulce Canyon in Soledad basin provides an important wildlife corridor between these two large protected areas. As the only major river in southern California without any dams on its main channel, the Santa Clara River functions as an important corridor between the mountains and the ocean. Protecting this corridor is a high priority for local and state agencies as well as conservation groups.

The Puente-Chino Hills are part of an important regional wildlife corridor. Together, the Puente-Chino Hills and Santa Ana Mountains encompass about 511,000 acres of wildlands which contain biological resources of statewide and worldwide significance (Noss, Beier and Shaw, n.d.). This wildlife corridor contains many of the rare and endangered ecosystems of the southern California region including coastal sage scrub, alluvial fan sage scrub, grasslands, Southern California walnut woodlands, big-cone Douglas fir forest, and Engelmann oak woodlands (Noss, Beier and Shaw n.d.).

Encroachment by roads and development threatens habitat connections. Fragmentation of the wildlife corridor from encroaching development impacts wildlife diversity. Mammals, which are top predators

(mountain lions, coyotes and bobcats), are the most threatened by fragmentation.

“The Puente-Chino Hills/Santa Ana Mountains complex provides an archipelago of natural open space thrust into one of the world’s largest metropolitan areas. As such, their value for biodiversity conservation, environmental education, outdoor recreation, and scenic beauty are immense (Noss, Beier and Shaw n.d.).”

Protecting this wildlife corridor is a high priority for local and state agencies. In 2006, a 20-foot wide, 160-foot long concrete tunnel in the Puente Hills was installed beneath Harbor Boulevard to provide a safe crossing for wildlife moving between Whittier Narrows and the Santa Ana Mountains.

SPECIAL STATUS WILDLIFE

A high concentration of sensitive wildlife is present in the study area, which provides habitat for approximately 116 species considered sensitive, rare, threatened or endangered (See Tables B1 and B3 in Appendix B). Eleven of these species are federally listed threatened (FT) or endangered (FE) animals (See maps: Federally Listed Threatened and Endangered Species and Designated Critical Habitat).

Arroyo Toad (FE)

Arroyo toads (*Bufo microscaphus californicus*) are found in seasonal pools and streams where natural disturbance is common. A highly sensitive species, arroyo toads are known to have one of the most specialized habitat requirements of any amphibian found in California. Shallow breeding pools with a minimum of silt, and free of predatory fish, are necessary for successful juvenile development (CDFG 2000). The arroyo toad is threatened by urban development, agriculture, and water diversions and was listed as endangered in 1994. Critical habitat has been designated for streams in the San Gabriel Mountains (Big Tujunga Creek and Little Rock Creek). The only known population in Antelope Valley is on Little Rock Creek above the Little Rock Reservoir (PCR Services 2000a, USFWS 2005a).

California Condor (FT)

Suitable habitat for condors (*Gymnogyps californicus*) includes foothill rangeland and forest in remote areas where the birds can roost and nest in tall trees and on cliffs. Rock outcrops in the San Gabriel Mountains provide suitable habitat for condors. Condors once considered extinct from this region have been sighted in the San Gabriel Mountains (CDFG 2008a and USFS 2005).

Coastal California Gnatcatcher (FT)

The coastal California gnatcatcher (*Polioptila californica californica*) is an insect-eating bird that typically occurs in or near coastal sage scrub, alluvial fan sage scrub, southern coastal bluff scrub, and coastal-sage chaparral. This subspecies is restricted to coastal southern California and northwestern Baja California, Mexico. Considered locally common in the mid-1940s, by the 1960s, the gnatcatcher experienced a significant population decline in the United States that has been attributed to widespread destruction of its habitat. Critical habitat for the coastal California gnatcatcher includes areas of the western San Gabriel Mountains, the San Jose Hills, the southern San Gabriel Mountain foothills east of Azusa, the Montebello Hills, Whittier Narrows, and the Puente-Chino Hills (USFWS 2007).

Desert Tortoise (FT)

Desert tortoise occupy desert scrub habitat in California, Nevada, Arizona, and southwestern Utah. Small numbers of desert tortoise occur along the northern edge of the San Gabriel Mountains. The U.S. Fish and Wildlife Service determined that the Mojave population of desert tortoise was threatened in 1990. The desert tortoise was listed in response to the loss and degradation of habitat caused by urbanization, agricultural development, recreational use, military training, mining, and livestock grazing. Individual species are also threatened by collision with automobiles and collection by humans for pets (USFS 2005).

Mountain Yellow-legged Frog (FT)

Mountain yellow-legged frogs (*Rana mucosa*) are diurnal frogs that occupy shaded streams with cool water from springs or snowmelt. Historically, the mountain yellow-legged frog was found throughout southern California on both the coastal and desert slopes of the San Gabriel, San Bernardino, San Jacinto, and Palomar mountains. Current surveys show that the frog has disappeared from most of its historical range in southern California. Most of the remaining populations are located in isolated headwater streams in the San Gabriel Mountains (USFWS 2005b). Designated critical habitat for the mountain yellow-legged frogs includes the East and North Forks of the San Gabriel River, the South Fork of Big Rock Creek, Little Rock Creek, Devil’s Canyon, Day Canyon, and Bear Creek (USFWS 2006a).

Least Bell’s Vireo (FE)

The Least Bell’s vireo (*Vireo belii pusillus*) inhabits riparian woodlands with tall trees and shorter

thick shrubs. Loss of riparian habitat, urbanization, non-native species invasion and predation, and long-term camping threaten the Least Bell's vireo. Riparian areas within the study area contain suitable habitat for the Least Bell's vireo (USFWS 1994).

Red-legged Frog (FT)

California red-legged frogs (*Rana aurora draytonii*) inhabit shrubby riparian areas and deep, slow moving water. Threats to the California red-legged frog include habitat degradation, off-road vehicles, reservoir construction, grazing, non-native aquatic predators, and water quality. Critical habitat for the red-legged frog was designated in 2006. A population of California red-legged frogs was recently discovered in the Angeles National Forest after the 2009 Station Fire (USFWS 2010, USFS 2010).

Southwestern Willow Flycatcher (FE)

The southwestern willow flycatcher (*Empidonax trailii extimus*) is a small insectivorous bird that makes its home in dense riparian areas in the study area. Nesting takes place primarily in thick riparian stands of willows or coast live oaks. Threats such as cowbird parasitism and habitat destruction from urban, recreational, and agricultural development have reduced the species so that, on the California coast, they can only be found in small isolated populations. Major threats to this species include loss of habitat and nest parasitism by the brown-headed cowbird (USFWS 1995).

FISHERIES

The Los Angeles basin was home to at least seven native species of freshwater fishes that have been declining or have been extirpated since the 1930s. Steelhead (*Oncorhynchus mykiss*), the Pacific lamprey (*Lampetra tridentata*), the Pacific brook lamprey (*Lampetra cf. pacifica*), and the unarmored threespined stickleback (*Gasterosteus aculeatus williamsoni*) have been extirpated from the Los Angeles basin since the 1950s. Two others, the Santa Ana speckled dace (*Rhinichthys osculus*), and the arroyo chub (*Gila orcutti*), have become rare in the Los Angeles basin (Swift. et al. 1993; USFWS 2004).

Historically, the San Gabriel River was the most abundant trout stream in southern California (Robinson 1946). The West, North, and East forks of the San Gabriel River and their tributaries contain highly significant aquatic habitats. Low-elevation portions of these streams provide refugia for a number of sensitive native fish species, including the Santa Ana sucker, Santa Ana speckled dace, and arroyo chub.



Photos (top to bottom): 1. California gnatcatcher. Photo courtesy of BonTerra Consulting. 2. Pacific gopher snake, Angeles National Forest. Eric Lowenback photo. 3. Mountain yellow-legged frog. Photo courtesy of BonTerra Consulting.

The largest remaining population of arroyo chub is reported from the West Fork of the San Gabriel River and the largest remaining population of Santa Ana speckled dace are on the lower reaches of the East, North, and West forks (Swift et. al. 1993, Stephenson and Calcarone 1999).

Because of stocking, rainbow trout (*Oncorhynchus mykiss*) are the most abundant species of fish found in the San Gabriel River drainage system. Populations occur on the West, North, and East forks of the San Gabriel River, and in both San Gabriel and Cogswell Reservoirs. Average densities of over 3,500 fish per mile were recorded on the West Fork (Deinstadt et. al. 1990). The upper San Gabriel River drainage is the most heavily stocked river system in the Los Angeles Basin, with more than 60,000 rainbow trout introduced annually into these waters from October through June.

The Santa Clara River also supports important habitat for native fish including southern steelhead, unarmored three-spine stickleback, tidewater goby, Santa Ana sucker, and arroyo chub (LADPW 2005). The Tujunga River Watershed supports both the Santa Ana sucker and arroyo chub (The River Project 2006).

SPECIAL STATUS FISH SPECIES

Santa Ana Sucker (FE)

The Santa Ana sucker (*Catostomus antonae*) is endemic to the Los

Angeles River, the San Gabriel River, and the Santa Ana River. Habitat requirements include clean, clear, and relatively cool streams of varying width and depth with a mix of substrates including sand, gravel, cobble, and boulders.

This species is now restricted to three noncontiguous populations in: Big Tujunga Creek; the East, West, and North Forks of the San Gabriel River; the lower and middle Santa Ana River; and the Santa Clara River Watershed. The Santa Clara River population of Santa Ana sucker is presumed to be an introduced population. The East, North, and West forks of the San Gabriel River are all designated as southern California arroyo chub/ Santa Ana sucker streams in the California Natural Diversity Database (CDFG 2006).

The population in the San Gabriel River drainage system is considered to be the only viable population within the species' native range. Threats to the Santa Ana sucker include urbanization, water diversions, dams, introduced competitors and/or predators, and other human-caused disturbances likely are playing a role in the decline of the species (USFWS 2004).

Southern Steelhead (FE)

Southern steelhead (*Oncorhynchus mykiss irideus*) are winter-run steelhead whose native habitat occurs in basins along the southern California coast. Steelhead require quality freshwater, marine, and estuarine ecosystems to support a healthy population, and therefore serve as an important indicator of watershed health. The coastal watersheds of the study area provide essential habitat for steelhead.

Native southern steelhead were historically reported from the San Gabriel River, but are now extinct as a result of major habitat modification or blockage of stream ways associated with flood control, urban development, and other factors. While the West Fork currently supports a productive, self sustaining "wild" trout population, this condition is a result of past stocking programs.

All tidally influenced waters within the study area are designated in the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act as "Essential Fish Habitat." Additionally, the study area is part of the Southern California Evolutionarily Significant Unit (ESU). An Evolutionarily Significant Unit is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout (NOAA 2002).

Unarmored Threespine Stickleback (FE)

The unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) is a small, scaleless, native fish that resides in slow water creeks along the California coast. It is endangered in its native habitat, the western and northeastern seaboard of the United States. Within the study area the stickleback is found in the Soledad basin in several tributaries of the upper Santa Clara River (CDFG 2000). Threats include habitat loss through stream channelization, increased water turbidity, introduction of nonnative competitors, water pollution, aquifer draw downs, and beaver activity. Critical habitat for the stickleback has been proposed for portions of the upper Santa Clara River and several of its tributaries (USFWS 1980).

Significant Ecological Areas

Through the Significant Ecological Areas program, Los Angeles County has designated and proposed areas of high priority for regional conservation. County significant ecological areas include those areas that contain:

- Rare, endangered, or threatened plant or animal species
- Biotic communities, vegetative associations, or habitat that are either one-of-a-kind, or restricted in distribution on a regional basis
- Habitat that serves as a concentrated breeding, feeding, resting, or migrating grounds, and is limited in availability
- Biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations, or they represent an unusual variation in a population or community
- Areas important as game species habitat or as fisheries
- Areas that would preserve relatively undisturbed examples of the natural biotic communities in Los Angeles County

Existing significant ecological areas in the study area include Tonner Canyon/Chino Hills, Power Canyon/Puente Hills, Whittier Narrows Dam County Recreation Area, Sycamore and Turnbull Canyons, Buzzard Peak/San Jose Hills, Santa Clara River, Santa Fe Dam Floodplain, Dudleya Densiflora and Gallium Grande populations (San Gabriel Canyon), San Dimas Canyon, San Antonio Canyon Mouth, Big Rock Wash, Little Rock Wash, Desert Montane Transect, and the Rio Hondo Wildlife Sanctuary. Los Angeles County has proposed new additions and expansions to many of these areas in its draft General Plan (2008).

Effects of Fire

Fire is part of the natural ecology in southern California. Many of the plant communities have adapted to natural fire regimes, averaging anywhere from 30 to 200 year intervals in southern California. Over the last two decades, human activities have caused fire to occur much more frequently. Frequently occurring anthropogenic fire as a result of urbanization is currently the most important disturbance factor responsible for displacing native scrub lands. Although many believe that communities such as chaparral and coastal sage scrub are fire-dependent, they are highly threatened by these frequent fires (Keeley 2005, Halsey 2008).

In fall of 2009, the San Gabriel Mountains experienced the largest wildfire on record to affect the Los Angeles region. Determined to be caused by arson, the fire burned approximately 161,000 acres, all within the study area. Approximately 154,000 acres of the burned lands were part of the Angeles National Forest and 6,700 acres were private lands.

The Burned Area Emergency Response (BAER) Assessment team evaluated Soil Burn Severity for national forest and private lands. The initial assessment was made in 2009 and a follow-up assessment was made after initial recovery efforts in 2010. Approximately 73 percent of the burn area was mapped as having a moderate or high soil burn severity (62% moderate and 11% high). The remaining 27% was either low soil burn severity or unburned.

Thirty seven plant communities were burned or impacted by suppression activities during the fire. In addition, the burned area includes occupied and potential habitat for one federal endangered plant species and eleven Forest Service sensitive plant species. Some of these habitats and species are at risk to further losses due to habitat loss.

Recent BAER team evaluations indicate the native vegetation within the burn area is recovering well due to a combination of factors. These include the native vegetation's adaptation to fire, the fire return interval being over 30 years in many of the burned areas, and the average rainfall year. Burn areas that seem to be experiencing a slower recovery are those locations where the factors listed above have not occurred simultaneously. These areas primarily occur on the drier, northern slopes composed of desert transition chaparral and California juniper/pinyon pine scrub, which are adapted to longer fire return intervals (50-200 years) and typically recover more slowly post-fire.

The most significant negative influence upon the vegetation recovery throughout the burn area is the abundance of nonnative plant species. Illegal off-highway vehicle activity can exacerbate the spread of nonnative species further hampering vegetation community recovery.

The BAER Report predicted that post-fire events would lead to the potential injury or mortality of threatened and endangered species. The modification of streams by post-fire sediment loads is a major threat to species such as arroyo toad, California red-legged frog, mountain yellow-legged frog, western pond turtle, Santa Ana sucker, arroyo chub, and Santa Ana speckled dace. Many historic pools that functioned as habitat are now filled with sediment. In some areas, the stream channels have

become braided or the active channel has shifted to a new location. Rescue teams were able to salvage and relocate some threatened and endangered species to other suitable habitat sites in the region (USFS 2010).

The following treatments were recommended for the Station Fire burned area by BAER team:

- Installing gates and signs for the forest closure areas
- Stabilizing hazardous material sites
- Salvaging threatened and endangered species
- Forest closure patrol and enforcement, and stabilization of cultural resource sites
- Restoring burned wildlife habitat
- Treating pre-existing noxious weed infestations and installing interpretive signs

The Puente-Chino Hills also experienced a significant fire in November 2008, the Freeway Complex Fire. Approximately 30,300 acres were burned, including 90% of Chino Hills State Park. Although many of the important habitats in Chino Hills State Park were impacted by this fire, in Spring of 2009, many habitats were beginning to recover. One of the largest threats to this recovery is the potential of another fire before the plant communities have a chance to reestablish.

Land Use Condition and Change

Portions of the study area landscape have changed dramatically since European contact in the 18th century. Early explorers encountered braided rivers, natural springs (cienegas), prairie grasslands, thick woodlands, coastal scrub, and dense chaparral forests. Today, many of the native plant communities have been replaced by nonnative species from other locations. This is especially true of the Los Angeles basin where most of the native vegetation has been altered by grazing, cultivated agriculture and ultimately, conversion to urban land uses. Rivers and creeks that once roamed freely from the mountains and crossed over the plains have been altered by dams and engineered channels to prevent flooding of homes and businesses and to provide water for irrigation, domestic, and industrial uses.

While the canyons and foothills of the San Gabriel Mountains were used for timber, irrigation, and grazing during dry periods, higher elevations were less impacted given the difficulty associated with gaining access to the steep slopes, rough terrain, and thick chaparral forests.

With the completion and continued implementation of the flood control plans, and the importation of water to the region, more areas of the Los Angeles Basin became available for urbanization. The chart

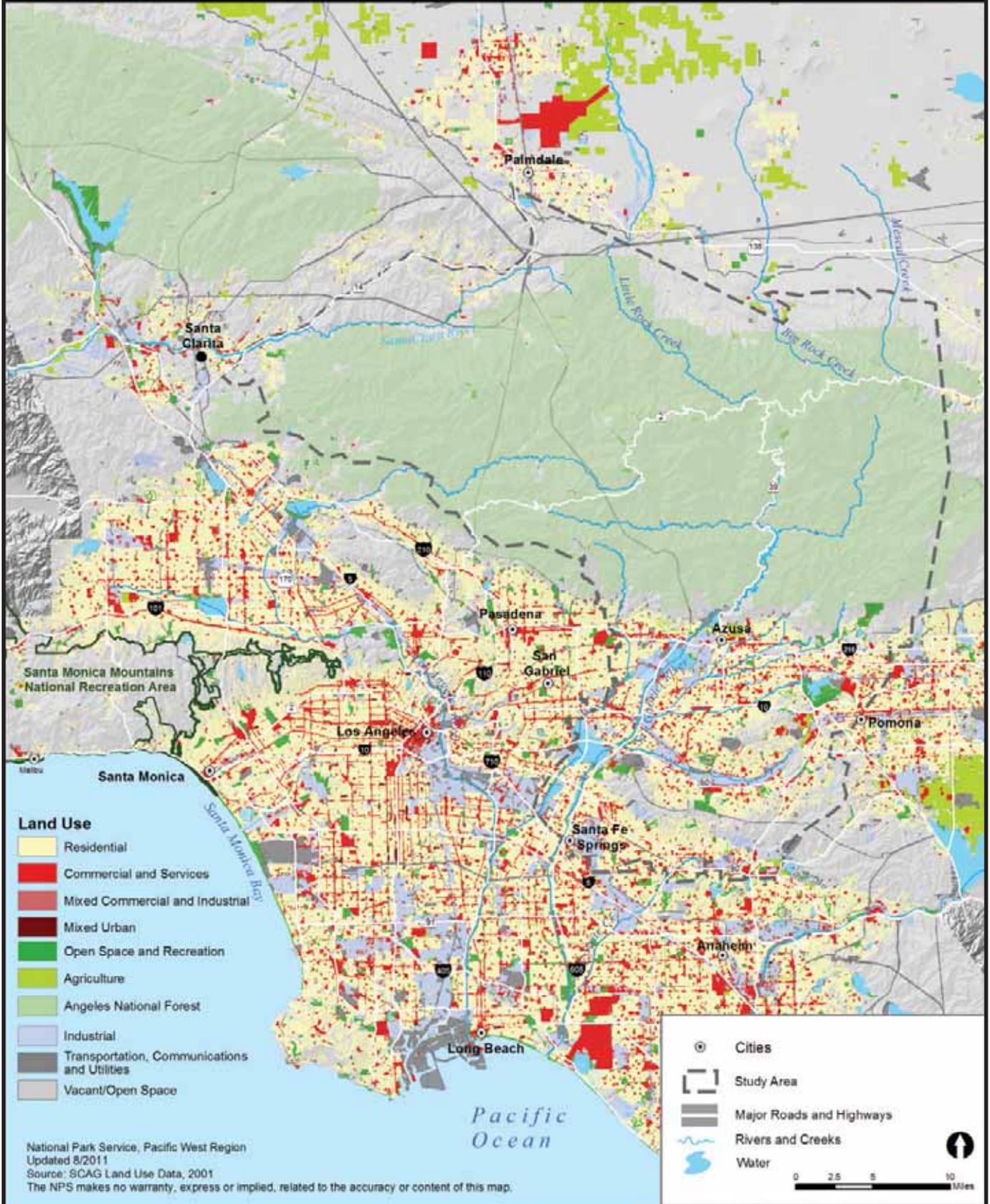


Station Fire in the San Gabriel Mountains, 2009. NPS Photo.

Land Use

San Gabriel Watershed and Mountains Special Resource Study

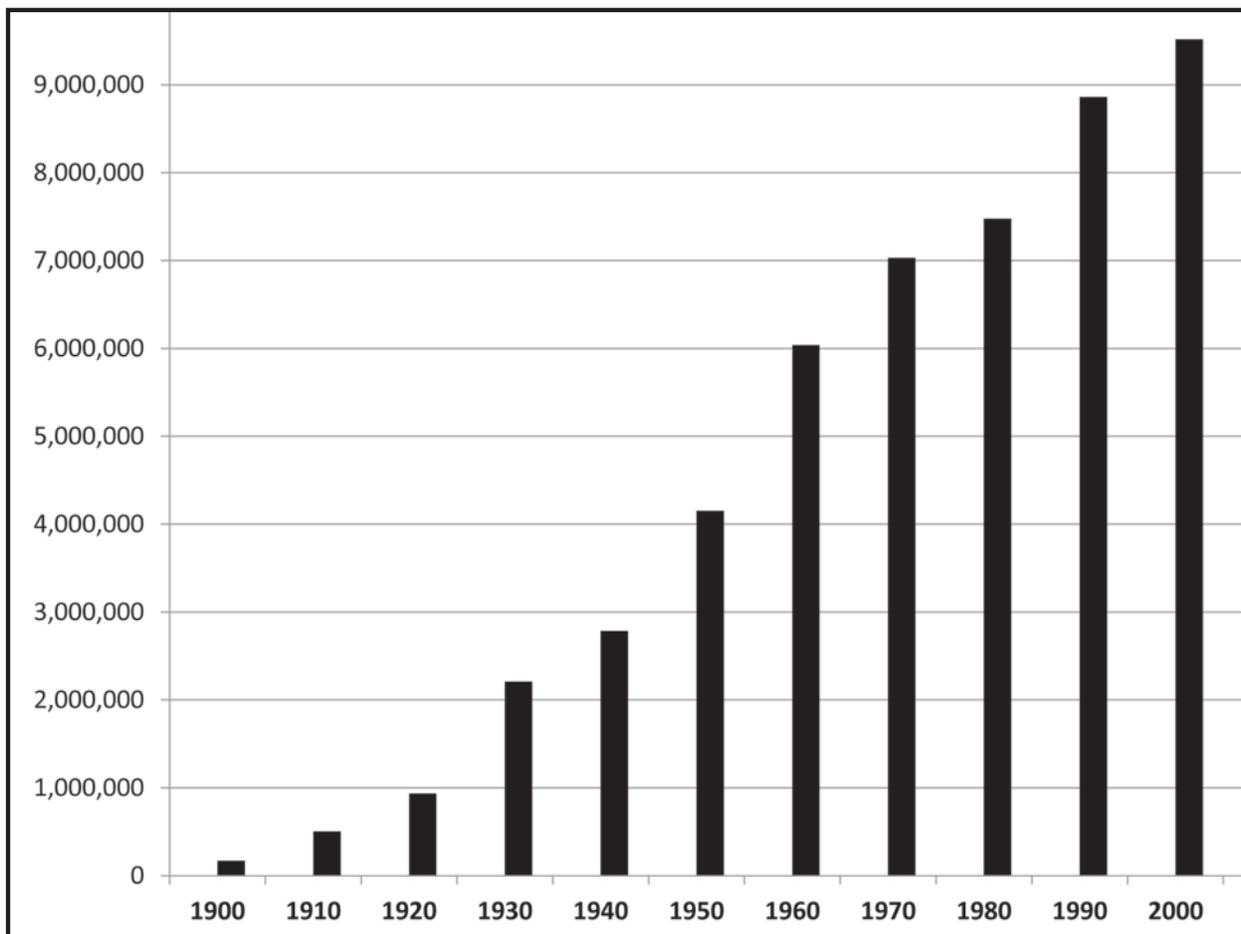
National Park Service
U.S. Department of the Interior



below depicts the rapid urbanization that took place since 1920 and that continued following World War II. Since 1940, Los Angeles County population increased by 240%.

Remaining open spaces are primarily found in the mountains and hills of the region which were more costly areas to build in. These lands remain important wildlife corridors and destinations for recreation. See Map, *Land Use* for area land use as of 2001. Current land use trends are described in Chapter 7, *Environmental Consequences*.

Los Angeles County Population Growth Chart 1900 - 2000

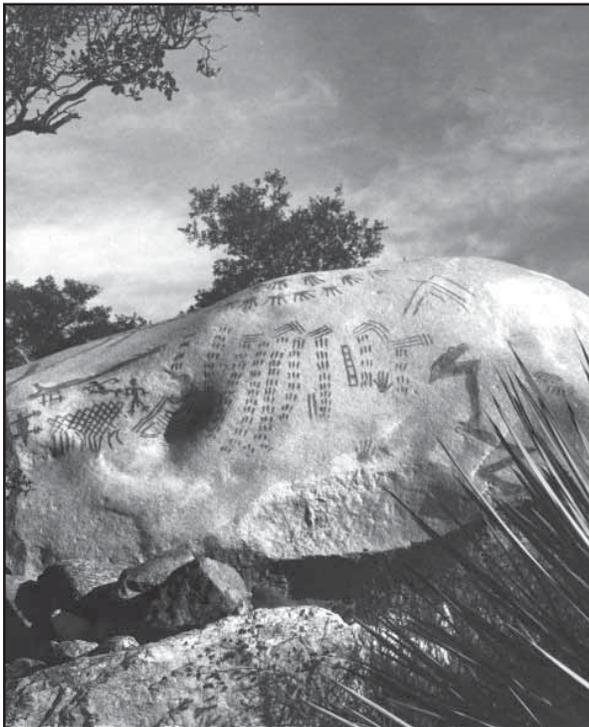


Cultural Resources

Introduction

The San Gabriel Watershed and Mountains area includes rich and diverse cultural resources that represent many layers of history in the region. This history includes the settlement of Native Americans, Spanish missionaries and colonialists, Mexican rancheros, and Euro-American settlers. Many cultural resources within the study area represent the settlement and growth of southern California. The distinctive regional environment, such as mountain passes and riverways, played a role in determining migration routes and settlement patterns. Native American trails, exploration routes, as well as trade and emigration routes from the east, traverse the study area. Later, railroads and highways such as Route 66 would also provide migration routes through the study area.

Cultural resources in the region include prehistoric archeological sites, historic sites, and historic landscape elements related to ranching, agriculture, mining, settlement, and transportation.



Pictographs in the San Gabriel Canyon. 1937. Photo courtesy of the Los Angeles Public Library.

Overview of Cultural Resources:

Resources with national designations:

- Portions of the Juan Bautista National Historic Trail, the Old Spanish National Historic Trail, Route 66 Corridor, and the Pacific Crest Trail.
- Upton Sinclair House National Historic Landmark (NHL)
- Other sites that have been nominated or have potential for listing as NHLs include the Mount Wilson Observatory and the San Dimas Experimental Forest both in the Angeles National Forest.
- A theme study on large federal dams found that the Los Angeles County Flood Control System may be nationally significant for its impact on the history and development of the region.

Resources with state and local designations (National Register of Historic Places, California Register, or other local listings):

- There are eight properties listed on the National Register of Historic Places at the state level of significance. An additional 2 sites are listed on the California Register.
- There are 17 State Historic Landmarks and 21 State Points of Historical Interest
- There are 31 properties listed on the National Register of Historic Places at the local level of significance.
- There are 90 additional properties recognized as historically significant by local governments.
- There are 135 historical sites within the study area that appear eligible for listing on the National Register of Historic Places, California Register, or other local listing as individual sites and contributors to a district. Most of these sites need survey evaluation to determine eligibility.
- In addition, there are 106 sites that need to be reevaluated to determine whether they have potential for listing on the National Register of Historic Places, California Register, or local listing/designation.

Prehistory

EARLY HUMAN OCCUPATION

Prior to historic contact in 1769, Native Americans occupied the region for at least 12,000 years. Some Native American groups moved from the inland deserts to coastal areas which had a more suitable environment.

Archeological evidence shows that human occupation of the Los Angeles basin appears to have been continuous since its beginning, though not necessarily by the same peoples. Sites identified on the Channel Islands and near the Los Angeles coast indicate that portions of the study area were occupied or in use during the Paleo-Indian Period. To the east of the study area, the earliest component of the Sayles Site at Cajon Pass, which links the Los Angeles basin with the Mojave Desert, has been dated to approximately 6,000 years. Archeological evidence within the Angeles National Forest date to at least 6,000 years ago (USFS 1986).

NATIVE AMERICAN SETTLEMENTS

Many Native American villages (both primary and seasonal settlements) were located in the Los Angeles basin and in mountain canyons (Raab 2005; Robinson 1991). Settlements were adjacent to, or near, freshwater sources, including the San Gabriel River's banks. Interior groups are presumed to have had access to coastal resources either directly or through trade, though historic references refer to inter-village conflicts in which "inland Gabrielino were effectively prevented by coastal Gabrielino from reaching the sea for fishing and trading purposes" (Bean and Smith 1978).

NATIVE AMERICAN GROUPS

Tongva

The Tongva were the predominant native group in the Los Angeles basin from the time of their settlement to their incorporation into the Spanish missions. The Tongva arrived around 2,500 B.P. (before present day), slowly displacing the indigenous Hokan speakers. The Tongva, with the exception of the Chumash, became "the wealthiest, most populous, and most powerful ethnic nationality in aboriginal southern California" (Bean and Smith 1978, Robinson 1991). The Tongva were also known as Gabrielinos because of their incorporation into Mission San Gabriel.

The Tongva were active hunters, artisans, traders, and fishermen. They made trails throughout the mountain areas and traveled seasonally to take

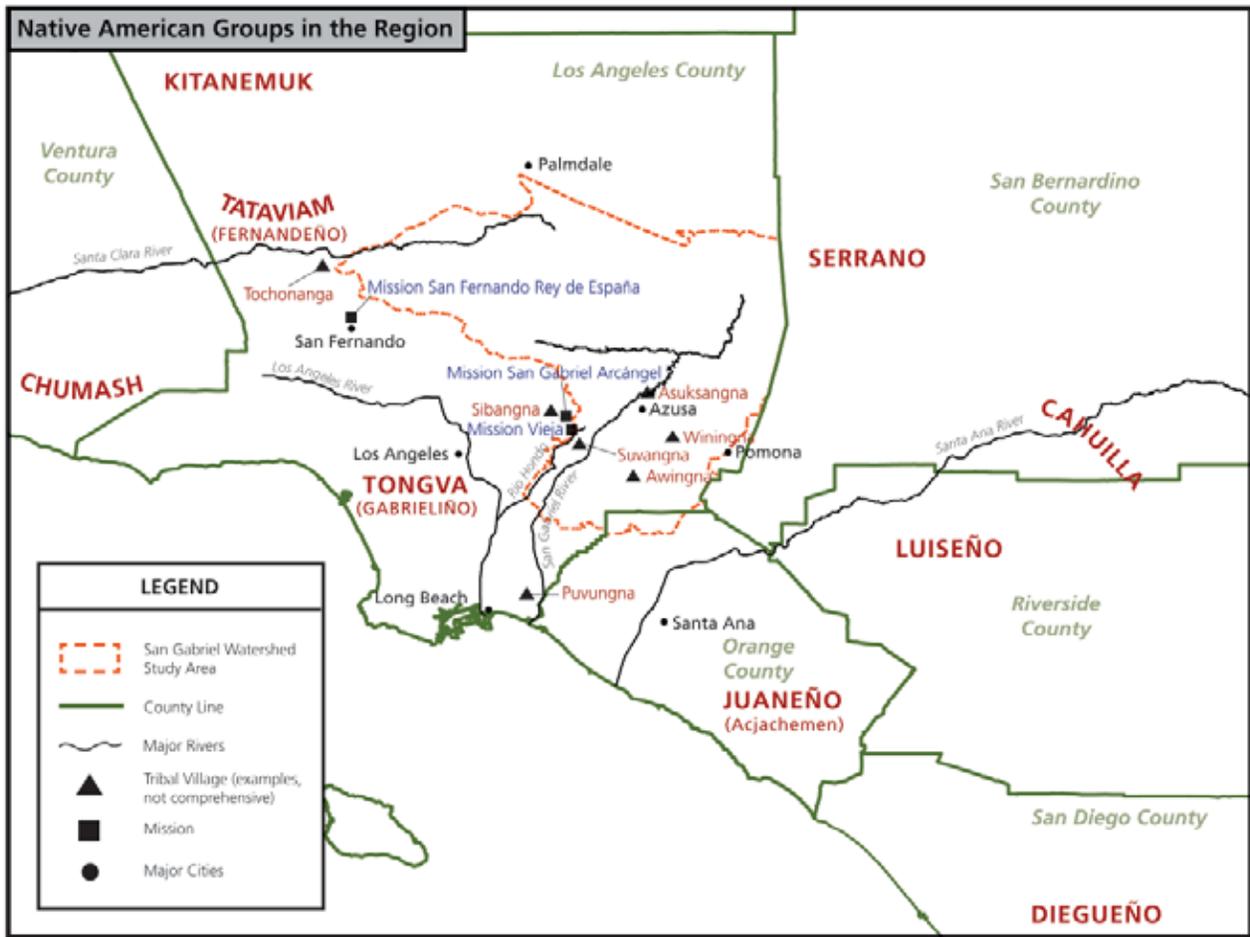
advantage of the region's resources (Johnston 1962). The Tongva used the San Gabriel Mountains for hunting deer, mountain sheep, and smaller mammals, and for gathering acorns, pinyon nuts, yucca, sage, and other plants and seeds. The San Gabriel River provided a means for transportation, sustenance, and farming.

The Tongva territory and other areas where they had activities included Los Angeles County south of the crest of the San Gabriel and Santa Monica Mountains, half of Orange County and the islands of San Clemente, San Nicolas, and Santa Catalina (Bean and Smith 1978; Kroeber 1976).

It is difficult to estimate the Tongva population. According to some estimates, their population exceeded 5,000 at the time of contact. It is possible that there were 50 to 100 mainland villages. Houses were large, domed, circular structures thatched with tule, fern, or carrizo. Archeologists have identified approximately 155 aboriginal sites in the mountains; most were seasonal camps for hunting and gathering. Permanent villages were usually along streams or close to springs and marshes. Asuksangna was a large Gabrielino village located on a knoll just outside the mouth of San Gabriel Canyon and north of the city of Azusa (Johnston 1962; Bean and Smith 1978; Robinson 1991). Evidence of permanent Tongva settlement has been found at several places in the North, East, and West forks of the San Gabriel (Robinson, 1946). The Awingna site, located on the banks of San Jose Creek, continued to exist after Rancho La Puente was established. Winingna occupied the city of Covina (Johnston 1962). See graphic, "Native American Villages."

Tataviam

The Tataviam territory was located to the north of the Tongva and was centered in the San Fernando Valley (Kroeber 1976). Their territory included the upper Santa Clara River drainage east of Piru Creek, extending over the Sawmill Mountains to the north to include at least the southwestern fringes of the Antelope Valley. Mount Gleason in the San Gabriel Mountains, at 6,500 feet, was the highest point in their territory (Bean and Smith 1978; Robinson 1991). Tataviam villages varied in size from large centers to small settlements. At the time of contact, the Tataviam population was most likely fewer than 1,000 people. The Tataviam were also referred to as the Fernandinos because of their incorporation into the San Fernando Mission. The Tataviam differed slightly in speech from the Tongva, but were usually grouped with the Tongva due to the similarity of their culture and practices (Bean and Smith 1978).



In recent archeological studies, the Tataviam have been considered a part of the Tongva culture (Robinson 1991).

Other Native American Groups

Other Native American groups in the region did not have settlements within the study area, but traded with the Tongva and Tataviam, traveled through their territories, or became incorporated with them in the missions. These groups include the Chumash, whose expansive territory was to the west; the Serrano (Indian mountaineers), who occupied the eastern end of the San Gabriel Range and the San Bernardino Mountains; the Kitanemuk, who were principally in the Tehachapi Mountains and occupied the major portion of the Antelope Valley; and the Kawaiisu, who occupied the land to the east of the Kitanemuk in the higher Sierra Nevada (Robinson 1946 and 1991; Bean and Smith 1978; Kroeber 1976).

NATIVE AMERICAN LANDSCAPE MANAGEMENT

There are several views on the impact the Native Americans had on the landscape based on different archeological research and historical accounts. These views range from passive hunter/gatherer with little impact on the landscape to societies where active landscape management through burning practices and quasi-agricultural production was common (Raab 2005).

According to one theory now gaining broad acceptance, Native Americans used fire to manage the landscape, playing a very active role in maintaining the diversity of native plant communities. Fire was used to clear forests for growth of certain plants needed for food and fiber and to improve forage for game animals. There are numerous accounts of the intentional burning by the Native Americans in descriptions by the 18th century explorers (Blackburn and Anderson 1993).

PREHISTORIC ARCHEOLOGICAL RESOURCES

The study area contains hundreds of prehistoric archeological sites, with more being recorded each year, many of which represent the Tongva.

Prehistoric sites include permanent and seasonal habitation sites of various sizes with midden soils. Some habitation sites may be associated with rock shelters. Smaller food processing or tool manufacturing sites such as bedrock mortars and lithic scatters may constitute separate sites or be located in association with larger habitation sites. Rock art sites (pictographs and petroglyphs) are also known and are sometimes associated with habitation sites. Cultural features typically associated with habitation sites include housepit depressions and living surfaces (floors) representing semi-subterranean residential and ceremonial structures, earth ovens, stone hearths, rock alignments, and accumulations of fire altered rock. Graves consisting of buried human skeletal remains with or without associated artifacts are also typical of habitation sites.

Much of native southern California material culture, such as basketry, was fiber-based and therefore perishable. Artifacts made of stone, bone, and shell, are often preserved in archaeological sites. They include such objects as: milling stones (ovoid to round grinding slabs) and hand stones (manos); portable stone mortars and pestles; percussion and pressure flaked lithic artifacts such as projectile points, cutting blades, drills and scrapers; steatite pipes, vessels and ornaments; a variety of shell beads, ornaments and implements; bone basketry making implements, seed harvesters and other tools; and bird bone whistles, sometimes decorated with incised patterns or small split-shell beads held fast with asphaltum. Even basketry fragments can be preserved if they have been charred or only partially carbonized by fire.

Most of the recorded archeological sites within the study area are within the Angeles National Forest. Approximately 225 prehistoric sites are located within the Forest, not including isolated finds of individual artifacts. The 7,800-acre Aliso-Arrastre Middle and North Special Interest Area, located within the Aliso, Arrastre, and Kentucky Springs Watersheds on the Santa Clara-Mojave Rivers Ranger District, includes numerous prehistoric archaeological sites ranging from long-term occupation sites to seasonal encampments and special-use resource procurement, processing, and storage sites. There are stone circle features, many of which are interpreted as house rings, storage caches, or religious sites. This concentration of

stone circles may be unique in southern California. There are several sites containing cupule rock art features. One of these sites is currently being nominated to the National Register of Historic Places (USFS 2005). A National Register nomination has been prepared for rock art sites within the forest dating from approximately 4,000-200 B.P. Resources include the only remaining Tongva rock art site in eastern Tongva territory.

To the west of the Angeles National Forest, a substantial number of sites have been recorded in the vicinity of Agua Dulce between the cities of Santa Clarita and Acton along Highway 14.

Fewer sites have been recorded in the urbanized communities south of the Angeles National Forest as a consequence of rapid growth and development in the 20th century. Nevertheless, considering the area's relatively dense prehistoric population and the presence of freshwater sources such as the San Gabriel River and its tributaries, there is reasonable potential for finding buried or otherwise obscured prehistoric sites in the area. Archeological sites located within the urban communities include the Patricia Ontiveros Adobe Old Fort and the village of Sejat. Several sites have also been determined eligible for listing on the National Register of Historic Places.

Of the 1,200 archeological sites within the study area that have been recorded, approximately 160 have either been listed, or determined eligible for listing, in the National Register of Historic Places either individually or as sites contributing to larger archeological districts.

Hispanic Period

European exploration into the region during this period (1542-1846) had significant impacts on the lives of Native Americans. Spanish missionaries and explorers forced native cultures to assimilate into the European cultural system. This section describes the Spanish explorations into this area, the missions, ranchos, and associated cultural resources.

Spanish Exploration and the Mission System

Explorations and early settlements during the late 1700s brought about significant changes to the study area landscape, most of which took place in the valleys and plains. The Portola and Anza expeditions brought livestock and new settlements of Europeans and Mexicans through the establishment of missions, pueblos (small towns), and presidios (military posts).

THE PORTOLA EXPEDITION AND EL CAMINO REAL

Many Spanish explorers traveled through the study area and established settlements. In 1769, the expeditions of Don Gaspar de Portola and Padre Junipero Serra led to the founding of five missions and two presidios. The expedition route, known as El Camino Real, crossed through the San Gabriel Valley on its way to Monterey. A historical marker commemorates the Portola Expedition in Brea Canyon, just north of the city of Brea.

THE JUAN BAUTISTA DE ANZA EXPEDITIONS

Captain Juan Bautista de Anza led two expeditions to establish an overland route to connect Sonora, Mexico to Alta California. The route was used to provide the California settlements with supplies. In 1774, Anza left Tubac, Arizona, with soldiers, servants, and a herd of cattle and reached Mission San Gabriel Arcángel. At this time, the mission (Mission Vieja) was in its original location on the banks of the Rio Hondo.

In 1775, Anza made a second expedition bringing more colonists and livestock. Mission Nueva was established at its present location in the city of San Gabriel. On January 4, 1776, the expedition reached the mission during a fierce winter storm. The colonists remained at the mission for about six weeks to rest while Anza, Pedro Font, and soldiers traveled to San Diego to help quell a Native American rebellion (National Park Service 1996).

The colonists that arrived on the expedition more than doubled the Hispanic population of Alta California. With mixed European, Indian, or African parentage, the colonists represented diverse cultural backgrounds. These influences changed the lives of the Native Americans. Pio Pico, the last Mexican governor of California, was a descendent of the expedition colonists (National Park Service 1996). Additionally, this expedition also more than doubled the livestock numbers by bringing over 1000 domestic animals (Burcham 1957).

The Juan Bautista de Anza National Historic Trail was designated in 1990 to commemorate the expedition. The study area includes 19 miles of the 1,200 mile long national historic trail from Pomona in the east to El Monte in the west.

OTHER EXPLORATIONS

Other portions of the region were also explored during the late 1700s – early 1800s. Captain Pedro Fages traveled through Cajon Pass and along the northern foothills of the San Gabriel Mountains looking for army deserters, and Father Francisco

Garces traveled southwesterly and intersected the Anza expedition. He camped on the San Gabriel River, near present El Monte (Hafen 1954 and McIntyre 1986). Father Jose Maria Zalvidea explored the Antelope Valley and the Mojave Desert, almost circling what is now the Angeles National Forest (USFS 1986; Robinson 1946; Leadabrand 1966).

THE MISSIONS

The Spanish established a chain of 21 missions and several presidios along the California Pacific Coast. Mission San Gabriel Arcángel was founded in 1771 and Mission San Fernando Rey de España, just beyond the study area, was founded in 1797. Spanish towns, or pueblos, including El Pueblo de Nuestra Señora (Los Angeles), were also established (Beck and Haase 1974).

Mission San Gabriel Arcángel

Mission San Gabriel Arcángel was the fourth Spanish mission. The original site of the mission was located along the Rio Hondo. It is believed that the timber for the Mission came from the San Gabriel Mountains. The first Mission buildings were only used for a few years. The mission was relocated to higher ground 5 miles northeast (presently the city of San Gabriel) in 1776 because of excessive dampness and flooding (King 1975 and 1990).

The missions owned extensive lands within the study area. The San Gabriel Mission lands extended 35 miles south to San Pedro and 62 miles inland to the Muscupaibe Range, totaling approximately 1.5 million acres (King 1990).

The Mission was the center of community life and economic development. Religious and festive gatherings including wedding fiestas occurred at the Mission (Rowland 1948). The Mission was also a place of education, including religious study, agricultural practices, art, and music.

Land Use during the Mission Period. Mission San Gabriel Arcángel became the agricultural leader of the California missions. Spanish settlers established an irrigation system for the mission and the pueblo of Los Angeles. Irrigation water was brought from the foothill canyons of the San Gabriel Mountains. Water from the San Gabriel River was diverted by a brush “toma,” or weir, upstream into a system of “zanjas” (ditches) (Robinson 1991; Nelson 1983). Native Americans dug and installed clay-tile pipes.

The native vegetation was well suited to grazing and the missions had several ranches for producing livestock. For example, Mission San Gabriel owned seventeen ranchos for raising cattle and horses,

and fifteen ranchos for raising sheep, goats, and pigs (Burcham 1957). By 1832, the San Gabriel Mission livestock numbers had grown to 16,500 cattle, 11,000 sheep, 830 horses, 117 mules, 280 hogs, and 130 goats. Crops grown on mission lands included wheat, other grains, and many vegetables. In 1834, the Mission was recorded as having four vineyards with over 150,000 vines and over 2,000 fruit trees. Orange trees planted at the Mission were the first citrus grown in Los Angeles County (Sugranes 1909; Farnsworth 1883).

Mission San Fernando

Mission San Fernando, founded in 1797, helped to relieve the long journey between missions San Gabriel and San Buenaventura (in Ventura). It is located west of the study area and south of the Angeles National Forest. Like Mission San Gabriel, Mission San Fernando supplied the Los Angeles pueblo with hides, tallow, cloth, livestock, and other goods. It also became a popular stopping place for travelers. The 240-foot long convento building, built in 1822, is the largest building to survive from mission days and the largest adobe building in California. The church, damaged severely in the 1971 Sylmar earthquake, was demolished, and an exact replica was built (Engelhardt 1908).

Mission Period Impacts on Native Americans

The Tongva culture rapidly declined following the establishment of the missions. Between 1770 and 1830, Native American populations declined from an estimated 310,000 to approximately 245,000. The greatest factor was the introduction of diseases. Other factors included social and cultural dislocation, and outright violence (Cook 1978).

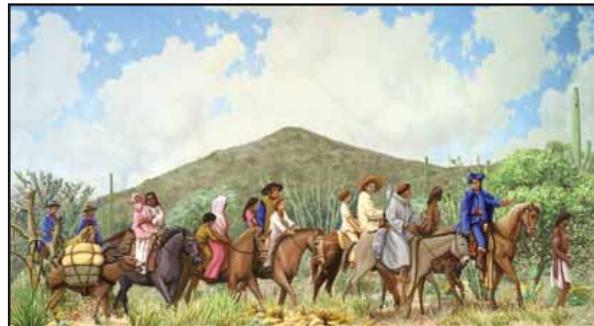
Many Native Americans were incorporated in the missions (San Gabriel Arcángel, San Fernando, and San Juan Capistrano). The Tongva residing in the mission lived under a strict church system of governance, and were provided a minimal education in agriculture, carpentry, cattle-raising, reading, and music (Weber 1979). However, there were also attempts at resistance. The 1785 Toyupurina Revolt at Mission San Gabriel and others at San Diego and the Colorado River were organized by leaders who were threatened by Spanish colonial activities (Thomas 1989). In the end, despite the destruction of native villages and cultures, the Tongva peoples survived (Weber 1979).

Mission Period Resources

Construction of the Mission San Gabriel Arcángel began during the latter part of the 18th century, and was completed in 1800. It remains in the city of San Gabriel. Other remaining structures include mills. The 1816 Old Mill, “El Molino Viejo,” located in San Marino, was designed of fired bricks and adobe. These sites are state historic landmarks. Although nothing is left of the original structures, the site of the original mission, Mission Vieja, is also a state landmark. Other remaining mission resources are located outside of the study area.

MEXICAN INDEPENDENCE AND THE RISE OF THE RANCHOS

Mexico gained independence from Spain in 1821 and California fell under Mexican rule. Under the new government, missions became secularized, and land grants were given to individuals along with incentives to raise livestock. Many ranchos were established in the region. During this period, population growth in the region began to increase as overland routes to the West Coast were explored and established for trade and commerce.



Photos (top to bottom): 1. Artist representation of the Juan De Anza Expedition - *On the Trail* by Bill Singleton, courtesy of NPS. 2. San Gabriel Mission. 2006. NPS photo.

Trade and Overland Routes (Westward Migration)

The Santa Fe Trail was the first overland route to linking Missouri to Santa Fe, New Mexico. Later, trade routes linking Santa Fe further west to the Pacific were established.

The Old Spanish Trail was the longest and most difficult pack mule route in America. The trail linked Mexican settlements in southern California with those in northern New Mexico. In 1829, Mexican trader Antonio Armijo succeeded in establishing a route from Abiquiu, New Mexico, to Los Angeles. The trail was used for trading woolen blankets from New Mexico for California horses and mules (Hafen 1954).

Trade along the Old Spanish Trail tied into and contributed to a broader economic system, including the Santa Fe Trail/Chihuahua Trail trade, the Camino Real, and the ranching and maritime trade economy of California. Each area contributed its own resources to the trade. New Mexico supplied woolen goods to California and other markets. Within the study area, the ranchos were a significant source for horses and mules. Mission San Gabriel was a supply point for early travelers and the destination for the first trade caravan.

The Old Spanish National Historic Trail (NHT) was designated in 2002. A portion (21 miles) of the 2,700 mile Old Spanish NHT passes through the study area from Claremont and going west to El Monte and into Los Angeles. Several areas within the study area represent settlements from the Old Spanish Trail. El Monte was an encampment. The state historic landmark plaque at the city's Santa Fe Historical Park states that in the 1850s, some began to call El Monte "The End of the Santa Fe Trail." The Bureau of Land Management and the National Park Service are producing a comprehensive management plan for the trail.

Ranchos and Land Grants

In 1833, the Mexican government decreed the missions to be secularized, with their lands and properties dispersed (Thomas 1989). Many settlers and some Native Americans received land grants in the form of ranchos from the secularized lands. Ranchos occupied the valleys and foothills below the San Gabriel Mountains. The ranchos were primarily used for cattle grazing and agriculture. Southern California was heavily dependent on a pastoral economy. Cattle production became profitable since it required little labor and the lands were well suited for raising cattle. The demand for beef intensified as the state's population increased,

mainly in the north, following the discovery of gold in 1848.

As cattle, sheep, horses and other livestock increasingly occupied the landscape many native plants lacked the adaptations to withstand the impacts of grazing and were soon replaced by invasive exotic plant species from the Mediterranean region. By 1860s, much of the native grasslands or California prairie had been displaced (Burcham 1957; Schiffman 2005).

Ranchos continued into the early part of the American period until a series of winter storms and droughts beginning in the mid-1800s led to their collapse. According to the census, in 1860, there were 70,000 cattle in Los Angeles County; by 1870 there were 20,000 cattle (Cleland 1941). During this period, sheep replaced the cattle. Raising sheep for wool production was an important industry in the valley from the 1860s through the 1870s. The collapse of ranching affected the economy in the region, greatly reducing the amount of funding from taxes to the state and county (Cleland 1941).

Ranchos within the Study Area

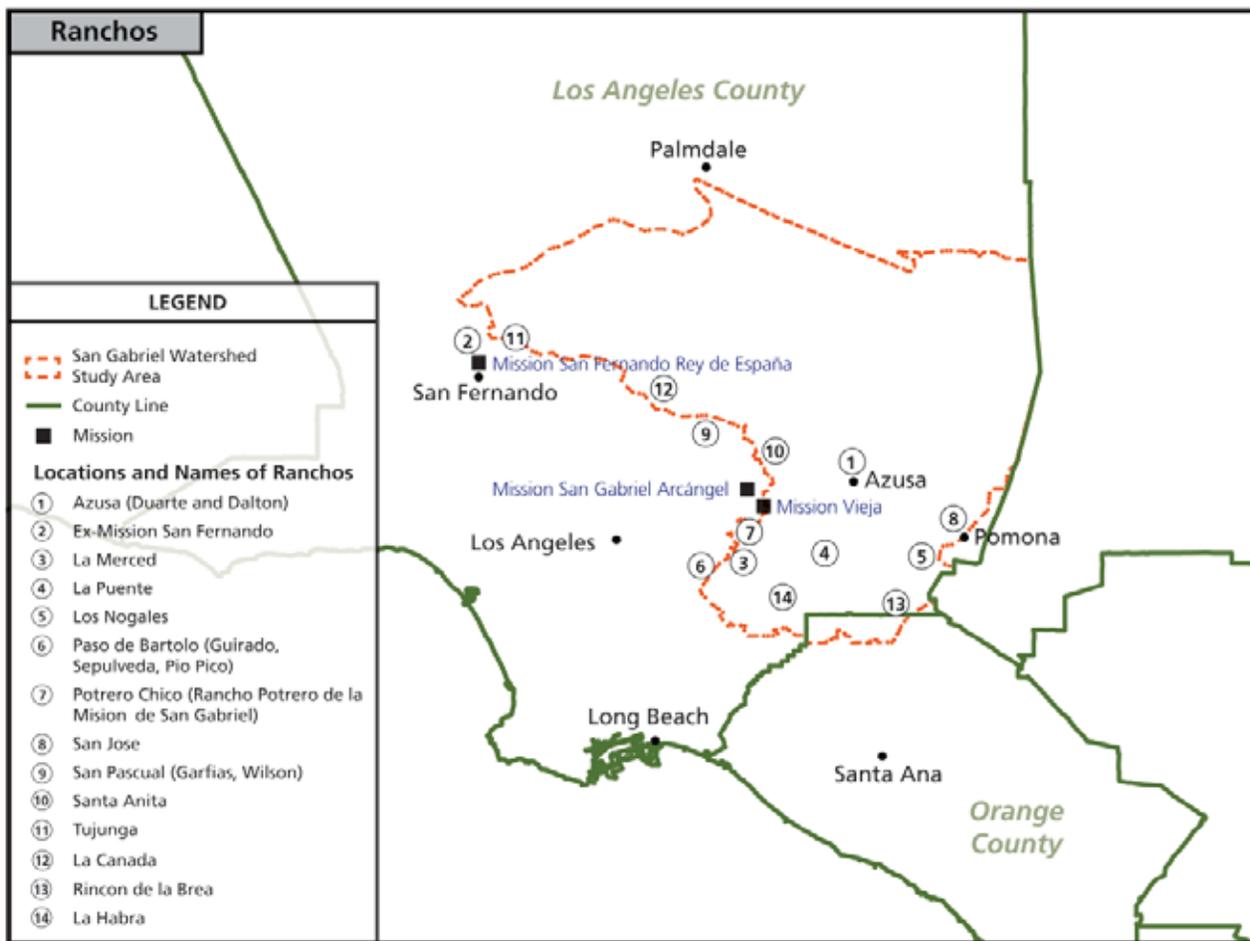
In 1837, the 22,000-acre Rancho San Jose became the first former mission land to be granted. La Casa Primera de Rancho San Jose, built by the Palomares family in 1837, still stands in Pomona; it is now a museum and headquarters of the Pomona Valley Historical Society. The Casa de Madera, now known as the Palomares Adobe, also remains in Pomona and is open to the public.

William Workman, John Rowland, and Juan Matias Sanchez, who arrived in California along the Old Spanish Trail, were granted Rancho La Puente and Rancho La Merced. In 1842, the 48,000-acre Rancho La Puente went to Rowland and Workman (Cleland and Dumke 1966; King 1990 and 1975).

In 1850, Workman purchased Rancho La Merced. The 2,300-acre, triangular-shaped land grant was situated near the site of Mission Vieja. Workman later sold his half of Rancho La Merced to his ranch manager, Juan Matias Sanchez. The Sanchez Adobe still remains and is a historic site in the city of Montebello.

Other ranchos with portions within or near the study area included:

- Rancho Santa Anita, owned by Hugo Reid, consisted of 8,000 acres. Reid was married to a Tongva woman, one of the few Indians who received land after secularization. Reid's account of the Tongva is one of the few sources of information on Tongva life during this period.



National Park Service, Pacific West Region, Internal Map, 03/2011
 Sources: Beck, Warren A. and Ynez D. Haase *Historical Atlas of California*

- Rancho Potrero Chico, owned by Juan Matias Sanchez, was one of the San Gabriel Mission's original ranchos.
- Rancho Noghales (Los Nogales) included 4,000 acres south of San Jose Creek.
- Rancho Azusa, named for the Indian Rancheria of Asuksangna, was granted to Andreas Duarte and Luis Arenas in 1841.
- Rancho Paso de Bartolo Viejo was owned by Don Pio Pico, the last Mexican governor of California, who later became a rancher and businessman after American acquisition of California. Pio Pico State Historic Park in Whittier includes Don Pio Pico's adobe mansion, and six acres of the former rancho.
- Other ranchos include Ex-Mission San Fernando, Rancho Tujunga, Rancho La Canada, and Rancho San Pascual (Hafen 1954; Robinson 1991; King 1990).

Rancho Period Resources

There are many resources from the Mexican Land Grant and Ranchos period that still remain within the study area. Many are listed on the National Register of Historic Places, the California Register, or are locally recognized historic sites. They include the Adobe De Palomares, La Casa Primero de Rancho San Jose, the Workman Adobe, the Workman Family Cemetery (El Campo Santo), the Rowland Adobe, John Rowland House, a mill on the San Gabriel River built by Rowland, and the Juan Matias Sanchez Adobe. Several sites associated with Rancho La Puente are listed on the National Register of Historic Places.

Mexican Period Impacts on Native Americans

Following secularization, most Native Americans left the missions to work on ranchos or to return to their native lands. Further spread of disease along with Spanish, Mexican, and American settlement in the state reduced the Native American population to approximately 125,000-150,000 (Cook 1978).

American / Contemporary Period

Prior to the U.S.-Mexican War of 1846-1848, the United States, inspired by the doctrine of “Manifest Destiny,” continued to expand to the west while Mexico struggled to control the lands acquired from Spain. During the war, Governor Pio Pico and General Castro concentrated their forces in the Los Angeles area. William Workman and John Rowland were some of the leaders of the American contingent (Hafen 1954). In January 1847, Mexican forces surrendered to the Americans in California, and in September, Mexico City fell, thus ending the war. In 1848, the Treaty of Guadalupe Hidalgo gave California to the United States (King 1990). The Rio San Gabriel Battlefield in Montebello is a state historic landmark commemorating the 1847 battle between American forces and Mexican Californians.

During the mid-1800s, southern California remained primarily Hispanic-dominated with a small population relative to northern California. As previously described, there was a brief explosion of wealth during the first decade of the American period, as the Mexican rancheros provided beef for the gold miners in the mountain regions to the north. Significant growth did not occur in southern California until the 1880s, with the arrival of the railroad and the first real estate booms. These events brought profound changes to the social and cultural make-up of the region, with Anglo-Americans replacing Hispanic Californians as the dominant group (National Park Service 2010).

EARLY AMERICAN PERIOD IMPACTS ON NATIVE AMERICANS

By the time the first Americans settled in the Los Angeles area, Tongva survivors were scattered and working at a subsistence level on Mexican land grants. The discovery of gold in California brought numerous immigrants into regions, including the remote valleys of the Sierra Nevada, that had not previously been occupied by Euro-Americans. During 1845-1855, the Native American population was reduced from 150,000 to just 50,000. Between 1770 (first encounter with Europeans) and 1900, Native American populations severely declined from an estimated 310,000 to approximately 20,000 (a decline of over 90 percent) (Cook 1978). Today, it is estimated that a few hundred to a few thousand Tongva still live in California.

American Period Themes

During the early American period (1846-1950) the Los Angeles region experienced growth and advancements in commerce and industry, transportation, technology and engineering, arts, social history, recreation, and government. These themes and related resources in the study area are described below.

Commerce and Industry

The region’s resources provided opportunities for immigrants that moved to the region. Many settlers who came during the gold rush became involved in agriculture. Later, other industries and technologies such as road and water systems provided additional opportunities for the region to develop.

GOLD MINING

Throughout the late 1800s and early 1900s, mining contributed to the growth of the state. Although most of the new immigrants came to northern California, gold mining also contributed to the economy of southern California as the region provided food and supplies to the northern mines (Robinson 1973).

Some prospectors, however, did settle in the southern region with the hopes of discovering gold. Placer gold was mined in the San Gabriel Mountains as early as 1834. (See the Natural Resources “Mineral Resources” section). Gold had been discovered as early as 1842 in Placerita Canyon by Francisco López. This discovery may have contributed indirectly to the more famous, and consequential, American discovery in 1948 by drawing attention to the potential for valuable mineral resources in the new state. This location lies just west of the study area.

Mining was extensive, but few made any profit in the region (Robinson 2007, pers. com.). The areas that were mined within the study area include the San Gabriel Canyon, Tujunga Canyon, the east slope of Mount San Antonio (Mount Baldy), and Mount Gleason (Clark 1998). The most productive gold mines were in the Acton District. The Governor and the Red Rover mines accounted for more than three-fourths of the total gold production in Los Angeles County since 1880 (Robinson 1973). Governor Mine was the most productive gold mine in Los Angeles County. The Bureau of Mines listed the total gold output of the Governor Mine as more than \$1,500,000 – almost three times the yield of any other gold mine in the county. Red Rover had a total yield of \$550,000 (Robinson 1973).

The mining town of Eldorado, located at the main fork of the San Gabriel River, had a population of about 1,500 by 1861. Eldorado had general stores, dance halls, and several saloons. Miners had also set up camps along the East Fork of the river building wooden shacks and stone cabins (Smith 1936).

Floods during 1859 and 1861 were difficult for mining operations on the San Gabriel. In 1868, nearly all of the mining equipment was swept out of the canyon. Eldorado was completely washed away in the winter of 1861-62, the same event which signaled the demise of southern California's Hispanic cattle industry (Thrall 1935).

The enduring influence of gold mining can be seen today as gold-panning enthusiasts continue to take their pans out to the creeks, rivers, and streams of the San Gabriel Mountains.

Mining-related resources

Former gold mining boomtowns, such as Eldorado, and other mining sites are located within the Angeles National Forest. The U.S. Forest Service is evaluating the Eldorado site for potential listing on the National Register of Historic Places. Gillibrand Claim #10 (Iron Blossom Mine), Vincent's Blue Cat Claim, and Mining Site have been determined eligible for listing on the National Register of Historic Places. Other mining sites, including North Chilao Placer, Baldora Mining Complex, Novert Placer Mine, Gold Bar/Eldorado/Hooverville area, Steamshovel Placer, East Fork Old Miners' Trail, and Bighorn Mine, are also being evaluated.

The Baldora Mine Complex appears eligible for the National Register. The preserved ball mill (Baldora Ball Mill No. 2) represents the most intact, complete mine of its type in California. The mines, mills, and their support buildings represent early 1900s mining technology in the San Gabriel Mountains and an important period of early exploration, settlement, and economic development of the region (Conkling and Sturm 1997).

Significant sites related to the discovery of gold are also located just beyond the study area. Oak of the Golden Dream in Newhall is a state historic landmark commemorating California's first authenticated gold discovery by Francisco López.

PETROLEUM

Oil has long been an important resource in the region throughout history. Before the arrival of the Spanish, Native Americans used naturally

occurring asphaltum for tools and craft works. Spanish and Mexican settlers learned to use pitch and coal tar from Native Americans. In the 1920s, oil was discovered near Newhall, in northern Los Angeles County (not far from Francisco López's original gold discovery). Soon, more oil was found throughout the Los Angeles basin and in other parts of California. It soon became the most profitable industry in southern California. Oil production in California is ten times greater than its gold production and ranks 2nd in the nation among oil-producing states.

California's petroleum industry began in the Santa Clarita Valley. The Pico Well No. 4, Pico Canyon Oil Field, west of Newhall (just outside the study area), was the first commercially successful well in California and led to other oil production operations within the study area. Well No. 4 made Pico Canyon oil field the most commercially successful oil field in the entire west coast (Stein 1960; Western Oil and Gas Association 1965). It was also the longest continually operating oil well in the world. Oil production continued for 114 years before it was finally capped in 1990. The Pico Well No. 4, Pico Canyon Oil Field, is a National Historic Landmark District.

Within the study area, the Puente Hills and the cities of Whittier and Brea were also rich with oil. Oil was discovered in the Puente Hills in 1884 when William Rowland discovered oil on his father's former ranch, Rancho La Puente. Rowland founded the Puente Oil Company, which produced over a million and a half barrels of oil in its first 15 years (Keating 2006).

Petroleum-related resources

Olinda, located in Brea, was a boomtown in the late 1800s which supplied oil to the Santa Fe Railroad. The 2,300-acre Brea-Olinda field produced more than 300 million barrels of oil in its lifetime (Keating 2006). The area stretched southeast from the Puente Hills through Brea and Tonner canyons to the site of old Olinda. Olinda Oil Well #1, drilled in 1897, is still pumping. Many structures tied to the oil industry have been removed, but features such as access roads, well pads, and several towers and pumps remain. The Brea Cañon Oil Company Building also remains. Olinda is a State Historic Landmark and is known as the Olinda Museum and Trail.

AGRICULTURE

Agriculture played a significant role in the development of the San Gabriel Valley. During the Spanish and Mexican periods, the missions and ranchos cultivated the land for crops and vineyards

and grazed cattle and raised sheep. Agriculturalists first had to overcome high costs for developing irrigation systems, a lack of local markets, limited transportation facilities, and financial dependence upon bankers (Cleland 1941).

The completion of a transcontinental railroad to southern California in 1883 provided a means to distribute produce. With new advances in irrigation systems and the formation of water districts throughout the region, the fertile valleys and foothills were quickly converted to orchards and farms (Burcham 1957).

Citrus

The San Gabriel Valley and other parts of southern California were once dominated by citrus orchards. Citrus was first planted by the Spanish missionaries in the early 1800s. Rancho landowners also planted commercial citrus orchards on their lands. By the late 1800s, citrus became very profitable in the region.

In 1880, there were over 1.25 million citrus trees in southern California (Atchison, Topeka, and Santa Fe Railway 1938; Dumke 1944). In the 1880s and 1890s, sheep herders of the San Gabriel Valley began to trade their stock to grow oranges. The California Foothill Orange and Lemon District stretched along the foothills from Pasadena to Claremont and into San Bernardino County. The southern region of the valley, including towns such as El Monte and Downy, grew citrus and row crops (McBane and Hartig 1998). The Pomona Valley area produced over \$2 billion in revenues from the citrus industry between 1890 and 1940.

In the mid-1930s, there were approximately 18,000 growers and the citrus industry employed about 200,000 people (Atchison, Topeka, and Santa Fe Railway 1938). The rapid growth of this industry had significant impacts on workers in the region. Labor for the citrus industry was dominated by Mexican immigrants. This was aided by the removal of immigration restrictions for Mexicans in the early 1900s. "By 1926, 10,000 Mexican pickers worked in Southern California citrus groves, and by 1940 approximately 22,000 Mexican men labored in the orchards, constituting nearly 100 percent of the picking force. Approximately 11,000 Mexican women packed citrus fruit" (Garcia 2001).

Citrus-related resources. Resources from the citrus industry include structures such as packing houses as well as orchards. The College Heights Lemon Packing House/Claremont Packing House and the Teague Grove in San Dimas are examples of resources within the study area. The Teague Grove

was one of the largest groves in the world. At one time it had nearly 250,000 trees. Today, there are about a dozen remaining trees.

Walnut

The walnut industry, like the citrus industry, thrived in the region. In the early 1900s, state production was almost entirely from southern California. The walnut crop was handled by brokers, speculators, and commission men. It suffered from poor marketing just as the citrus industry had. There were several local cooperatives, but at first they did not take collective action. A central organization called the Executive Committee of Southern California Walnut Associations was formed in 1905. Later, the California Walnut Growers Association established grading standards. The Diamond Brand was known for having the best walnuts (Teague 1944).

The Paradox Hybrid Walnut Tree in Whittier represents the once flourishing walnut industry in Southern California. The Paradox Hybrid was planted by the University of California Experiment Station in 1907. The university planted a dozen experimental walnut varieties. The Paradox Hybrid was the only one spared when the university gave up their lease in 1925 (Pomeroy 2000).

Other crops

In addition to citrus and walnuts, other crops were also planted in the valley. Olives, flax, wheat, barley, oats, tobacco, alfalfa, silk, and cotton were examples of other crops grown. Many new crops were also grown for experimentation (Cleland 1941, Dumke 1944).

Agriculture in the Antelope Valley

Agriculture first peaked in the Antelope Valley area in the 1880s. With the arrival of the railroad, the formerly isolated Antelope Valley on the north side of the San Gabriel Mountains began to see its first settlers. The first homesteads in Antelope Valley were established where water was available. In 1886, Palmenthal was founded by Swiss German families. Its name was later changed to Palmdale. During the 1880s and early 1890s, heavy rainfall allowed homesteaders to successfully cultivate alfalfa, barley, wheat, and a variety of fruits and nuts. However, a serious drought between 1894 and 1904 devastated many farms, forcing some settlers to abandon their land. A second agricultural boom began in 1905 with the introduction of new irrigation techniques which provided the means for the large-scale cultivation of alfalfa. By 1920, alfalfa was the Antelope Valley's major crop (Los Angeles County Libraries 2006).



Photos (top to bottom): 1. Glendora orchards, San Gabriel Valley, 1931. Photo courtesy of Fairchild Aerial Surveys, Inc. and the Los Angeles County Library. 2. Pio Pico Adobe, 1919. Los Angeles County Library photo. 3. Workman House. 2007. NPS photo.

Early American Settlements in the Study Area

During the early part of the American period, many Mexican land grant holders held on to their grants until the 1870s or later. The California Land Act of 1851 addressed questions regarding pre-existing property rights in California prior to United States acquisition of California. The act required all persons claiming lands in California to give legal proof of their claim in order to receive property rights under United States statutes (Raab 2005). After the collapse of the Hispanic ranching industry after the mid-1860s, landowners became interested in subdividing and developing their lands for other purposes.

The population of Los Angeles grew steadily from about 1,600 to 11,000 during the first three decades of the American period. Settlements throughout the region were established following the arrival of the Southern Pacific Railroad in 1876, success from industries, such as mining and commercial agriculture, and the land boom of the 1880s. During the land boom's peak period in 1887, \$100,000,000 worth of real estate in southern California was sold, more than 130,000 persons remained as permanent settlers, and Los Angeles increased in size 500 percent (Dumke 1944). Many people who came were only interested in realty speculation, but others were interested in settling and developing the area's resources. This resulted in the development of many small towns while other town sites remained undeveloped with only staked-out lots (Dumke 1944).

Recreation

CONSERVATION, WILDERNESS AND MOUNTAIN RECREATION

In southern California, the arrival of the railway in 1876, followed by the boom of the agricultural industry started to place significant pressures on the regional landscape. Furthermore, increased timber, hunting and fishing, and devastating fires in the region all took a noticeable toll on mountain areas and wildlife. As the landscape changed at a rapid rate in the late 1800s, many residents recognized the need to protect areas for recreation.

An interest in the wilderness and outdoors was furthered by the writings of naturalist John Muir. Muir first hiked the San Gabriel Mountains in 1875 where he reveled in the wildlife views, trails, and canyons that the mountains provided. In his book, "The Mountains of California," Muir describes the waterfalls of the San Gabriel's Eaton Canyon as a "charming little thing, with a low sweet voice, singing like a bird (Muir 1894)."

The alarming depletion of wilderness on both a national and local scale began to concern the American public. This eventually led to one of the nation's most influential acts regarding land policy, the Forest Reserve Act of 1891. The Act provided Congress authority to set aside public lands for present and future use. Local residents mobilized to seek designation of both the San Bernardino and San Gabriel Mountain ranges as forest reserves.

In 1891, the Los Angeles Chamber of Commerce appealed to Congress to have "all public domain included in the watersheds of Los Angeles, San Gabriel and other rivers in the Sierra Range" withdrawal from sale such that the mountains "may in future time serve the general public as a great park" (Robinson 1991). The San Gabriel Timberland Reserve, which is now in part the Angeles National Forest, was proclaimed by President Harrison on December 20, 1892, and was the first forest reserve to be created in California and only the second in the United States. In 1905, legislation turned over reserve lands to the Department of Agriculture – later coming under management by the newly formed U.S. Forest Service.

GREAT HIKING ERA

Hiking became a popular recreation activity in the late 1800s. The San Gabriel Mountains provided numerous trails through scenic mountain passages and became a prime destination for many outdoor enthusiasts. Many trails connected foothill communities to the mountains. For example, the

Mount Wilson Trail, constructed by rancho owner Benjamin Wilson, begins in Sierra Madre. Later, the Pacific Electric Railway expanded rail lines within easy walking distances of mountain trailheads. With improved access, the San Gabriel Mountains became a weekend destination for many southern California residents.

For nearly four decades (1890s-1938), hiking was tremendously popular among area residents. On a single holiday weekend, as many as five thousand hikers passed through Joe Clark's Half Way House, a check point on the Sturtevant hiking trail (Robinson 1946). Many accommodations for weekend travelers emerged near train depots and trailheads, including cafes, stores, and tourist camps. The Angeles National Forest was so popular that visitation between 1932 and 1933 alone was greater than visitation to all of the national parks at that time combined (Thrall 1934). During World War II, hiking popularity declined only to reemerge again during the post war boom. Today, the Angeles National Forest remains one of the most visited national forests in the United States.

MOUNTAIN CAMPS, RESORTS, AND OTHER FACILITIES

Camps

As the San Gabriel Mountains became an increasingly popular recreation destination, tourist camps were developed to accommodate hikers. The first of these camps, Switzer Camp, was established in the heart of San Gabriel's Arroyo Seco in 1884. Rustic in nature, the camp consisted of tents, a communal log cabin, and a series of campfire pits.

Throughout the 1880s and 1890s, Switzer Camp accommodated hundreds of guests from Southern California and inspired a wave of camp resorts throughout the San Gabriels, including Steil's Camp, Dell's Camp, Sturtevant Camp, Strain's Camp, and Martin's Camp. The popularity of these camps was so great that, in the summer of 1890, it was estimated that 1,000 people visited Steil's camp in one summer alone (Robinson 1991).

Of these camps, the famed Sturtevant Camp, founded by Wilbur M. Sturtevant in 1893, was the most frequented and adored. Located in a wooded grove near a stream of the Big Santa Anita Canyon, Sturtevant camp's picturesque location quickly became a favorite among hikers and campers (Robinson 1991).

Resorts

Professor and inventor Thaddeus Lowe and engineer David Macpherson were successful

entrepreneurs of the area. To further the concept of the San Gabriel Mountains as a tourist destination, they developed a plan for a rail line that would ascend Rubio Canyon to the summit of Echo Mountain, where tourists would find an elaborate series of resorts. (The Mount Lowe Railway is further described in the “Transportation” section).

From 1892 to 1894, three mountain resorts were constructed along the railway: The Rubio Pavilion within Rubio Canyon, The Chalet near the top of Echo Mountain’s ridge, and the impressive summit resort of The Echo Mountain House. Popularly known as the “White City,” the incline railway and Echo Mountain Resort Complex soon became a sensation throughout the country.

During the 41 years of operation, the “White City” under the ownership of Lowe and later Huntington, were reported to have accommodated more than three million people. But the White City and Mount Lowe railway could not survive a series of unfortunate, natural events including windstorms, fires, and a flood, which not only obliterated the elaborate railway system, but virtually every structure as well (Robinson 1991).

CCC-built facilities

As the Great Depression years began to set in, investment in parks and recreation began to diminish. During this time, President Franklin D. Roosevelt established the Civilian Conservation Corps (CCC), in addition to numerous other social work programs, to help improve the economy. The CCC played a significant role in constructing many recreational facilities around the country.

The California Region of the Forest Service had prepared new designs for Forest Service buildings during the establishment of the CCC. With these designs they were able to receive awards for several CCC camps to work on the construction of recreational facilities. The first CCC camp in the country was reportedly built at Piru Canyon in the Castaic Range of the Angeles National Forest (Jones and Stokes 2004). Between 1933 and 1942, more than twenty CCC camps were established in the Angeles National Forest. With the assistance of other relief agencies such as the Work Projects Administration (WPA), the CCC were responsible for constructing many of the roads, campground facilities, and trails in the Angeles National Forest.

Other Recreation Facilities

The rise of the automobile had already brought a renewed interest to mountain resorts in the 1920s. During this time, the Los Angeles County

Board of Supervisors decided to construct a series of mountain recreational facilities in the San Gabriel Mountain’s Swarthout Valley. In 1923, construction began, with recreation buildings, trails, campgrounds, and picnic areas. At the center of these facilities was the Big Pines County Park – a first-rate recreation facility envisioned by the Board. From roughly 1923-1933, the Los Angeles County Department of Parks and Recreation spent approximately four million dollars in developing the park. The park had a swimming pool, ice skating rink, tennis courts, children’s playground, numerous campgrounds, and ski and sled facilities (Robinson 1991).

In the 1920s the Forest Service also began to develop campground facilities. Many of the facilities received supplemental funding from organizations including the Los Angeles Chamber of Commerce, the San Gabriel River Water Committee, and the State.

In the San Gabriel Mountains, the desire to drive to scenic destinations and recreation areas within the upper reaches of the mountains eventually outweighed the desire for hiking. Soon hiking camps began to close and were replaced with roadside amenities for tourists, including automobile convenience cabins.

WINTER SPORTS

By the 1930s, winter sports were becoming a favorite pastime for southern California residents. Skiing, in particular, gained popularity. The mountainous locale of Big Pines Park proved to be an ideal location for the region’s first ski resort. Big Pines soon became a popular skiing destination, hosting winter sports competitions in the mid-1930s, attracting both local and world-class skiers. Though skiing and winter sports in general slumped in popularity during the depression and WWII years, ski resorts bounced back after the war (Robinson 1991).

SPORTS CLUBS

Organized sports in the country and within southern California began to take hold at the turn of the 18th Century. In 1904, the town of San Gabriel founded the San Gabriel Country Club. Offering the first 9-hole golf courses in the region, by 1912, the Country Club had significant membership. The Country Club, still in existence, is considered the oldest golf club in both Los Angeles and Orange Counties.

Nationwide organizations such as the YMCA and the Boy Scouts of America, which possessed strong

recreational components, began to form local chapters in the San Gabriel Valley. The Boy Scouts of America opened its San Gabriel Chapter in 1910, and the West San Gabriel Valley YMCA chapter was established in 1912.

HISTORIC RECREATION RESOURCES

There are numerous historic resources within the study area related to recreation, including park areas, trails, and visitor facilities. Angeles National Forest resources under consideration for local and state recognition include: Crystal Lake, Charlton-Chilao, and Big Pines. Big Pines Park is in the process of being nominated for the National Register as a historic district. Within the study area, there are also five Recreation Residence Tracts of cabins (Big Santa Anita, McClellan, Manker Flat, San Antonio Falls, and Upper San Antonio) all considered eligible for the National Register.

Resources that represent “The Great Hiking Era” include the Mount Wilson Trail and Lizzie’s Trail Inn / Museum, which served hikers and packers as they headed up the Mt. Wilson trail starting in the early 1900s. The Mount Lowe Railway is a designated National Register District listed at the state level of significance.

Transportation

As described earlier, the study area and the broader southern California region has a rich history of travel routes and transportation. Many migration and travel routes were determined by the regional environment, such as mountain passes and river corridors. Prior sections have already described Native American, Hispanic, and early American trade routes. This section describes the technology related to transportation, including railroads and the modern highway system.

RAILROADS

Railroads extended into the study area to meet the needs of the region’s growth during the mid-1800s. The Southern Pacific Railroad and the Santa Fe Railroad were extended through the study area east from Los Angeles. When the Santa Fe offered competition in the mid-1880s, the rates were reduced, and the resulting rate war helped to increase migration to California. Along the San Gabriel Valley, the Santa Fe Railroad had stops at towns such as Sierra Madre, Arcadia, Monrovia, Duarte, Azusa, San Dimas, and Claremont (Dumke 1944).

Several railroad stations/depots remain within the study area, including the Atchison, Topeka, and Santa Fe Railroad Station in Claremont, the



Photos (top to bottom): 1. Electric car at Ye Alpine Tavern, Mount Lowe Railway, 1913. Shorpy.com photo. 2. Mexican Americans at San Gabriel River, 1920. Photo courtesy of Shades of L.A. Collection and Los Angeles County Library. 3. Aztec Hotel, Route 66 (now Foothill Boulevard). 2006. NPS photo.

Southern Pacific Railroad Station in Whittier, and the Pomona Southern Pacific Railroad Depot.

Pacific Electric Railway

As towns in the region developed, they needed a connection to Los Angeles and to the main trunk railroad lines. The Pacific Electric Railway would provide that connection. Henry Huntington had envisioned building an interurban system that would cover Southern California (Crump 1962). The system began in 1873 when cars were pulled by horses and mules along iron railroad tracks. In 1889, the Los Angeles Cable Railway Company began constructing a double track wire-cable railway. Pacific Electric was formed in 1911 by a merger of eight companies (Hilton and Due 1960).

The Pacific Electric Railway was labeled by several transit historians as “The World’s Greatest Interurban Railway” (Fischler 1979). The railway was an exceptional example of an interurban system of its period. The Pacific Electric Railway spanned over 1,000 miles of track and provided pollution-free transit in the Los Angeles region from hydroelectric power in the Sierra Nevada.

The railway had a significant impact on the development of the Los Angeles region. It encouraged new communities in the San Gabriel Valley by providing a link to Los Angeles. The railway also hauled freight and helped to improve transportation of citrus which was a primary source of income for the valley.

Historian William D. Middleton wrote “in a time before Southern California became the world’s most automobile-oriented society, almost everyone rode Pacific Electric’s ‘big red cars’ to the beaches, mountains, race tracks, and other pleasure spots of the Southland, as well as to and from their daily work” (Fischler 1979). The Pacific Electric Railway offered scenic vistas on lines which included the Mount Lowe Railway section, which climbed 3,130 feet above Altadena in about 6 miles. Its last journey was in December, 1937. It is listed on the National Register of Historic Places.

“Although some of the integrity of the Mount Lowe Railway has been affected over the years through fire, floods, etc, much of the right-of-way and structures are still intact, and have become interpretive hiking trails” (Darrell Vance, personal communication, 2007).

In the 1920s, buses and cars started to compete with the Pacific Electric Railway. Highways and cars crossed rail lines and trolleys were slowed. The system did not keep up with technology. There

were plans to build an underground network, but it was never implemented. Ridership greatly declined in the 1950s and the last trains ran in 1961.

The railway has been noted as a civil engineering landmark of California. It was the first mountain railroad in the world to be operated by electricity. Andrew Hallidie, who designed San Francisco’s cable car system, designed the cable winding machinery. The Circular Bridge was the first bridge in the world designed for both a curve and an ascending grade.

A comprehensive survey of remaining resources of the railway system has not been completed. Although much of the railway system no longer exists, there are a few remaining resources within the study area, including the Mount Lowe Railway National Register District, the Puente Largo Bridge, and railway depots and substations. The Great Bridge (Puente Largo) took trains over the San Gabriel River. The Great Bridge was an impressive structure constructed with reinforced concrete. The Pacific Electric Railway Bridge, also known as the Irving Gill Bridge, in Torrance, is listed on the National Register. The La Habra depot is now a performing arts theater. The Whittier freight depot which was shared with the Southern Pacific Railroad is now a transit center and the Whittier depot storefront ticket agency is now the Moose Hall. The Pacific Electric Railway Substation #8 nearby in Altadena is listed on the National Register of Historic Places.

Parts of the system, including trolley cars, can be seen in several museums including the Orange Empire Railway Museum in Perris, California. Existing rights-of-ways remain in portions of the study area. Many of the system’s rights-of-way were purchased by railroads and are preserved as rail transportation corridors. In 1990, the Blue Line portion of the Los Angeles County Metrorail System (outside the study area) opened. The line, for the most part, uses the Pacific Electric 4 track right-of-way. The Southern California Regional Rail Authority now operates Metrolink commuter trains on the former Covina-Claremont branch line.

HIGHWAYS

The popularity of automobiles changed transportation in the region and led to a departure from mass transit. Soon many roads through the study area were paved, including Route 66. Los Angeles County became the second largest auto manufacturing region in the nation in the mid-1900s. Streets and highways were quickly built or modernized. Covina was one of the first cities in the nation to pave all of its streets (King 1975).

Route 66

U.S. Highway 66, popularly known as “Route 66,” is the nation’s first all-weather highway linking Chicago and Los Angeles. Route 66 was popular among thousands of motorists who drove west. The road, which opened in 1926, is 2,400 miles long, although it is estimated that all of the various alignments total about 5,000 miles of roadway (National Park Service 1995). The study area includes 18 miles of Route 66 which crosses through the foothill communities and parallels, or in some areas is replaced by, Interstate 210.

Route 66 helped enable “the most comprehensive movement of people in the history of the United States” and linked the rural west to metropolitan areas. It provided an economic boom to the towns it passed through. Many businesses developed to serve the traveling public. The Route 66 corridor includes bridges motels, gas stations, diners, and other roadside businesses. Fanciful buildings, signs, and colossal sculptures were a colorful feature of highway culture and commerce during the 1920s and 30s. These “roadside attractions,” combined with natural features, create the distinctive character of the road (Cassity 2004).

The congestion, safety issues, and need for an efficient rapid transport system for defense purposes in post-war America during the 1950s and 1960s, figured prominently in the passage of the Federal Aid Highway Act of 1956. This Act, which created the current Interstate system, led to the decline of Route 66 as a federal highway. The road was decommissioned in 1985.

Route 66 Corridor Resources within the Study Area. The portion of Route 66 within the study area is part of a high-growth urban metropolis. As a result, the area reflects considerable change through time. In the early days of its history, the Route 66 corridor was dominated by citrus and other agriculture. Over time, the corridor has been extensively developed. Many buildings and signs remain that reflect evolving periods of development (Kaisa Barthuli, personal communication, 2007).

A National Park Service comprehensive survey of historic California Route 66 properties is underway. There are several resources identified within the study area that are associated with Route 66 during its historic period:

- The Aztec Hotel (Monrovia)
- The Azusa drive-in theater marquee (Azusa)
- La Paloma Mexican Restaurant sign (La Verne)
- Golden Spur Restaurant sign (Glendora)

- Palm Tropics Motel (Glendora)
- Colonial Motel (Azusa)
- Stardust Motel (Azusa)

Other historic road features associated with Route 66 will be identified in the forthcoming survey (Kaisa Barthuli, personal communication, 2007).

Technology and Engineering

Engineering and technology played important roles in the history of the study area, including advancements in water systems, transportation, agriculture, and scientific discovery in space exploration and astronomy. This section describes the development of water supply and flood control systems in the region and the advances in scientific discovery in space exploration and astronomy.

Water supply

The Los Angeles region is prone to periods of drought and massive floods. In the 1880s a legal battle over water in the region known as the “Battle of San Gabriel River” took place (King 1975). The Wright Act was passed in 1887 and allowed cities to create water districts and develop irrigation. In 1889, a Compromise Agreement was made regarding what each town or region should receive from the river, and a permanent body, the Committee of Nine, was formed to settle any future disputes.

After years of drought, the city of Los Angeles pursued other means of bringing in other water sources. Ex-mayor Fred Eaton and city engineer William Mulholland (at the time in charge of the city Department of Water) traveled to the Owens Valley in 1904. Mulholland was convinced that an aqueduct could be built to carry water by gravity flow across the Mojave Desert and through the San Gabriel Mountains into the San Fernando Valley. A bond issue to purchase land and survey the route was passed in September 1905, and funding for the aqueduct was approved by voters in 1907. Construction of the Owens River aqueduct was completed in 1913 (Nelson 1983).

The construction of the aqueduct was highly controversial. The project took the water in the Owens River for the City of Los Angeles, leaving the former Owens Lake a dry alkali flat. This generated much enmity among the agricultural community of the Owens Valley.

In the 1920s, Congress authorized construction of a dam at Boulder Canyon on the Colorado River. Construction of Hoover Dam began in 1931. The city of Los Angeles filed an application with the

State Bureau of Water Rights to obtain water from the Colorado River after the completion of the dam. The 242-mile Colorado Aqueduct was a challenging engineering enterprise in its own right. Water had to be pumped out of Lake Havasu, the reservoir created behind Hoover Dam, and then over or through six mountain ranges (Nelson 1983).

A California Water Plan was approved in 1960 to address flooding issues, conflicts with northern and southern California, and to deal with the Supreme Court decision to reduce California's share of Colorado River water by half. Later, the California Aqueduct was constructed, extending 444 miles along the west side of the San Joaquin Valley (Nelson 1983). A small portion of the aqueduct traverses the northernmost portion of the study area.

Flood control

As urban development increased in the early 1900s, the unpredictable nature of the meandering rivers of the Los Angeles basin was viewed as incompatible with the needs of the growing metropolitan region. Before the region was urbanized, flooding was considered an inconvenience, but it also benefited agriculture and ranching after periods of drought. With continued urban growth, however, natural flood events

needed to be controlled. In addition, land use changes, including the construction of impermeable surfaces, altered the river systems and exacerbated the flooding.

The flood of 1914, which caused \$10,000,000 in damaged property, was the catalyst for the first comprehensive effort to solve the flooding problem in Los Angeles (Bigger 1959). Before the 1914 flood, flood control efforts were handled locally in a piecemeal manner. At the time there was no state or federal law that provided for comprehensive regional flood control. The Los Angeles County Board of Supervisors appointed a team of engineers to produce a comprehensive flood control plan for the county. The Los Angeles County Flood Control District was established as the central authority (Orsi 2004).

The first plan consisted of dams in the mountains, check dams in the canyons, and the channelization of rivers in the Los Angeles Basin. Implementation of the 1915 Comprehensive Plan took several turns and ultimately resulted in mismanagement and a failed attempt at a large dam in San Gabriel Canyon. These events undermined public confidence in the flood control authority. In 1931, under new leadership, the Flood Control District presented a new plan. This plan was similar to the 1915 approach; however, it added the inclusion of



Aerial view of flooding at Hall's Canyon wash in La Canada, located in the Cresenta Valley between the San Gabriel Mountains and the Angeles National Forest. Spence Air Photo. Courtesy of the Los Angeles County Library.

spreading grounds to allow water to percolate into groundwater basins beneath the Los Angeles Basin (Orsi 2004).

The 1936 Flood Control Act provided federal funding for comprehensive flood control projects. Because Los Angeles County already had a plan in place, the county was able to take advantage of this opportunity. This was the first and largest program to receive funding under the new law. The 1936 act and a subsequent flood control act passed in 1938 called for the Army Corps of Engineers to work with the Los Angeles County Flood Control District on future flood control efforts. This resulted in the Los Angeles County Flood Control System, a comprehensive, coordinated river-based flood-control system constructed by the Los Angeles County Flood Control District and the U.S. Army Corps of Engineers.

Flood control structures were built by the Department of Public Works and the Army Corps of Engineers. Large dams were built, including the Devils Gate Dam on the Arroyo Seco in 1920. Early dams were built in mountain canyons, then further downstream on the rivers. Debris basins were constructed near the mouths of the canyons to collect erosion (Nelson 1983).

Five large dams were constructed on the San Gabriel River. The first was Cogswell Dam in 1934. The other dams are Morris, San Gabriel, Santa Fe, and later Whittier Narrows in 1957. President Herbert Hoover attended the dedication of Morris Dam which played a part in the World War II effort.



High flood water raging down the Puente Creek wrecks a Union Pacific train. 1927. Photo courtesy of the Los Angeles County Library.

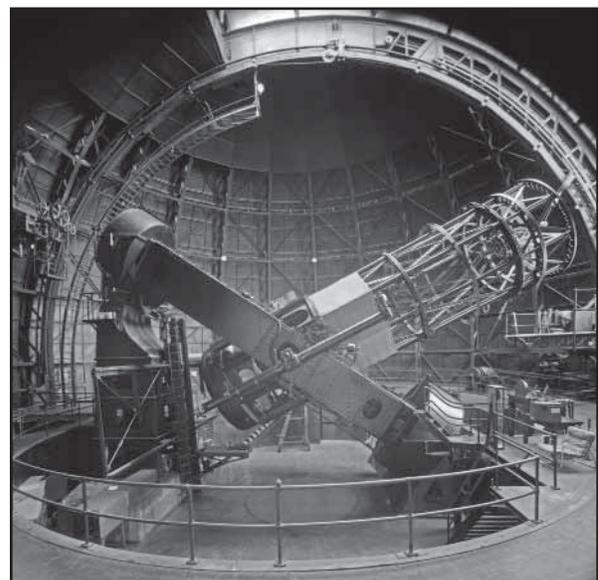
Morris Dam has been determined eligible for listing on the National Register of Historic Places. In total, 14 dams were constructed.

In a theme study on large federal dams, the U.S. Bureau of Reclamation found that the Los Angeles County Flood Control System may be nationally significant. Many of the system's flood control resources are located within the study area. The theme study identified potential contributing resources: dams, debris basins, spreading ground facilities, diversion tunnels, outlets, inlets, stilling basins, guide walls, gates, spillways, trash racks, penstocks, transformer yards, pumping stations, powerhouses, turbines, fish ladders, and temperature control devices (Billington, Jackson, and Melosi 2005).

Science. Scientific experiments and research have yielded valuable knowledge within the study area. For example, nationally significant research has been conducted at the Mount Wilson Observatory and the San Dimas Experimental Forest for many years.

Astronomy and astrophysics. Before the Mt. Wilson Observatory was constructed, the Mount Lowe Observatory on Echo Mountain was the principal astronomical institution in southern California. Constructed in 1894 by Thaddeus Lowe, builder of the Mount Lowe Railway, its director was Dr. Lewis Swift. There Swift discovered numerous nebulae and comets (National Park Service 1991).

The Mount Wilson Observatory was constructed in the Angeles National Forest, at the summit of



100-inch telescope at the Mt. Wilson Observatory. June 1949. Photo reproduced by permission of The Huntington Library, San Marino, California.

Mount Wilson in 1904. Mount Wilson was chosen as the site for the observatory because of its location on a high mountain with clear skies (W.W. Robinson 1946). Later that year, the Mount Wilson Toll Road Company was formed to build a road to the site (Thrall 1937).

The Mount Wilson Observatory was a model modern facility that forever changed the history of the science of astronomy. The observatory contains five significant research telescopes that are still in operation: the Snow horizontal telescope, the 60-foot solar telescope, the 150-foot solar telescope, the 60-inch reflector, and the 100-inch Hooker reflector (National Park Service 1989).

At Mount Wilson, many well-known scientists, including Edwin P. Hubble and Albert Michelson, were able to make significant astronomical discoveries and conducted many important experiments. For example, Nobel Prize-winning physicist Albert Michelson conducted an experiment to accurately measure the speed of light; he was also the first to measure diameters of various stars.

Since 1986, the Mount Wilson Observatory has been operated by the Mount Wilson Institute (MWI), a non-profit organization that focuses on scientific research, historic preservation, astronomical education, and public outreach. Several guest institutions operate facilities on the observatory.

A National Historical Landmark theme study for Astronomy and Astrophysics (1989) included a National Historic Landmark nomination for the Mount Wilson Observatory.

San Dimas Experimental Forest. The San Dimas Experimental Forest was established in 1933 and is the only U.S. Forest Service experimental forest in southern California. The experimental forest maintains some of the earliest and most comprehensive records from continuously monitored experimental watersheds.

The experimental forest includes a range of facilities that were constructed through unemployment relief programs during the 1930s. The Lysimeter facility (tunnel and instrument room) is the largest of its kind in the world. It is a significant engineering structure and is the most elaborate research facility on the experimental forest. The facility contains 26 large lysimeters (each measuring 10.5 x 21 ft and 6 ft deep) and numerous small ones (Jones & Stokes 2004).

An inventory and evaluation report for the experimental forest concluded that it appears

eligible for listing on the National Register of Historic Places as a historic district. (Also see “Architecture” section in this chapter and the discussion in Chapter 3, *Resource Significance*.)

Other Cultural Themes Represented in the Study Area

Arts

ARCHITECTURE, LANDSCAPE ARCHITECTURE, URBAN DESIGN

There are numerous resources throughout the study area that represent diverse architectural styles, ranging from Mission/Spanish revival to Queen Anne. Types of structures and historic uses include adobes, hotels, and schools. Several structures are listed on the National Register of Historic Places for architecture – the Ygnacio Palomares Adobe (1854), located in Pomona, was the home of Don Ygnacio Palomares, one of the owners of Rancho San Jose; the Phillips Mansion (1875), also located in Pomona, is the only “Second Empire” style home in Southern California; the Temple Mansion, located in the City of Industry (original adobe home in 1842 and remodeled in 1872 to resemble an English manor house); the Clarke Estate (1921) in the Santa Fe Springs is one of the best remaining examples of architect Irving Gill’s work.

Within the Angeles National Forest, the San Dimas Experimental Forest (SDEF) contains a significant collection of Forest Service buildings and other structures constructed under Depression-Era relief programs. The SDEF field headquarters located in Tanbark Flats is an excellent example of U.S. Forest Service architecture. Facilities at Tanbark Flat include a laboratory/office, residences, a mess hall/ conference room, and several storage/utility buildings. Research/monitoring equipment includes rain gauges, stream gauges, debris dams, water quality samplers, a weather station, and a lysimeter complex. Other important CCC structures include stone landscape features that contribute to the cultural landscape (Jones & Stokes 2004).

The Glendora Bougainvillea, the largest growth of bougainvillea in the United States at 70 feet tall, represents landscape architecture. The two city blocks on which 24 individual bougainvillea plants grow, were once occupied by orange groves. The Glendora Bougainvillea, listed on the National Register of Historic Places, are some of the best remaining examples of the early twentieth century image of California as a paradise (Pomeroy 2000).

VISUAL AND PERFORMING ARTS

Several resources within the study area represent the performing arts, including the Pomona Fox Theater and the Padua Hills Theater in Claremont. In the early 1900s, Pomona and Claremont became prosperous from the citrus industry. The Pomona Fox Theater included state-of-the-art projection and sound systems and refrigeration air conditioning. The Padua Hills Theatre and the theatrical group, the Mexican Players, attracted thousands of visitors and provided education on the rich and diverse culture of Mexico (National Park Service 1998).

LITERATURE

The Upton Sinclair House, located in Monrovia, is a National Historic Landmark (NHL). The house represents Sinclair, who was one of the most influential American novelists focused on social justice in the early twentieth century.

Social History

CLUBS AND ORGANIZATIONS / REFORM MOVEMENTS

The La Puente Valley Woman's Club, Montebello Woman's Club, and Pomona YMCA Building are examples of clubs that represent social history within the study area. The Montebello Woman's Club made substantial contributions to the city. They founded and staffed the first library in Montebello, sold World War I bonds and stamps, and assisted the Red Cross in both World Wars (Pomeroy 2002).

RELIGIOUS INSTITUTIONS

Several churches, temples, and other structures represent the religious diversity of the region. The Episcopal Church of the Ascension in Sierra Madre, founded in 1885, is constructed of stone modeled after churches of Sussex, England. The Hsi Lai Temple in Hacienda Heights is the largest Buddhist temple complex and monastery in the Western Hemisphere.

Government, Military and Aerospace

Several resources within the study area represent government – both local government and federal government, including the U.S. Forest Service – and the United States military.

GOVERNMENT

There are many historic U.S. Forest Service buildings and facilities within the Angeles National Forest that are important in telling the history of the national forest. The West Fork Ranger Station, also known

as “Old Shortcut,” was the first ranger station built in California. The San Dimas Experimental Forest, as described earlier, includes buildings that are excellent examples of U.S. Forest Service architecture. Additional historic resources include recreation camps (Buckhorn, Messenger, Switzer), the Rincon administration site, trails, and fire lookouts.

Within the San Gabriel Valley, Pio Pico Casa in Whittier, now part of Pio Pico State Park, represents Pio Pico, the last Mexican governor of California. Other structures are related to local government institutions.

MILITARY AND AEROSPACE

During World War II, California played a major role in the war effort. There are several resources related to World War II and the Cold War that remain within the study area. The Morris Dam Test Facility in Azusa was used for military experiments to build an effective torpedo during World War II. The Navy conducted tests in the lake during 1942-44 (John Robinson, personal communication, 2007). The Temporary Detention Camp for Japanese Americans at the Pomona Assembly Center and the Santa Anita Assembly Center (just beyond the study area) are two sites that are related to the internment of people of Japanese ancestry during World War II. These two assembly centers make up the Temporary Detention Camps for Japanese Americans State Historical Landmark. The Santa Anita Assembly Center was the largest assembly center. The Los Piñetos and the Mount Gleason Nike Installation sites in the Angeles National Forest



Morris Dam. 2006. NPS photo.

and two dismantled sites in the Puente Hills are from the Cold War era. Several post-World War II military plane crash sites (F-6 Hellcats and Lockheed T-33A) have been recorded in the Angeles National Forest.

During the 1950s, significant technological advances were made with aviation. Within the study area and the region, numerous air-training bases were established, where many aircraft manufacturers, including Douglas Aircraft and Hughes Aircraft, expanded or established factories. Antelope Valley was transformed from an agricultural area to a significant place for the aerospace industry. The shift from agriculture to the aerospace and defense industry occurred in Palmdale during this period. Edwards Air Force Base (formerly Muroc Army Air Base) in Palmdale is the second largest base in the Air Force. In 1952, the U.S. government bought Palmdale Airport, renaming it Air Force Plant 42. Rockwell, Northrop, Lockheed, and McDonnell Douglas maintain production facilities at Plant 42.

The Space Flight Operations Facility (SFOF) in nearby Pasadena is a National Historic Landmark. The SFOF is significant because it is the hub of the vast communications network through which NASA controls its unmanned spacecraft flying in deep space. The Mariner, Viking, Pioneer, and Voyager projects that have explored the solar system have all been controlled for at least part of their missions in this facility. The Jet Propulsion Laboratory has been the primary NASA center for the unmanned exploration of the planets.

Post World War II Period

World War II had a significant impact on California and the study area region. Because of the war in the Pacific, the aircraft industry developed, as described earlier. The Los Angeles – Antelope Valley area were major production areas. “World War II gave California, along with the rest of the nation, an economic stimulus that swept the state to new pinnacles of prosperity, encouraged unbelievable population growth and a continuation and intensification of the industrialization process which had started in the 1920s” (Cleland and Dumke1966). The *Los Angeles Times* noted in 1955 that “The impact of the migration [into the Los Angeles area] averaging nearly 500 new residents a day for ten years, makes even seasoned statisticians sit up and take notice...Only five American cities – New York, Chicago, Detroit, Philadelphia, and Los Angeles – exceeded the 1955 population of the San Gabriel Valley” (Cleland and Dumke1966).

The period following the war was also one of substantial economic growth in the Los Angeles region. More than \$1.6 billion was invested in industrial expansion during the postwar decade. By the mid-1950s Los Angeles was the third largest industrial and marketing center of the United States (Cleland and Dumke1966). Southern California diversified its economic activities, expanding on the aircraft and oil industries, including automotive construction, metal products, food, and building materials. The downside to this growth was the impact on the environment, including smog. Despite extensive development of water resourced at the beginning of the century, as described above, water was still an issue for the region during the post-war era.

Cultural Landscapes

A cultural landscape is a geographic area including both cultural and natural resources, and wildlife or domestic animals therein associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. The study area includes several examples of cultural landscapes.

Prehistoric Landscapes

Native American villages and seasonal camps were located throughout the study area. Many sites in the urban areas have been disturbed while other sites in the forest have been relatively well-preserved. As described in the archeological resources section, the Aliso – Arrastre Middle and North Special Interest Area is known to have numerous prehistoric archaeological sites. Sites range among long-term occupation sites, seasonal encampments and special-use resource procurement, processing, and storage sites. One site containing cupule rock art features is currently being nominated to the National Register of Historic Places (USFS 2005). A National Register nomination has been prepared for rock art sites within the forest dating from approximately 4000 to 200 B.P. (Whitley 2002). Because these archeological sites have not been disturbed by modern development, they retain exceptional potential for studying the cultures of native people and their relationship to the natural environment.

Historic Landscapes

There are many cultural landscapes within the study area that represent themes such as transportation, recreation, agriculture, science, and architecture. Some cultural landscapes retain both historic and natural features while others do not. This section describes some examples of historic landscapes within the study area.

Beginning with the Hispanic Period, the Mission San Gabriel Arcangel retains some key structures. The church building began during the latter part of the 18th century and was completed in 1800; it remains in San Gabriel. Other extant structures include mills such as El Molino Viejo and another grist mill near the mission. Nothing remains of the original site of the mission, however. Other structures and natural features related to the mission landscape have been altered or removed, including elements related to ranching and agriculture.

Within the study area there are numerous historic resources that represent the ranchos, such as original homes; however, cultural landscape elements such as the spatial relationships between the remaining built environment and natural features are not readily evident. Landscape features usually associated with ranching operations and agriculture that would have surrounded these structures are no longer apparent since most of these areas have been developed or heavily urbanized.

Even though many features of the Mount Lowe Railway within the Angeles Forest no longer remain, elements such as the natural setting, the path of the railway, and stone foundations and retaining walls of structures remain. Interpretive signs provide context for the railway, including spatial relationships among key features.

The San Dimas Experimental Forest contains cultural landscape elements that represent Forest Service administration and science. Structures that contribute to the cultural landscape were previously described under "Architecture, Landscape Architecture, Urban Design." The natural landscape features of the experimental forest are intact. Many features have been preserved as the experimental forest continues to operate today.



Photos (top to bottom): 1. Mt. Lowe Railway, circle bridge view. 2007. NPS photo. 2. Mt. Lowe Railway track remains. 2007. NPS photo. 3. San Dimas Experimental Forest. Photo by the United States Forest Service.

Table 3: Inventory of Cultural and Archeological Resources within the San Gabriel Watershed and Mountains Special Resource Study Area – Representation of National Park Service Themes

Resource Name	Location	Listing Status
SPANISH, MEXICAN, AND AMERICAN SETTLEMENT		
Juan Bautista de Anza National Historic Trail	Extends through study area	NHT
Old Spanish National Historic Trail	Extends through study area	NHT
Workman Adobe	Industry	NR-state
Hawkins--Nimocks Estate-Patricio Ontiveros Adobe	Santa Fe Springs	NR-state, SPHI
La Casa Alvarado	Pomona	NR-local
Jonathan Bailey House	Whittier	NR-local
Pitzer House	Claremont	NR-local
John Rowland House	Industry	NR-local
El Monte – 1 st Southern Californian Settlement by Immigrants from United States	El Monte	CR, SHL
Grave of George Caralambo	Whittier	SHL
Site of Mission Vieja	Montebello	SHL
J. D. Palomares Ranch	La Verne	SPHI
W. R. Rowland Adobe Redwood Ranch House	Walnut	SPHI
Juan Matias Sanchez Adobe	Montebello	SPHI, NRST3
NATIVE AMERICANS (Resources representing Tongva/Gabrielino, Tataviam, Fernandeno, and Serrano peoples)		
<i>Angeles National Forest Native American prehistoric resources determined eligible:</i> Alimony Earth Oven #2 Burial Site at Chilao Flats (also 51-33), Chilao Creek Midden, House Pits at Lower Chilao Lower Alder Creek Terrace Site Old Shortcut Road Prehistoric Site #1	Angeles National Forest	Determined eligible for NR
<i>Additional resources in the study area:</i> Many archeological sites have been identified but most have not yet been evaluated. Most numerous in Agua Dulce Quadrangle (33 sites)	Throughout study area	2 sites = NRST2
CLUBS AND ORGANIZATIONS		
La Puente Valley Woman's Club	La Puente	NR-local
Montebello Woman's Club	Montebello	NR-local
Pomona YMCA Building	Pomona	NR-local
East Whittier Women's Improvement Club	Whittier	SPHI
Women's Club of Claremont	Claremont	SPHI, NRST3
Montebello Senior Citizens Center	Montebello	NRST2
Masonic Temple	Pomona	NRST3
RELIGIOUS INSTITUTIONS		
Whittier First Christian Church	Whittier	NRST2
Rivera First Baptist Church	Pico Rivera	SPHI, NRST3
Claremont Missionary Home, Pilgrim Place	Claremont	NRST3
First Baptist Church	Monrovia	NRST3
First Methodist Episcopal Church, Seventh Day Adventist Church	Pomona	NRST3

Resource Name	Location	Listing Status
German Baptist Church, Bible Missionary Church	Santa Fe Springs	NRST3
Holy Trinity Episcopal	Covina	NRST3
Methodist Episcopal Church, United Methodist Church	Monrovia	NRST3
RECREATION		
Old Short Cut, Chilao Visitor's Center [West Fork Ranger Station]	Angeles NF	SHL, NRST2
Lizzies Trail End Museum/Lizzies Trail End Inn	Sierra Madre	SPHI, NRST3
Five Recreation Residence Tracts of cabins (Big Santa Anita, McClellan, Manker Flat, San Antonio Falls, and Upper San Antonio)	Angeles NF	eligible for NR
EDUCATION		
Barbara Greenwood Kindergarten	Pomona	NR-local
First Home of Pomona College (Ayre Cottage)	Pomona	SHL, NRST3
Reform School for Juvenile Offenders (Fred C. Nelles School)	Whittier	SHL, NRST2
Bassett Elementary School	Bassett	SPHI
Soledad-Acton Schoolhouse	Acton	SPHI
Whittier Union High School	Whittier	NRST2
Duarte School, Duarte School Administration Building	Duarte	NRST3
Claremont Colleges	Claremont	NRST5
Webb School of California	Claremont	NRST3
VISUAL AND PERFORMING ARTS		
Padua Hills Theater	Claremont	NR-local, SPHI
Pomona Fox Theater	Pomona	NR-local
Mabel Shaw Bridges Music Auditorium	Claremont	NRST2
Lyric Theater, Crest Theater	Monrovia	NRST3
Mcnees, Bruens, Warner Bros Theaters, Whittier Theater	Whittier	NRST3
LITERATURE		
Upton Sinclair House	Monrovia	NHL
ARCHITECTURE, LANDSCAPE ARCHITECTURE, AND URBAN DESIGN		
Clarke Estate	Santa Fe Springs	NR-state
Episcopal Church of the Ascension	Sierra Madre	NR-state
Glendora Bougainvillea	Glendora	NR-state, SHL
Workman Family Cemetery (El Campo Santo)	Industry	NR-state
Abraham Lincoln Elementary School	Pomona	SPHI
Atchison, Topeka and Santa Fe Railroad Station	Claremont	NR-local
Aztec Hotel	Monrovia	NR-local
Brea City Hall and Park	Brea	NR-local
DeWenter Mansion	La Verne	NR-local
Hoover Hotel	Whittier	NR-local
Ygnacio Palomares Adobe	Pomona	NR-local, SHL
John Carlton Pegler House	Sierra Madre	NR-local
Phillips Mansion	Pomona	NR-local, SPHI
Pitzer House	Claremont	NR-local

Resource Name	Location	Listing Status
La Casa Primera de Rancho San Jose	Pomona	NR-local
Lincoln Park Historic District	Pomona	NR- local
San Dimas Hotel	San Dimas	NR-local, SPHI
Scripps College for Women	Claremont (within .5 mi of study area)	NR-local
Charles E. Straight House	La Verne	NR-local
Temple Mansion	Industry	NR-local
The Oaks	Monrovia	NR-local
La Casa de Carrión	La Verne	SHL, NRST3
Glendora Historic District	Glendora	NRST2
Leven Oaks Hotel	Monrovia	NRST3
12 individual listings for houses	Whittier	NRST3
36 individual listings for houses, 26 with no name	Monrovia	NRST3
28 individual listings for houses, 1 with no name	Claremont	NRST3
1 listing for a house	Pico Rivera	NRST3
1 listing for a house	Sierra Madre	NRST3
Pomona	NRST5	
Approximately 80 individual listings for houses and avenues or blocks in Claremont	Claremont	NRST5
GOVERNMENT		
Azusa Civic Center	Azusa	NR-local
Glendora District Office	Angeles NF	Eligible (w/o concurrence)
Pio Pico Casa	Whittier	NR-state (NHL Evaluation in progress)
Vetter Peak Lookout	Angeles NF	NRST2
MILITARY		
Pomona Assembly Center-Temporary Detention Camps	Pomona	CR, SHL
Los Pinetos Nike Installation	Angeles NF	NRST2
Morris Dam Test Facility	Angeles NF	NRST2
Mount Gleason Nike Installation	Angeles NF	NRST2
Pomona Armory, National Guard Building	Pomona	NRST2
POLITICAL IDEAS, CULTURES, AND THEORIES		
Site of Llano Del Rio Cooperative Colony	Llano, on State Hwy 138	SHL
INDUSTRY (<i>gold mining, petroleum, energy</i>)		
Edison Historic District	Pomona	NR-local
Orin Jordan House	Whittier	NR-local
Pitzer House		
Standard Oil Building	Whittier	NR-local
Olinda	Brea	SHL
Pomona Water Powerplant	Claremont	SHL
Golden West Refining Company	Santa Fe Springs	NRST2
East Whittier Water Company Pumphouse	Whittier	NRST3

Resource Name	Location	Listing Status
AGRICULTURE		
College Heights Lemon Packing House/Claremont Packing House	Claremont	NRST2
Parent Haas Avocado Tree	La Habra Heights	NRST5
TRANSPORTATION		
Route 66	Extends through study area	NPS preservation program
Pomona City Stable	Pomona	NR-local
Southern Pacific Railroad Station	Whittier	NR-local
Lang (Southern Pacific: golden spike at Lang connected Los Angeles with San Francisco)	Santa Clarita	SHL
Lyons Station Stage Coach Stop	Santa Clarita (within .5 mi of study area)	SHL
Azusa Santa Fe Railroad Depot	Azusa	NRST2
Pomona Southern Pacific Railroad Depot	Pomona	NRST2
Santa Fe Railroad Depot	Monrovia	NRST3
Union Ice House, Ice House	Claremont	NRST3
Union Pacific Railroad Station	Whittier	NRST3
COMMERCE		
National Bank of Whittier Building	Whittier	NR-local
National Bank of Pico	Pico Rivera	NRST2
Wells Fargo Bank	Azusa	NRST2
SCIENCE AND TECHNOLOGY		
Mount Wilson Observatory	Angeles NF	(NHL nomination prepared)
Paradox Hybrid Walnut Tree	Whittier	SHL
Mount Lowe Railway	Altadena /Angeles NF	NR district-state
San Dimas Experimental Forest	Angeles NF	NR district (nomination prepared)
ENVIRONMENT		
Angeles National Forest		SHL
CHANGING ROLE OF THE UNITED STATES IN THE WORLD COMMUNITY		
Juan Bautista de Anza National Historic Trail	Extends through study area	NHT
Old Spanish National Historic Trail	Extends through study area	NHT
Rio San Gabriel Battlefield	Montebello	SHL
OTHER RESOURCES: THEMES UNKNOWN		
Captain William Banning Home	Walnut	SPHI
Old El Monte Jail	El Monte	SPHI
Richardson House	Sierra Madre	SPHI
Rosemead Historical Park	Rosemead	SPHI
Temple Hall – check if same as Temple Mansion	Industry	SPHI
The East Wing/Azusa Auditorium	Azusa	In CHRIS, not in NRIS
SR 30, Widen Baseline Road	Claremont	NRST2
no name (program reference # HUD880901H)	Azusa	NRST2
Baldwin Park City Hall	Baldwin Park	NRST2

Resource Name	Location	Listing Status
Central School Auditorium, Baldwin Park Civic Auditorium	Baldwin Park	NRST3
Azusa loof Hall / Odd Fellows Building	Azusa	NRST2
Baughman House	Claremont	NRST2
Johnson Bros Ranch	Claremont	NRST2
Johnson House	Claremont	NRST2
Keeler Residence	Claremont	NRST2
W.K. Kellogg Arabian Horse Ranch	Baldwin Park	NRST2
2 sites with no name	San Dimas	NRST2
2 sites with no name	La Puente	NRST2
Covina Fire Station	Covina	NRST3
Orton Englehardt Historic Shop Building	Glendora	NRST5
Approximately 80 individual listings for homes and avenues or blocks in Claremont	Claremont	NRST5
Sarah J. Abbott House	Monrovia	NRST5
Umbach House, Mildred Umbach Residence	Monrovia	NRST5
no name	Monrovia	NRST5
Sites that have potential for listing on the NR, CR, or local listing/designation:		
<p>There are 135 historical sites within the study area appear eligible for listing on the National Register, California Register, or other local listing as individual sites and contributors to a district. Most of these sites need survey evaluation to determine eligibility. These are NRST 7N: Needs to be reevaluated (Formerly NR Status Code 4 – may become eligible for listing on the NR)</p> <p>There are 106 sites that need to be reevaluated to determine whether they have potential for listing on the NR, CR, or local listing/designation.</p>		

Sources:

- National Park Service, National Register of Historic Places Database
- Angeles National Forest, Heritage Resources Database
- State of California, Lists of State Historic Landmarks, Points of Historical Interest, Historic Resources Inventory database, Archeological Resources Determination of Eligibility Database
- County of Los Angeles, Department of Regional Planning, list of resources within the county including unincorporated lands

Notes:

- Data was compiled in 2007. Data is not comprehensive at the local level. Many cities have their individual local landmarks. This information has not been collected for every city/community within the study area.
- Although many resources represent more than one theme/topic, they are listed under their primary them/topic.
- Location information for archeological sites and historic sites on private land that have been determined eligible/or potentially eligible for listing on either the National Register of California Register is not identified.

Status codes:

NHL = National Historic Landmark
NHT = National Historic Trail
NR = National Register
NRST2 = Determined eligible for listing on the National Register or California Register
NRST3 = Appears Eligible for NR as an individual property through survey evaluation
NRST5 = Eligible for local listing or designation
SHL = California State Historic Landmark
SPHI = California State Point of Historic Interest

Cultural Resources

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



Recreational Resources

Introduction

With its diverse landforms and landscapes, the study area features a variety of scenic and recreational resources. Large, wild, open spaces in the mountains and hills are contrasted with dense urban areas. Within the large expanse of urban areas, hidden “wild places” that provide recreational opportunities can be found. A short drive can take a person from one of America’s most densely populated regions, to stark desert and serene wilderness areas. Sub-alpine mountain environments are located just miles away from dry deserts and mild coastal beaches.

Recreational resources in the study area range from the Angeles National Forest in the San Gabriel Mountains to small neighborhood parks. Recreational activities include: organized sports activities, recreational mining, spiritual gatherings, swimming, hiking, biking, swimming, camping, picnicking, fishing, wildlife viewing, hang-gliding, use of off-road vehicles, and hunting. Despite the diversity of recreational opportunities and open spaces, the region has had difficulties preserving enough open space and recreational areas to meet the needs of its ever growing population.

This section describes an overview of recreational use in the study area, an inventory of recreational resources, an analysis of recreational needs and demand, and future opportunities for recreation within the study area.

Inventory of Existing Parks and Open Space

OVERVIEW OF PARKS AND OPEN SPACE

The study area features a variety of areas devoted to recreation in some form, often in conjunction with the preservation of natural open space or historic sites. These include the federal, state, joint powers authority lands, and an assortment of regional and local parks, nature centers, and preserves. Parks and open space are not evenly distributed throughout the region, and access for those without private transportation is limited.

With the exception of the Puente Hills Landfill Native Habitat Preservation Authority Area, and two county regional parks, large open spaces in the more urbanized portions of the study area are relatively sparse, consisting of isolated patches or narrow, disconnected corridors of green space in a matrix of urban development.

Open space may be described as any land that is not developed for urban use. This may include natural areas set aside for species protection, lands used for agriculture or natural resource extraction, recreational areas, or areas unsuitable for development either due to a potential hazard (such as slide areas or floodplains) or due to other uses such as groundwater recharge or flood protection (San Gabriel and Los Angeles Rivers and Mountains Conservancy 2001).

Parks are a type of open space that is designed and managed for multiple uses such as recreation, natural resource conservation, and education.

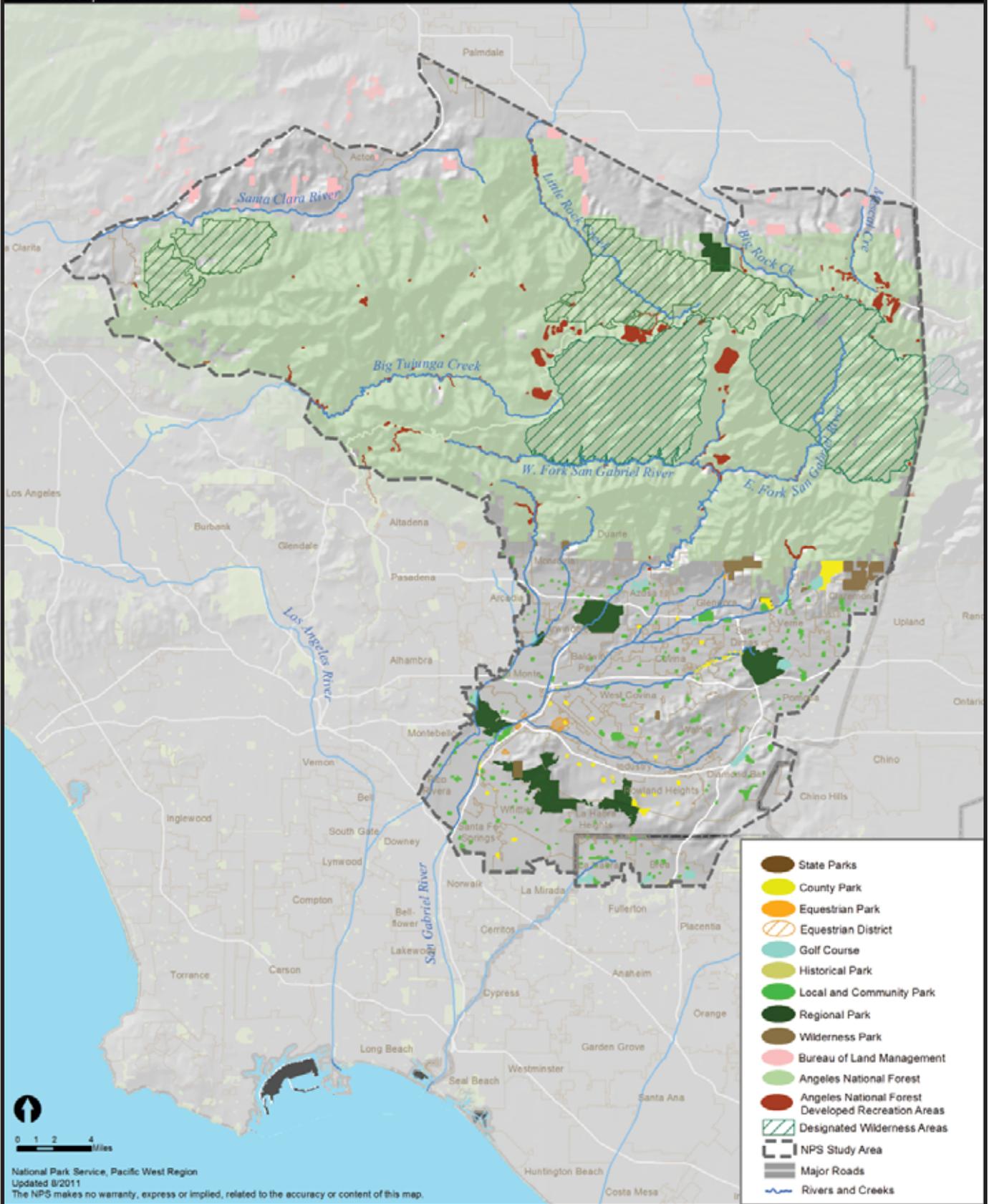
Table 4. Agencies Administering Parks and Open Space in the Study Area

Federal	USDA Forest Service (USFS)
	US Army Corps of Engineers (ACOE)
	Bureau of Land Management
State	San Gabriel and Lower Los Angeles Rivers & Mountains Conservancy (RMC)
	Santa Monica Mountains Conservancy
	California State Parks
Regional Park Districts	Puente Hills Landfill Native Habitat Preservation Authority
Joint Powers Authorities (JPAs)	Mountains, Recreation and Conservation Authority
	Puente Hills Native Habitat Preservation Authority
	Watershed Conservation Authority
County	Los Angeles County Department of Parks & Recreation
	Los Angeles County Department of Public Works
	County of Orange Resources and Development Management Department / Harbors, Beaches and Parks Division
Districts	School Districts
Cities	City Parks and Recreation Departments, Community Services Departments

Parks and Open Space

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



Recreational use may be designated active, passive, or both. Passive use refers to activities that are generally low impact such as hiking, fishing, picnicking, bird watching, or non-motorized boating. Active recreational use may include facilities designed for sports such as soccer or baseball, lakes for motor-boats and jet skis, bicycle trails or equestrian trails.

This section examines parks and open spaces that are specifically managed for recreation or conservation purposes as well as areas which are not exclusively managed for public recreation and conservation purposes but offer some recreational opportunities. The latter areas include country clubs, botanical gardens, schools and universities, and cemeteries.

Within the study area, agencies from all levels of government provide open space, park, and recreational amenities (See Table 4, Agencies Administering Open Space and Recreation in the Study Area.)

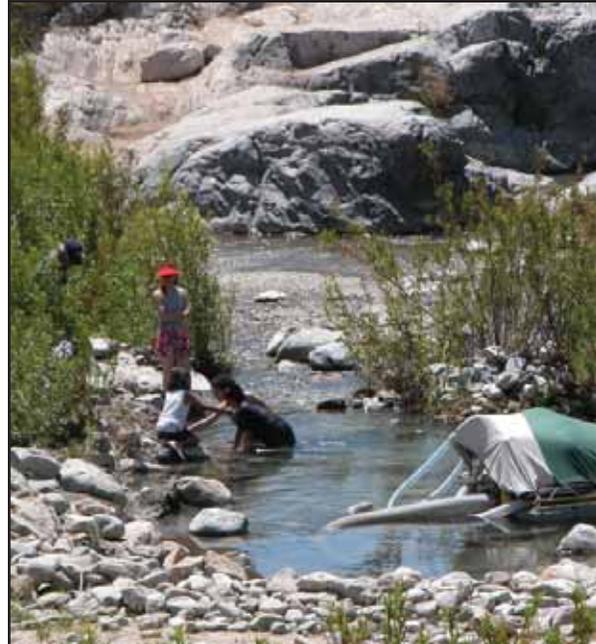
PARKS AND OPEN SPACE MANAGED FOR RECREATION AND CONSERVATION

The following section describes parks, open space and regional recreation areas that are specifically managed to provide recreational opportunities. A summary of these areas within the study area is provided in Table 5. Also, see Map: Parks and Open Space for an overview of distribution throughout the study area.

Local and Community Parks

Local and community parks are generally less than 50 acres and are designed to serve the active recreational needs of neighborhoods and communities. The types of parks that would fall in this category include tot-lots, athletic fields and courts, and playgrounds. Activities include play, organized sports, picnicking, barbequing, and hiking or walking on trails. Over 200 local and community parks are located in communities throughout the study area. Together these parks provide over 2,500 acres of land for managed specifically for recreation. These parks are typically managed by city park agencies and community services departments.

An analysis conducted by the Trust for Public Land demonstrated that higher density communities with lower than average median income in Los Angeles County typically do not have adequate access to local and community parks. While many cities in the study area have ample access to local and community parks, others have few or no



Photos (top to bottom): 1. Santa Fe Dam Recreation Area. NPS photo. 2. Eaton Canyon Natural Area. NPS photo. 3. East Fork San Gabriel River. NPS photo.

Table 5: Approximate Acreage of Study Area Parks and Open Space

Parks and Open Space	Units	Approximate acreage within study area	% of study area (707,000 acres)
Local and Community Parks	241	2,500	<1%
County and Regional Parks	35	11,050	1.6%
Golf Courses	20	1,650 public course (1300 private)	<1%
Wilderness Parks	8	3,100	<1%
Historical Parks and Cultural Sites	3	115	<1%
Equestrian Parks (public) and Districts	7	535	<1%
Bureau of Land Management Lands (BLM)	28	3640	<1%
Angeles National Forest	1	415,000 (5,000 acres or 1.1% of the forest lands are considered <i>developed recreation areas*</i>)	59%
Total Open Space (including forests and BLM lands) = 437,590 acres			
Total Open Space (excluding national forest lands and BLM Lands that have not been developed for recreational access) = 23,950 acres			
*Developed recreation areas in the Angeles National Forest include campgrounds, parking areas, day use areas, picnic areas, visitor centers, rest areas, lakes and reservoirs used for recreation, river access, and scenic overlooks.			
** Congressionally-designated Wilderness areas acreage is included in the total acreage for the Angeles National Forest			
Sources: Green Visions Parks GIS Database (2006), Puente Hills Landfill Native Habitat Authority (2007), Protected Open Space Lands GIS Database (2005), USFS (2005), Southern California Association of Governments Land Use GIS Data (2001).			

parks available. The section, *Recreation Needs and Opportunities*, discusses this issue further.

County and Regional Parks

The Los Angeles County Department of Parks and Recreation manages numerous parks throughout the study area. Some county parks function as local and community parks for unincorporated areas of Los Angeles County while others function as large regional parks that offer many types of recreation opportunities to a large service area. The County of Orange manages Craig Regional Park which spans the cities of Brea and Fullerton.

Major flood protection facilities in the Los Angeles Basin function as regional recreational areas. These include Whittier Narrows Recreation Area, Frank G. Bonelli Recreation Area, and Santa Fe Dam Recreational Area. Each of these regional parks provides over 1,000 acres of land for recreation. They afford a wide variety of recreational opportunities including trails and bike paths, boating, athletic fields, concession services, swimming, nature centers, camping (Frank G. Bonelli Regional Park only), fishing, event venues (such as amphitheaters), and barbeque/picnic areas. Whittier Narrows and Santa Fe Dam Recreational Areas also have nature centers and natural areas. Walnut Creek County Park is a linear park that

follows Walnut Creek from Frank G. Bonelli County Regional Park several miles west through San Dimas and Covina.

Devil’s Punchbowl is a 1,300-acre regional park managed by Los Angeles County at the northern end of the study area. Adjacent to the Angeles National Forest and near the San Andreas fault, this park was set aside so that visitors could learn about and enjoy the dramatic sandstone formations. Devil’s Punchbowl features a nature center and miles of hiking trails. Wildlife viewing is another popular visitor activity at this park.

The largest of the regional parks is the Puente Hills Landfill Habitat Preservation Authority Preserve (Preserve) which includes 3,860 acres of land in the Puente Hills. The Preserve was established in 1994 and is managed by a joint powers authority with a Board of Directors represented by the City of Whittier, the County of Los Angeles, the Sanitation Districts of Los Angeles County, and the Hacienda Heights Improvement Association. Solid waste fees from the Puente Hills Landfill provide funding for the Preserve (Puente Hills Landfill Native Habitat Preservation Authority 2007).

Golf Courses

Large and small golf courses are found throughout the study area. Although Los Angeles County

and several municipal governments manage golf courses for the general public, many golf courses in the study area are privately managed. Public golf courses also typically require usage fees. The study area features almost 3,000 acres of golf courses. More than half of these (1,650 acres) are available for the general public. Approximately 1,300 acres are part of private clubs where membership is required. Golf courses are typically land- and resource-intensive facilities. Golf courses in the study area are about 60 acres on average, although they range in size from a few small courses at 10-20 acres to large 100-200-acre courses.

Wilderness Parks

In recent years land conservancies and municipal governments have cooperated to preserve wilderness parks. Wilderness parks are large, undeveloped open spaces that provide passive recreational opportunities and protect habitat for wildlife. Recreational activities include hiking, biking, horse-riding and dog-walking. Wilderness parks are typically located in foothill communities such as Claremont, Glendora, Arcadia, La Verne, and Pasadena and provide connections to the Angeles National Forest. Galster Wilderness Park in West Covina is located in the San Jose Hills. Over 3,100 acres of land in the study area has been designated as this type of parkland.

Pasadena manages a unique kind of natural park called a watershed park. The Hahamongna Watershed Park is located above Devil's Gate Dam adjacent to the Angeles National Forest. Established in 1997, these lands were previously used for sand and gravel mining operations. When these operations ceased, habitat was restored and a park was established based on community input and participation. The park is meant to be a showcase for water and natural resources education and utilization, preservation of native plants and habitat, Native American culture, and both passive and active recreation.

Historical Parks and Cultural Sites

Often cultural and historic sites occur within a park-like setting and are managed by government agencies or non-profit organizations. These facilities tend to have an educational mission, which provide opportunities for outreach and education. Only one state park is located within the study area, Pio Pico State Historical Park. Local historical parks, museums, and markers that commemorate historical events and features are found throughout the study area.

Equestrian Parks, Centers, and Districts

Use of trails and river corridors by equestrians has a long history in the study area. The horse also was the center of nearly all sporting events for the Spanish and Mexican settlers. Horse races, bullfights, rooster pulls, rodeos (or charreadas), and a variety of other daring feats performed on horses demonstrated the level of one's horsemanship while entertaining an enthusiastic audience (Welles 1972). This tradition continues today. The Pico Rivera Sports Arena near the San Gabriel River still hosts traditional charreadas.

Various equestrian facilities are located throughout the study area. Although many of these equestrian facilities are privately managed, the City of Industry and Glendora feature public equestrian parks. Equestrian facilities are also located in Pico Rivera at Bicentennial Park and Whittier Narrows

Los Angeles County has designated equestrian districts in several places in the study area. Equestrian districts are established to recognize particular areas where the keeping or maintaining of horses and other large domestic animals for the personal use of members of the family residing on the premises has become, or is intended to become, an integral part of the character of the area (Los Angeles County Code, Title 22, Chapter 22.44, Part 3). Of the eight Equestrian Districts designated throughout Los Angeles County, five are located in the study area. All five of these areas are located in close proximity to Whittier Narrows, the San Gabriel River, and San Jose Creek.

BUREAU OF LAND MANAGEMENT LANDS

The Bureau of Land Management (BLM) manages over 3,000 acres of land in study area. These lands consist of isolated parcels scattered throughout Soledad Basin and the Antelope Valley. Lands in the Soledad Basin are managed by BLM's South Coast District Resource Management Plan. This plan has designated most of the parcels in the study area for sale or exchange under Federal Land Policy and Management Act of 1976 (FLPMA). The FLMPA declared it the policy of the United States that "... the public lands be retained in Federal ownership, unless as a result of the land use planning procedure provided in this Act, it is determined that disposal of a particular parcel will serve the national interest..." Several parcels are designated for exchange with the National Forest Service. Antelope Valley parcels are managed under the West Mojave Plan. These will be retained or consolidated to reflect their value wildlife habitat and rare species (BLM 1994 and 2006).

ANGELES NATIONAL FOREST

Visitation and Use

Located in the heart of the greater Los Angeles metropolitan region, over 15 million people live within a 90-minute drive to the Angeles National Forest (ANF). Proximity to such a large urban population means that the ANF is one of the most visited national forests in the United States. In 1992, the U.S. Forest Service reported that the Angeles National Forest was the second highest ranked national forest in the United States for intensity of use. The Forest Service estimates that over 3.5 million visitors come to the national forest on an annual basis, making recreation the predominant use of the forest.

Comprising over 70% of Los Angeles County's open space, the ANF primarily serves day-use and family recreation activities. Almost all of the visitors to the forest are local in origin. Because over 90% of the San Gabriel Mountains are steep and rugged, these visits tend to be concentrated in the developed recreation areas that are easily accessible by roads. Major destination areas include San Gabriel Canyon, Crystal Lake, Big and Little Tujunga Canyons, and the area surrounding Mt. Baldy. Summer visitation is heaviest along areas with water recreation such as the San Gabriel Canyon. Winter recreation is focused around the Mt. Baldy area with its developed ski resorts (USFS 2007). Primary visitor facilities within the study area include two visitor centers, campgrounds, ski areas, picnic areas, trails, and roads. There are several private camps and recreation areas that serve various organizations throughout the region.

Waterfalls are an important recreational feature of the San Gabriel Mountains portion of the ANF. Geologic uplift associated with the Sierra Madre fault system created numerous falls that dot the southern base of the mountains. Some of the most popular and easily accessed falls include the Pasadena Glen Falls, Monrovia Canyon Falls, Millard Canyon Falls, Lewis Falls, Bailey Canyon Falls, San Antonio Falls, Eaton Falls, Sturtevant Falls, and Switzer's Falls (Chester 2004).

Angeles National Forest lands in the San Gabriel Mountains are also heavily used by communities of faith. The mountains and the San Gabriel River are used for baptisms, retreats, faith hikes, pilgrimages, camping, and other spiritual activities such as prayer and meditation. There are about a dozen church camps in the San Gabriel Mountains, most notably Sturtevant Camp and the several Christian-owned camps that border the Pleasant View Ridge Wilderness area.

Visitor Services

Visitor services provided in the Angeles National Forest include interpretive services, visitor center management, interpretive media, in-forest concessions, management, fee collection, community outreach, visitor safety, and law enforcement services. The overall mission of the interpretive services, visitor centers, and education program is to forge intellectual and emotional connections between people and their natural and cultural heritage.

Community outreach includes activities that encourage the stewardship of national forest lands through the participation of people from local areas. These efforts lead to sustainable recreation within the national forest. Partnerships and volunteers are emphasized to improve visitor services and increase opportunities for interpretation and environmental education.

The Angeles National Forest manages approximately 500 recreation special-use authorizations, including four concession campground complexes, two concession target shooting areas, five ski areas, a marina, 26 organization camps, and over 450 summer homes. The forest also issues and administers numerous recreation events, such as mountain bike events and car rallies (USFS 2005).

Facilities

The Angeles National Forest operates over 350 buildings throughout the national forest. These range from restroom facilities and fire stations to administrative offices. In addition, the forest operates 63 campgrounds with over 1,100 individual campsites and an additional 36 picnic areas. Numerous trails are located on the forest; these trails are described in the following section, *Trails and Scenic Highways*.

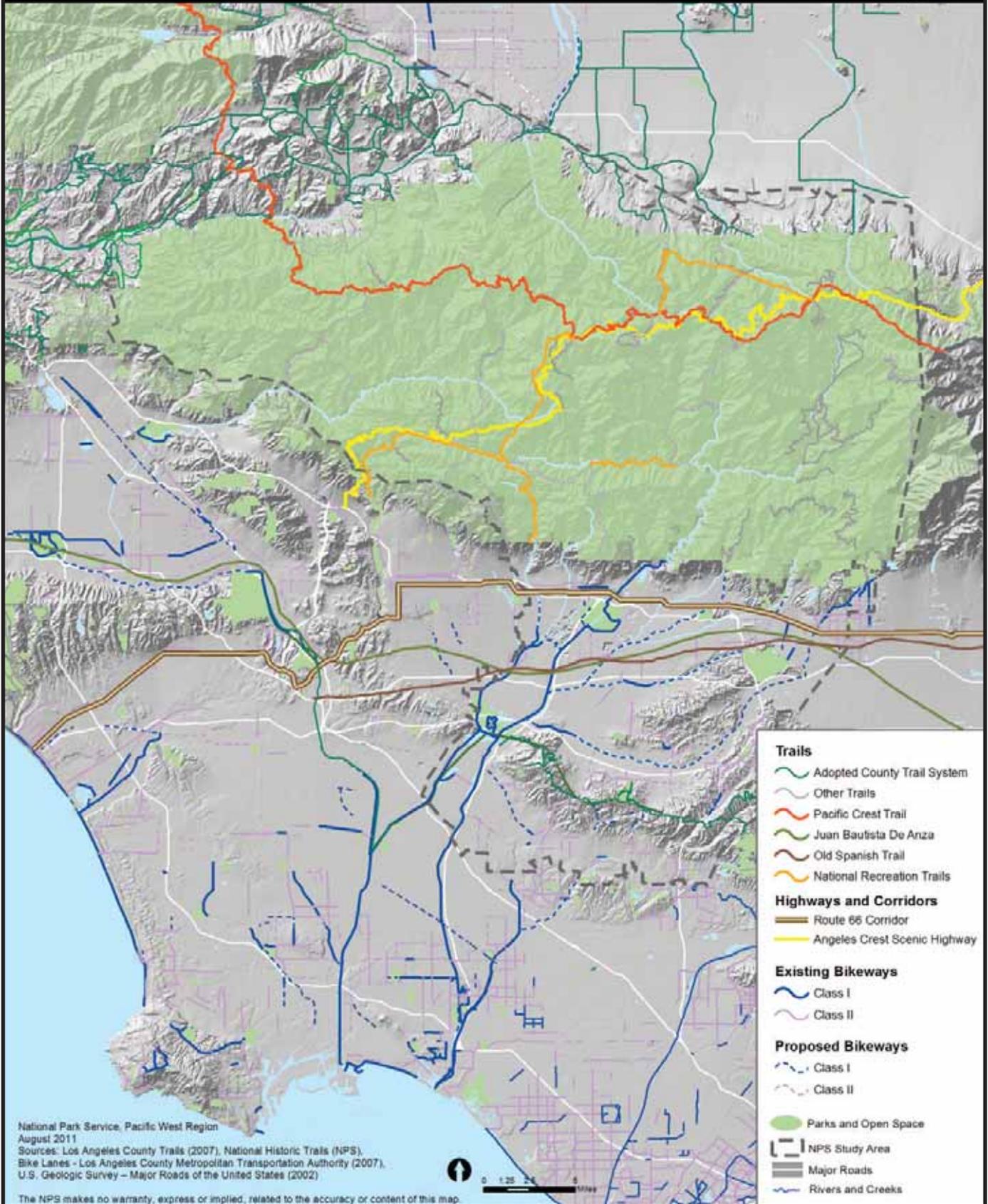
Multiple agencies maintain a large road network in the national forest, including bridges, culverts, low-water crossings, and tunnels. The California Department of Transportation is responsible for three major highways: California State Route 2, California Interstate 5, and California State Route 39. Los Angeles and San Bernardino Counties also maintain a portion of the network. The U.S. Forest Service maintains 1,000 miles of roads.

The 2005 Forest Plan indicates that roads and trails will be maintained to minimize the level of effects to species and watersheds while safely accommodating use. National Forest staff plan to maintain approximately 10 percent of National Forest System roads to their objective

Trails, Bikeways and Scenic Highways

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



National Park Service, Pacific West Region
August 2011
Sources: Los Angeles County Trails (2007), National Historic Trails (NPS),
Bike Lanes - Los Angeles County Metropolitan Transportation Authority (2007),
U.S. Geologic Survey - Major Roads of the United States (2002)

The NPS makes no warranty, express or implied, related to the accuracy or content of this map.



maintenance level. Decommissioning of unneeded or unauthorized roads and trails will be emphasized. ANF staff plan to complete site-specific road analysis on approximately 30 percent of the unclassified roads and make appropriate designations.

Wilderness Areas

There are four Congressionally-designated wilderness areas in the study area, all of which are located in the Angeles National Forest. The *San Gabriel Wilderness* area is over 36,000 acres. It is located north and east of the West Fork of the San Gabriel River. It includes rugged terrain ranging in elevation from 1,600 to 8,200, most of which includes chaparral habitat. Higher elevations are dominated by fir and pine forests. Popular recreation activities that occur in this area include hiking, fishing, waterplay and picnicking. Most of this visitation occurs on trails and riparian woodlands located in canyon bottoms.

The *Sheep Mountain Wilderness* area is over 39,000 acres and located on the eastern end of the San Gabriel Mountains. Approximately 400 acres of this area is located on the San Bernardino National Forest. Elevations range from 2,400 ft. to over 10,000 ft. This highly scenic wilderness area is primarily chaparral habitat. Several pre-1964 mining operations are located in this area with special-use authorization (USFS 2005).

In 2009, Congress designated two new wilderness areas in the Angeles National Forest, both of which are located in the study area. The *Magic Mountain Wilderness* area is over 12,000 acres; it features steep narrow canyons with a combination of chaparral, pines and hardwood forests. This area provides habitat for many of the forest's threatened and endangered species. There are no officially designated trails that fall within this wilderness area. The *Pleasant View Ridge Wilderness* area, containing almost 27,000 acres is located in the northeastern section of the San Gabriel Mountains and includes the northern slope where the mountains meet the Mojave Desert. The area is known for its majestic peaks and spectacular views of the San Gabriel Mountains and desert basin. It is traversed by the Pacific Crest Trail.

Trails and Scenic Highways

Trails and scenic highways provide opportunities for hiking, horseback riding, running, biking, and leisure driving. They also provide a means of connecting people to places, including parks and open spaces where they can partake in other recreational activities. The study area contains a wide range of trail types, including roads that have

designated bikeways, paved trails separate from roadways, unpaved trails, and nationally recognized scenic, historic, and recreational trails.

The Angeles Crest Scenic Highway is an important recreational feature of the study area. It is the only road that traverses through the entire Angeles National Forest from north to south; therefore it provides one of the best opportunities for people to access the forest via automobile. Many trailheads and recreational facilities are located along this highway. This road was designed expressly for recreational pleasure and features outstanding views and mountain scenery.

TRAILS

Trail corridors allow people to connect from their neighborhoods to open space and park resources, while experiencing their surroundings and contributing to their mental and physical well-being. Trail use also provides opportunities for social interaction. With the integration of educational and interpretive elements, trails also become spaces for connecting people to special places and their stories. The increasing demand for trails is exemplified in the Public Opinions and Attitudes on Outdoor Recreation (1997) conducted for California State Parks which revealed through surveys that the top outdoor activity in the state is recreational walking. When asked if they would increase their participation in any particular activities if good opportunities became available, respondents indicated that recreational walking and trail hiking were in the top three activities in which they would engage.

Trail corridors often follow waterways, but they also have the ability to traverse and connect sub-watershed areas as well as other open space areas. Trail corridors, depending on their widths, provide opportunities for integrating native vegetation and limited habitat and groundwater recharge and water quality improvement features such as bioswales.

Trails are maintained by a broad range of agencies. The Angeles National Forest offers 557 miles of hiking and equestrian trails which include 73 miles of National Recreation Trails and 176 miles of the Pacific Crest National Scenic Trail. Trails in the ANF are open to hiking and equestrian and mountain bikes use, except on the Pacific Crest National Scenic Trail and trails in designated wilderness areas.

In the urban areas, trails are primarily used for two purposes, recreation and non-motorized transportation. The County of Los Angeles manages the primary regional trail network. Their trails are

described as multi-use “riding and hiking trails,” but not all of the trails are necessarily feasible for equestrian use.

Trail data for this area is sparse and inconsistent because of the many agencies that manage trails. Agencies which have trail data include the Angeles National Forest, the Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy, and the Los Angeles County Department of Parks and Recreation. Various municipal governments also collect trail data. Trails of the western Puente Hills have also been digitized by the Puente Hills Native Habitat Preservation Authority.

National Trails

The study area contains trails designated under the National Trails System, a network of scenic, historic, and recreation trails created by the National Trails System Act of 1968. These trails provide for outdoor recreation needs, promote the enjoyment, appreciation, and preservation of open-air, outdoor areas and historic resources, and encourage public access and citizen involvement. There are two categories of these trails in the study area, National Scenic and Historic Trails and National Recreation Trails (See map: Trails, Bikeways and Scenic Highways).

National Scenic and Historic Trails preserve stories that are essential to a true understanding of the American experience. While National Scenic Trails and National Historic Trails may only be designated by an act of Congress, National Recreation Trails may be designated by the Secretary of Interior or the Secretary of Agriculture to recognize exemplary trails of local and regional significance in response to an application from the trail’s managing agency or organization. National Scenic and Historic trails within the study area include the Pacific Crest National Scenic Trail, the Juan Bautista de Anza National Historic Trail, and the Old Spanish National Historic Trail. National Recreation Trails include the Gabrieleno Trail, the High Desert Trail, the Silver Moccasin Trail, and the West Fork Trail.

Established in 1968, *The Pacific Crest National Scenic Trail* spans 2,650 miles from Mexico to Canada through three western states, revealing the beauty of the desert, the Sierra Nevada, Transverse, and the Cascade Range Provinces. In the study area, the trail traverses the Angeles National Forest, entering at Cajon Pass and traversing across Blue Ridge, past Mt. Baden-Powell and eventually descending to Highway 14 at Agua Dulce where it enters the Sierra Pelona Mountains. The vistas from the trail in the Angeles National Forest include the Los Angeles Basin and Mojave Desert.

The Juan Bautista de Anza National Historic Trail, which is managed by the National Park Service, commemorates the route followed by a Spanish commander, Juan Bautista de Anza, in 1775-76 when he led a contingent of 30 soldiers and their families through what is now Mexico, Arizona, and California to found a presidio and mission near the San Francisco Bay. This unit of the National Park System has an auto route and a recreational route. The recreational route is currently planned through the Puente Hills to the Whittier Narrows area, and will coincide with the Schabarum/Skyline Trail and a portion of the Rio Hondo River Bike Trail.

The recently designated Old Spanish National Historic Trail commemorates the Santa Fe-to-Los Angeles route that sent dry goods west, and horses and mules east. The Old Spanish Trail forged the first overland link to California for the east coast markets served by the Santa Fe Trail and the trade-hungry markets of Mexico and New Mexico using El Camino Real de Tierra Adentro. The trail, which is more than 2,700 miles long and crosses New Mexico, Colorado, Arizona, Utah, Nevada, and California, goes through the Los Angeles region paralleling the Juan Bautista de Anza National Historic Trail.

The BLM and NPS will work with partners to provide recreation, public education, and interpretation, including: marking trails for public use, conducting historic and archeological research, developing visitor services and facilities, and protecting trail-related sites and segments along the historic routes.

The Gabrieleno Trail follows the route of an original 1920s road that ran from Pasadena north up the canyon past wilderness resorts and old rustic cabins. The road lost its appeal after the Angeles Crest Highway was built, but today has reinvented itself as a multiuse trail for hikers, horseback riders, mountain bikers, and birders. Much of the hike follows a gurgling stream past thick groves of live oak, sycamore, Douglas fir, and big-leaf maple trees. Except for the first half mile, the path is almost entirely in the shade, making it a great year-round hike. Some hikers prefer to begin at the northern end of the Gabrieleno Trail, heading south into the forest from Switzer Falls Picnic Area and ending at the Arroyo Seco trailhead.

The High Desert Trail is a 27-mile backcountry trail that incorporates several trails, including the Burkhardt Trail, Devil’s Punchbowl Trail, Manzanita Trail, and South fork Trail. The High Desert Trail system joins the San Gabriel Mountains with the Mojave Desert, and combined with the Pacific Crest Trail, it forms two small loops or one large loop. The

trail affords the Pacific Crest Trail traveler a “high desert experience” alternative.

The Silver Moccasin Trail is the oldest designated national recreation trail and stretches 51 miles through the Angeles National Forest Backcountry. The trail runs from Red Box down the West Fork of the San Gabriel River, up Shortcut Canyon and across the head of Big Tujunga to Charlton Flat and onto Chilao. From this point it follows along the Pacific Crest Highway to Mt. Baden-Powell and ends at Vincent Gap. This trail has been used by the Boy Scouts of America since 1942. Those that successfully complete the 5-day trip receive a Silver Moccasin badge.

The West Fork Trail is a paved trail which extends six miles along the West Fork of the San Gabriel River. This trail is popular for bicyclists in the region and provides access to excellent fishing locations.

Angeles National Forest Trails

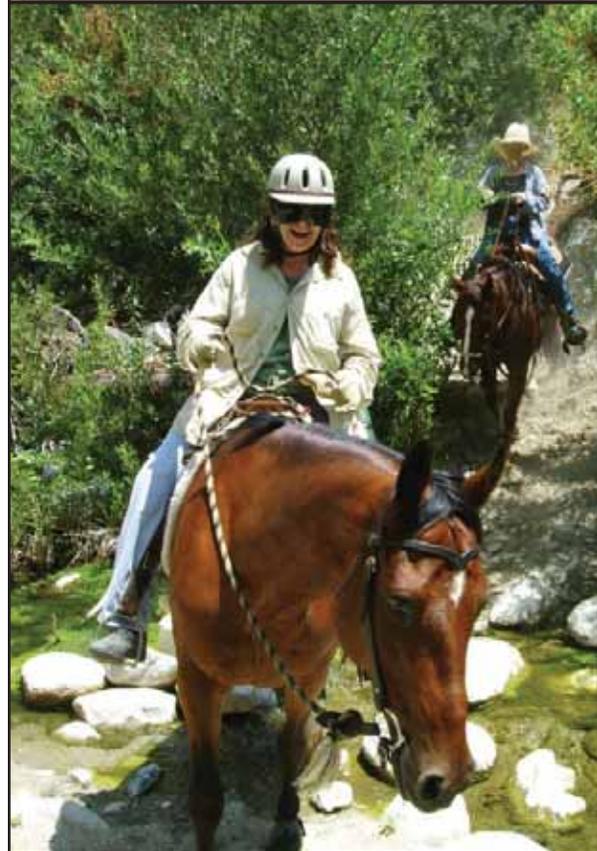
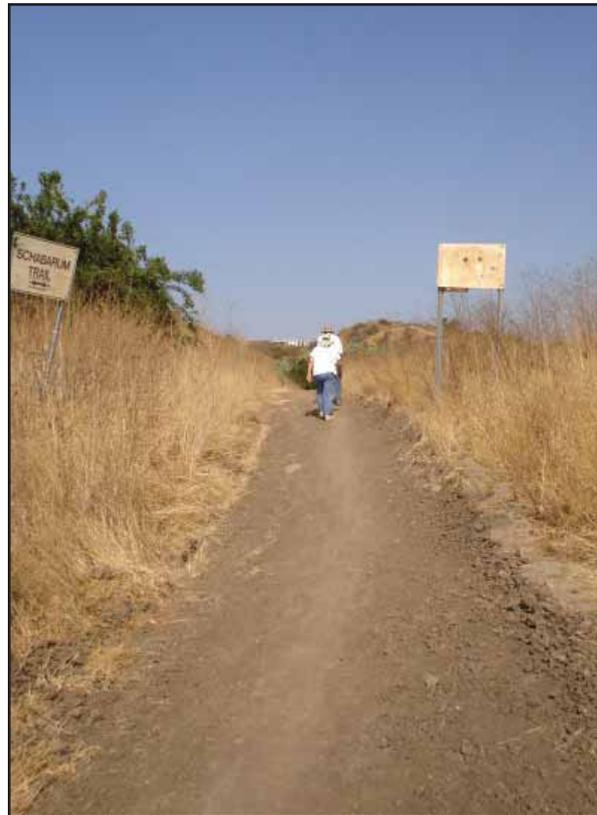
In addition to the popular National Recreation Trails described above, the Angeles National Forest provides hundreds of miles of trails and fire roads. John W. Robinson’s *100 Hikes in the San Gabriel* provides good descriptions of these trails. They range from strenuous to easy and provide access to historic structures, high mountain peaks, and wilderness areas. With the exception of the wilderness areas, trails are generally open to mountain bikes. Equestrians also make use of the Angeles National Forest Trails. Many miles of trails are also available for off-highway vehicle use (OHV).

County and Regional Trails

Regional trails and greenways are located throughout the study area linking various parks and open spaces. Schabarum (also known as Skyline) Trail extends 17 miles through the Puente Hills from Workman Mill Road in the west to Fullerton Road in the East. It serves as the spine for the preserve’s trail system and is maintained by Los Angeles County Parks. Schabarum Trail will also serve as a recreational route for the Juan Bautista de Anza National Historical Trail.

Los Angeles County manages a regional trail network within the study area that connects regional and county parks. The County’s trail network connects all of the regional parks in the study area. A similar county trail network is planned for the Soledad Basin area and the Antelope Valley to the west and north of the Angeles National Forest.

The Marge Feinberg Rim of the Valley Trail Corridor encompasses the entire upper Los Angeles River



Photos (top to bottom): 1. Schabarum Regional Park, Puente Hills. NPS photo. 2. Equestrians in Arroyo Seco. NPS photo.

watershed area within the Angeles National Forest and portions of the Upper Santa Clarita River watershed. The trail is 150 miles long and approximately 60% complete. Trails connecting into the Rim of the Valley trail are the Backbone Trail, Pacific Crest Trail, De Anza Trail, and the Los Angeles River Parkway. Responsible jurisdictions are Los Angeles County, Ventura County, City of Los Angeles, US Forest Service, National Park Service, and California Department of Parks and Recreation (California Department of Recreation and Parks 2002).

Bikeways

There are several types of bicycle paths and trails available in the study area. Class I bikeways feature off-street, bi-directional paved paths designated for cyclists. The San Gabriel River and Rio Hondo River trails are examples of Class 1 bike paths. These river bike trails also serve as regional trails and greenways, connecting communities and park areas. Los Angeles County's San Gabriel River bike trail extends from the southern border of the Angeles National Forest in Azusa, all of the way to the Pacific Ocean. The total trail length is 39 miles. This trail includes access points from most major streets and direct access to 15 parks. The Rio Hondo River Trail links to the San Gabriel River Trail via the Whittier Narrows Recreation Area and converges with the Los Angeles River Trail near Downey, just south of John Anson Ford Park. The Whittier Greenway Trail is a 5-mile bicycle/pedestrian trail which replaced an abandoned right-of-way of the old Pacific Electric Railway.

Other bikeways are located along streets and roads. These include Class II bikeways, on-street, one-way striped lanes designated for cyclists, and Class III bike routes, on-street preferred bicycle routes designated by signs only.

The Los Angeles County Metropolitan Transportation Authority (Metro) developed a strategic plan in 2005 to describe a vision for bicycling as a viable transportation mode in Los Angeles County. The strategic plan establishes regional bicycle planning policies and provides tools for local agencies in creating local bicycle plans (Metro 2006).

Equestrian Trails and Access

Equestrian users need strategic access points and staging areas to use the many trails available for equestrian use. Staging areas are located throughout the study area in Azusa, Duarte, Santa Fe Dam Recreation Area, San Dimas, Walnut, and the nearby Whittier Narrows Dam Recreation Area.

Equestrian trails parallel the San Gabriel and Rio Hondo River Trails along many portions of these rivers. Some specific equestrian facilities include the Pico Rivera Bicentennial Park & Equestrian Center located at the northern end of the Whittier Narrows area. This facility holds 168 horse stalls and provides access to miles of trails. Included in the City of Industry is the Industry Hills Equestrian Center, a 400-staff equestrian center that provides access to 15 miles of trails for riding and hiking. The City of Walnut also maintains 26 miles of multi-use trails which are equestrian-oriented.

Off-Highway Vehicle Trails

Trails for off-highway vehicle (OHV) use are found throughout the Angeles Forest in Soledad Basin and the Antelope Valley. Approximately 291 miles of unpaved road are open to OHV use on the Angeles National Forest while another 194 miles of unpaved road are closed to such use. It is estimated that the forest has 131,965 riders annually (Chavez and Knapp 2004). As OHV use grows in popularity, management concerns have arisen, including use of undesignated trails, soil erosion, water degradation, habitat destruction, the spread of endangered species, damage to cultural sites, and conflicts between different recreational user groups.

Trail Connectivity

Another key issue is trail connectivity, or the degree to which trails connect to each other and to open space and park resources. Within the San Gabriel River watershed, the Los Angeles County's regional trail system connects local parks, regional parks, and national forests. In the western portion of the study area, the Rim of the Valley Regional Trail connects open spaces along the western San Gabriel Mountains Foothills, the Verdugo Mountains, the San Gabriel and San Fernando Valleys, and the Santa Monica Mountains. This trail provides several connections to Angeles National



OHV use. Angeles National Forest. NPS Photo.

Forest Trails. Connectivity between cities and parks exists in some areas but there are many local trails that do not extend beyond jurisdictional borders. The Metropolitan Transit Authority has identified connections for bike trails and commuter bike lanes on city streets. Los Angeles County Parks and Recreation has planned a connected trail system for the Antelope Valley area that will connect national forest lands to local communities. Planning is underway for this effort.

SCENIC ROADS AND HIGHWAYS

Angeles Crest Highway

The Angeles Crest Highway is the only major roadway that traverses the San Gabriel Mountains. The highway traverses from La Canada Flintridge through the heart of the mountains to Wrightwood, on the northeastern base. Completed in 1956, the highway was first proposed in the early 1900s to provide access to the spectacular scenery, recreational areas, historic sites, geological features, and to mountain communities. In 1971 it was designated a California State Scenic Highway and in 1990, a National Forest Scenic Byway. From the highway, visitors can access campgrounds, ski areas, wilderness areas, historic sites, natural areas, picnic areas, and national recreation trails.

OTHER AREAS THAT OFFER RECREATIONAL OPPORTUNITIES

Various land uses in the study area not expressly managed for public recreational opportunities also provide opportunities for recreation. These areas include schools, colleges and universities, botanical gardens, and cemeteries.

Schools

Schools provide the opportunity to supplement open space resources in communities, particularly in areas that lack traditional parks and wildland areas. School grounds such as playing fields and playgrounds can be managed for multiple uses, providing community spaces close to neighborhoods when school is not in session, such as during afternoons, weekends, and holidays. Because the distribution of schools tends to be denser than the distribution of parks in the study area, they provide an important opportunity to provide close-to-home recreation opportunities. There are nearly 500 elementary, junior high, and senior high schools in the study area.

Colleges and Universities

Institutions of higher education provide multiple opportunities for providing recreation and conservation areas. In addition to having larger campuses than elementary, middle, and high schools, student populations are often energetic to engage in environmental issues. There are nine colleges and universities in the study area. Several colleges and universities managed open space for habitat conservation and recreation. For example, the Rio Hondo Wildlife Sanctuary at Rio Hondo College is available for research and educational use.

Botanical Gardens

Botanical gardens, although not expressly managed for public recreation, provide an opportunity to walk and hike while learning about plant communities. Approximately 25 acres of the 86-acre Rancho Santa Ana Botanical Gardens, managed by California Polytechnic University, Pomona, are within the study area. The garden is expressly designed to preserve and showcase native California plant communities.

Cemeteries

While not traditionally considered open space, larger cemeteries and memorial parks are typically open, landscaped areas. Through public-private partnerships, there could be opportunities to develop watershed management practices in these areas. There are even examples of cemeteries being used by communities for recreational uses such as walking. Within the watershed, there are seven large cemeteries over 10 acres. Rose Hills Memorial Park in the Puente Hills is the largest cemetery in the study area. At 1,500 acres, it is also one of the largest in the world.



The Angeles Crest Highway. 2005. NPS photo.

Recreation Needs and Opportunities

INTRODUCTION

The Los Angeles metropolitan region has struggled to provide adequate recreation opportunities for its growing urban areas since its first population boom at the end of the 19th century. Throughout the 20th century, population growth and development in the region has far outpaced the creation of recreational facilities. This has occurred despite the completion of previous comprehensive recreation studies that called for investment in more recreational facilities.

Deficiencies in recreation and open space remain for much of the Los Angeles Region. Over 15 million people live in the larger metropolitan region and the California Department of Finance projects another 13 million residents by 2050 (California Department of Finance 2007a).

With existing recreation and park areas in most cases already taxed beyond capacity, it is safe to assume that significant efforts will need to take place to ensure sufficient opportunities for diverse recreational experiences in the future. In addition, communities of color and children have disproportionately low access to parks and open space in Los Angeles County. See also Chapter 7, *Environmental Consequences*, for a more discussion on current recreation trends.

NEEDS

Recreation Demand in Urban Areas

In addressing present and future open space concerns for the study area, disparities must be addressed regarding the disproportional access to park and recreational space. As recent reports from The Trust for Public Land (TPL) and the City Project indicate, public access, predominantly of minority populations, to parks and recreation facilities is a serious concern. According to TPL, Los Angeles County ranks at the bottom in comparison to the nation's seven major cities (Boston, New York, San Francisco, Seattle, San Diego, and Dallas) in terms of providing access to parks for children. In fact, the report, based on 2000 census data, indicates

that “more than 1.5 million children in Los Angeles County do not live within walking distance of a public park.” In most cases, parks in the Los Angeles region are not located near those areas with high concentrations of young children (Trust for Public Land 2004).

The issue of accessibility is of particular concern when measuring existing open and park space in comparison to population densities. As demonstrated in the City Project's work in Los Angeles, many families in the low income neighborhoods of the region often do not have cars nor are near public transportation systems that allow for access to regional parks. This is particularly true in the case of the 651,874-acre Angeles

National Forest which, in making a simple per capita measurement (open space divided by population size), appears to indicate a sizeable measurement of potential recreation space in comparison to a local urban population. However, the aforementioned barriers to access and the inaccessibility of much of the forest's terrain, skews this measurement significantly.

Public interest in open space and recreation in the region is significant and concerted efforts are underway by a myriad of non-profit organizations, local and municipalities, community groups, and private and public groups to procure and maintain open space in various areas throughout the Los Angeles region. Furthermore, the \$2.6 billion Proposition 40 has further sparked this interest in public space allowing for funds to be allocated for environmental and park projects throughout the state of California (Trust for Public Land 2004).

Regional stakeholders such as the state land conservancies, land trusts, and other non-profits have worked diligently in their respective efforts to maintain and acquire park and open space in the region. The Rivers and Mountains Conservancy (RMC), one of eight conservancies in the California Resources Agency, is working to “preserve open space and habitat in order to provide for low-impact recreation and educational uses, wildlife habitat restoration and protection and watershed

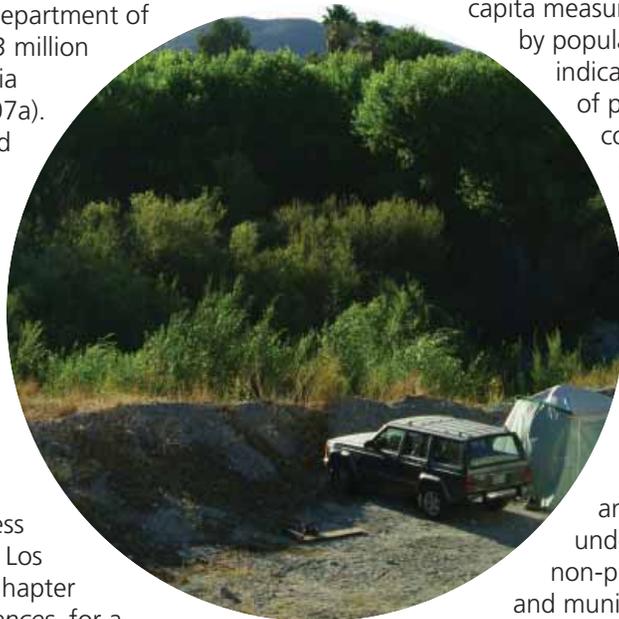


Photo caption: The Santa Clara River. 2007. NPS photo.

improvements within our jurisdiction.” Their work has been instrumental in the allocation of several new parks and open spaces including the Woodland Duck Farms (in coordination with the Trust for Public Land and the El Monte/Gibson Road Community Park. RMC has also been instrumental in their work on the San Gabriel River Corridor Master Plan

The Emerald Necklace Plan, headed by Amigos de los Rios, is working with local communities to develop a 17-mile loop of parks and greenways that connect to the San Gabriel River, creating additional open space for the local communities, and providing opportunities to improve water quality and create habitat. It is their vision to serve 500,000 local residents with more than 1,500 acres of interconnected parks and open spaces. Amigos de los Rios’ work with local communities has resulted in the establishment of several parks along this necklace including Lashbrook Park, and the current rehabilitation of Rio Vista Park, both in the city of El Monte.

National Forest Challenges and Demands

With over 10 million people within a 90-minute drive, the Angeles National Forest is highly used by local residents. Increasing recreation demands put increasing pressure on forest management. It is estimated that the recreational demand will increase by as much as 15-35% over the next two decades (UCLA Landscape Architecture Program 2006).

The effects of heavy recreational use in sensitive river corridors, particularly in the upper San Gabriel River Watershed, have impacted sensitive resources. With a mild climate, these areas receive year-round visitation. Additionally, on summer weekends, more than 10,000 visitors come to this area. Challenges include trash, graffiti, tree-carving, and other illegal activities (UCLA Landscape Architecture Program 2006).

As U.S. Forest Service budgets have been primarily allocated for wildfire preparedness, the Angeles National Forest has struggled to provide adequate staffing and facility maintenance for such heavily used areas. Base budgets for non-fire operations have remained relatively flat since 1995. When adjusted for inflation, such budgets have actually fallen. Meanwhile, recreation demands have continued to increase. With additional staffing, the U.S. Forest Service could expand education programs, ranger patrols, and facility maintenance to better address these needs (Richardson 2009).



Photos (top to bottom): 1. San Gabriel River bike trail, near Lashbrook Park. 2004. NPS photo. 2. The San Gabriel River. 2004. NPS photo. 3. Picnicking by Jackson Lake. 2007. NPS photo.

Station Fire Effects on Recreation

A number of campgrounds and picnic sites within the ANF were damaged by the 2009 Station Fire. Those campgrounds damaged by the Station Fire include Monte Cristo, Mt. Pacifico, Messenger Flats, Chilao, Valley Forge, West Fork, Devore, Millard, and Gould Mesa. Forest Service picnic areas damaged by the fire are: Wildwood, Vogel Flat, Stoneyvale, Pines, and Switzer. The U.S. Forest Service anticipates that most campgrounds will be opened to the public when the burn closure ends, even though some features are fire-damaged. Damaged tables, restrooms, etc. will be repaired or replaced following availability of funds.

After the Station Fire, many forest roads were left without guard rails and regulatory and safety road signage, making them unsafe for regular traffic. The damage to the surrounding land and hillsides also made the roads vulnerable to debris flow hazards during rain storm conditions. Because of this public safety danger, roads within the burned area are only open to residents, agency personnel, and construction crews. Trails were also damaged by fires and subsequent erosion. Reconstruction of trail sections will also be necessary in many areas of the forest affected by the burn (USFS 2010).

OPPORTUNITIES

An inventory of open space with the urbanized portion of the study area (excluding the Angeles National Forest) demonstrates that opportunity areas often exist within the watershed corridors of the San Gabriel and Rio Hondo Rivers, in addition to tributary creeks including Walnut Creek and San Jose Creek. Flood zones both within and outside of these particular corridors provide open space with potential for recreational use.

Additional opportunities for recreation and park development may also exist in industrial areas and Brownfield sites. Though remediation will no doubt be a concern, exhaustible extraction activities, namely oil and mineral sites, provide an opportunity for park and recreation space as these activities will at some point end.

The eventual expiration of quarry activities, in such areas as Irwindale, Pico Rivera, and Baldwin Park, may open up significant areas of open space within the San Gabriel River corridor, presenting additional opportunities for open space and recreation.

Utility right-of-way areas in many areas throughout the study area provide significant tracts of open space that are, in places, used for such activities as biking, walking, equestrian, use and plant

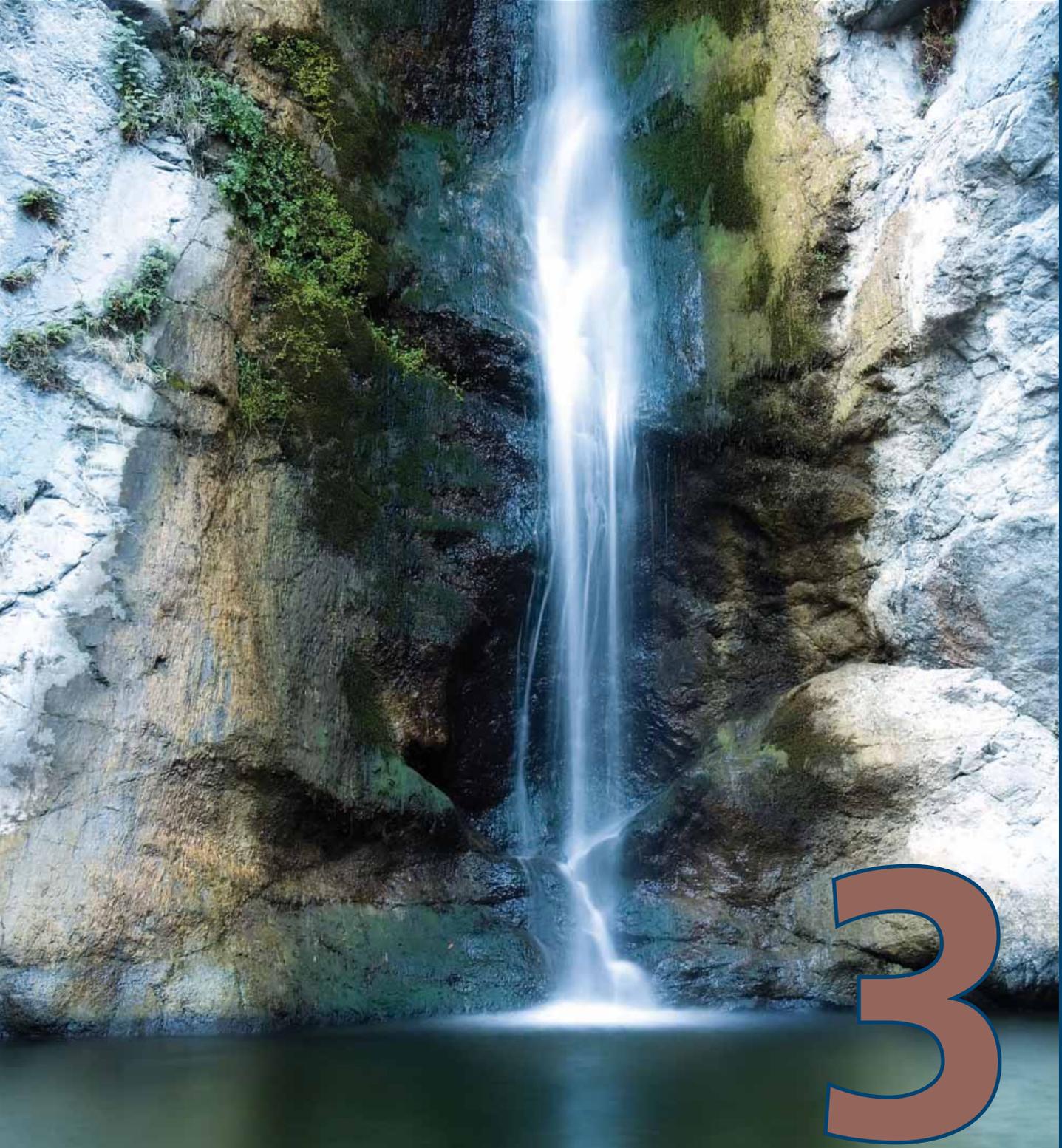
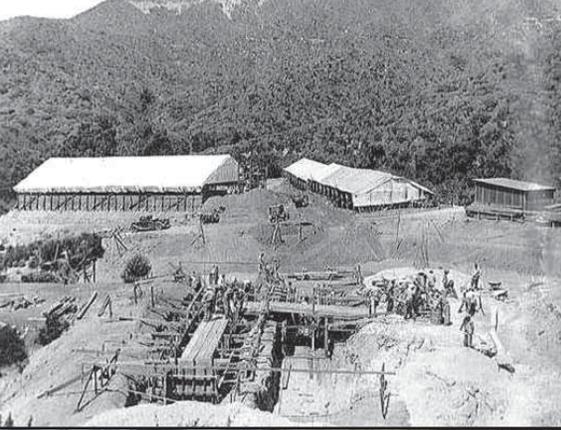
nursery activities. Safety is no doubt a concern and negotiations with utility companies and city municipalities will need to take place to determine the appropriateness of space associated with any rights-of-way.

Opportunities for further trail enhancements and connections exist throughout the study area. Efforts are underway to extend trail networks, particularly in and around the proposed Emerald Necklace project area. Additional efforts are underway to improve and link trail networks in Puente Hills, Schabarum Park, and the San Gabriel Foothills. Broader regional planning could greatly assist local agencies in realizing greater trail connectivity.

As many of these opportunity areas span political boundaries and are beyond local municipality control, a regional, effective, and comprehensive approach should be taken when examining these opportunity sites. In doing so, barriers related to the relatively fragmented political character of these cities must be overcome so as to ensure effective and comprehensive management policies for regional recreation and open space planning.



Wildflowers, Puente Hills. 2010. NPS photo.



Resource Significance

3

Photos (clockwise): 1. San Dimas Experimental Forest. United States Forest Service photo. 2. Walnut tree. NPS Photo. 3. Hiking, Angeles National Forest. NPS Photo. 4. Eaton Falls. Photo by Eric Lowenbach.

Chapter 3: Resource Significance

Criteria for National Significance

The National Park Service (NPS) uses four basic criteria to evaluate the national significance of proposed areas. These criteria, listed in the National Park Service *Management Policies*, state that a resource is nationally significant if it meets all of the following conditions:

- It is an outstanding example of a particular type of resource
- It possesses exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage
- It offers superlative opportunities for public enjoyment, or for scientific study
- It retains a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource

The NPS evaluates national significance for cultural resources by applying the national historic landmarks (NHL) criteria contained in 36 CFR Part 65 (see Appendix E), in addition to the criteria above.

National Park Service professionals consult with subject matter experts, scholars, and scientists in determining whether a study area is nationally significant. Natural and cultural resource experts and scholars, locally and within the NPS, contributed expertise, research and technical review of this statement of significance. See Chapter 8, *Consultation and Coordination* for more information on subject matter experts and their role in this portion of the study process.

National Significance of the San Gabriel Watershed and Mountains Study Area

The topographically and geographically diverse study area contains a mosaic of natural communities that span both coastal and desert ecological regions. Plant communities range from coastal sage scrub in the coastal valleys and foothills, to unique subalpine habitats high in the San Gabriel Mountains, to desert scrub and Joshua trees at the northern base of the mountains. The region has a long history of human use with a wide range of historical and archeological resources.

Due to extensive urbanization in the Los Angeles region, many native plant communities and their associated wildlife are now rare, threatened or endangered. The intersection of biological resources and urbanization has made the southern California coastal region the most-threatened biologically diverse area in the continental United States (California Department of Fish and Game 2007). Southern California has been identified as a "hotspot" for biodiversity due to the high diversity of imperiled species (Stein, Kutner and Adams 2000). Archeological and historical resources have also been impacted by urbanization.

In 1973, the National Park Service conducted a comprehensive survey of natural history in California and identified sites with national significance that would be eligible for National Natural Landmark designation. This survey found that for areas in the Transverse and Peninsular Ranges, "Much of the mountainous areas lack intensive agriculture or dense urbanization, unlike the lowland valleys and floodplains of this area. These upland sites are in many cases the sole remnant of the pristine landscape (NPS 1973)." This statement remains true today. The significant resources within the study area are concentrated in the San Gabriel Mountains and foothills and in undeveloped hillside areas such as the Puente-Chino Hills.

Nationally Significant Regions

The NPS determined that two regions of the study area are nationally significant, the San Gabriel Mountains and the Puente-Chino Hills (See Map: Nationally Significant Regions). These regions contain outstanding examples of geologic resources and native southern California ecological communities. The San Gabriel Mountains are also culturally rich, with a long history of human use. Nationally significant cultural resources in the San Gabriel Mountains include the Mount Wilson Observatory and the San Dimas Experimental Forest.

SAN GABRIEL MOUNTAINS

The San Gabriel Mountains and foothills are nationally significant for their geologic resources, high biodiversity, dynamic river systems, and the long history of scientific study and discovery. Early conservation of the San Gabriel Mountains ensured that these areas were protected from the rapid development of the Los Angeles basin, which began in the late 19th century. The active mountain system has created scenic and unusual landscapes that support a high level of ecological

diversity. Within a short distance, the mountains and foothills feature coastal, desert, montane and sub-alpine ecological communities. This diverse landscape provides habitat for an abundance of rare and endemic plants and wildlife. In addition, the San Gabriel Mountains contain significant waterways and riparian areas, some of which are eligible Wild and Scenic River segments. Nationally significant cultural resources include the San Dimas Experimental Forest, which contains some of the earliest and most comprehensively and continuously monitored research watersheds, and the Mount Wilson Observatory which includes large telescopes that were used in significant astronomical discoveries.

PUENTE-CHINO HILLS

The Puente-Chino Hills contain rare native plant communities. Although this area is somewhat of an island of open space surrounded by urbanized areas, the Puente-Chino Hills and the Santa Ana Mountains to the southeast together encompass about 500,000 acres of wildlands containing significant biological resources.

The remaining portions of the study area which contain highly urbanized communities were found not to be nationally significant. These areas include

urbanized areas of the San Gabriel Valley and the Los Angeles Coastal Plain. Although significant natural and cultural resources are located within these urbanized areas, these resources are highly fragmented and surrounding development has, in many cases, negatively impacted their integrity.

National Significance Criteria

The following analysis describes how the study area resources meet the national significance criteria. More detailed information on study area resources and historical context can be found in Chapter 2, *Resource Description*.

San Gabriel Mountains

CRITERION 1: IT IS AN OUTSTANDING EXAMPLE OF A PARTICULAR TYPE OF RESOURCE.

Natural Resources

Mountain building and diverse geology. The San Gabriel Mountains present the greatest vertical elevation gain for the shortest horizontal distance from the ocean, when compared to anywhere else in the continental United States. These mountains owe their ruggedness to the fact that they are one of the most tectonically active mountain systems in the United States. Tectonic activity along the

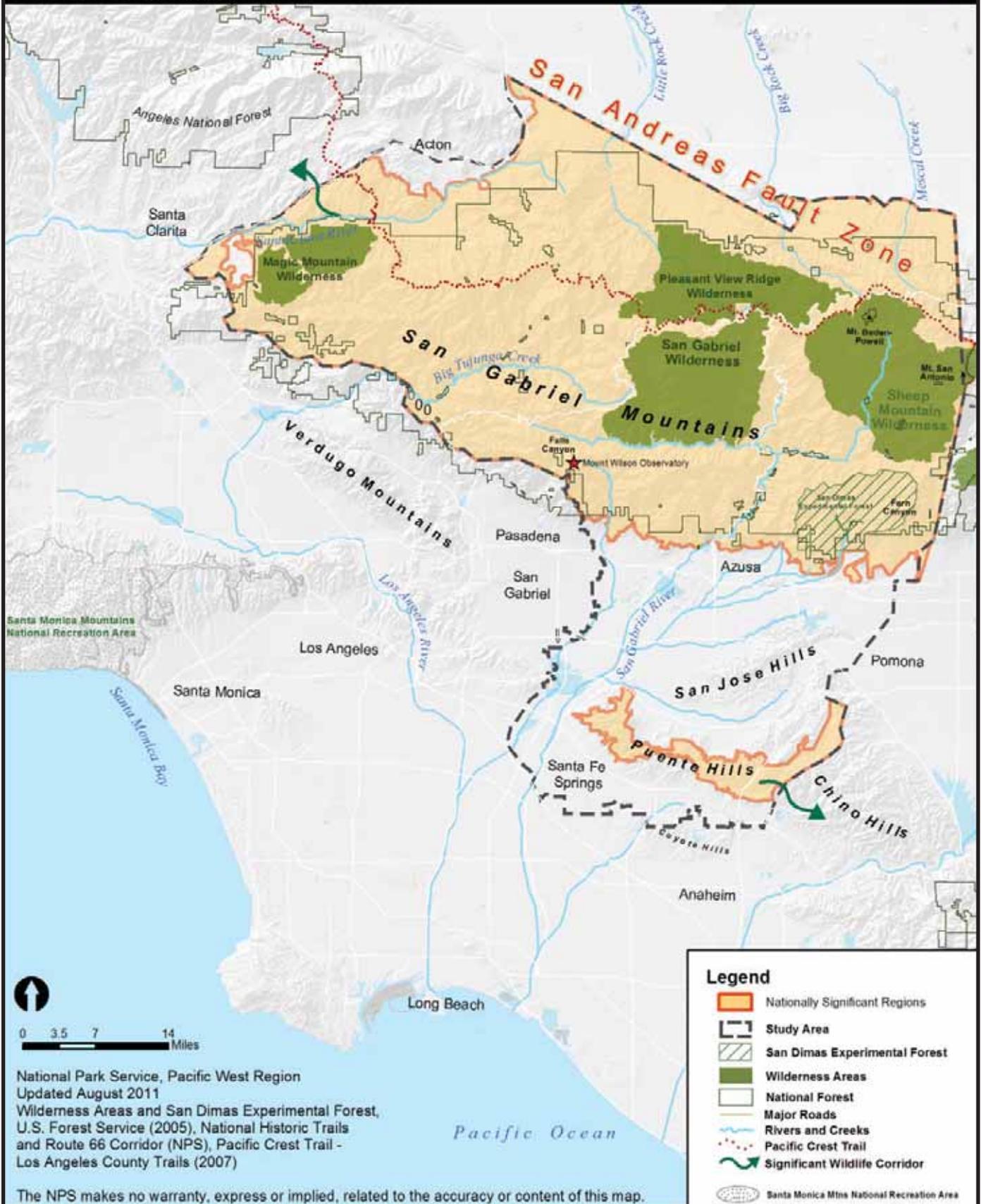


San Gabriel Mountains, Vincent's Gap. NPS photo.

Nationally Significant Regions

San Gabriel Watershed and Mountains Special Resource Study

National Park Service
U.S. Department of the Interior



National Park Service, Pacific West Region
Updated August 2011
Wilderness Areas and San Dimas Experimental Forest,
U.S. Forest Service (2005). National Historic Trails
and Route 66 Corridor (NPS), Pacific Crest Trail -
Los Angeles County Trails (2007)

The NPS makes no warranty, express or implied, related to the accuracy or content of this map.

San Andreas and other regional faults force the mountains to rise at a rate of as much as 2 inches a year. The San Gabriel Mountains thus provide an ideal setting to learn about mountain building and plate tectonics. Geologists have studied the San Gabriel Mountains for many years and continue to make new discoveries about the evolution of the San Andreas Fault and the Transverse Range province (Gumprecht 1999, McPhee 1989, Murphy 1985, Powell 1993).

One of the most geologically diverse mountain ranges in southern California, the San Gabriel Mountains are comprised of rocks from all the major geologic eras as defined by the U.S. Geological Survey's geologic time scale. This includes the most extensive, best-exposed and most completely studied exposures of several geologic formations: the San Gabriel Mountains anorthosite massif, the Mount Lowe plutonic suite, and Pelona schist (Carter 1982a and 1982b, Ehlig 1982, Powell 2007a).

The San Gabriel Mountains also contain some of the oldest rocks in California. Ancient Precambrian rocks in the San Gabriel Mountains include Mendenhall gneiss (1.045 billion years old), anorthosite and related rocks (1.02 billion years old) and augen gneiss (1.7 billion years old). Although these rocks are not as old as the 3.6 billion-year old Archean rocks of the Lake Superior region, they do form part of the Precambrian core of the North American continent. Rocks of this age are typically associated with what geologists refer to as the North American craton, the old nucleus of the North American continent. Ancient rocks associated with the North American craton are typically found throughout the Midwest and in the Colorado Plateau (areas of Utah, Colorado, Arizona and New Mexico where the craton has been uplifted) (Norris and Webb 1990, Powell 2007b, Lillie 2005).

Within the San Gabriel Mountains there are many striking landforms. One such area is the Devil's Punchbowl, a magnificently exposed ridge of steeply tilted sandstone that was forced out of areas of older crystalline rocks by tectonic activity along the San Andreas rift zone. Tilted sandstone ridges and associated riparian areas create a highly scenic landscape. The Devil's Punchbowl was identified by two previous studies as a nationally significant geological feature (NPS 1974 and NPS 1976). The latter study recommended it for designation as a National Natural Landmark. It was described as "*an ideal place to ponder the importance of the regional faults and to view the San Gabriel Mountains*" (NPS 1976)." Devil's Punchbowl is designated a "Special Interest Area"

by the Angeles National Forest and is managed as a county park by the Los Angeles County Department of Parks and Recreation.

Geologic activity in the San Gabriel Mountains creates dynamic disturbance regimes. As a result of significant tectonic activity, mountain building and climate, ecological systems in the region have evolved to be dependent on disturbance dynamics associated with fire, flooding and erosion. Specialized plant communities have adapted to these disturbance conditions.

The U.S. Forest Service's San Dimas Experimental Forest (SDEF) is an international leader in the study of dynamic disturbance regimes. Established in 1933, the SDEF is one of the first U.S. Forest Service experimental forests established in the nation. Created as a natural laboratory to study fire, hydrology, and other topics related to chaparral ecology, the SDEF maintains some of the earliest and most comprehensive records from continuously monitored experimental watersheds in the United States (Jones and Stokes 2004). In 1976, the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Man and the Biosphere Program recognized the SDEF as a "Biosphere Reserve."

The SDEF's technological innovations in watershed research include:

1. the development of rain gauges and rain gauge networks to accurately measure precipitation in steep terrain,
2. the development of flumes (San Dimas Flume) to measure and withstand debris-laden flows,
3. the identification of post-fire soil conditions, and
4. use of lysimeters, large rectangular planters used to measure the influence of different vegetation types on water transpiration, evaporation, and percolation.

High levels of biodiversity. The topographically and geographically diverse San Gabriel Mountains feature climatic variations and extreme changes in elevation that create conditions for a high level of biodiversity. The San Gabriel Mountains contain plant communities that span two ecological regions (ecoregions): the coastal Southwestern ecoregion (coastal areas from Santa Barbara County to San Diego County) and the Mojave Desert ecoregion. Plant communities range from coastal sage scrub in the foothills, to unique subalpine habitats high in the San Gabriel Mountains, to desert scrub and Joshua trees at the northern base of the mountains.

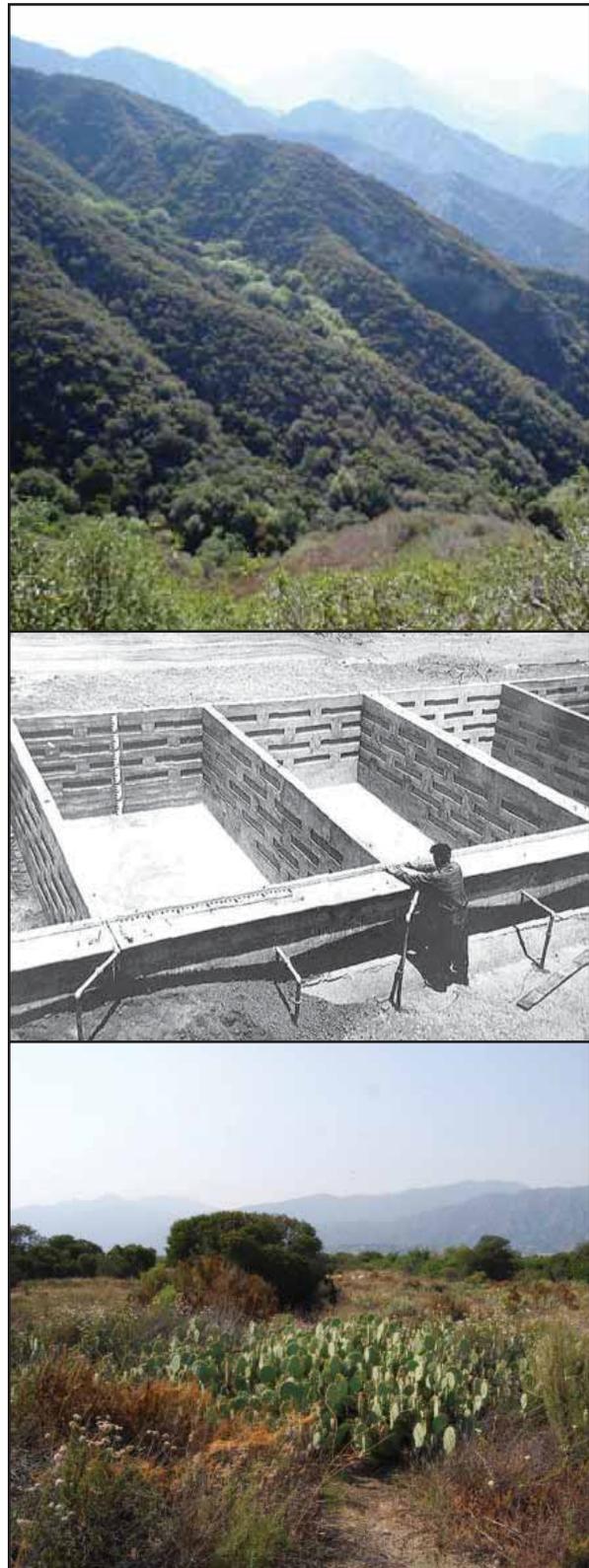
Visitors to the mountains can experience all of these distinct communities in a two-hour drive from the City of Los Angeles.

The wide range of vegetation types in the San Gabriel Mountains provides habitat for 67 sensitive, rare, threatened or endangered plant species. Federally listed threatened (FT) or endangered (FE) plants include: Nevin's barberry (*Berberis nevinii*) (FE), slender-horned spineflower (*Dodecahema leptoceras*) (FE), Braunton's milk-vetch (*Astragalus brauntonii*) (FE), thread-leaved brodiaea (*Brodiaea filifolia*) (FT), and California Orcutt grass (*Orcuttia californica*) (FE).

High levels of wildlife diversity are also present in the San Gabriel Mountains. Four of the six life zones (areas with similar plant and animal communities) identified for North America by Merriam are represented in the San Gabriel Mountains: Lower Sonoran, Upper Sonoran, Transition and Canadian. No single national park unit in the Southwestern and Mojave Desert ecoregions contains this level of diversity.

Federally listed threatened or endangered animals include the arroyo toad (*Bufo californicus*) (FE), least Bell's vireo (*Vireo bellii pusillus*) (FE), mountain yellow-legged frog (*Rana muscosa*) (FT), unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) (FE), California condor (*Gymnogyps californianus*) (FE), California red-legged frog (*Rana aurora draytonii*) (FE), coastal California gnatcatcher (*Polioptila californica californica*) (FT), desert tortoise (*Gopherus agassizi*) (FT), Santa Ana sucker (*Catostomus santaanae*) (FT) and southern willow flycatcher (*Empidonax traillii extimus*) (FE). Other significant species in the San Gabriel Mountains include black bear, the mastiff bat, kit fox, bighorn sheep and mountain lions.

In a statewide comparison, the San Gabriel Mountains contain high levels of biodiversity. The California Department of Fish and Game has identified 12 measures to compare biodiversity throughout the state. These measures include species rarity, richness and endemism. The San Gabriel Mountains have among the highest levels of biodiversity for 8 of the 12 measures identified including: vegetation type richness, plant rarity, amphibian richness, reptile richness, bird richness (winter and summer), mammal richness and invertebrate rarity. Although not among the richest areas for native freshwater fishes in the state, within the southern California region, the San Gabriel Mountains are among the richest areas for native freshwater fishes (California Department of Fish and Game 2003).



Photos (top to bottom): 1. San Gabriel Mountains. NPS photo. 2. San Dimas Experimental Forest Lysimeter construction. Photo by the United States Forest Service. 3. Santa Fe Dam Natural Area. NPS photo.

The Angeles National Forest manages special designated areas, including research natural areas and special interest areas, for research and protection of outstanding examples of habitat types. The Fern Canyon Research Natural Area (RNA) was established to protect chamise (*Adenostoma fasciculatum*), chaparral, and canyon live oak (*Quercus chrysolepis*) woodland. This area also includes a unique relict stand of low-elevation ponderosa pine (*Pinus ponderosa*) at Brown's Flat, a shallow 80-acre bowl created by an ancient land slump. Fern Canyon RNA falls entirely within the San Dimas Experimental Forest. Fern Canyon was affected by the 2002 Williams fire but is expected to recover naturally (USFS 2005).

The Falls Canyon RNA encompasses a tributary of the West Fork of the San Gabriel River. This area was set aside to preserve rare stands of dense, mature bigcone Douglas-fir trees, some of which are over 350 years old. Most old-growth, bigcone Douglas-fir communities are in decline as younger trees do not survive well during the extreme fire events common in the southern California. The Falls Canyon forest is more resistant to fire because of its lack of understory vegetation. The U.S. Forest Service manages the Falls Canyon RNA to maintain biological diversity and provide ecological baseline information, education, and research.

Mount San Antonio and Mount Baden-Powell Special Interest Areas contain a rich array of isolated subalpine habitats close to large-scale arid and semi-arid landscapes. Mount San Antonio, the highest peak in the San Gabriel Mountains (10,064 ft), contains rare alpine and subalpine plants, partly related to the local geology. The area supports an unusual subalpine forest of krummholz lodgepole pine, *Pinus murrayana*. Disjunct western juniper (*Pinus occidentalis* ssp. *australis*) also occurs here. Mount San Antonio is the only known locality in southern California for the rare dwarf hawksbeard (*Crespis nana*), an arctic-alpine plant species. Other rare plant species in this area include alumroot (*Heuchera abramsii*), bed straw (*Galium parishii*), and woolly mountain parsley (*Oreonana vestita*). The area provides summer habitat for Nelson's bighorn sheep, a California Species of Special Concern. Mount San Antonio was recommended as a potential National Natural Landmark in a 1979 survey (NPS 1979, USFS 2005).

Mt. Baden-Powell, at 9,399 feet, features some of the best examples of 1,000 year-old limber pines in southern California. The peak and adjacent areas contain elements of subalpine habitat, including at least three endemic plant species (USFS 2005).

Although pinyon-juniper communities are common in southern California, a community near Mescal Creek, which flows from the San Gabriel Mountains north to the Mojave Desert, contains an unusual relict/remnant juniper woodland. The type of vegetation found in this woodland is a remnant of vegetation that was prevalent in this area during the Pleistocene epoch (1.8 million to 8,000 years ago.) Fossils of similar juniper species associated with the Pleistocene epoch in Mescal Creek have been found in the La Brea Tar Pits in Los Angeles. Species include *Juniperus californica* and *Juniperus utahensis*.

The Mescal Creek area juniper woodland was recommended for National Natural Landmark status in a previous study because of its high aesthetic value and the opportunity it provides to interpret the interaction of geologic history, plant geography, plant adaptation, water supply, desert-montane habitat and ecotones.

No recent surveys of the Mescal Creek juniper woodland have been conducted. However, it remains an undeveloped area of the Angeles National Forest. There are few trails in the Mescal Creek Area and off-road vehicle use is not allowed.

Dynamic River Systems. The highly erosive steep slopes of the San Gabriel Mountains produce dynamic river systems with rich habitat such as alluvial fan sage scrub and riparian areas. San Gabriel Mountains river segments that remain free flowing meet eligibility criteria for Wild and Scenic River designation.

Alluvial Fan Sage Scrub. During rain events, water moves with great velocity from the mountains carrying soil and aggregate which are deposited in the foothills and valleys below. In years following fire episodes, soils from slopes cleared of vegetation form mud and debris flows which can be highly destructive. Alluvial fan sage scrub is a specialized plant community that has adapted to this type of disturbance conditions.

The study area contains some of the best remaining examples of alluvial fan sage scrub in the Los Angeles basin. Alluvial fan sage scrub is a distinct and rare plant community found on alluvial fans and floodplains along the southern base of the Transverse Ranges and portions of the Peninsular Ranges in southern California (Hanes et al 1989). Flood control projects, agriculture, and urban development have significantly reduced alluvial fan sage scrub in river washes throughout the Los Angeles region (Davis et al. 1998). Only remnants of this habitat remain.

An analysis of ten stands of the most well-developed alluvial fan vegetation in Los Angeles, Riverside, and San Bernardino Counties found that Big Tujunga Wash is one of three sites which exhibits the most species diversity and the San Gabriel River is among one of two sites that exhibits the greatest structural diversity (Hanes et al. 1989). San Antonio Canyon and the upper Santa Clara River also contain excellent examples of alluvial fan sage scrub.

Riparian Vegetation. A wide range of riparian habitats are present in the San Gabriel Mountains: Mojave riparian forest, southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern mixed riparian forest, southern riparian scrub, and southern sycamore alder riparian woodland (Davis et al. 1998). These riparian areas support wildlife including threatened and endangered species such as the Santa Ana sucker, arroyo toad, unarmored threespine stickleback and the southwestern willow flycatcher.

Riparian areas are important for resident and

migratory bird species. The Santa Fe Dam Recreation Area and the Santa Clara River at the base of the mountains contain riparian areas that are recognized International Bird Areas because they support a high number of bird species (Los Angeles County Department of Public Works 2006a; Audubon Society 2007; San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy 2001).

Wild and Scenic Rivers. Many river systems in the San Gabriel Mountains remain free-flowing with intact riparian areas. The U.S. Forest Service determined, in its Angeles National Forest Plan, that free-flowing stretches of the East, North and West Forks of the San Gabriel River and Little Rock Creek are eligible for National Wild and Scenic River designation (USFS 2005).

Portions of these river systems traverse the San Gabriel and Sheep Mountain Wilderness Areas, providing opportunities for public enjoyment in a wilderness setting. The east and west forks of the San Gabriel River contain remarkable recreational



East Fork San Gabriel River, NPS photo

values and provide easy access to year-round water-based recreation. These river segments contain outstandingly remarkable scenic, recreation, fish, wildlife and historic resource values.

The Santa Clara River is the only major river corridor in southern California that runs freely without obstruction by major flood protection facilities. Although much of the upper Santa Clara watershed is located within the Angeles National Forest, the U.S. Forest Service did not include this corridor in their Wild and Scenic River analysis as the main stem of the river is outside the national forest boundaries. The upper Santa Clara River in the Soledad basin contains high quality riparian and aquatic habitats that support the Santa Ana sucker, arroyo toad, unarmored threespine stickleback and the southwestern willow-flycatcher. This area also functions as one of the important habitat linkages in the Los Angeles region, providing a connection between the San Gabriel Mountains and the Sierra Pelona Range (Stephenson and Calcarone 1999).



Wild cactus in bloom. NPS Photo.

Cultural Resources

Scientific Research and Discovery. The San Gabriel Mountains have been the location for major scientific research and discovery. Nationally significant research facilities within the San Gabriel Mountains that meet the criteria for designation as National Historic Landmarks include the Mount Wilson Observatory and the San Dimas Experimental Forest.

Mount Wilson Observatory. A National Historical Landmark theme study for Astronomy and Astrophysics (1989) included a National Historic Landmark nomination for the Mount Wilson Observatory which establishes the significance of the observatory. The Mount Wilson Observatory, established in 1904 by astronomer George Ellery Hale, contains five major research telescopes still in operation. The 60-inch reflector and the 100-inch Hooker reflector made Mount Wilson the home of the two largest telescopes in the world in the early 1900s. These telescopes laid the technological foundation for all large modern telescopes. In 1981, the 100-inch Hooker reflector was designated an International Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers (NPS 1989).

Many of the major advances and greatest names in 20th-century astronomy are associated with the Mount Wilson Observatory, including Edwin P. Hubble and Albert Michelson. Astronomy questions, including the nature of sunspots, the temperature and composition of stars, and the structure and origin of the universe, were addressed by the greatest astronomers in the world using the best equipment at Mount Wilson (NPS 1989).

The observatory continues to provide opportunities for scientific study. The Center for High Angular Resolution Astronomy Array, operated by Georgia State University, is used for current astronomical research. It is the world's largest optical interferometer array. University of California, Berkeley, operates the Infrared Spatial Interferometer.

San Dimas Experimental Forest. An "Inventory and Evaluation Report for the San Dimas Experimental Forest," prepared by Jones and Stokes, concluded that the SDEF field headquarters located in Tanbark Flats appears eligible for listing on the National Register as a historic district. The buildings and structures at the Tanbark Flats headquarters are excellent examples of Blanchard and Maher Forest Service Administration Buildings. Architects Blanchard and Maher designed the buildings to reflect California's architectural heritage

(wood buildings of the early days of the Mother Lode Country). Between 1933 and 1937, they produced over 200 designs. (Jones & Stokes 2004).

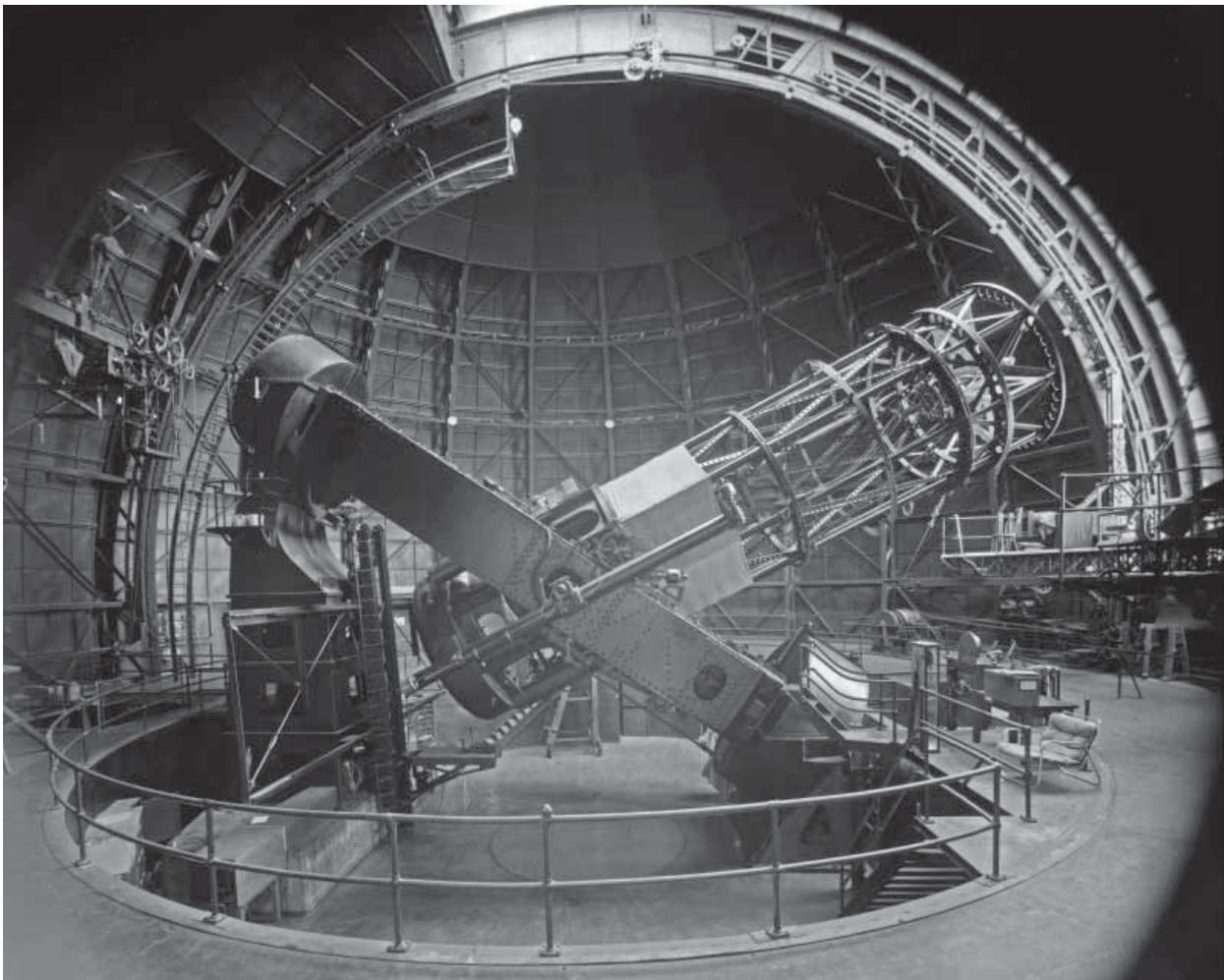
The SDEF facilities are among the earliest facilities constructed by U.S. labor programs during the 1930s, including the Civilian Conservation Corps (CCC) and the Work Projects Administration labor programs, as well as a group of conscientious objectors (COs) assigned by the Civil Public Service program (Jones & Stokes 2004).

The Tanbark Flats field headquarters appears eligible for listing on the National Register as a separate historic district. Research/ monitoring equipment includes a historical lysimeter facility (Jones & Stokes 2004). The Lysimeter facility at SDEF (tunnel and instrument room) is the largest of its kind in the world. The facility contains 26 large lysimeters (each measuring 10.5 x 21 ft and 6 ft deep) and numerous small ones. The facility appears eligible for listing on the National Register as an individual resource and contributes to the larger historic

district (Robinson 1985, Robinson 1991, and Jones & Stokes 2004).

Other important CCC structures include stone landscape features (walls, stairs, flumes, and walkways) that contribute to the cultural landscape. In total, the historic district includes 42 contributing resources. In addition, the natural features (topography, landscape) of the SDEF also contribute to the historic landscape setting (Jones & Stokes 2004).

Potential Cultural Significance. The Angeles National Forest contains several dams that are part of the comprehensive flood control system in the Los Angeles Region. The Los Angeles County Flood Control System is a comprehensive coordinated river-based flood-control system that was constructed by the Los Angeles County Flood Control District and the U.S. Army Corps of Engineers under the Flood Control Act of 1936. The Los Angeles County system was the first and largest program to receive funding under this law. Because



Mount Wilson Observatory 100-inch Hooker telescope. This image is reproduced by permission of The Huntington Library, San Marino, California.

of the geologic forces affecting the region extensive growth and development in the Los Angeles basin would not have been possible without the comprehensive flood control system. In addition to flood control dams, the system also includes other facilities such as debris basins, spreading grounds, diversion tunnels, outlets, inlets, guide walls, gates, and spillways.

In a recent theme study on large federal dams, the U.S. Bureau of Reclamation determined that the Los Angeles County Flood Control System might be nationally significant for its impact on the history and development of the Los Angeles metropolitan region. Further study would be needed to identify which resources contribute to the national significance of the system and to document the integrity of the contributing resources (Billington, Jackson, and Melosi 2005). A National Historic Landmark nomination would need to be prepared using the theme study guidelines for applying the NHL criteria to the flood control system. This nomination process would only happen if supported by the agencies that manage the flood control system facilities.

Criterion 1 Conclusion

The San Gabriel Mountains provide outstanding examples of geologic resources, mountain building, native plant communities, wildlife, dynamic river systems, and cultural resources related to scientific research and discovery. The San Gabriel Mountains meet criterion 1.

CRITERION 2: IT POSSESSES EXCEPTIONAL VALUE OR QUALITY IN ILLUSTRATING OR INTERPRETING THE NATURAL OR CULTURAL THEMES OF OUR NATION'S HERITAGE.

Every unit of the National Park System preserves important aspects of our nation's natural and/or cultural heritage. The National Park Service uses a series of natural and cultural themes to categorize the important resources protected by our national park units. The themes are used to evaluate whether resources in a study area would broaden and diversify resources protected by our national park system.

The natural and cultural resources as described in the previous section possess exceptional value in illustrating the themes represented in the lists below. The Suitability chapter includes an evaluation of themes represented by resources in the study area in terms of their current representation in the national park system.

Natural Themes

The geological and biological diversity of the San Gabriel Mountains are unparalleled in southern California. These resources represent the following NPS natural themes:

Landforms of the Present. The "Landforms of the Present" theme describes the character of the landscape as a physical and scenic entity as it exists today, as well as present and past geologic events and processes. The following sub-themes related to Landforms of the Present are represented in the San Gabriel Mountains:

- **Mountain Systems:** The San Gabriel Mountains possess exceptional value in illustrating and interpreting mountain building and plate tectonics.
- **Sculpture of the Land:** The Devil's Punchbowl is an excellent example of sculpture of the land created by impressive geologic forces. This striking landform is a dramatic example of earth movement caused by plate tectonics.
- **River Systems and Lakes:** The East, West and North forks of the San Gabriel River, and Little Rock Creek are eligible for National Wild and Scenic River designation. They present an exceptional opportunity to illustrate free flowing southern California river systems. The San Gabriel River system has played a significant role in shaping the southern California region, both geologically and culturally.

Land Ecosystems. The theme "Land Ecosystems" represents vegetation types as well as the animal populations and physical environmental features which are often important elements in identifying and evaluating sites. The following sub-themes related to Land Ecosystems are represented in the study area:

- **Chaparral (shrubs and evergreen forest trees):** Coastal sage scrub, San Dimas Experimental Forest (chaparral)
- **Dry Coniferous Forest:** Bigcone Douglas-fir, pinyon-juniper forest, subalpine forest

Land ecosystem themes represented by plant communities in the San Gabriel Mountains provide a unique opportunity to interpret native southern California habitats. Within a relatively short distance, visitors can experience excellent examples of coastal, desert, montane, alpine and subalpine habitats. The mountain habitat contains exceptionally high plant and animal diversity and representations of the vegetation types described above.

Aquatic Ecosystems Themes. The theme “Aquatic Ecosystems” is based on geomorphic and other physical aspects of aquatic ecosystems. The sub-theme “Streams” represents aquatic ecosystems with flowing waters. The following sub-themes related to Aquatic Ecosystems are represented in the study area:

- **Streams:** Some of the best remaining examples of alluvial fan sage scrub are located in the foothill canyons of San Gabriel Mountain rivers providing an exceptional opportunity to preserve and interpret rare remnants of southern California natural heritage. San Gabriel Mountain river systems contain high quality riparian habitat which support numerous rare, threatened, and endangered species.

Cultural Themes

The San Gabriel Mountains contain historically significant research facilities that represent the following cultural themes:

Expanding Science and Technology. This theme focuses on science, which is modern civilization’s way of organizing and conceptualizing knowledge about the world and the universe beyond. Technology is the application of human ingenuity to modification of the environment in both modern and traditional cultures. Topics under this theme that are represented by nationally significant resources within the study area include:

- **Experimentation and Invention:** Astronomy questions, including the nature of sunspots, the temperature and composition of stars, and the structure and origin of the universe were addressed by some of the greatest astronomers in the world using the telescopes and other equipment at the Mount Wilson Observatory. Research conducted at the San Dimas Experimental Forest has greatly contributed to our understanding of natural processes and chaparral ecosystems.
- **Technological Applications:** The telescopes at the Mount Wilson Observatory laid the technological foundation for all large modern telescopes. Major accomplishments and effects of research at San Dimas include the development of rain gauges and rain-gauge networks to accurately measure precipitation in steep terrain, the development of flumes to measure and withstand debris-laden flows, and the identification of post-fire soil non-wet-ability.

- **Scientific Thought and Theory:** Research efforts at the Mount Wilson Observatory and the San Dimas Experimental Forest have shaped current scientific thought and theory in the areas of astronomy and Mediterranean watersheds and ecosystems.

Expressing Cultural Values. The theme “expressing cultural values” covers expressions of culture – people’s beliefs about themselves and the world they inhabit. This theme also encompasses the ways that people communicate their moral and aesthetic values. Topics under this theme that are represented by nationally significant resources within the study area include:

- **Architecture:** San Dimas Experimental Forest buildings and structures at Tanbark Flats are excellent examples of Forest Service Administration Buildings reflecting California’s architectural heritage (wooden buildings of the early days of the Mother Lode Country). The buildings were some of the first to be constructed by federal relief programs such as the CCC.

Criterion 2 Conclusion

The San Gabriel Mountains possess exceptional quality in illustrating or interpreting natural and cultural themes of our nation’s heritage, including: mountain systems, sculpture of the land, river systems and lakes, chaparral and dry coniferous forest, streams, expanding science and technology, and expressing cultural values. The San Gabriel Mountains meet criterion 2.

CRITERION 3: IT OFFERS SUPERLATIVE OPPORTUNITIES FOR PUBLIC ENJOYMENT, OR FOR SCIENTIFIC STUDY.

Scientific Study. Scientific study of geological features in the San Gabriel Mountains continues to provide major contributions to our understanding of plate tectonics. The Mount Wilson Observatory provides opportunities for scientific study in the field of astronomy. Several guest institutions use the observatory.

The San Dimas Experimental Forest provides excellent opportunities for the scientific study of mountain watersheds and chaparral ecosystems. Studies completed at the experimental forest have greatly contributed to our understanding of natural processes and chaparral ecosystems. Technological innovations developed at the experimental forest to monitor watersheds are in use in similarly diverse areas all over the world.

The U.S. Forest Service manages the Falls Canyon

and Fern Canyon Research Natural Areas to maintain biological diversity and provide ecological baseline information, education, and research. Mount San Antonio and Mount Baden-Powell Special Interest Areas provide opportunities to observe subalpine forest close to both desert and coastal environments.

Proximity to the Los Angeles Metropolitan Area provides many universities and colleges alike with readily available access to the mountains for research.

Opportunities for Public Enjoyment. A scenic backdrop of the Los Angeles region, the San Gabriel Mountains offer dramatic views of both the coast and the desert. Over 15 million people live within a 90-minute drive to the San Gabriel Mountains. The Angeles National Forest, which includes the San Gabriel and Sierra Pelona Mountains, comprises 70% of the open space in Los Angeles County. The Angeles National Forest describes itself as a “backyard wildland,” as local and regional families consider the forest a preferred destination for day use recreation.

With over 3.5 million annual visitors, the Angeles National Forest is one of the most visited forests in the nation. Because of the steepness of the San Gabriel Mountains, visitation is highly concentrated along several prominent canyons such as Big Tujunga and San Gabriel canyons (USFS 2003a and 2009).

Many recreation facilities constructed by the Civilian Conservation Corps (CCC) are among the first of such facilities in the nation. The Angeles National Forest maintains historical trails, camps, and other recreation facilities that continue to serve millions of visitors each year. These facilities are being evaluated for listing on the National Register of Historic Places.

The Mount Lowe Railway Historic District in the Angeles National Forest was part of Los Angeles’s once active Pacific Electric Railway. When in operation, the railway included various stops within easy walking distances of mountain trail heads. Although only remnants of the railway remain today, there are opportunities to hike and learn about the railway from interpretive features.

Today, recreational opportunities in the San Gabriel Mountains include hiking, backpacking, climbing, camping, swimming, picnicking, birding, fishing, off-highway vehicle driving, and horseback riding. The Angeles Crest Scenic Highway is the only developed road that traverses the San Gabriel Mountains from north to south. This road is an

important access point for visitors to the national forest. The road offers unparalleled views and scenery.

The San Gabriel Mountains contain 5 nationally designated recreation trails. The Pacific Crest National Scenic Trail, which spans 2,650 miles from Mexico to Canada, traverses the mountain divide. Four national recreation trails also traverse the San Gabriel Mountains; the Gabrieleno Trail, the High Desert Trail, the Silver Moccasin Trail, and the West Fork (San Gabriel River) Trail.

Water-based recreation is one of the most popular activities in the forest. Visitors are drawn to the wild and scenic rivers that contain flowing water throughout the year. Balancing recreation demand with the sensitive nature of these river systems is one of the major management challenges of the Angeles National Forest.

The dynamic river systems that run through the San Gabriel and Sheep Mountain Wilderness Areas provide opportunities for public enjoyment in a wilderness setting. The east and west forks of the San Gabriel River contain remarkable recreational values and provide easy access to year-around water-based recreation.

Mount Wilson Observatory has allowed public visitation to its facilities since the 1930s. The museum interprets the astronomical knowledge. Nearby Skyline Park Picnic Area, operated by the U.S. Forest Service, is open to the public. The Mount Wilson Observatory Association provides walking tours on weekends and holidays. The Mount Wilson Trail provides additional recreation opportunities (Mount Wilson Observatory 2007).

Criterion 3 Conclusion

The San Gabriel Mountains offer superlative opportunities for public enjoyment and scientific study. Over 15 million people live within a 90-minute drive to the San Gabriel Mountains. The mountains have a long history of research in geology, Mediterranean ecosystems and astronomy. The San Gabriel Mountains meet criterion 3.

CRITERION 4: IT RETAINS A HIGH DEGREE OF INTEGRITY AS A TRUE, ACCURATE, AND RELATIVELY UNSPOILED EXAMPLE OF A RESOURCE.

The Angeles National Forest was part of an early conservation movement to protect wilderness lands and watersheds in California. It is one of the first national forests in the United States and is the first in the State of California. California has designated the Angeles National Forest a state historic landmark.

Early conservation of the San Gabriel Mountains in 1891 has largely preserved its natural and scenic integrity. Although certain areas of the mountains have been altered for flood control and recreational facilities, as a whole, the native plant communities and river systems remain intact and provide a refuge for wildlife. Areas with significant resources retain a high degree of integrity and are relatively unspoiled examples of their type of resource.

With over 90% of the San Gabriel Mountains slopes being steep and rugged, much of the landscape has retained its natural character. Over one-quarter of the national forest lands within the study area, 114,000 acres, are designated wilderness areas (USFS 2005 and 2011). The Angeles National Forest has nearly 60,000 acres of inventoried roadless areas within the study area. Several conservation groups and members of Congress have proposed that some of these roadless inventory areas be designated wilderness.

Nearly 20,000 acres of land in the San Gabriel Mountains are U.S. Forest Service special designated areas (research natural areas, experimental forests and special interest areas). As described under Criterion 1, these areas are protected for their botanical, geological, and research values.

Rare opportunities to see free flowing rivers with perennial flows are available in the study area. The rivers are the main attractions of the national forest. The rivers are also home to several native fish species.

The 2010 Station Fire has had impacts on some of the significant resources as described previously in the Fire Effects section in Chapter 2, *Resource Description*. Habitat for threatened and endangered species has been damaged. Those species that reside in pools and riparian areas are threatened by erosion and debris flows. Recovery efforts have salvaged many of these species and habitat in many areas is recovering well due to weather patterns and efforts to control non-native species invasion. Additionally, those habitats that fared best in the fire were those that were mature and had a high level of integrity. Continued restoration efforts on the part of the U.S. Forest Service will help restore habitats. One of the largest threats is the spread of non-native species. Forest closures and weed removal efforts are planned to reduce the spread of such species (USFS 2010).

The privately-owned Mount Wilson Observatory continues to operate on a renewed 99-year lease with the U.S. Forest Service. The observatory retains



San Gabriel Mountains alluvial fan near La Crescenta. Photo by Jeremiah Easter.

a high degree of integrity of location, design, setting, materials, and association to their period of significance. All five significant telescopes are still in operation and are in their original location. The natural setting of the Angeles National Forest contributes to the integrity of the observatory's setting and association of the historic period (1904-present).

The design and setting of the observatory has been changed from the time the NHL nomination was prepared. New facilities added to the observatory are directly associated with the observatory's purpose for astronomical research.

The San Dimas Experimental Forest historic district retains a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association to their period of significance. Many of the original CCC structures built for the SDEF remain. None of the resources have been moved and none has been greatly altered from its original design. Some resources are in a state of disrepair but all retain the majority of their original materials. Some minor alterations either occurred within the period of significance or are so minor that they do not affect the overall integrity of the buildings (Jones & Stokes, 2004).

The Williams fire in 2002 destroyed 4 buildings within the Tanbark Flat headquarters area. The most significant structure that was burned was the CCC Bunkhouse. It was a wood frame building that

spanned Tanbark Creek much like a covered bridge (Jones & Stokes 2004). The SDEF retains the feeling and association of its historic period.

Criterion 4 Conclusion

The San Gabriel Mountains retain a high degree of integrity and contain relatively unspoiled examples of significant resources, despite impacts in some areas from reservoirs, utilities, roads, fire, and recreational use. The San Gabriel Mountains meet criterion 4.

OVERALL CONCLUSIONS

The San Gabriel Mountains meet all four criteria for national significance:

- The San Gabriel Mountains provide outstanding examples of geologic resources, mountain building, native plant communities, wildlife, dynamic river systems, and cultural resources related to scientific research, and discovery.
- The San Gabriel Mountains possess exceptional quality in illustrating or interpreting natural and cultural themes of our nation's heritage, including: mountain systems, sculpture of the land, river systems and lakes, chaparral and dry coniferous forest, streams, expanding science and technology, and expressing cultural values.
- The San Gabriel Mountains offer superlative opportunities for public enjoyment and scientific study. Over 15 million people live



Puente Hills with a view of the San Gabriel Mountains beyond. NPS photo.

within a 90-minute drive to the San Gabriel Mountains. The mountains have a long history of research in geology, Mediterranean ecosystems, and astronomy.

- The San Gabriel Mountains retain a high degree of integrity and contain relatively unspoiled examples of significant resources, despite impacts in some areas from reservoirs, utilities, fire, roads, and recreational use.

Puente-Chino Hills

CRITERION 1: IT IS AN OUTSTANDING EXAMPLE OF A PARTICULAR TYPE OF RESOURCE.

Natural Resources

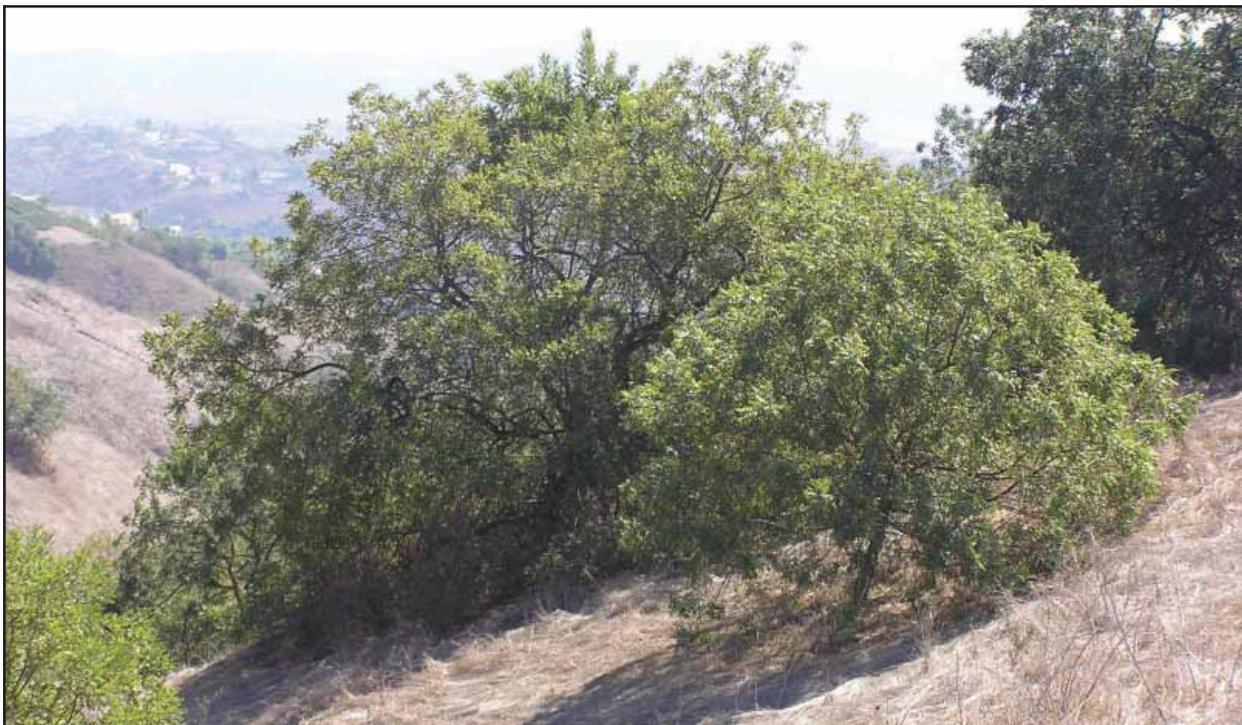
High levels of biodiversity. The Puente-Chino Hills in the Los Angeles basin contain a diversity of native plant communities. Although this area is somewhat of an island of open space within urbanized areas, the Puente Hills along with the Chino Hills and the Santa Ana Mountains to the southeast together encompass over 500,000 acres of wildlands containing significant biological resources (Noss, Beir and Shaw n.d.). Covering over 40,000 acres within the study area, the Puente-Chino Hills are an important component of this regional wildlife corridor (Puente Hills Landfill Native Habitat Authority 2007). This mountain system is associated with the active Whittier-Elsinore fault system. Maintaining this contiguous corridor is a high priority for state and local conservation agencies.

“When combined with other habitat types in the area, such as chaparral and oak/sycamore woodland, the vegetation provides habitat for a unique assemblage of plants and animals” (Puente Hills Landfill Native Habitat Preservation Authority 2007).

Despite its proximity to millions of people, the Puente-Chino Hills contain over 300 species of birds, deer herds, predators such as bobcats and coyotes, and one of the most diverse raptor populations in southern California. Twenty-two raptor species have been observed in the Puente-Chino Hills. Many of these species rely on connections to the larger regional corridor (Puente Hills Landfill Native Habitat Authority 2007).

Within the study area, the Puente-Chino Hills provide habitat for sensitive, rare, threatened or endangered species. Federally listed threatened or endangered plants and animals include Brauntern’s milk vetch (*Astragalus leucolobus*), least Bell’s vireo (*Vireo bellii pusillus*) (FE), southwestern willow flycatcher (*Empidonax traillii extimus*) and coastal California gnatcatcher (*Polioptila californica californica*). The U.S. Fish and Wildlife Service has designated much of the Puente-Chino Hills as critical habitat for the California coastal gnatcatcher (Puente Hills Landfill Native Habitat Authority 2007, CDFG 2006, USFWS 2007, Scott and Cooper 1999).

Most of the Los Angeles basin’s native plant communities have been destroyed by development.



California walnut. Photo courtesy of BonTerra Consulting.

However, excellent examples of coastal sage scrub and California walnut woodlands remain in the Puente-Chino Hills. Coastal sage scrub is one of the most threatened plant communities in California. Since 1945, the majority of coastal sage scrub vegetation in California has been lost to urban and agricultural land use (Kirkpatrick and Hutchinson 1980). Only 15% of coastal sage scrub's historic range remains in southern California. This habitat is of the highest priority for preservation (Davis et al. 1998, Mistretta 2007, personal communication, NPS 1973).

The Puente-Chino Hills are a transitional area for Venturan to Diegan coastal sage scrub communities. The California Natural Community Conservation Program identified the Puente-Chino Hills as a functioning biological unit of high conservation value for coastal sage scrub (Puente Hills Landfill Native Habitat Preservation Authority 2007, CDFG 1993).

California walnut (*Juglans californica*) woodlands and forests are found only in southern California. The historic distribution of California walnut woodlands and forests is limited to the areas between the Santa Clara River drainage in Ventura County on the north and the Chino Hills on the south. Outside this range, walnuts only occur interspersed with other foothill woodland species such as oaks (Quinn 1990).

Contiguous stands of walnut woodlands and forests once lined the Puente-Chino and San Jose Hills, favoring shale soils that have a high water-holding capacity. Walnut woodlands and forests provide habitat for deer, nesting birds, and rodents.

Today, California walnut woodland communities are in decline and residual stands are extremely limited. According to the California Natural Diversity Database (CNDDDB), walnut forests are only found in small areas of Ventura and Los Angeles Counties. The best remaining stands of California walnut-dominated forests and woodlands south of Ventura County are located in the San Jose and Puente-Chino Hills. These stands have adapted to their local site characteristics and differ from the Ventura County stands in morphology and canopy structure (Quinn 1990).

The CNDDDB has on record approximately 17,000 acres of remaining California walnut woodlands and forests. Approximately 2,300 acres are located in the study area. Only a small percentage (8%) of the California walnut woodlands and forests within the study area are in public ownership (CDFG 2006). Some of the prime examples are currently in

private ownership. (Quinn 1990).

In 1973, a National Park Service study identified a grove of walnut woodlands in Diamond Bar as a potential National Natural Landmark (NPS 1973). Although this particular woodland has been reduced somewhat by development, woodlands and forests in nearby Brea and Tonner Canyons remain outstanding examples of walnut woodlands (Quinn 1990; PCR Services Corporation 2006).

Native walnut trees played an important role in the history of the region. During the 1900s, walnut production was almost entirely from Southern California. Success was due in part to use of the native walnuts to hybridize commercial walnut trees. Hybridization with native walnut trees improved the walnut's resistance to heat. The Paradox Hybrid Walnut Tree in Whittier, a state historical landmark, was planted in 1907 by the University of California. This landmark tree represents the once flourishing walnut industry in Southern California.

Wildlife within the Puente Hills is diverse and abundant due to the large acreage of natural open space, the habitat types, and regional connectivity. While a few wildlife species are entirely dependent on a single vegetative community, the entire mosaic of all the vegetation communities within the area and connected areas constitutes a functional ecosystem for a wide variety of wildlife species. This includes areas both within the Puente Hills as well as the regional ecosystem. Habitat in the Puente Hills supports migrating large mammals, over-wintering birds of prey and nesting songbirds, including the California gnatcatcher (PCR Services Corp. 2006).

Cultural Resources

Although there appear to be no nationally significant cultural resources in the Puente Chino Hills, the natural landscape contributes to the significance of the Juan Bautista de Anza National Historic Trail and the Old Spanish National Historic Trail. The Puente Hills also contain numerous cultural resources of state and local significances representing the Spanish/Mexican Rancho Period and historic oil industry sites.

Criterion 1 Conclusion

The Puente-Chino hills contain a high level of biodiversity and outstanding examples of southern California communities including coastal sage scrub, one of the most endangered plant communities in California, and the best remaining stands of California walnut-dominated forests and

woodlands in their southern limit of distribution. The Puente-Chino Hills meet criterion 1.

CRITERION 2: IT POSSESSES EXCEPTIONAL VALUE OR QUALITY IN ILLUSTRATING OR INTERPRETING THE NATURAL OR CULTURAL THEMES OF OUR NATION'S HERITAGE.

Land Ecosystems Themes

The Puente Hills resources possess exceptional value in illustrating NPS natural history themes. Chapter 4, *Suitability*, includes an evaluation of themes represented by resources in the study area in terms of their current representation in the National Park System.

The following sub-themes related to Land Ecosystems are represented in the Puente-Chino Hills:

- **Chaparral:** The Puente-Chino Hills contain exceptional examples of coastal sage scrub. A unique transition zone between northern and southern affinities, coastal sage scrub in the Puente-Chino Hills provides habitat for rare, threatened, and endangered species.
- **Dry Coniferous Forest:** The Puente-Chino Hills contain some of the best remaining examples of California walnut woodlands, a rare, endemic plant community.

Criterion 2 Conclusion

The Puente-Chino Hills possess exceptional quality in illustrating and interpreting natural themes of our nation's heritage, including: chaparral and dry coniferous forest. The Puente-Chino Hills meet criterion 2.

CRITERION 3: IT OFFERS SUPERLATIVE OPPORTUNITIES FOR PUBLIC ENJOYMENT, OR FOR SCIENTIFIC STUDY.

Opportunities for Public Enjoyment

Easily accessible to the millions of residents that surround them, the Puente-Chino Hills feature several thousand acres of parks and open space, and miles of local and regional trails. Recreational opportunities include hiking, biking, horseback riding, and birding. A recreational route of the Juan Bautista de Anza National Historic Trail follows the popular Skyline Trail which traverses the Puente-Chino Hills. Publicly owned and accessible stands of coastal sage scrub, walnut woodlands and forests can be found in Walnut Park, and the Puente Hills Landfill Native Habitat Preserve (Preserve).

The largest area of preserved open space in this

region of the study area is the Preserve. The Preserve offers superlative public enjoyment opportunities. In addition to traditional recreational activities such as hiking, jogging, mountain biking, and nature appreciation, the Preserve offers interpretation and outdoor education programs. Educational programs have included a Junior Ranger Program, guided hikes, campfire talks and lecture series. Interpretive panels, kiosks and signs describe wildlife, vegetation, historical descriptions, and public safety information.

Scientific Study

The Puente-Chino Hills have been studied by numerous universities and conservation agencies. The Habitat Authority's management plan encourages more opportunities for university-level research at the Preserve that would help to answer fundamental management questions regarding habitat and species of interest (Puente Hills Landfill Native Habitat Authority 2007).

The California Department of Fish and Game defined portions of the Puente-Chino Hills as a recovery and research area for the Natural Communities Conservation Planning (NCCP) program. The NCCP Program was initiated in 1991, and is administered by the California Department of Fish and Game. The focus of this program is the coastal sage scrub habitat of Southern California, home to the California gnatcatcher and approximately 100 other potentially threatened or endangered species. The Orange County portion of the Puente-Chino Hills is included in the Orange County Northern NCCP subregion. Recently Chevron set aside a 28-acre preserve as part of a permit to complete oil field abandonment operations in the area (California Department of Fish and Game 2008b).

Criterion 3 Conclusion

The Puente-Chino Hills feature public open spaces and miles of trails that provide opportunities such as hiking, biking, horseback riding, outdoor education and birding. Excellent opportunities are available for scientific research of native habitats and wildlife. The Puente-Chino Hills meet criterion 3.

CRITERION 4: IT RETAINS A HIGH DEGREE OF INTEGRITY AS A TRUE, ACCURATE, AND RELATIVELY UNSPOILED EXAMPLE OF A RESOURCE.

The Puente-Chino Hills have remained largely undeveloped despite the dense development that has occurred in the surrounding valleys and coastal plain. Lands in this hill system were historically used

for oil extraction, grazing, and recreation.

Despite its long history of use and proximity to urban development, the Puente-Chino Hills support many of southern California's native landscapes and sustain important habitat for numerous native animal species. Almost 17,000 acres of contiguous undeveloped open space within these hills contain significant native habitat. The Habitat Authority manages almost 4,000 acres in the western Puente-Chino Hills. The primary management objective is to protect biological diversity (Puente Hills Landfill Native Habitat Preservation Authority 2007). Large areas of undeveloped, privately owned land in the eastern Puente-Chino Hills contain some of the most significant natural resources and provide key linkages and connections to the larger wildlife corridor.

The slope, aspect and soil conditions of the Puente-Chino Hills favor walnut woodlands and forests. Significant contiguous stands line portions of the Puente-Chino Hills. These stands still retain the general pattern of walnut woodlands and forests documented over 50 years ago (Quinn 1990).

Plant communities found within the Puente-Chino Hills are becoming increasingly rare on a global scale, as are many of the wildlife and rare plant species. These species require walnut woodland, oak woodland, chaparral, native grassland, and coastal sage scrub habitats contained in the Puente-Chino Hills (Puente Hills Landfill Native Habitat Authority 2007).

"Biologically, this area preserves a microcosm of the California Floristic Province, an identified biodiversity hot spot in North America and a genetic reserve for the continent (Puente Hills Landfill Native Habitat Preservation Authority 2007)."

Some walnut woodlands in the far eastern end of the Puente Hills within the study area were impacted by the 2008 Freeway Complex fire. In total, this fire burned 30,305 acres including 90% of Chino Hills State Park. Most of the burned area was outside of the study area. The calculated acreage burned would make the fire the fourth largest fire on record in Orange County. Despite the fire damage, a 2010 field visit with California State Parks staff to Chino Hills State Park indicated that walnut woodlands and forests were making a strong recovery from the fire. Therefore, it is likely that the walnut woodlands in the eastern portion of the study area will also recover. California State Park officials stated that wildlife survival was aided by the contiguous open space which provided sufficient habitat during fire recovery. Potential

threats continued to further recovery include fire and the spread of non-native species.

Criterion 4 Conclusion

The Puente-Chino Hills contain large areas of native habitat and a high level of biodiversity despite the development that has occurred in the surrounding valleys and coastal plain. The Puente-Chino Hills meet criterion 4.

Overall Conclusions

The Puente-Chino Hills meet all four criteria for national significance:

- The Puente-Chino hills contain a high level of biodiversity and outstanding examples of southern California communities including coastal sage scrub, one of the most endangered plant communities in California, and the best remaining stands of California walnut-dominated forests and woodlands in their southern limit of distribution.
- The Puente-Chino Hills possess exceptional quality in illustrating and interpreting natural themes of our nation's heritage, including: chaparral, and dry coniferous forest.
- The Puente-Chino Hills feature public open spaces and miles of trails that provide opportunities such as hiking, biking, horseback riding, outdoor education and birding. Excellent opportunities are available for scientific research of native habitats and wildlife.
- The Puente-Chino Hills contain large areas of native habitat and a high level of biodiversity despite the development that has occurred in the surrounding valleys and coastal plain.

Other Significant Resources within the Study Area

Portions of the study area that were not included in the nationally significant regions are highly urbanized. There are nationally significant resources in these areas, many of which are fragmented, and therefore lack overall integrity.

Significant Natural Resources

Isolated pockets of rare native plant communities can be found in the San Gabriel Valley and Los Angeles Coastal Plain.

Coastal Sage Scrub. The San Jose Hills, located just north of the Puente-Chino Hills contain excellent examples of coastal sage scrub. These

areas have been designated critical habitat for the coastal California gnatcatcher. Another isolated patch of coastal sage scrub that contains designated critical habitat for the coastal California gnatcatcher is located in the Montebello hills. Although these areas are small and isolated, they provide some of the few remaining habitats for the gnatcatcher in the Los Angeles basin (USFWS 2007).

Walnut Woodlands and Forest. Walnut woodlands in the San Jose Hills are some of the best remaining stands of California walnut-dominated forests and woodlands south of Ventura County (Quinn 1990).

Riparian Areas. Despite losses of habitat in the Los Angeles basin, remaining riparian areas support wildlife, primarily migratory and resident bird species. This includes federally listed endangered species such as the Least Bell's vireo. Many of these remaining areas lie along the San Gabriel River in areas such as the Santa Fe Dam and Whittier Narrows Recreation Areas. Much smaller fragments are located on other portions of the San Gabriel River and along a few areas of the San Gabriel River's tributaries such as Walnut Creek, San Dimas Wash, and San Jose Creek.

The Whittier Narrows Dam County Recreation Area riparian habitat supports over 300 migratory and resident bird species. This area, along with several other Los Angeles County Flood Control basins, are recognized as "Important Bird Area (IBA)" by Birdlife International. IBAs are key sites for conservation that: 1) hold significant numbers of one or more globally threatened species; 2) are one of a set of sites that together hold a suite of restricted-range species or biome-restricted species; and 3) have exceptionally large numbers of migratory or congregatory species.

Also recognized as an International Bird Area is the Santa Clara River which supports a high number of bird species associated with riparian habitat (Los Angeles County Department of Public Works 2006a; Audubon Society 2007; San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy 2001).

Natural History Themes. Pockets of native habitat within the San Gabriel Valley possess exceptional quality in illustrating and interpreting natural themes of our nation's heritage, including: chaparral, dry coniferous forest, and streams.

Opportunities for Public Enjoyment or for Scientific Study. Isolated portions of the study area offer superlative opportunities for public enjoyment. Parks and recreation areas within the

San Jose Hills and along the San Gabriel River feature public open spaces and miles of trails that provide opportunities such as hiking, biking, outdoor education, and birding.

High degree of Integrity. This portion of the study area lacks a high degree of integrity due to urbanization and fragmentation of resources. Although areas within the San Gabriel Valley and Los Angeles Coastal Plain provide pockets of intact, rare native plant communities, the integrity of these areas have been highly altered by flood control projects and subsequent urbanization.

Significant Cultural Resources

Historic Trails and Migration Routes. The San Gabriel Valley and the Los Angeles Coastal Plain contain cultural resources representing the theme "Peopling Places." These resources, in the form of historic trails, played an important role in the region's settlement. Many colonists, traders, explorers, and people searching for a better way of life dramatically increased the population and diversity of the study area. Below is a description of these nationally significant resources.

Juan Bautista de Anza National Historic Trail. The study area includes 19 miles of the 1,200 mile long Juan Bautista de Anza National Historic Trail. The trail, designated in 1990, represents the route taken by Juan Bautista de Anza in 1775–1776 when he led a group of colonists from Mexico into the northwestern frontier of New Spain.

Old Spanish National Historic Trail. The study area includes 21 miles of the 3,500 mile long Old Spanish National Historic Trail designated in 2002. The trail linked Mexican settlements in southern California with those in northern New Mexico.

Route 66. The study area includes 18 miles of the 2,400 mile long U.S. Highway 66, widely known as "Route 66." Route 66 is significant as the nation's first all-weather highway linking Chicago and Los Angeles.

Portola Expedition. The 1769 expedition of Gaspar de Portola and Padre Junipero Serra from San Diego to Monterey led to the founding of five missions and two presidios in California. From the Santa Ana River, the expedition traveled through La Brea Canyon, crossed the San Gabriel valley, and came to the bank of the Los Angeles River. A Portola marker in Brea Canyon marks the site where the Portola expedition group camped.

Other Cultural Resources. The *Upton Sinclair House*, a privately owned national historic

landmark, is located in the city of Monrovia. Upton Sinclair was one of the most influential American novelists focused on social justice in the early twentieth century. The house was designated a national historic landmark in 1971.

Cultural Themes. There are a few isolated areas within the San Gabriel Valley that possess exceptional quality in illustrating or interpreting resources that represent cultural themes, including “Peopling Places,” “Expressing Cultural Values,” “Developing the American Economy,” and “Changing Role of the United States in the World Community.”

Opportunities for Public Enjoyment or for Scientific Study. Although many historic resources lack opportunities to experience historic settings, there are many opportunities for interpretation and education. Some areas are privately owned and lack opportunities for public enjoyment.

High degree of Integrity. Because of the impacts on historic settings, overall this portion of the study area lacks unspoiled examples of significant resources.

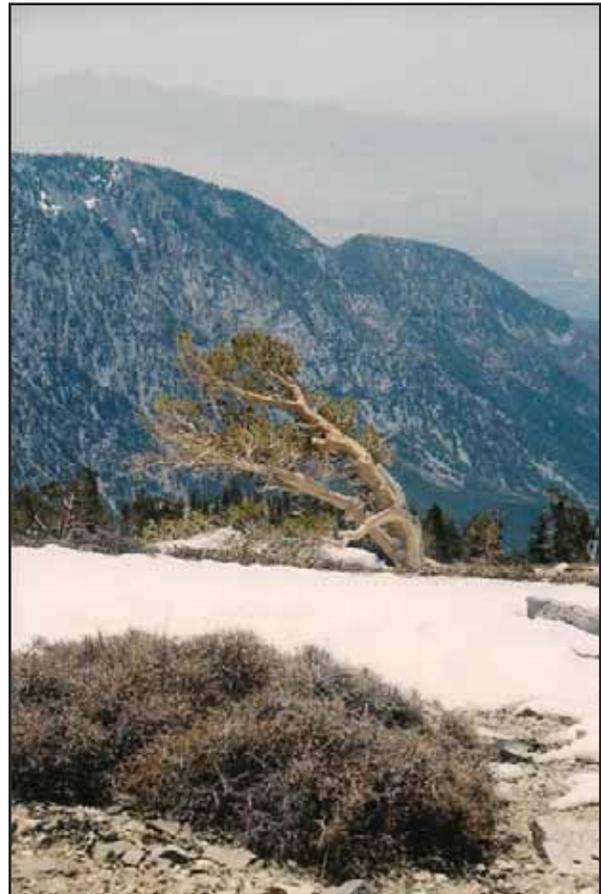
Potential Cultural Significance. Resources that are part of the comprehensive flood control system in the Los Angeles region are located along the lower portions of the San Gabriel River. The potential significance of that system is described under the significance evaluation of the San Gabriel Mountains.

OVERALL CONCLUSIONS

Significant resources within isolated areas of this portion of the study area meet only three of the four criteria for national significance. Extensive urbanization has fragmented and impacted the integrity of the resources in these areas.

Other Recognized Resources

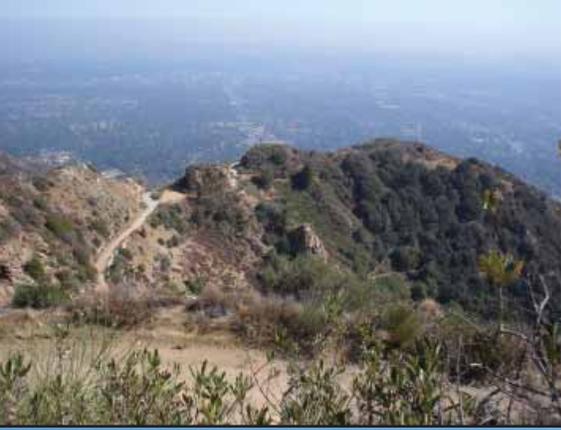
In addition to these nationally recognized cultural resources, there are many state and locally designated historic resources. These resources are described by their associated cultural theme in Chapter 2, *Resource Description*. Other important natural resource areas that are not nationally significant are also described in Chapter 2.



Photos (from left to right): 1. Jeffrey Pine, San Gabriel Mountains. 2. Lodgepole pine, West Baldy, San Gabriel Mountains. Photographs courtesy of Ryan Gilmore.

Table 6: Summary of National Significance

Area / National Significance	Is it an outstanding example of a particular type of resource?	Does it possess exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage?	Does it offer superlative opportunities for public enjoyment, or for scientific study?	Does it retain a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource?
<p>San Gabriel Mountains</p> <p>YES</p>	<p>Yes, the San Gabriel Mountains provide outstanding examples of geologic resources, mountain building, native plant communities, wildlife, river systems and cultural resources related to scientific research and discovery.</p>	<p>Yes, the San Gabriel Mountains possess exceptional quality in illustrating or interpreting natural and cultural themes of our nation's heritage, including: mountain systems, sculpture of the land, river systems and lakes, chaparral and dry coniferous forest, streams, expanding science and technology, and expressing cultural values.</p>	<p>Yes, the San Gabriel Mountains offer superlative opportunities for public enjoyment and scientific study. Over 15 million people live within a 90-minute drive to the San Gabriel Mountains. The mountains have a long history of research in geology, Mediterranean ecosystems, and astronomy.</p>	<p>Yes, the San Gabriel Mountains retain a high degree of integrity and are relatively unspoiled examples of their type of resource, despite impacts in some areas from dams and reservoirs, utility corridors, roads and recreational use.</p>
<p>Puente – Chino Hills</p> <p>YES</p>	<p>Yes, The Puente-Chino hills contain a high level of biodiversity and outstanding examples of southern California communities including coastal sage scrub, one of the most endangered plant communities in California, and the best remaining stands of California walnut-dominated forests and woodlands in their southern limit of distribution.</p>	<p>Yes, the Puente Chino Hills possess exceptional quality in illustrating or interpreting natural themes of our nation's heritage, including: chaparral and dry coniferous forest.</p>	<p>Yes, the Puente-Chino Hills feature public open spaces and miles of trails that provide opportunities such as hiking, biking, horseback riding, outdoor education, and birding.</p> <p>Excellent opportunities for scientific research of native habitats and wildlife are available.</p>	<p>Yes, the Puente-Chino Hills contain large areas of native habitat and a high level of biodiversity despite the development that has occurred in the surrounding valleys and coastal plain.</p>
<p>Other Portions of the Study</p> <p>NO</p>	<p>Yes, areas within the San Jose and Montebello hills contain outstanding examples of coastal sage scrub and California walnut-dominated forests.</p> <p>Although reduced from historic accounts, the San Gabriel River and its tributaries contain important remnant riparian areas that provide essential habitat for migratory and resident bird species.</p> <p>Outstanding examples of cultural resources in these historic trails, migration routes, and literature.</p>	<p>Yes, isolated native habitat within the San Gabriel Valley possess exceptional quality in illustrating and interpreting natural themes of our nation's heritage, including: chaparral, dry coniferous forest and riparian areas.</p> <p>Cultural resources in other portions of the study area possess exceptional quality in illustrating or interpreting resources that represent several cultural themes, including "Peopling Places," "Expressing Cultural Values," "Developing the American Economy," and "Changing Role of the United States in the World Community."</p>	<p>Yes, isolated areas within this portion of the study area offers superlative opportunities for public enjoyment and scientific study. Parks and recreation areas within the San Jose Hills and along the San Gabriel River feature public open spaces and miles of trails that provide opportunities such as hiking, biking, outdoor education and birding.</p> <p>Although many historic resources lack opportunities to experience historic settings, there are many opportunities for interpretation and education provided. Some areas are privately owned and lack opportunities for public enjoyment.</p>	<p>No, this portion of the study area lacks a high degree of integrity due to urbanization and fragmentation of resources. Although areas within the San Gabriel Valley and Los Angeles Coastal Plain provide pockets of intact, rare native plant communities, the integrity of these areas have been highly altered by flood control projects and urbanization.</p> <p>Because of the impacts on historic settings, overall this portion of the study area lacks unspoiled examples of significant resources.</p>



Suitability

Photos (clockwise): 1. Mt. Lowe Circlebridge View. NPS Photo. 2. Cooper's Hawk. Photo by Eric Lowenbach. 3. Puente Hills. NPS Photo. 4. Aerial of the Los Angeles urban area. Photo by Bruce Perry, Dept. of Geological Sciences, CSU Long Beach.

Chapter 4: Suitability

Introduction

To be considered suitable for addition to the national park system, an area must represent a natural or cultural resource type that is not already adequately represented in the national park system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

Adequacy of representation is determined on a case-by-case basis by comparing the potential addition to other comparably managed areas representing the same resource type, while considering differences or similarities in the character, quality, quantity, or combination of resource values. The comparative analysis also addresses rarity of the resources, interpretive and educational potential, and similar resources already protected in the national park system or in other public or private ownership. The comparison results in a determination of whether the proposed new area would expand, enhance, or duplicate resource protection or visitor use opportunities found in other comparably managed areas. The suitability analysis is applied to those areas found to be nationally significant, the San Gabriel Mountains and the Puente-Chino Hills.

NPS Thematic Framework – Natural and Cultural Themes

The National Park Service (NPS) developed a thematic framework for evaluating potential and existing units within the national park system. The basic thematic framework includes a series of natural and cultural themes.

Every unit of the national park system preserves important aspects of our nation's natural and/or cultural heritage. The NPS uses a series of natural history and cultural themes to categorize the important resources protected by national park units. The themes are used to evaluate whether resources in a study area would broaden and diversify resources protected by the national park system.

The following analysis is organized by natural history and cultural history themes represented by the study area.

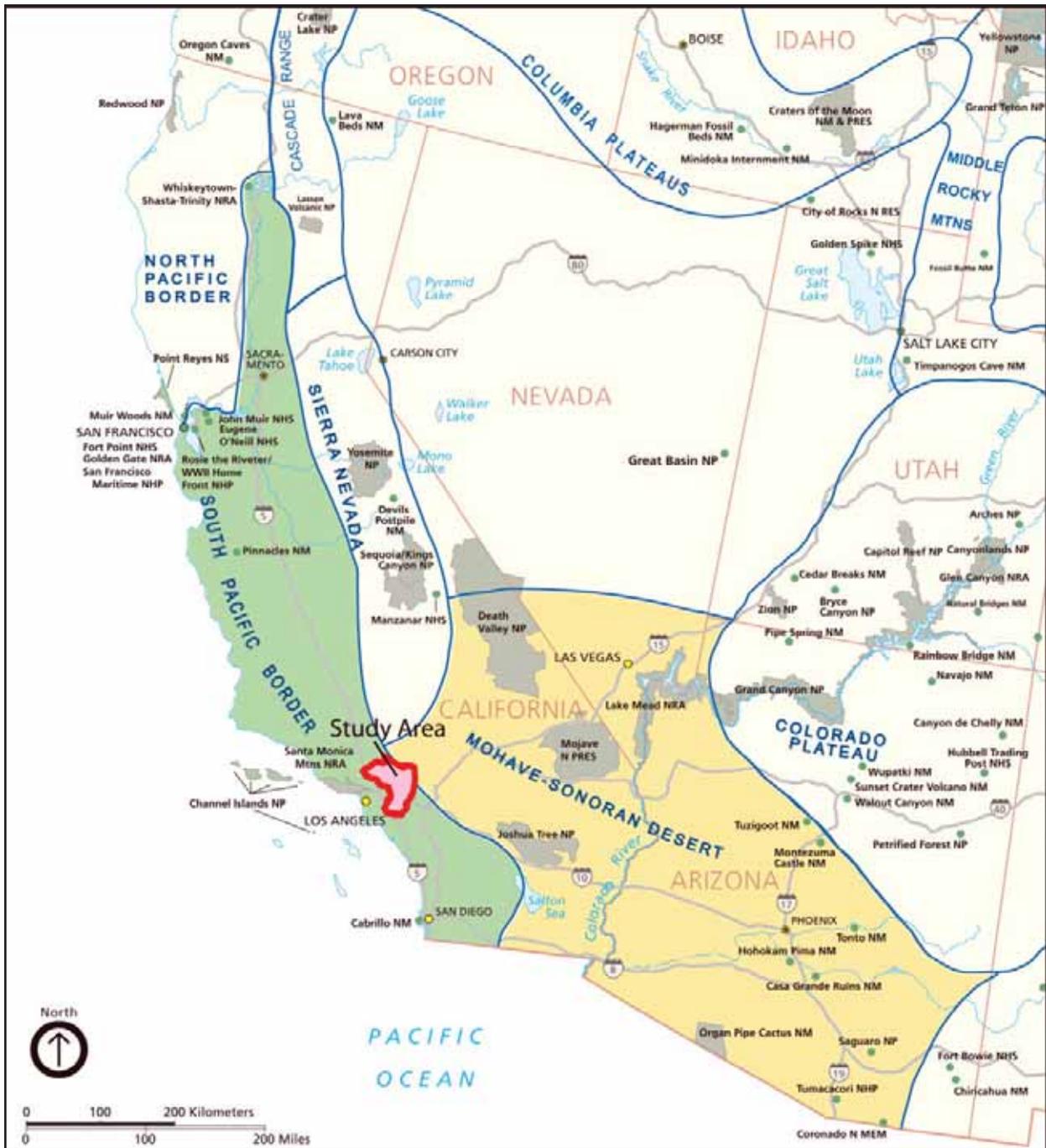
Natural History Themes

Biophysiological Regions

The physiographic and biologic features of the country tend to be regionally oriented dividing the country into natural regions. These regions give primary consideration to the geologic histories, structures, and landforms, which in turn influence the climates, soils, vegetation, and animal life associated with the regions (NPS 1990). These biophysiological regions provide the context for determining whether nationally significant natural resources of an NPS special resource study area are adequately represented in the national park system or other comparably managed areas. The thematic framework is described in the publication "Natural History in the National Park System" (NPS 1990).

The majority of the study area is located in the South Pacific Border biophysiological province or natural region as described in "Natural History in the National Park System (see graphic, *National Park biophysiological regions*)." The South Pacific Border region includes the southern Coast Ranges, the Transverse Ranges, the Peninsular Ranges of California and the Central Valley. These ranges have extensive forested areas composed of a mixture of coastal, Sierran, and inland species (NPS 1990).

The northern end of the study area lies partially in the Mojave-Sonoran Desert region. This region includes the Mojave and Sonoran deserts in southeastern California, southernmost Nevada, and southern Arizona. Their physiographic features are roughly similar to those of the Great Basin. The major river system is the lower Colorado River. Both the Mojave and Sonoran deserts have hot summers and warm winters but their vegetation is different. The Mojave Desert of southern Nevada and southeastern California has simple plant communities dominated by creosote bush and bur-sage, with Joshua trees at 3000-4000 feet. The Sonoran Desert, in Baja California and inland Mexico and extending in southern Arizona, has more diverse vegetation characterized by columnar cacti (NPS 1990). The study area does not contain any Sonoran Desert resources, therefore, this comparative analysis includes park units and comparable sites from the Mojave Desert portion of this region only (park units west of the Colorado River).



National Park Biophysigraphic Regions, adapted from the Physiographic Provinces Mpa, NNL Program, Pacific West Region, Oakland, CA 1/24/04, M.G.

Comparison of Similar Areas by Theme and Sub-Theme

San Gabriel Mountains

NATURAL HISTORY THEMES REPRESENTED IN THE SAN GABRIEL MOUNTAINS

As described in Chapter 3, *Resource Significance*, natural history themes are a series of categories encompassing the natural phenomena of the country. Themes represented by nationally significant resources in the San Gabriel Mountains include:

- Landforms of the Present
- Land Ecosystems
- Aquatic Ecosystems

Landforms of the Present

The “Landforms of the Present” theme describes the character of the landscape as a physical and scenic entity as it exists today, as well as present and past geologic events and processes. Principal features of the natural landscape such as mountain systems, river systems and lakes are included in this theme. Each landform possesses certain distinguishing qualities and characteristics which set it apart from others. The following sub-themes related to Landforms of the Present are represented in the San Gabriel Mountains:

- **Mountain Systems:** San Gabriel Mountains
- **Sculpture of the Land:** Devil’s Punchbowl
- **River Systems and Lakes:** East, West and North Forks of the San Gabriel River, Little Rock Creek, Santa Clara River

MOUNTAIN SYSTEMS

The form, composition, and structure of mountain systems are manifestations of a wide variety of geologic events and processes and constitute veritable record books of the earth’s history. As stated in Chapter 3, San Gabriel Mountains significance lies in the evidence of *active mountain building* and the *diverse array of geological features*, both of which are directly associated with the *San Andreas Transform Fault System*.

National Park Service Units

Existing national park units within the South Pacific Border and Mojave-Sonoran Desert Regions that represent the theme Mountain Systems include:

South Pacific Border Region

- Channel Islands National Park
- Golden Gate National Recreation Area
- Pinnacles National Monument
- Santa Monica Mountains National Recreation Area
- Whiskeytown-Shasta-Trinity National Recreation Area

Mojave-Sonoran Desert Region

- Death Valley National Park
- Joshua Tree National Park
- Lake Mead National Recreation Area
- Mojave National Preserve

Scientific Study and the San Andreas Fault

The San Andreas Fault System formed along the translational boundary between the North American and Pacific Plates. As one of the few places on Earth where a transform-fault plate-boundary occurs on land rather than beneath the sea, the San Andreas fault system is one of the most studied structural features on the planet. The theory of plate tectonics evolved based on scientific study of the San Andreas Fault. The San Gabriel Mountains were formed by the San Andreas fault to the north and a series of thrust faults to the south.

National park units within the two provinces that represent mountain systems which are also associated with the San Andreas fault system include Channel Islands National Park (NP), Golden Gate National Recreation Area (NRA), Pinnacles National Monument (NM), Santa Monica NRA, and Joshua Tree NP.

Death Valley NP, Lake Mead NRA, Joshua Tree NP, and Mojave NP (including Cinder Cone National Natural Landmark) are more associated with active continental rifting processes associated with the Basin and Range Province. This area is characterized by fault-block mountain systems separated by basins or rift valleys. The Whiskeytown-Shasta-Trinity NRA is located within mountain systems that are associated with subduction zones of the Pacific Northwest (Lillie 2005).

Santa Monica NRA, Pinnacles NM, Golden Gate NRA, Channel Islands NP and Joshua Tree NP are national park units that have been changed and altered by activity along the massive San Andreas transform fault system. Of these national park units, Pinnacles NM is the only unit whose park purpose and significance expressly relate to plate tectonics and the San Andreas fault. Pinnacles NM contains a remnant of an ancient strata volcano that was split

by the movement of the two continental plates and provided key evidence for the basis of the theory of plate tectonics. The Pinnacles Rocks are believed to be part of the Neenach Volcano that occurred 23 million years ago near present-day Lancaster, California, some 195 miles (314 km) southeast of Pinnacles. Activity on the San Andreas fault split the volcano and the Pacific Plate crept north, carrying the Pinnacles.

The long history of research on the San Andreas fault in the San Gabriel Mountains, which continues today, expands on the story of plate tectonics told at Pinnacles NM. In the early 20th century, noted geologist Levi Noble conducted a long-term study of a fifty-mile stretch of the San Andreas fault near the San Gabriel Mountains. Noble was the first scientist to advance ideas about large-scale lateral movement on the San Andreas fault (Norris and Webb 1990, Wright and Troxel 2002).

Noble's 1927 landmark paper contains the first printed statement that lateral displacement occurred along the San Andreas fault for many miles. Noble observes, "*Scarcely anywhere in the fault zone are the rocks on the opposite sides of the master fault similar* (Wright and Troxel 2002)." The concept was an important precursor to later ideas regarding plate tectonics (Carter 1982b). Since the time of Levi Noble, geologists and scientists have continued to make new discoveries and expand research on the San Andreas fault.

The portion of the San Andreas fault that traverses the study area is also the location of the highest elevation point along the San Andreas Fault. This highpoint is located in the northeastern corner of the study area near the Big Pines area of the Angeles National Forest. Here one can see the deep and wide crevasse at the plate boundary. The deep crevasse highlights the magnitude of activity associated with this transform-plate boundary. Most areas along the San Andreas fault are filled with sediments, alluvium or water (in the case of sag ponds) which makes such landform gaps less obvious. The highpoint is therefore an excellent location to interpret this important geologic feature.

Active Mountain Building

The San Gabriel Mountains may be one of the best locations in the United States to observe and study active mountain building. One of the most tectonically active mountain systems in the United States, tectonic activity along the San Andreas and other regional faults is forcing the mountains to rise at a rate of as much as 2 inches a year (Murphy 1985). Large events such as the Sylmar earthquake

of 1971 (6.6 magnitude) have resulted in the San Gabriel Mountains rising six feet in relation to the San Fernando Valley floor (Norris and Webb 1990).

Geologic Diversity

The geologic composition of the San Gabriel Mountains also differs in rarity, quality and quantity from mountain systems at comparable national park units such as Pinnacles NM and Mojave NP. As described in the previous chapter, the San Gabriel Mountains contain the most extensive, best-exposed and most completely studied exposures of the San Gabriel Mountains anorthosite massif, the Mount Lowe plutonic suite, and Pelona schist. Some of the oldest rocks (over one billion years old) on the west coast of the United States are located in the San Gabriel Mountains. While a rich array of ancient rocks are also found in Mojave NP, these geologic features differ from those represented in the San Gabriel Mountains. In addition, the relations of geologic formations present in the San Gabriel Mountains, but that are more widespread elsewhere in California, enable geologists to understand how the Earth's crust has evolved in the region. In this way, the geologic composition of the San Gabriel Mountains serves as a "Rosetta Stone" for understanding the evolution of the Earth's crust (Powell 2007a).

Of the national park units that represent the theme mountain systems, in no other single national park unit does the visitor have an opportunity to observe the forces of the San Andreas fault system and how it relates to active mountain building. The geologic diversity of the San Gabriel Mountains is also unique and has helped scientists to understand how the southern California region evolved.

Comparably Managed Areas

Outside of the national park system other areas that represent mountain systems include:

National Natural Landmarks (NNLs)

- Mt. Diablo State Park, CA
- Amboy Crater, CA
- San Andreas Fault, CA

National Forests

- Angeles National Forest, CA
- San Bernardino National Forest, CA

National Natural Landmarks (NNLs)

Mt. Diablo State Park, located in the northern South Pacific Border natural region, is not associated

with the San Andreas fault. Its primary significance is that it contains the best examples of diapiric (igneous intrusion) geologic processes in the South Pacific Border natural region.

The San Andreas Fault NNL consists of a privately-owned winery located in San Benito County, CA. The Cienega Winery property represents one of the best illustrations of earth displacement caused by small crustal movements. One-half of a winery structure has moved eight inches in nine years. Although this site has been specifically designated to represent the San Andreas Fault, it does not have the long history of research associated with the San Gabriel Mountains, nor does it tell the story of active mountain building associated with the San Andreas fault. Because it is privately owned and managed, the site does not expressly interpret evidence of displacement. However, several online geologic guides direct visitors and students to portions of the building affected by displacement along the fault.

The only NNL in the Mojave-Sonoran natural region associated with the theme mountain systems is the Amboy Crater. Located in eastern San Bernardino County, Amboy Crater is an example of a recent volcanic cinder cone with an unusually flat crater floor (NPS 2008a). Amboy Crater NNL is partially owned by the Bureau of Land Management (BLM). Other portions are located on private land. The BLM provides a viewing platform, interpretative information and trail access to the crater.

National Forests. The San Gabriel Mountains are primarily managed by the Angeles National Forest. However, a comprehensive interpretive and educational program on the theme mountain building is currently lacking.

The San Bernardino Mountains in the San Bernardino National Forest are located just east of the San Gabriel Mountains and the Angeles National Forest. The two ranges are separated by the Cajon Pass which was formed by the San Andreas fault. The San Andreas fault lies to the south of the San Bernardino Mountains, whereas it lies north of the San Gabriel Mountains. Although the San Bernardino Mountains are directly affected by the forces of the San Andreas fault, they do not experience the rapid uplift associated with the San Gabriel Mountains which are compressed by the San Andreas fault to the north and a series of thrust faults to the south. Thus, the topography of the San Bernardino Mountains is much gentler. While similar geologic units are found in the San Bernardino Mountains, the geologic make-up of the San Gabriel Mountains differs vastly from the

San Bernardino Mountains. Ancient rocks in the San Gabriel Mountains are not found in the San Bernardino Mountains.

Compared to the San Bernardino Mountains, the San Gabriel Mountains have greater opportunity for interpretation, education and scientific study of the San Andreas fault, plate tectonics, mountain building and regional geology.

Conclusion: Mountain Systems

Of the national park units and comparably managed areas that represent the theme mountain systems, in no other area does the visitor have an opportunity to observe the forces of the San Andreas fault system and how it relates to active mountain building. In addition, the San Gabriel Mountains contain a diversity of geological features that represent some of the oldest rocks on the west coast of California. These units have helped geologists to understand how the Earth's crust has evolved in the region. The San Gabriel Mountains could expand greatly on the story of the San Andreas fault and plate tectonics in the national park system.

SCULPTURE OF THE LAND

The Sculpture of the Land sub-theme includes landforms produced by erosive action of water and wind, landslides and other physical or chemical land shaping events or phenomena. The Devil's Punchbowl is an excellent example of sculpture of the land created by impressive geologic forces.

The scenic Devil's Punchbowl consists of magnificently exposed ridges and ravines etched into steeply tilted and folded sandstone that protrudes out of the surrounding substrate. Located between the San Andreas and Punchbowl fault zones, tectonic activity forced the Devil's Punchbowl formation into areas of older crystalline rocks associated with the San Gabriel Mountains. This striking landform is a dramatic example of earth movement caused by plate tectonics.

The Devil's Punchbowl was identified by two previous studies as a nationally significant geological feature (NPS 1974 and NPS 1976). The latter study recommended it for designation as a National Natural Landmark. It was described as "an ideal place to ponder the importance of the regional faults and to view the San Gabriel Mountains (NPS 1976)." Managed by Los Angeles County Parks, the Devil's Punchbowl features an interpretive center and interpretive trails which explain the significance of the site.

National Park Service Units

There are numerous national park units within the South Pacific Border and Mojave-Sonoran Desert natural regions that represent the theme Sculpture of the Land including:

South Pacific Border Region

- Channel Islands National Park
- Golden Gate National Recreation Area
- Pinnacles National Monument
- Santa Monica Mountains National Recreation Area

Mojave-Sonoran Desert Region

- Death Valley National Park
- Joshua Tree National Park
- Lake Mead National Recreation Area
- Mojave National Preserve

Of the NPS units in the South Pacific Border and Mojave-Sonoran natural regions, landforms within Pinnacles NM, Joshua Tree NP, Death Valley NP, Mojave NP and Lake Mead NRA are most similar to the Devil's Punchbowl in the San Gabriel Mountains.

Pinnacles National Monument features volcanic breccia that was associated with an ancient volcano. Over time these formations have been impacted by wind, erosion and seismic activity associated with the San Andreas fault which has caused cracks and talus cave features. While these features provide an ideal location to learn about and study the San Andreas fault and plate tectonics, they differ from the Devil's Punchbowl which was down-dropped into areas of older crystalline rocks creating stark contrasts between the structure and its surrounding landscape.

Joshua Tree NP features giant granite boulders that are related to the effects of subduction along the San Andreas fault. These granite boulders are remnant magma chambers that formed during subduction of the Farallon Plate (Lillie 2005). Although related to activity along the San Andreas fault, these features are located quite a distance from the fault itself.

Death Valley NRA, Mojave NP and Lake Mead NRA are renowned for their unusual geologic features associated with the Mojave Desert, Colorado Plateau and the Basin and Range geologic provinces. Some of these forms bear resemblance to the Devil's Punchbowl in the San Gabriel Mountains. For example, Marble Mountain in Death

Valley NP features dipping sedimentary rocks and Lake Mead NRA contains a steeply dipping cliff face at Gale Hills. Mojave NP is significant for volcanic geological features such as Cima Dome, the Cinder Cones, as well as the Kelso Dunes. However, none of these features are directly associated with the San Andreas fault.

Channel Islands NP, Golden Gate National NRA, and Santa Monica Mountains NRA contain examples of sculpture of the land related to both plate tectonics as well as the ongoing erosion associated with coastal environments.

Comparably Managed Areas

Outside of the national park system other areas that represent the sculpture of the land include:

National Natural Landmarks (NNLs)

- Anza-Borrego Desert State Park, CA
- Rainbow Basin, CA
- Turtle Mountain Natural Area, CA
- Ramsey Canyon, AZ

County Parks

- Devil's Punchbowl Natural Area, CA
- Vasquez Rocks County Park, CA

National Natural Landmarks (NNLs)

Anza-Borrego Desert State Park NNL, most of which is located in eastern San Diego County, is the largest desert state park in the nation. The state park contains some of the best examples of the various desert biotic communities in the Colorado Desert as well as excellent examples of desert geological phenomena. A combination of up-thrusting and subsidence formed this park's unique landforms which consist of valleys, badlands, canyons, oases, and mountain ranges.

Rainbow Basin NNL is located in San Bernardino County eight miles north of Barstow. Managed by the Bureau of Land Management, the basin is notable for the fantastic and beautiful shapes of its rock formations, particularly the Barstow Syncline. However, the primary significance of this site is the fossil evidence of insects, larger Micoene mammals and mammal tracks and the deep erosional canyons with rugged rims.

Also located in San Bernardino County, the Turtle Mountain Natural Area NNL, managed by the Bureau of Land Management, features two mountain sections entirely different in composition which illustrate past volcanic phenomena with

superimposed sculpturing of mountain landforms by weathering and uplift.

Ramsey Canyon Preserve's primary significance is its well-defined habitat created by a vertical-sided gorge. The gorge features an extension of Mexican flora and fauna into the American side of the International Boundary, and contains plants which normally occur only at higher elevations. The preserve is owned and managed by the Nature Conservancy (NPS 2008a).

The landforms in these NNLs differ from Devils Punchbowl Formation. While the San Gabriel Mountains are directly influenced by forces on the San Andreas fault, most of the NNLs that represent "sculpture of the land" are primarily desert landscapes more closely associated with forces of the Basin and Range geologic province.

County Parks. A good portion of the Devil's Punchbowl formation in the San Gabriel Mountains is currently managed by Los Angeles County Parks. The Devil's Punchbowl Natural Area features a small nature center with information about the area's geology, wildlife, plants. Guided tours are offered about such topics and various hiking trails area available for visitors to experience the resources.

Wedged between the San Gabriel Mountains and the Sierra Pelona Mountains in the Soledad Basin, the Vasquez Rocks are composed of steeply tilted andesite volcanic rocks, non-marine red beds, sedimentary breccia, claystone, mudstone and limestone. The Vasquez formation is spectacularly displayed at Vasquez Rocks County Park just west of the study area where the rocks were thrust up as the North American tectonic plate initially collided with the Pacific Plate about 25 million years ago. The Vasquez Formation volcanic rocks are also found in the San Gabriel Mountains along the Soledad Basin.

The Vasquez Rocks are similar in character to the Devil's Punchbowl. However, they do not feature the dramatic contrast in geologic units that is evident at the Devil's Punchbowl.

Conclusion: Sculpture of the Land

While many national park units in South Pacific Border and Mojave-Sonoran natural regions contain striking landforms similar to the Devil's Punchbowl, Devil's Punchbowl's prominent location in the San Andreas Fault zone makes it an ideal location to learn about the significance of the this important fault while enjoying a highly scenic landscape. The Devil's Punchbowl features are sharply contrasted with its surrounding geology and landscape creating

one of the most dramatic examples of earth movement caused by plate tectonics and active mountain building. Interpretation and education on plate tectonics and geology is currently available at the Devil's Punchbowl Natural Area.

Of the comparably managed areas that represent the theme sculpture of the land, the Vasquez Rocks County Park is most similar to the Devil's Punchbowl in terms of its character and the opportunity to interpret plate tectonics and the San Andreas Fault.

The NNLs that currently represent sculpture of the land are more associated with the Basin and Range geologic province. They do not present the same opportunity to interpret the San Andreas Fault, plate tectonics and active mountain building.

RIVER SYSTEMS AND LAKES

River systems and lakes are noteworthy features of the natural landscapes often revealing past and ongoing geological process. Portions of the river systems in the San Gabriel Mountains meet the eligibility criteria for National Wild and Scenic River designation. Free-flowing sections of Little Rock Creek and the north, east and west forks of the San Gabriel River retain high levels of integrity and support sensitive wildlife. The riparian areas in the San Gabriel Mountains provide some of the richest habitat for freshwater fishes in southern California.

National Park Service Units. Existing national park units within the South Pacific Border and Mojave-Sonoran Desert Regions that represent the theme River Systems and Lakes include:

South Pacific Border Region

- Channel Islands National Park
- Golden Gate National Recreation Area
- Santa Monica Mountains National Recreation Area
- Whiskeytown-Shasta-Trinity National Recreation Area

Mojave-Sonoran Desert Region

- Lake Mead National Recreation Area

Of these national park units, Channel Islands NP and Santa Monica Mountains NRA represent river systems most similar in quality and character to the systems found in the San Gabriel Mountains. While the Golden Gate and Whiskeytown-Shasta-Trinity NRAs contain excellent examples of river systems and lakes, these systems differ from those represented in the San Gabriel Mountains in that they are more associated with northern California ecosystems.

The Santa Monica Mountains NRA is home to freshwater aquatic habitats and two of the last salt marshes on the Pacific Coast. While this habitat provides refuge to a significant number of rare species, the primarily marine influence and lower elevations support different species than those found in the San Gabriel Mountains. The San Gabriel River and its mountain tributaries provide some of the richest habitat for native freshwater fishes in southern California. Similarly, the tidal systems at Channel Islands NP are heavily marine influenced and differ in both vegetative structure and species composition from the San Gabriel Mountains.

The character of river systems in the Santa Monica Mountains NRA and Channel Islands NP are different from the river systems in the steep, rugged San Gabriel Mountains. River systems in the San Gabriel Mountains are highly influenced by the topography and active geologic processes. Measured as a function of the horizontal distance from the ocean, these mountains present the greatest vertical elevation gain from the ocean when compared to anywhere else in the continental United States (McPhee 1989; Gumprecht 1999).

The proximity of mountains to the sea presents unique climatic conditions and orographic effects, causing large amounts of annual rainfall and significant flooding. Combined with the rapid erosion resulting from the active mountain-building in the San Gabriel Mountains, the river systems of the Los Angeles Basin are some of the most dynamic in California. Residents of the Los Angeles Basin went through extraordinary efforts in their attempts to stabilize these rivers. The result is the development of one of the most comprehensive flood control projects undertaken in the United States. The San Gabriel Mountains are an ideal location to interpret this story.

Significant desert river systems can be found at Lake Mead NRA. Despite alteration of the riverine environment from dams, the lakes at Lake Mead NRA contain excellent examples of desert riparian systems and provide habitat to rare and endangered species. This includes two endemic fish species listed as federally endangered, the razorback sucker and the bonytail chub. These species are native to Mojave, Colorado Plateau and Basin and Range geologic provinces.

Whereas Lake Mead features mostly lacustrine riparian areas, outstanding examples of desert riparian areas in the San Gabriel Mountains are associated with Little Rock Creek. Little Rock Creek is the only eligible Wild and Scenic River on the

northern slope of the San Gabriel Mountains which drains into the Mojave Desert region. Little Rock Creek differs in character from the other three units in that it traverses a greater elevation change. Over its course, Little Rock Creek transitions quickly from Sierran mixed conifer habitat in its upper watershed to juniper woodlands and finally to desert scrub habitat as it spreads into the Mojave Desert to the north.

The desert and high country setting of Little Rock Creek attracts visitors for picnicking, water play and driving opportunities and features a diverse array of wildlife including threatened, endangered, and sensitive species. Also present are prehistoric sites valued by local Native American tribes (USFS 2005). The Little Rock Creek is an excellent location to interpret the ecological transition from the southern California coastally influenced Mediterranean ecosystem to the Mojave Desert ecosystem as well as prehistoric human occupation of these sites.

Comparably Managed Areas

Outside of the national park system other areas that represent the River Systems and Lakes include:

National Natural Landmarks (NNLs)

- San Felipe Creek Area, CA

National Forests and Private Reserves

- Angeles National Forest, CA
- San Bernardino National Forest, CA
- Los Padres National Forest, CA
- Santa Margarita Ecological Reserve, CA

National Natural Landmarks (NNLs)

No NNL was identified for the South Pacific Border natural region that represents the theme River Systems and Lakes. Within the Mojave-Sonoran Desert natural region, the San Felipe Creek Area in San Diego County features a marsh area containing what is probably the last remaining perennial natural desert stream in the Colorado Desert. Managed by the California Department of Fish and Game, this ecological reserve is open to the public for hiking and viewing wildlife. The Colorado Desert ecosystem is distinctly different in character from desert ecosystem associated with the San Gabriel Mountains (NPS 2008a).

National Forests. The Angeles National Forest manages eligible wild and scenic rivers in the San Gabriel Mountains. However, some segments are currently impacted by heavy visitation. Expanded visitor education programs about the importance of

these water resources and proper stewardship could expand and enhance their protection, and improve the overall visitor experience.

National Forests with comparable river systems to those found on the Angeles National Forest include rivers in the San Bernardino NF and the Los Padres NF. Located in the coastal mountains of the southern California coast, the San Bernardino and Los Padres National Forests both contain river segments that are eligible for Wild and Scenic River status. The Sisquoc River, Sespe Creek, and Big Sur River in the Los Padres National Forest are the only rivers within the South Pacific Border Region that are designated Wild and Scenic Rivers.

The U.S. Forest Service has identified twelve rivers on the San Bernardino National Forest that are eligible for Wild and Scenic River status. These rivers would be most comparable to those found in the San Gabriel Mountains. Although many of these rivers have comparable scenic, wildlife and recreational value, eligible river segments in the San Gabriel Mountains differ in both physical character and quantity of native fisheries.

Historically, the San Gabriel River was the most abundant trout stream in Southern California (Robinson 1946). Today, the West, North, and East forks of the San Gabriel River and their tributaries still contain highly significant aquatic habitats (Swift et al 1993, Deinstadt et al 1990). Rainbow trout populations occur on the West, North, and East Forks of the San Gabriel River, and in both San Gabriel and Cogswell Reservoirs. Average densities of over 3,500 fish per mile have been recorded on the West Fork (Deinstadt et al 1990). The San Gabriel River also contains the largest remaining populations of Arroyo chub (Wells et al 1975) and the Santa Ana speckled dace (Swift et al 1993). The San Gabriel River thus provides some of the best opportunities to interpret southern California native freshwater fisheries.

The Los Padres National Forest has three Wild and Scenic Rivers – a segment of the Sespe Creek, the Sisquoc River, and the Bid Sur. A four-mile segment of Sespe Creek in the Los Padres NF was included in the Wild and Scenic River system in 1992. Sespe Creek represents five outstandingly remarkable wild and scenic river values including: recreation, wildlife, geologic, fishery and scenic. Sespe Creek forms highly scenic, deep gorges that expose formations of the Topa Topa Mountain range. The creek is one of the southernmost anadromous fishery habitats (southern steelhead) in California. Other federally listed species found within the creek include the arroyo toad and the California condor.

Although access to Sespe Creek is limited since the Wild and Scenic river segment is primarily in wilderness areas, several trails provide opportunities for hiking, swimming and equestrian use along Sespe Creek (USFS 2003b).

The Sisquoc Wild and Scenic River is located in the Los Padres NF, in the County of Santa Barbara. The outstandingly remarkable values for the Sisquoc River are scenic, recreation, wildlife, heritage, and ecological values. The extensive riparian corridor, along the Sisquoc River remains relatively natural and surrounded by a large wilderness area. The scenic value of the river is associated with the narrow corridor of the river itself and the contrast of the geologic features, water, and riparian vegetation. Several federally listed threatened or endangered species are found in a relatively undisturbed riparian habitat. These species include Central California Coast Steelhead trout, California red-legged frogs, Arroyo toads, Least Bell's vireos, and California condors.

The Sisquoc River corridor has abundant prehistoric and historic sites. Patterns of travel and settlement along the river's length, and the sites that stand in evidence of the past, reflect the distinctive nature of the drainage. The corridor frequently has narrow travel passages, and many adjacent high flats that were occupied in prehistoric times and often homesteaded and cultivated in more recent times. The area also has cultural significance to modern Native Americans (USFS 2003c).

The Sisquoc River corridor offers excellent opportunities for solitude, primitive camping, hiking, horseback riding and other wilderness oriented activities. There is an established trail system that generally parallels the river out of the floodplain that periodically crosses the river.

The Big Sur Wild and Scenic River is located in the Los Padres NF. Outstanding remarkable values for which the Big Sur River was designated include scenic, recreation, and ecological values. Scenic values include: abundant, rapid, flowing water, with pools, springs and an occasional waterfall; interesting landforms; diverse tree canopy with redwoods; combination of scenic features uncommon to Central and Southern California. The three natural sulfur hot springs pools and the redwood-riparian environment provide outstanding opportunities for hiking, camping, swimming, fishing, picnicking, and nature study. Outstanding ecological values include a diverse combination of alders, maples, willows and bay with dominant over story of redwood (USFS 2003d).

Although the three Los Padres NF Wild and Scenic Rivers are outstanding examples of river systems, these systems differ significantly in character from rivers systems in the San Gabriel Mountains. The Sespe, Sisquoc and Big Sur Wild and Scenic Rivers support different fisheries, vegetation types and have distinctly different geologic make-ups than that of the San Gabriel River.

Private Reserves. The Santa Margarita River, located south of the study area in San Diego County, is the longest protected coastal river in southern California. Upper portions of the river are located in unincorporated areas of San Diego County while lower portions are protected by the Santa Margarita Ecological Reserve and the Department of Defense at Camp Pendleton. In contrast to the San Gabriel River, Santa Margarita River has its most significant resources in its lower reaches. These sections differ significantly in vegetative structure and geologic make-up from the San Gabriel Mountains. Although the lower Santa Margarita River offers exceptional educational and research opportunities, the restricted access limits interpretive and recreational opportunities.

Conclusion: River Systems and Lakes

While several national park units in the South Pacific Border and Mojave-Sonoran natural regions contain excellent representations of the theme River Systems and Lakes, the San Gabriel Mountain river systems differ significantly in geologic character and processes and diversity of river habitats. Access to significant river systems in the San Gabriel Mountains is excellent. The rivers provide opportunities to interpret how the impact of mountain building on river processes shaped the Los Angeles Region.

Of the comparably managed areas, the San Gabriel Mountain river systems differ in geologic character and geologic processes, habitat type, fisheries and opportunities for access and interpretation.

Land Ecosystems

The theme "Land Ecosystems" represents vegetation types as well as the animal populations and physical environmental features which are often important elements in identifying and evaluating sites. The following sub-themes related to Land Ecosystems are represented in the San Gabriel Mountains:

- **Chaparral** (shrubs and evergreen forest trees): Coastal sage scrub, San Dimas Experimental Forest (chaparral)

- **Dry Coniferous Forest:** Bigcone Douglas-fir, pinyon-juniper forest, subalpine forest.

CHAPARRAL

Chaparral ecosystems include broad-leafed, mainly evergreen, species of shrubs or low trees, occurring as dense scrub or woodland. Almost 50% of the study area land cover is chaparral habitat.

The San Dimas Experimental Forest in the Angeles National Forest has been a leader in research of chaparral ecosystems and watersheds and provides superlative opportunities for scientific study.

National Park Service Units

Existing national park units within the South Pacific Border and Mojave-Sonoran Desert Regions that represent Chaparral include:

South Pacific Border Region

- Cabrillo National Monument
- Channel Islands National Park
- Pinnacles National Monument
- Santa Monica Mountains National Recreation Area
- Whiskeytown-Shasta-Trinity National Recreation Area

Mojave-Sonoran Desert Region

- Joshua Tree National Park

Whiskeytown-Shasta-Trinity NRA represents chaparral species associated with more northern California affinities and Pinnacles NM represents chaparral communities associated with central California. Similarly, chaparral communities represented in the Mojave-Sonoran Desert natural region are more representative of desert chaparral communities. The Santa Monica Mountains NRA contains chaparral habitat most similar chaparral in the San Gabriel Mountains. However, given that the San Gabriel Mountains are located in a transition zone between two ecoregions, and the range of chaparral types associated with different elevations and climate, the San Gabriel Mountains contain a greater diversity of chaparral habitat..

The presence of the San Dimas Experimental Forest in the San Gabriel Mountains is what distinguishes this area the most from existing units that represent the theme Chaparral. No other location has the extensive history of research and experimentation on chaparral watersheds. Data collected in the San Dimas Experimental Forest since 1933 represents some of the earliest and most comprehensive

records from continuously monitored U.S. Forest Service experimental watersheds in the United States.

Of the three national park units in the South Pacific Border natural region, Santa Monica Mountains NRA mostly closely represents chaparral habitat similar to what is found in the San Gabriel Mountains.

In recent years, the National Park Service has established Research Learning Centers throughout the nation to facilitate research efforts and provide educational opportunities. The California Mediterranean Research Learning Center (CMRLC) is an integral program of three units of the national park system: Cabrillo National Monument, Channel Islands National Park, and Santa Monica Mountains National Recreation Area. These three NPS areas represent outstanding examples of Southern California's Mediterranean Biome which includes chaparral communities.

The California Mediterranean Research Learning Center was established to support a broad scope of research on the terrestrial and oceanic aspects of the Mediterranean Biome, and promote research directed specifically at addressing management needs. Through the CMRLC, the NPS plans to engage citizens in science and research and will place a strong focus on education. While the CMRLC will likely conduct important research on chaparral systems, the program is new and does not have the years of focused, controlled research that has been conducted at the San Dimas Experimental Forest. The CMRLC will provide educational opportunities for the public which is currently not a function of the San Dimas Experimental Forest.

Comparably Managed Areas

Outside the national park system other areas that represent chaparral include:

National Natural Landmarks (NNLs)

- American River Bluffs and Phoenix Park Vernal Pools , CA
- Año Nuevo Point and Island, CA
- Miramar Mounds, CA
- Nipomo Dunes-Point Sal Coastal Area, CA
- Tijuana River Estuary , CA

National Forests

- Angeles National Forest, CA
- San Bernardino National Forest, CA
- Los Padres National Forest

- Cleveland National Forest, CA

National Natural Landmarks (NNLs)

The American River Bluffs and Phoenix Park Vernal Pools located outside of Sacramento, CA contain outstanding examples of rare plant community types such as blue oak woodlands and vernal pools. The landmark is owned by federal, county and private owners. Public access is readily available along the bluffs which feature a continuous trail. The Phoenix Park Vernal Pool Preserve is managed by the City of Fair Oaks Recreation and Park District. The pools are sensitive and public access is restricted.

Año Nuevo Point and Island on the northern California coast is the best known breeding ground in the world for the northern elephant seal; it is also habitat for Steller sea lions, California sea lions, and harbor seals. The area is managed by California State Parks.

Miramar Mounds in San Diego, California is an example of vernal pools habitat and distinctive geomorphic forms and soils that are now rare within California, particularly in coastal southern California. The Miramar Mounds NNL is owned and managed by the Department of Defense as part of the Marine Corps Air Station Miramar.

The Nipomo Dunes-Point Sal Coastal Area contains the largest, relatively undisturbed coastal dune tract in California, supporting both rare and endangered plants and animals and great species diversity and one of the last remaining tracts of pristine rocky coastline in the South Coast Ranges. The landmark is managed owned by federal, state, county and private landowners.

The Tijuana River Estuary on the southernmost tip of California is of the finest remaining saltwater marshes on the California coastline, containing three species of endangered birds and an important habitat for other wildlife, especially waterfowl (NPS 2008a).

While each of these NNL sites contain chaparral habitat, the quality of the chaparral is not the primary significance or purpose for designating any of the NNLs. None of the NNL sites has a chaparral research component similar to the San Dimas Experimental Forest.

National Forests. Southern California's four national forests (Angeles, Los Padres, Cleveland and San Bernardino) manage most of the southern California's chaparral resources. While national forest status ensures that the chaparral habitat

is under some level of federal protection, threats to chaparral in the national forests include infrastructure development such as power lines and roads, and increasing fire frequency as a result of human-caused ignitions (Halsey 2005).

The Angeles National Forest is home to the San Dimas Experimental Forest, unique among the four national forests, where significant research about chaparral ecosystems and watersheds has contributed to our knowledge and management of this type of ecosystem. Currently, there is little to no opportunity to provide interpretive and educational opportunities about the San Dimas Experimental Forest and the significant resource contributions which it has generated, both nationally and internationally. A comparison to other experimental forests and stations is further analyzed later in the cultural themes section of this chapter.

Conclusion: Chaparral

Of the national park units and comparably managed areas that contain significant chaparral ecosystems in the South Pacific Border natural region, no other site has been so significant for historical and contemporary research on chaparral ecosystems and watersheds as the San Dimas Experimental Forest located within the San Gabriel Mountains. Additionally, the chaparral habitat types in the San Gabriel Mountains are diverse covering a range of elevations and spanning two distinct ecoregions.

DRY CONIFEROUS FOREST

This sub-theme includes belts of coniferous forest and woodland dominated by Douglas-fir, ponderosa pine, and pinyon-juniper. At its lower limits these forests give way to steppe or chaparral ecosystems.

Outstanding examples of dry coniferous forest communities in the San Gabriel Mountains and foothills include: bigcone Douglas-fir, relict juniper communities, and southern California subalpine habitat.

National Park Service Units

Existing national park units within the South Pacific Border and Mojave-Sonoran Desert Regions that represent the theme Dry Coniferous Forest include:

South Pacific Border Region

- Channel Islands National Park
- Golden Gate National Recreation Area
- Pinnacles National Monument
- Santa Monica Mountains National Recreation Area

- Whiskeytown-Shasta-Trinity National Recreation Area

Mojave-Sonoran Desert Region

- Death Valley National Park
- Mojave National Preserve
- Saguaro National Monument
- Montezuma Castle National Monument

Because of its high elevation, the San Gabriel Mountains contain rare examples of southern California subalpine vegetation. No other national park unit in the South Pacific Border natural region or the Mojave-Sonoran Desert Region contains this type of habitat which includes an unusual subalpine forest of krummholz lodgepole pine (*Pinus murrayana*) and 1,000 year-old limber pines.

Although examples of bigcone Douglas-fir and juniper woodlands are found in many of the existing national park units, the San Gabriel Mountains contain unique and outstanding examples of this type of habitat. The relict juniper woodland found at Mescal Creek in the San Gabriel Mountains is a remnant of vegetation that was prevalent in this area during the Pleistocene epoch (1.8 million - 8,000 years ago.) The bigcone Douglas-fir habitat found at Falls Canyon Research Natural Area is one of the best remaining examples of this declining community. Stands here include dense, mature bigcone Douglas-fir trees, some of which are over 350 years old.

Comparably Managed Areas

Outside of the national park system other areas that represent Dry coniferous forest include:

National Natural Landmarks (NNLs)

- Consumnes River Riparian Woodlands, CA
- Patagonia-Sonoita Creek Sanctuary, AZ
- Ramsey Canyon, AZ

National Forests and Monuments

- Angeles National Forest, CA
- San Bernardino National Forest, CA
- Santa Rosa and San Jacinto Mountains National Monument, CA

National Natural Landmarks (NNLs)

The three National Natural Landmarks contain plant communities associated with dry coniferous forest. Consumnes River Riparian Woodlands contain a small remnant of a rapidly disappearing riparian woodland community type that once

formed a major part of the California Central Valley. The Patagonia-Sonoita Creek Sanctuary in Arizona features permanent stream-bottom habitat supporting rare aquatic biota, including the Gila Topminnow. This site is also the only known nesting spot in the country for the rare rose throated becard. Ramsey Canyon in Arizona features a vertical-sided gorge containing a well-defined microclimatic habitat, which consists of an extension of Mexican flora and fauna into the American side of the International Boundary, and contains plants which normally occur only at higher elevations (NPS 2008a). All three of these landmarks are managed by the Nature Conservancy. Each site contains a visitor/nature center and some opportunities for passive recreation such as wildlife viewing, nature study and hiking.

Although these three NNLs contain some dry coniferous forest habitat, this type of habitat is not dominant in any of the units. Each was established for their outstanding representation of riparian vegetation. Additionally, the combination of plant communities within these three NNLs is quite different than the significant habitats represented in the San Gabriel Mountains.

National Forests and Monuments. The San Bernardino National Forest contains examples of Dry Coniferous Forest habitat types most similar to the San Gabriel Mountains. The Millard Canyon Research Natural Area contains well-developed bigcone Douglas fir. However, this area is primarily preserved for its representation of interior live oak vegetation.

The Santa Rosa and San Jacinto Mountains National Monument (monument) is located approximately 100 miles east of Los Angeles encompassing 89,500 acres, the monument is jointly managed by the Bureau of Land Management, the Forest Service (San Bernardino NF) lands, the Agua Caliente Band of Cahuilla Indians, California State Parks, and the California Department of Fish and Game.

Within the monument vegetation ranges from cactus, creosote, chamise, and red shank along desert slopes, to stands of ponderosa pine, mixed conifer, Jeffrey pine, and lodgepole pine. Significant habitats include high-country conifer forests, live oak in deep canyons, a diverse cactus scrub community, pinyon juniper woodlands, and the fan palm oasis in Palm Canyon, the largest oasis of California fan palms in the United States.

Similar to the San Gabriel Mountains, the monument has a dramatic landscape rising abruptly from near sea level in the valley to the San Jacinto

Peak at 10,834 feet. Five distinct "life zones," from Sonoran Desert to Arctic Alpine provide exceptionally diverse biological resources.

Higher elevations of the monument support subalpine vegetation such as lodgepole pine. The lodgepole pine habitat at the national monument differs in character from that found in the San Gabriel Mountains in that lodgepole pine habitat at Mt. San Antonio in the San Gabriel Mountains contain a variety of rare alpine and subalpine plants, partly related to the local geology. The area also supports an unusual subalpine forest of krummholz lodgepole pine, *Pinus murrayana*. Disjunct western juniper (*Pinus occidentalis* ssp. *australis*) also occurs here.

Conclusion: Dry Coniferous Forest

No other national park unit in the South Pacific Border natural region or the Mojave-Sonoran Desert Region contains the types of Dry Coniferous Forest habitat found in the San Gabriel Mountains. Of the other comparably managed sites, the Santa Rosa and San Jacinto Mountains are most similar in character and quantity of habitat types. However, the San Gabriel Mountains maintain unique and unusual subalpine species not found in these locations.

Aquatic Ecosystems Themes

The theme "Aquatic Ecosystems" is based on geomorphic and other physical aspects of aquatic ecosystems. The sub-theme "Streams" represents aquatic ecosystems with flowing waters. The following sub-theme related to Aquatic Ecosystems is represented in the study area:

- **Streams:** Alluvial fan sage scrub, riparian habitat

STREAMS

Streams include flowing waters with biological characteristics that are determined by the physical properties of the stream bed and by the nature of the watershed. The San Gabriel Mountain foothills contain some of the best remaining examples of alluvial fan sage scrub in the Los Angeles Basin. This type of vegetation is most common at the canyon mouths along the coastal side of the San Gabriel, San Bernardino, and San Jacinto Mountains. These floodplain systems are formed by extreme floods and erosion and features vegetation that has uniquely adapted to nutrient-poor substrates and subsurface moisture (Hanes et al 1989).

Since riparian areas were discussed in the previous section on River Systems and Lakes, the

comparative analysis for this theme will focus on the alluvial fan sage scrub component of vegetation. Specific areas of well-developed alluvial fan vegetation within the study area include: the Big Tujunga Wash, the San Gabriel River Wash, San Antonio Creek, and the upper Santa Clara River.

National Park Service Units

Existing national park units within the South Pacific Border and Mojave-Sonoran Desert Regions that represent the theme Streams include:

South Pacific Border Region

- Channel Islands National Park
- Golden Gate National Recreation Area
- Pinnacles NM
- Santa Monica Mountains National Recreation Area
- Whiskeytown-Shasta-Trinity National Recreation Area

Mojave-Sonoran Desert Region

- Death Valley National Park
- Lake Mead National Recreation Area
- Organ Pipe Cactus National Monument
- Saguaro National Monument
- Tonto National Monument
- Tuzigoot National Monument

Alluvial fan sage scrub is a distinct and rare plant community found on alluvial fans and floodplains along the southern base of the Transverse Ranges and portions of the Peninsular Ranges in southern California. As discussed in the previous chapter on significance, alluvial fan sage scrub habitat is extremely rare. Excellent examples of remaining alluvial fan sage scrub are not found on any of the existing national parks in the Transverse and Peninsular Ranges. An analysis of ten of the most well-developed alluvial fan vegetation stands in Los Angeles, Riverside and San Bernardino Counties found that Big Tujunga Wash is one of three sites which exhibit the most species diversity and the San Gabriel River is among one of two sites that exhibits the greatest structural diversity (Hanes et al. 1989). San Antonio Canyon and the upper Santa Clara also contain excellent examples of alluvial fan sage scrub.

None of the national park units in the South Pacific Border Region or Mojave-Sonoran Desert Region which represent “Streams” contain significant examples of southern California alluvial scrub vegetation.

Comparably Managed Areas

Outside of the national park system other areas that represent streams include:

National Natural Landmarks (NNLs)

- Consumnes River Riparian Woodlands, CA
- San Ridge Wildflower Preserve, CA
- Canelo Hills Cienega, AZ
- Patagonia-Sonita Creek Sanctuary, AZ
- Ramsey Canyon, AZ

National Forests and Bureau of Land Management Lands

- San Bernardino National Forest, CA
- Santa Ana Wash Area of Environmental Concern, CA

National Natural Landmarks (NNLs)

None of the NNLs in the South Pacific Border Region or Mojave-Sonoran Desert Region which represent the sub-theme “Streams” contain significant examples of southern California alluvial scrub vegetation.

National Forests and Bureau of Land Management Lands

Of the remaining large, intact stands of alluvial fan sage scrub in southern California, most sites are located on privately-owned lands or lands not expressly managed for resource values or public enjoyment. Two protected area sites are located in the San Bernardino National Forest (NF) and on Bureau of Land Management (BLM) lands.

The San Bernardino NF protects one of the largest intact stands of alluvial fan sage vegetation in southern California. Located in the pass between the San Gabriel and San Bernardino Mountains, the Cajon Wash alluvial fan sage scrub supports one of the most important populations of short-joint beavertail (*Opuntia basilaris* var. *brachyclada*), occurrences of Plummer’s mariposa lily (*Calochortus plummerae*) and Parry’s spineflower (*Chorizanthe parryi* var. *parryi*), all of which are considered sensitive species. Public access to this area is via the Pacific Crest National Scenic Trail where it crosses Cajon Wash at Crowder Canyon, the Mormon Rocks Fire Station, and a nearby interpretive trail located in the northern section of the Cajon Wash alluvial fan sage scrub area (USFS 2005).

The Santa Ana Area of Critical Environmental Concern protects 755 acres of lands north of the City of Redlands, CA within the floodplains of the

Santa Ana River and Plunge Creek. This area was set aside to provide special management for two federally listed endangered plant species associated with alluvial fan sage scrub, the Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *sanctorum*) and the slender-horned spineflower (*Dodecahema leptoceras*). The Upper Santa Ana River Wash is primarily managed for water recharge, sensitive species habitat, and sand/gravel mining. The area is generally not accessible to the public, and the BLM parcels are surrounded by lands that are also closed to public use.

Conclusion: Streams

No other national park unit in the South Pacific Border natural region or the Mojave-Sonoran Desert Region contains the alluvial fan vegetation unique to the Transverse and Peninsular Ranges of southern California. Of the comparably managed areas, the San Bernardino National Forest is the only publically accessible protected area with significant alluvial fan sage scrub.

The significant alluvial fan sage scrub areas within the study area are primarily privately owned or managed by local water districts. However, several of these areas are adjacent to public lands and trails providing potential interpretive opportunities. The Santa Fe Dam Recreation Area along the San Gabriel River contains significant alluvial fan sage scrub which is publicly accessible through recreational and interpretive trails.

Cultural Themes

The NPS Thematic Framework (2000) for historical themes provides guidance on:

- evaluating the significance of resources for listing on the National Register of Historic Places, for designation as national historic landmarks, or for potential addition to the national park system
- assessing how well the themes are currently represented in existing units of the national park system and in other recognized areas; and,
- expanding and enhancing the interpretive programs at existing units of the national park system to provide a fuller understanding of our nation's past. (NPS 2000)

Cultural Themes Represented in the San Gabriel Mountains

Themes represented by nationally significant resources in the San Gabriel Mountains include:

- **Expressing Cultural Values**
- **Expanding Science and Technology**

EXPRESSING CULTURAL VALUES

The theme "expressing cultural values" covers expressions of culture – people's beliefs about themselves and the world they inhabit. This theme also encompasses the ways that people communicate their moral and aesthetic values (NPS 2000). The following topic related to Expressing Cultural Values is represented in the San Gabriel Mountains:

- **Architecture:** San Dimas Experimental Forest

Architecture

Architecture is focused on the development and expression of building design within the United States. It deals with the careers and works of leading architects, structures of outstanding value in design, the evolution of significant architectural styles, and structures richly representative of particular types or geographical regions.

The San Dimas Experimental Forest (SDEF) contains buildings and landscape features that are excellent examples of U.S. Forest Service architecture in the Pacific Southwest Region. Architects Blanchard and Maher designed the buildings in the region to reflect California's architectural heritage (wood buildings of the early days of the Mother Lode Country) (Jones & Stokes 2004).

Facilities at the SDEF headquarters at Tanbark Flat include a laboratory/office, residences, a mess hall, conference room, and several storage/utility buildings. Research/monitoring equipment includes rain gauges, stream gauges, debris dams, water quality samplers, a weather station, and a historical lysimeter complex. The lysimeter complex remains the largest structure of its type in the world. Other important CCC structures include stone landscape features

The SDEF retains the character, feeling, and association of its historic period. The SDEF has always functioned as an experimental forest and the built environment is largely unchanged since the SDEF was first established in the 1930s. The Pacific Southwest Research Station and Angeles National continue to maintain the facility (USFS 1999a).

Another factor that makes the SDEF stand out is that a group of conscientious objectors (CO) was assigned to work at the SDEF through the duration of the war. Because the forest was short on workers during the war, the COs were able to do the work to maintain the SDEF (Jones & Stokes 2004). This story is not represented at comparable national park sites.

National Park Service Units

A variety of architectural styles are represented in national parks. Some buildings were representative of mainstream American architecture, while other architects' designs were influenced by nature. "Rustic" design spread throughout the nation during the 1930s work-relief programs of the Depression (NPS 1986).

The U.S. Forest Service has many rustic facilities of the Civilian Conservation Corps (CCC) era. Forest Service architecture is distinctive from region to region since building design was influenced by local conditions and building materials (Jones & Stokes 2004). The U.S. Forest Service Blanchard and Maher designs are similar to the NPS rustic design in California.

There are many national park units in the west that have structures constructed by the CCC and other Depression era labor programs. In 1977, the NPS Western Regional Office prepared a report on NPS Rustic Architecture. The report includes a comprehensive list of rustic structures in the NPS western region (now the Pacific West and Southwest Regions) that appear to qualify for listing on national register of historic places. The following national park areas include significant facilities of the rustic architectural style in the West constructed by Depression era labor programs (NPS 2008b):

- Pinnacles National Monument, CA
- Bandelier National Monument, NM
- Crater Lake National Park, OR
- National Park Service Southwest Regional Office, NM

Similar to the designs for the forest service administration buildings in the Pacific Southwest Region, national park architects combined native wood and stone with native styles to create structures that fit naturally within the landscape.

All of the national park examples are different than the SDEF because they are not solely used for research. Also, the role of the conscientious objectors is unique to the SDEF.

The Pinnacles National Monument East Entrance District includes features associated with the early park development and administration and the craftsmanship of the CCC and Works Progress Administration (WPA) programs. Types of facilities include small cabins now used for offices and a nature center, trails, and the dam that forms the Bear Gulch reservoir. This district is similar to the facilities at SDEF through its reflection of California regional architecture and its chaparral setting. However, Pinnacles does not have the range of types of facilities represented at SDEF. Pinnacles National Monument offers interpretation of the CCC history while interpretive and educational opportunities of U.S. Forest Service architecture at the SDEF are not available. Public access is restricted and use of the SDEF is focused on scientific research.

Bandelier National Monument, Crater Lake National Park, and the NPS Southwest Regional Office also contain significant rustic architecture constructed by the CCC and other Depression era labor programs. These park and the regional office structures reflect different settings than that of the SDEF and Pinnacles National Monument.

The Bandelier CCC Historic District includes the largest collection of CCC-built structures in a national park area that has not been altered by the addition of new structures within the district (NPS 1977). The SDEF has more structures identified than Bandelier. The architecture at Bandelier also differs from that of the SDEF since the buildings were designed and built to mimic a pueblo/small New Mexican village in keeping with rustic architecture principles.

Crater Lake National Park was chosen for one of the most comprehensive rustic architectural programs undertaken by the NPS. Landscape architect Merel Sager layed out the administrative, residential and maintenance facilities and established design guidelines. Work on the site was done by CCC crews. The rustic character of the buildings was carried throughout a sequence of small stone-and-timber cottages. Although Crater Lake National Park has a collection of CCC structures, the natural setting is different than at SDEF and it does not have the range of types of facilities represented at SDEF (NPS 1977).

The National Park Service Southwest Regional Office in New Mexico is the largest known adobe office building and one of the largest secular adobe buildings in the United States. The CCC cut and shaped the timbers, formed the thousands of adobe bricks, and erected the building, and the WPA put

in the mechanical systems and other aspects of the finished product. Although this is a significant NPS structure built by the CCC, it does not compare to the range and types of facilities constructed by the CCC at the SDEF.

Comparably Managed Areas

There are no national historic landmarks that represent the California Mother Lode Country architecture. There are no other national forest areas within the Pacific Southwest Region that contain the quality and quantity of the types of CCC-constructed rustic architecture facilities and landscape features representing the “wood buildings of the early days of the Mother Lode Country” as the SDEF in the Angeles National Forest. The building plans were adopted by other forests. Several California Department of Forestry buildings constructed during the 1930s were based on these plans. Examples of these remnant structures within the U.S. Forest Service and California Department of Forestry include:

- Tahoe National Forest, North Bloomfield Ranger Station: ranger residence and garage; Camptonville Ranger Station (Downieville Ranger District fire station): office, 2 residences, 2 garages
- Modoc National Forest, Patterson Ranger District: garage
- Sierra National Forest, North Fork Ranger Station (Bass Lake Ranger District): supervisor’s residence
- Shasta –Trinity National Forest, Weaverville Ranger Station, Mt. Shasta Ranger Station: headquarters office building, ranger’s residence, auto shop, oil house, two warehouses, two large garages, and storage building
- Plumas National Forest, headquarters
- California Department of Forestry, Alma Forest Fire Station: kitchen-mess hall (Joslin 1995)

None of these sites contain the range, quality, and quantity of structures as the SDEF. Many of these buildings have been modified and their uses have changed over the years.

There are ten experimental forests/areas in the Pacific Southwest Region including the San Dimas Experimental Forest. There are no other experimental forests in the region that have historic structures based on the early U.S. Forest Service building plans and constructed by the CCC, in fact, most have few to no facilities:

- Caspar Creek, Challenge, North Mountain, Redwood, Stanislaus-Tuolumne, Swain Mountain: no facilities
- Hawaii, Onion Creek, San Joaquin, and Teakettle: limited infrastructure/facilities
- Sagehen Experimental Forest: modern facilities

Conclusion: Expressing Cultural Values

The facilities at the SDEF are the best representation of the U.S. Forest Service architecture influenced by the wood buildings of the early days of the California Mother Lode Country. Among comparable national park areas, Pinnacles National Monument has CCC rustic architecture most similar to the SDEF. However, Pinnacles does not have the range of types of facilities, including those associated with research, represented at SDEF. Other California national forests have few remaining structures of the Blanchard and Maher designs, but there are no other sites, including experimental forests, that have the diversity of types, quality, quantity, and character as the SDEF.

Although the SDEF offers educational and research opportunities, interpretive opportunities are lacking. The SDEF could include interpretation by organizations that conduct field trips or educational tours of the SDEF. The SDEF provides limited tours and scheduled visits for local youth. However, the SDEF does provide information to the public through a web site. This information includes some information about the CCC constructed facilities.

EXPANDING SCIENCE AND TECHNOLOGY

This theme focuses on science, which is modern civilization’s way of organizing and conceptualizing knowledge about the world and the universe beyond. This is done through the physical sciences, the social sciences, and medicine. Technology is the application of human ingenuity to modification of the environment in both modern and traditional cultures. Technologies can be particular to certain regions and cultures. The following topics related to Expanding Science and Technology are represented in the San Gabriel Mountains:

- Experimentation and Invention
- Technological Applications
- Scientific Thought And Theory

Within the San Gabriel Mountains, these topics are represented by the Mount Wilson Observatory and San Dimas Experimental Forest.

The Mount Wilson Observatory provides excellent representation of the sciences of astronomy and

astrophysics. The National Park Service report entitled "National Survey of Historic Sites and Buildings report (1964)" included the section "The Arts and Sciences: Scientific Discoveries and Invention" that addressed astronomy. Twelve sites, including the Mount Wilson Observatory, related to the history of the science of astronomy were examined for designation under this theme. A subsequent national historic landmark theme study for Astronomy and Astrophysics (1989) included an NHL nomination for the Mount Wilson Observatory.

The San Dimas Experimental Forest provides excellent representation of chaparral ecology. As described under the Natural History Themes, Land Ecosystems: Chaparral, the San Dimas Experimental Forest has been a leader in research of chaparral ecosystems and watersheds and provides superlative opportunities for scientific study.

The following comparative analysis is organized by the sciences: (1) astronomy and astrophysics and (2) chaparral ecology.

Astronomy and Astrophysics: Mount Wilson Observatory

Experimentation and Invention

The Mount Wilson Observatory represents experimentation using new scientific instruments and methods for studying the sun and the universe. The Mount Wilson Observatory provided many significant contributions to the science of astronomy and our understanding of the universe. Many astronomers and other scientists, including Edwin P. Hubble and Albert Michelson, conducted significant research and experiments at the Observatory. Astronomy questions including the nature of sunspots, the temperature and composition of stars, and the structure and origin of the universe were addressed at the Mount Wilson Observatory. Astronomers and physicists made astrophysics a modern science. George Ellery Hale proved that sunspots are actually regions of reduced solar temperature while Albert Michelson conducted experiments to accurately measure the speed of light.

Experimentation often required the invention of new technology. Inventions related to the observatory include, the five large telescopes designed by Hale, and new technologies, including new large scale telescopes, reflectors, refractors and cameras to study distant astronomical objects.

Technological Applications

George Ellery Hale's vision of a modern observatory combining a solar telescope and a large reflecting

telescope was achieved at the observatory, making it a model for modern observatories. Hale's telescopes laid the technological foundation for all large modern telescopes (NPS 1989). For example, the flexible optical system for the 150-foot solar telescope developed by Hale became a model for future large reflectors.

Hale designed the telescopes and other equipment to be flexible to accommodate changing needs and uses. The 100-inch Hooker reflector was used to produce the first detailed photographs of "spiral nebulae." Hale estimated that the Hooker reflector could photograph at least two million nebulae. Today, the Hooker reflector is equipped with a modern adaptive optics system and is used in a variety of high-resolution studies.

Scientific Thought and Theory

Before establishing the Mount Wilson Observatory, George Hale worked at the Yerkes Observatory in Wisconsin. Through his work at Yerkes, Hale believed that the future of astronomy required the study of astrophysics, the term he invented. Hale needed to establish a mountaintop observatory that would combine a solar telescope and a large reflecting telescope in order to understand the physical processes that took place in the sun and other more distant stars. Hale explained this when he wrote: "The story of the origin of the sun and its development is illustrated in stars of many types which are no less important to a thorough understanding of its physical constitution than is a direct investigation of solar phenomena (NPS 1989)."

In the 1920s, many scientists at Mount Wilson Observatory were able to gather important data about the stars and universe. In 1920, Albert Michelson determined the diameter of the star Betelgeuse to be 215,000,000 miles. In 1923 Edwin Hubble studied the Cepheid variable star in Andromeda Galaxy providing proof that the Milky Way is only one of many galaxies. In 1929, Hubble used the 100-inch Hooker reflector to gather data that showed the universe to be in a regular state of expansion. This provided the first clues to the origin of the universe and corrected Einstein's belief that the universe was static. Later, direct evidence for the "Big Bang" theory was collected (NPS 1989).

National Park Service Units

There are no units in the national park system that represent astronomy. Under a previous thematic framework for cultural resources, national park units were listed under the subtopic of "Physical Sciences." There were no park units identified

for “Astronomy.” Two sites were identified for representation of “Physics,” Benjamin Franklin National Memorial (Affiliated Area) and Edison National Historic Site. Edison National Historic Site was also identified for the theme, “Chemistry.”

Comparably Managed Areas

Several studies, documents, and properties listed in the National Register of Historic Places included sites for consideration under this topic. More than 100 sites, including laboratories, workshops, homes and sites associated with the lives and achievements of famous American astronomers were included in the theme study list. Observatories/laboratories related to astronomy that are national historic landmarks (NHLs) include:

- Cincinnati Observatory, Cincinnati, OH
- Hubble, Edwin, House, San Marino, CA
- Lowell Observatory, Flagstaff, AZ
- Hale Solar Laboratory, Pasadena, CA
- Stellafane Observatory, North Springfield, VT
- Gaithersburg Latitude Observatory, Gaithersburg, MD
- University of Illinois Observatory, Urbana, IL
- Vassar College Observatory, NY

These facilities, including Mount Wilson Observatory, are owned and managed by non-governmental institutions. Since 1986, Mt. Wilson Observatory has been operated under an agreement with the Carnegie Institution of Washington by the Mount Wilson Institute, a non-profit corporation whose mission focuses on scientific research, historic preservation, astronomical education and public outreach. In 2003, Mount Wilson Observatory’s 99-year lease was renewed by the U.S. Forest Service. The Friends of the Mount Wilson Observatory Association works to provide public appreciation and education about the observatory.

The Lowell Observatory in Arizona, the Cincinnati Observatory in Ohio, and the Hale Solar Laboratory in California are the NHLs that are most comparable to the Mount Wilson Observatory. Experiments conducted at these facilities produced data and results that complemented those at Mount Wilson. At the Lowell Observatory, experiments were conducted to help prove that the universe was expanding. The Cincinnati Observatory’s publication of *Stellar Proper Motions*, which provided data in determining the structure and rotation of the Milky Way, also provided data for theories, such as the Big Bang. George Ellery Hale worked at the Hale Solar

Laboratory, which he designed, during the latter part of his life. These facilities are still in operation for research or education.

Since the 1930s, Mount Wilson has provided many opportunities for visitors. Open to visitors during weekends and holidays, the observatory provides an educational program, exhibits, and regular lectures by the staff and visiting astronomers. Public use of the 60 inch telescope continues today. The museum interprets the astronomical knowledge in the 1930s and knowledge today. Visitors can view the historic Hooker telescope inside the dome. Picnic areas and Skyline Park, operated by the U.S. Forest Service, are open to the public. The Mount Wilson Observatory Association provides walking tours.

The Mount Wilson observatory continues to provide opportunities for scientific study in the field of astronomy. Several guest institutions including the University of California, Berkeley; the University of California, Los Angeles; Georgia State University; University of Illinois at Champaign-Urbana; and the University of Southern California have facilities on the observatory. The Mount Wilson Observatory Association provides support to the Observatory.

Similarly, Lowell Observatory and Cincinnati Observatory offer public access. Lowell offers a range of guided and other specialized tours and telescope viewing. It also has a visitor center, museum, and exhibits. Many observatories are affiliated with universities and also provide opportunities for research. However, the long history of the observatory, with its public and educational opportunities, and the combination of the observatory facilities and other amenities provided by the U.S. Forest Service makes the Mount Wilson Observatory unique compared to these other sites.

The Stellafane Observatory in Vermont, the Gaithersburg Latitude Observatory in Maryland, the University of Illinois Observatory in Illinois, and the Vassar College Observatory, in New York are other national historic landmarks that represent astronomy.

In addition, there are other important observatories and facilities that have not been designated national historic landmarks for their representation of astronomy. After the Mount Wilson Observatory location became impacted from light pollution in the Los Angeles Basin, Hale founded the Palomar Observatory in San Diego, which includes the 200-inch reflector. Its completion in 1948 made it the largest reflecting telescope in the world. At the Lick Observatory near San Jose, California, the 36-inch

Clark refractor was the first large telescope placed on a site chosen for its astronomical advantages, rather than for convenience.

Mauna Kea Observatories on the Island of Hawaii hosts the world's largest modern astronomical observatory, with telescopes operated by astronomers from eleven countries. The telescopes include the largest optical/infrared telescopes in the world (the Keck telescopes), the largest infrared telescope and the largest submillimeter telescope in the world (Institute for Astronomy, University of Hawaii).

Chaparral Ecology: San Dimas Experimental Forest

Experimentation and Invention

The San Dimas Experimental Forest represents "experimentation and invention" related to chaparral ecology. Study of the Big Dalton Canyon and San Dimas Canyon watersheds was the first major streamflow erosion study by the California Forest and Range Experiment Station and only the fourth such investigation of its kind in the world. The long record of studies conducted at the SDEF is unmatched in this region (Jones & Stokes 2004).

The initial research and experiments at the SDEF were focused on increasing water yields from watersheds. Scientists were able to monitor rainfall and runoff from the 1930s to 1950s with a network of rain gauges, stream gauges, and weather stations. Water consumption by various plant species was studied in lysimeter and runoff plots. Using the data gathered, scientists then attempted to increase water yield in the Bell and Monroe watersheds through vegetation manipulation (Jones & Stokes 2004).

After a fire in 1960 had burned the research watersheds, the research was focused on postfire rehabilitation, then on runoff and erosion. Scientists conducted experiments to control runoff. In subsequent decades, studies focused on ecosystem-level issues, including air pollution, soil genesis, postfire plant and animal succession and recovery. Soil research on the SDEF has included some pioneering studies on the "hydrophobic," or water-repellent, layer that forms after fires (Jones & Stokes 2004).

Technological Applications

Research and monitoring equipment were developed for the long-term studies at the SDEF. The Lysimeter facility at SDEF (tunnel and instrument room), completed in 1937, is still the largest of its kind in the world. Rain gauge

networks as described earlier were developed to accurately measure precipitation and flumes were developed to measure and withstand debris flows. Most of this equipment, including the lysimeter facility, are still intact and are continuing to be used for research (Jones & Stokes 2004).

Scientific Thought and Theory

The SDEF, established in 1933, has one of the longest – if not the longest – record of research on chaparral ecosystems. Long-term studies (described earlier) have yielded data for learning how to control runoff and for the identification of postfire soil conditions (Jones & Stokes 2004).

National Park Service Units

There are several national park units in California that include chaparral ecosystems (See discussion under "Natural History Themes"). The California Mediterranean Research Learning Center (CMRLC) promotes study of chaparral ecology and includes the following national park units:

- Santa Monica Mountains National Recreation Area (NRA)
- Channel Islands National Park
- Cabrillo National Monument

As described in the natural history themes section, the CMRLC program is new and its research differs from the watershed studies of the SDEF. The SDEF has a longer record of research than the more recently established CMRLC.

Comparably Managed Areas

There are ten experimental forests/areas in the Pacific Southwest Region including the San Dimas Experimental Forest. One experimental area and one experimental forest are most similar to the SDEF in their research focus:

- North Mountain Experimental Area (NMEA), San Bernardino National Forest
- Caspar Creek Experimental Watershed, Redwood National Forest

The North Mountain Experimental Area (NMEA), established in 1964, is the only U.S. Forest Service Experimental Area that is located in a chaparral ecosystem. The NMEA research differs from that of the SDEF. Whereas the SDEF studies have focused on watersheds, including hydrologic processes and postfire rehabilitation, the NMEA research is focused on prevention and control of forest and range fires. The SDEF has a longer record of research on chaparral ecosystems than the NMEA .

Caspar Creek Experimental Watershed, established in 1962, also conducts watershed studies, but it is located on the northern coast of California and has different vegetation than that of the SDEF.

There are opportunities to interpret the research and history of the SDEF from nearby facilities of the ANF, including the San Gabriel River Ranger District office in Glendora.

Conclusion: Expanding Science and Technology

There are no units in the national park system or areas managed by other entities that have the combination of resources as the San Gabriel Mountains has in its representation of the theme “Expanding Science and Technology.” Together, the Mount Wilson Observatory and the San Dimas Experimental Forest have provided decades of scientific information that is unmatched. There are no units in the national park system that represent astronomy and astrophysics. There are few NHLs that compare to the Mount Wilson Observatory. Likewise there are few national park units and other sites that represent chaparral ecology, and no other site contains the long record of research that has been collected at the SDEF.

OVERALL SUMMARY: SUITABILITY OF THE SAN GABRIEL MOUNTAINS

The NPS has determined, based on the combination of resource values in the San Gabriel Mountains, that this area is suitable for inclusion in the national park system. The San Gabriel Mountains have resources that are outstanding representations of a wide range of both natural and cultural themes not found in other national park units or comparably managed sites. Represented within these themes are unique geological features and dramatic geologic processes, a wide diversity of rare habitats located in close proximity given the dramatic changes in topography, and technological advances in the areas of architecture, astronomy, chaparral ecosystems, and watersheds.

The significant natural and cultural resources of the San Gabriel Mountains are primarily managed by the U.S. Forest Service as part of the Angeles National Forest. A few smaller areas with resource significance are managed by other agencies and organizations including Los Angeles County Parks, which manages most of the Devil’s Punchbowl formation for public enjoyment and education, and the Friends of the Mount Wilson Observatory which provides interpretive and educational programs about the significance of the observatory. While many of the foothill areas in the San Gabriel and Antelope Valleys

are protected by various conservancies and local park districts, some areas remain unprotected.

Although the U.S. Forest Service’s resource management provides substantial resource protection, comprehensive education and interpretation of the significance of the San Gabriel Mountains is lacking in many areas (e.g., chaparral ecosystems, geologic processes, watershed resources and research), primarily due to funding and staffing limitations. National Park Service expertise and emphasis on interpretation and education and visitor management would expand and enhance the visitor experience in the San Gabriel Mountains and would allow for more comprehensive education and interpretation on all of the interpretive themes related to its national significance.

The overall combination of resource values represented by the San Gabriel Mountains is not comparable to any other existing national park unit. The national park unit that is closest in representation to the combination of themes represented by the San Gabriel Mountains is the Santa Monica Mountains NRA. However, based on the theme-based comparative analysis, there are outstanding qualities represented in the San Gabriel Mountains which are not comparatively represented in the Santa Monica Mountains. The unique geologic composition of the San Gabriel Mountains differs in rarity, quality and quantity from mountain systems at Santa Monica NRA. With its adjacency to the San Andreas Fault and long history of research, the San Gabriel Mountains is one of the best locations to observe and study active mountain building and plate tectonics. The highly erosive geologic processes taking place in the San Gabriel Mountains has created river systems quite distinct from those found in the Santa Monica Mountains. Additionally, the extreme elevation changes in the San Gabriel Mountains represent a wider diversity of habitats. The San Gabriel Mountains contain rare examples of southern California subalpine vegetation not represented by any other national park unit in the South Pacific Border or the Mojave-Sonoran Desert natural regions. Finally, the cultural resource representation of the San Dimas Experimental Forest architecture, science and technology and the significance of the Mt. Wilson Observatory to the study of astronomy are not represented in the Santa Monica Mountains.

The combination of themes represented in the San Gabriel Mountains and its close proximity to greater Los Angeles metropolitan region with over 15 million residents, means that this area has excellent potential for expanding opportunities for interpretation, education, and scientific study.

Puente-Chino Hills

NATURAL HISTORY THEMES REPRESENTED IN THE PUENTE CHINO HILLS

The Puente-Chino Hills contain significant resources that represent the “Land Ecosystems” natural history theme.”

LAND ECOSYSTEMS THEMES

The following sub-themes related to Land Ecosystems are represented in the study area:

- **Chaparral (shrubs and evergreen forest trees):** Coastal sage scrub
- **Dry Coniferous Forest:** Walnut woodlands and forests.

CHAPARRAL

Chaparral ecosystems include broad-leaved, mainly evergreen, species of shrubs or low trees, occurring as dense scrub or woodland. The Puente-Chino hills contain a high level of biodiversity and outstanding examples of California coastal sage scrub, one of the most endangered plant communities in California.

National Park Units

Existing national park units within the **South Pacific Border** include that represent the theme Chaparral include:

- Whiskeytown-Shasta-Trinity National Recreation Area
- Pinnacles National Monument
- Santa Monica Mountains National Recreation Area
- Cabrillo National Monument

Mojave-Sonoran Desert Region parks that represent the theme Chaparral do not contain coastal sage scrub habitat.

Three classifications of coastal sage scrub are typical of the Southwestern ecoregion of California as classified by Paleobotanist Daniel Axelrod: Venturan, Riversidian, and Diegan. The Puente-Chino Hills, which are a transition zone, contain Venturan and Diegan coastal sage scrub communities not typically represented in any one protected area in southern California. Over 10,000 acres of coastal scrub are located in the portion of the Puente-Chino Hills included in the study area (Puente Hills Landfill Native Habitat Preservation Authority 2007; Davis, et al. 1994, Axelrod 1978).

Pinnacles NM and Whiskeytown-Shasta-Trinity NRA

contain northern and central California affinities of coastal sage scrub habitat. Areas managed by the National Park Service that protect southern affinities of coastal sage scrub similar to those found in the Puente-Chino Hills include Santa Monica Mountains NRA (approximately 32,000 acres of Venturan coastal sage scrub) and Cabrillo NM (approximately 840 acres of Diegan coastal sage scrub) (Davis, et al. 1994).

The Puente-Chino Hills contain a significant portion of designated critical habitat for the federally listed threatened coastal California gnatcatcher, a species dependent on coastal sage scrub habitat.

The combination of resources values associated with coastal sage scrub within the Puente-Chino Hills is not represented in the existing southern California national park units. No other existing national park unit contains both Venturan and Diegan coastal sage scrub. Nor does any existing unit contain designated critical habitat for the California coastal gnatcatcher. Evolutionary studies completed for species in the Los Angeles Basin area indicate that species in the Puente-Chino Hills are evolutionarily different from species in the Santa Monica Mountains which represent the southern extent of northern species (Personal communication, Robert Fisher, USGS 2007).

Comparably Managed Areas

Outside of the national park system other areas that represent chaparral (coastal sage scrub) in California include:

State and Local Parks

- Chino Hills State Park
- Crystal Cove State Park
- Puente Hills Landfill Native Habitat Preserve

Private Preserves

- Santa Rosa Plateau Ecological Reserve
- Starr Ranch Audubon Sanctuary

State and Local Parks

Chino Hills State Park (SP) and Crystal Cove SP both contain coastal sage scrub habitat. Chino Hills SP contains primarily Diegan coastal sage scrub, and Crystal Cove SP contains Venturan coastal sage scrub. Although just outside of the study area to the east, Chino Hills SP is a critical component of the larger Puente-Chino Hills biological corridor. The park primarily functions as an open space reserve. It contains almost 4,000 acres of coastal sage scrub and critical habitat for the California

coastal gnatcatcher. Recreational opportunities include hiking, biking, and wildlife observation.

While the Chino Hills State Park contains similar coastal sage scrub resources to the Puente-Chino Hills, protection of the study area coastal sage scrub would expand and enhance the protection of this habitat within the larger wildlife corridor. Numerous studies document the benefits of habitat connectivity to ensure healthy wildlife populations (Vandergast et.al. 2007). For example, 90% of the habitat in Chino Hills SP was damaged by the 2008 Freeway Complex fire. Having adjacent open space and habitat was critical for the recovery of wildlife in Chino Hills SP.

Crystal Cove SP is located in Orange County along the coast between the cities of Newport Beach and Laguna Beach. The park protects hundreds of acres of Venturan coastal sage scrub and provides numerous recreational opportunities on trails and beaches. Crystal Cove SP contains coastal sage scrub more similar in character to the Santa Monica Mountains NRA.

Located within the study area, the Puente Hills Landfill Native Habitat Preserve protects important coastal sage scrub habitat in the Puente Hills.

Private Preserves

The Santa Rosa Plateau Ecological Reserve is located at the southern end of the Santa Ana Mountains in southwest Riverside County. Managed by Riverside County Regional Park and Open-Space District and the Nature Conservancy, the Reserve consists of 8,300 acres and protects unique ecosystems such as Engelmann oak woodlands, riparian wetlands, coastal sage scrub, chaparral, bunchgrass prairie and vernal pools. A very small area of the reserve is designated critical habitat for the California coastal gnatcatcher. The bunchgrass prairie is one of the finest examples remaining in California.

The Starr Ranch Sanctuary is a 4,000 acre preserve owned and operated by the National Audubon Society. It is located in Orange County in the foothills of the Santa Ana Mountains. The Starr Ranch contains Diegan coastal sage scrub and critical habitat for the California coastal gnatcatcher. Although not open to the general public, research and education are core components of the ranch mission and public education programs are regularly held for school, groups and the general public. Staff research is integrated into all public education programs.

Although both private preserves contain excellent examples of coastal sage scrub, neither location

contains the quantity and diversity of coastal sage scrub found in the Puente-Chino Hills.

Conclusion: Chaparral

Of the national park units, Santa Monica Mountains NRA is most comparable to the Puente-Chino Hills. However, the Puente-Chino Hills differ considerably in character as they contain both a transitional area for coastal sage scrub and significant acreage of critical habitat for the California coastal gnatcatcher.

The Chino Hills SP and the Puente Hills Landfill Native Habitat Preserve manage coastal sage scrub resources in the Puente-Chino Hills. Management by the NPS could expand and enhance current protection efforts by California State Parks and the Puente Hills Landfill Native Habitat Preserve, particularly in the areas of coordinated resource management and education. Protected status for the Puente-Chino Hills within the study area would ensure long term protection of the larger corridor's biodiversity.

Although both of the private preserves analyzed contain excellent examples of coastal sage scrub, neither location contains the quantity and diversity of coastal sage scrub found in the Puente-Chino Hills.

DRY CONIFEROUS FOREST

This sub-theme includes belts of coniferous forest and woodland dominated by Douglas-fir, ponderosa pine, and pinyon-juniper. At its lower limits these forests give way to steppe or chaparral ecosystems. California walnut woodlands and forests are included in this theme. As stated in the previous chapter, some of the best remaining stands of California walnut-dominated forests and woodlands south of Ventura County are located in the Puente-Chino Hills.

National Park Units

The following national park unit within the **South Pacific Border Region** represents the theme dry coniferous forest:

- Santa Monica Mountains National Recreation Area

Mojave-Sonoran Desert Region parks that represent the theme Chaparral do not contain California walnut woodlands.

The historic distribution of California walnut woodlands and forests is limited to the areas between the Santa Clara River drainage in Ventura County on the north and the Chino Hills on the south. Outside of this range California walnut trees

tend to be interspersed with other tree species such as oaks. Therefore the only national park unit in the South Pacific Border region that contains California walnut woodlands is Santa Monica Mountains NRA. Approximately 450 acres of California walnut woodlands are located in the Santa Monica Mountains NRA.

The California Natural Diversity Database (CNDDDB) Inventory has on record approximately 17,000 acres of remaining California walnut woodlands and forests. Of these remaining woodlands, the best remaining stands south of Ventura County are those located in the Puente-Chino Hills. Approximately 1,700 acres, or 10% of the CNDDDB Inventory, are located in the study area in the Puente-Chino Hills (Quinn 1990, CDFG 2006).

Comparably Managed Areas

Outside of the national park system other areas that represent dry coniferous forest (California walnut woodlands) include:

National Forests and Wildlife Refuges

- San Bernardino National Forest
- Los Padres National Forest
- Hopper Mountain National Wildlife Refuge

State and Local Parks

- Chino Hills State Park
- Puente Hills Landfill Native Habitat Preserve
- Debs Park

National Forests and Wildlife Refuges

At the northern limit of distribution, the Los Padres NF contains approximately 660 acres of California walnut woodlands. Near the southern limit of distribution, the San Bernardino NF contains approximately 230 acres of California walnut woodlands (CDFG 2006).

The Hopper Mountain National Wildlife Refuge contains nearly 400 acres of California walnut woodland at its northern limit. Both the Hopper Mountain National Wildlife Refuge and Los Padres NF protect excellent examples of California walnut woodlands at their northern extent. These stands have adapted to their local site characteristics and differ from the Los Angeles County stands in morphology and canopy structure. Los Angeles and Orange County walnuts typically have multiple trunks. On mesic sites they often grow into more shrub-like habits (Quinn 1990).

Walnut woodlands in the San Bernardino NF are in small quantity and do not represent the best examples of this species at its southern distribution (Quinn 1990; CDFG 2006).

State and Local Parks

State and local parks that contain excellent examples of walnut woodlands include Debs Park, Chino Hills State Park, and the Puente Hills Landfill Native Habitat Preservation Authority (Habitat Authority).

Debs Park in the Arroyo Seco/Monterey Hills area of Los Angeles contains extensive stands of walnut woodlands. Recreational uses and facilities in this portion of the park are minimal. The emphasis is on the enjoyment of nature.

Chino Hills State Park contains the largest acreage of California walnut woodlands stands protected by a conservation agency, approximately 1,100 acres (Quinn 1990, CDFG 2006). However, the 1,700 acres found in the Puente-Chino Hills in the study area are also of the highest quality and would enhance and expand protection of this rare habitat.

While many of the study area stands are protected by the Habitat Authority, most are located on private lands. Additionally, other sites that protect walnut woodlands do not have the quality of walnut woodlands found in the Puente-Chino Hills. The quality of walnut woodlands and forests is measured by extensiveness. Although there are important walnut woodlands and forests at Debs Park and in other areas of the study area such as California State Polytechnic University at Pomona and the San Jose Hills, these woodlands are scattered for considerable distances. The area of Brea between Los Angeles and Orange County has not been urbanized and has an extensive stretch of woodlands and forests thus having the highest quality of this type of habitat (Quinn 2009).

Conclusion: Dry Coniferous Forest

No other national park unit in the South Pacific Border Region contains the quantity and quality of California walnut woodland habitat found in the Puente-Chino Hills. Although the Chino Hills SP and the Habitat Authority protects California walnut woodlands similar in quality and quantity, the rarity and quality of this habitat type requires protection of the remaining significant stands, most of which are located in portion of the Puente-Chino Hills within the study area.

OVERALL SUMMARY: SUITABILITY OF THE PUENTE-CHINO HILLS

The NPS has determined, based on the character, quantity and quality of resource values in the Puente-Chino Hills, that this area is suitable for inclusion in the national park system. The Puente-Chino Hills have resources that are outstanding representations of habitat types not widely found in other national park units or comparably managed sites. Represented within these themes are coastal sage scrub habitat and California walnut woodlands, both of which support rare and endangered plants and wildlife.

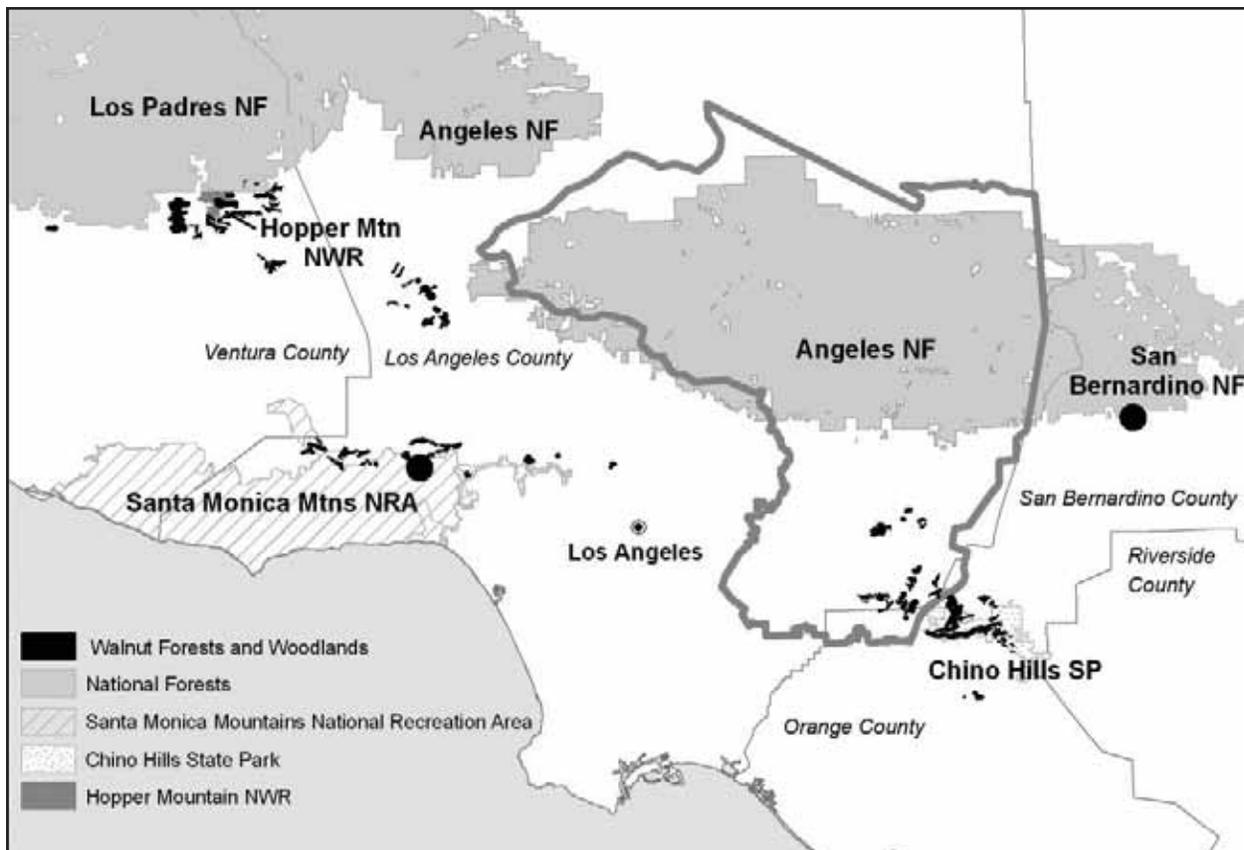
Lands suitable for coastal sage scrub habitat (lands below 500m in elevation) account for nearly half of the southwestern ecoregion, yet the proportion of these lands managed for protection of biodiversity is relatively small (Davis et.al. 1994). Higher elevations tend to have more protection (e.g. national forest lands). Although coastal sage scrub is protected at several national park units, no other unit protects a significant amount of the rare California walnut woodlands.

Of the comparably managed sites, the Chino Hills State Park is the closest in resource quality and

character to the Puente-Chino Hills portion of the study area. Although many similar resources are protected, Chino Hills State Park is part of the larger biological corridor of the Puente-Chino Hills. Protected status for the Puente-Chino Hills within the study area would expand existing resource protection and ensure long term protection of the larger corridor's biodiversity.

Additionally, recent studies have found that areas which retain adequate genetic variability are more likely to facilitate both adaptive and non-adaptive evolution as the environment changes. The Los Angeles Basin was identified as an evolutionary hotspot in need of based on its high levels of genetic diversity (Vandergast et.al. 2008).

Located in close proximity to urban populations of the Los Angeles Basin, universities and colleges, the Puente-Chino Hills provide excellent opportunities for interpretation, education and scientific study.



Statewide California Walnut Woodland and Forest Distribution (Source: CDFG 2006)

Summary: Suitability

Based upon evaluation of the study area resources and their relative quality, character, and rarity, the National Park Service has determined that the San Gabriel Mountains and Puente-Chino Hills portions of the study area are suitable for inclusion in the national park system. Together, the two areas contain a combination of themes and resources not found in any national park unit or comparably managed area.

Table 7: Summary of Areas Suitable for Inclusion in the National Park System	
San Gabriel Mountains	<p>The overall combination of cultural and natural resource values and themes represented by the San Gabriel Mountains is not comparable to any other national park unit or comparably managed areas. Represented within these themes are unique geological features and dramatic geologic processes, a wide diversity of rare habitats located in close proximity given the dramatic changes in topography, and technological advances in the areas of astronomy, chaparral ecosystems and watersheds.</p> <p>The close proximity of the San Gabriel Mountains to urban areas of the Los Angeles Region means that this area has excellent potential for interpretation, education and continued scientific study.</p>
Puente-Chino Hills	<p>The Puente-Chino Hills have resources that are outstanding representations of habitat types not widely found in other national park units or comparably managed sites. Represented within these themes are coastal sage scrub habitat and California walnut woodlands, both of which support rare and endangered plants and wildlife. Although coastal sage scrub is protected at several national park units, no other existing national park unit or comparably managed area protects a significant amount of the rare California walnut woodlands. Protected status for the Puente-Chino Hills within the study area would expand and enhance existing resource protection and ensure long term protection of the larger Puente-Chino Hills corridor biodiversity.</p> <p>Located in close proximity to urban populations of the Los Angeles basin, universities and colleges, the Puente-Chino Hills provide excellent opportunities for interpretation, education and scientific study.</p>



5

Feasibility and Need for NPS Management

Photos (clockwise): 1. Dam, Angeles National Forest. Photo by Eric Lowenbach 2. San Gabriel Slender Salamander. Photo by David Wake. 3. Workman House. NPS Photo. 4. Canyon Road, Angeles National Forest. Photo by Eric Lowenbach.

Chapter 5: Feasibility and Need for NPS Management

Introduction

Feasibility

To be feasible as a new unit of the national park system, an area must be (1) of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment (taking into account current and potential impacts from sources beyond proposed park boundaries), and (2) capable of efficient administration by the National Park Service (NPS) at a reasonable cost. In evaluating feasibility, the NPS considers a variety of factors for a study area, such as the following:

- size
- boundary configurations
- current and potential uses of the study area and surrounding lands
- landownership patterns
- public enjoyment potential
- costs associated with acquisition, development, restoration, and operation
- access
- current and potential threats to the resources
- existing degradation of resources
- staffing requirements
- local planning and zoning
- the level of local and general public support (including landowners)
- the economic/socioeconomic impacts of designation as a unit of the national park system

The feasibility evaluation also considers the ability of the NPS to undertake new management responsibilities in light of current and projected availability of funding and personnel.

An overall evaluation of feasibility is made after taking into account all of the above factors. However, evaluations may sometimes identify concerns or conditions, rather than simply reach a yes or no conclusion. For example, some new areas may be feasible additions to the national park system only if landowners are willing to sell, or the boundary encompasses specific areas necessary for

visitor access, or state or local governments will provide appropriate assurances that adjacent land uses will remain compatible with the study area's resources and values (NPS 2006).

Some management options are more feasible than others. The national park system includes many types of sites, and a range of ownership and management approaches. When many people think of national parks, they think of the large and mostly natural parks like Yosemite and Yellowstone. However, the national park system includes many other types of sites, such as small historic sites, wild and scenic rivers, and long distance trails. Some NPS sites are small parks located in urban areas, relying on partnerships, with little, if any, federal landownership or management. Other NPS sites are large natural areas where multiple park agencies cooperate to conserve land and provide public services. The NPS also offers grant and technical assistance programs that help local communities achieve their goals for conservation and recreation.

Evaluation of Feasibility Factors

The following evaluation explores the potential for a range of different types of national park sites and management roles, while acknowledging the existing ownership and uses of land within the study area.

Boundary Size and Configuration

An acceptable boundary for an envisioned unit of the national park system should provide for the inclusion and protection of its primary resources; sufficient surrounding area to provide a proper setting for the resources or to interrelate a group of resources; and sufficient land for appropriate use and development.

The study area covers more than 700,000 acres (1,000 square miles) in the greater Los Angeles metropolitan area, one of the most densely populated areas of the United States. The study area includes a large portion of the Angeles National Forest, plus rural agricultural areas, highly urbanized communities and large natural areas that contain nationally significant resources. As described in Chapter 3, *Resource Significance*, the nationally significant areas are concentrated in the San Gabriel Mountains and foothills (approximately 500,000 acres) and the Puente-Chino Hills (approximately 17,000 acres). These areas support native plant communities, rare and endangered species, and are large enough to connect multiple resource types, provide a natural setting for them, and provide regional habitat connectivity. The San

Gabriel Mountains and Puente Hills also provide the region with recreation opportunities, fresh drinking water, and flood protection.

CONCLUSION

The study area is of adequate size to include and protect the area's nationally significant resources.

Land Use, Ownership Patterns, Planning and Zoning

Two-thirds of the study area is owned and managed by the United States Forest Service (USFS) as part of the Angeles National Forest (approximately 415,000 acres). These lands are currently managed by the USFS for multiple uses, including public recreation, utility corridors and watershed management, with recreation as the primary use. Early in the study process, the NPS compared the size and scale of the Angeles NF to the NPS ability to take on new management responsibilities, and determined that continued USFS management would be necessary and desirable.

Because of this determination, the NPS committed to consider in this study only those alternatives that retain USFS management of the Angeles NF. Appropriate roles for the NPS that complement USFS management and enhance resource protection and public enjoyment opportunities also exist.

One third of the study area is primarily privately owned, consisting of urbanized land in the San Gabriel Valley and Los Angeles Basin, and rural/agricultural areas north of the ANF. This land is spread among 57 communities, 38 of which are incorporated, with the remainder subject to area-specific planning and zoning regulated by Los Angeles County. Various parks, infrastructure and large land areas are owned and managed by individual municipalities, county, and state government agencies.

The nationally significant resources in this part of the study area include portions of the San Gabriel foothills and the Puente-Chino Hills and where land ownership in these areas is more scattered. Landowners in the eastern Puente Hills want to retain ownership of their land and have limited interest in cooperative management with the NPS. The Puente Hills Landfill Native Habitat Preservation Authority, the largest recreational open space in the urbanized part of the study area, has stated that the area could potentially benefit from a non-traditional partnership with the NPS. The NPS is considering only management approaches that respect and retain the land use authority of jurisdictions within

the study area, and would consider land acquisition or land management only in specific areas that are found to be nationally significant, meet NPS criteria for suitability and feasibility and where there are supportive landowners.

CONCLUSION

The complexity of existing land uses complicates designation of a large, traditional park unit. Designation of a collaborative national park unit that works with local, state, and federal managers to protect natural and cultural resources, provide recreation, public access, interpretation, education, and other compatible uses could, however, be compatible with existing ownership patterns and regulatory authorities. For example, there may be opportunities to provide habitat and recreational opportunities that could also improve water quality, provide water retention for flood protection or water conservation, and expand upon the ongoing efforts of local organizations. Given the size and scale of the Angeles National Forest, the NPS determined that continued USFS management would be necessary and desirable. Many potential collaborators, such as the Angeles National Forest, worked with the NPS in developing the alternatives presented in this document.

Access and Public Enjoyment Potential

Approximately 1.5 million people live within the study area. Millions more in the greater Los Angeles metropolitan area use the open spaces and parklands of the study area. Publicly accessible open space includes the Angeles National Forest as well as state, regional and local parks.

Comprising over 70% of Los Angeles County's open space, the Angeles National Forest serves as a recreational day-use opportunity for local residents. Data from 2009 estimate almost 3.5 million visitors to the forest annually (USFS 2009). The forest offers river access and miles of trails through a wide array of landforms and habitats. Recreational activities on the forest include camping, hiking, climbing, horseback riding, off-highway vehicle use, fishing and swimming. Approximately 1.1% of the forest lands within the study area have developed recreational opportunities (e.g. roads, parking areas, restrooms, etc.). The developed areas around the San Gabriel River are the most popular destinations in the forest. Visitors are attracted to this area for its water-based recreation opportunities.

Within the urbanized areas and rural communities there are numerous open spaces and parklands

available for public recreation, such as local, regional, county and state parks, golf courses, wilderness parks, historical parks and cultural sites, equestrian areas and Bureau of Land Management lands. These sites make up approximately 2% of the study area. Although access to some rivers and creeks is restricted for water supply and flood protection purposes, many waterways have adjacent bike trails as well as nearby parks that provide recreational opportunities.

The largest recreational open space area in the urbanized portions of the study area is the land owned by the Puente Hills Landfill Native Habitat Preservation Authority (Preserve) which includes 3,860 acres of land. The jurisdictional boundary for the Preserve includes a total of 20,000 acres in the eastern Puente Hills, extending from the San Gabriel River east to the Chino Hills. Over time the Preserve plans to continue to acquire key parcels of land within the jurisdictional boundary for conservation and recreational uses. Other major recreational open space areas include Whittier Narrows Recreation Area, Santa Fe Dam Recreation Area, Bonelli Regional Park, municipal wilderness parks in the San Gabriel foothills, and numerous city and county parks.

The study area contains seven trails designated under the National Trails System. Regional and local trails also provide recreational access.

Despite the considerable public open space and recreation opportunities in the area, there are many unmet needs and interests, including:

- need for linkages between regional open spaces and local parklands to protect habitat and wildlife corridors and provide more recreational opportunities for the growing region;
- demand for additional recreation;
- limited or difficult access to recreational opportunities for people who do not have automobiles, and from urbanized communities with greater numbers of children, low income residents and people of color;
- the need to plan for additional recreation opportunities to meet the demands of future population growth.

CONCLUSION

There is considerable potential for public access and enjoyment within the study area. There are opportunities for a wide variety of recreational uses in the nationally significant San Gabriel Mountains and Puente-Chino Hills, and there is ample

potential for development of additional recreation opportunities and improved access elsewhere.

Existing Resource Degradation and Threats to Resources

The San Gabriel Mountains and Puente-Chino Hills contain significant resources with a high degree of integrity. These areas make up over two-thirds of the study area. Isolated pockets of significant resources exist within other portions of the study area where extensive urbanization has fragmented and impacted the integrity of the resources.

The Angeles National Forest contains highly significant resources, however, certain areas are impacted by a variety of factors, including infrastructure, private inholdings, concentrated visitor use, and recreational activities such as off-highway vehicle use. River-based recreation activities are extremely popular, and the San Gabriel Canyon often hits its capacity on warm summer weekends and the U.S. Forest Service has to close the area. High use visitor areas within the Angeles National Forest have higher incidences of litter, graffiti and other types of vandalism. Some visitors alter river bed geomorphology by creating rock dams for swimming areas.

Regional population growth and future development pose a threat to significant resources within the study area. Existing and proposed urban development threatens coastal sage scrub habitat in the Montebello Hills and walnut woodlands and coastal sage scrub in the eastern Puente-Chino Hills. Proposals for transportation projects, including road widening and freeway development, water and sewer projects, and new housing development threaten significant resources throughout the study area. Development proposals in the Puente-Chino Hills could degrade resource integrity and threaten the area's important wildlife connection to the Santa Ana Mountains. Although areas of the Soledad Basin and Antelope Valley within the study area are relatively undeveloped with pockets of significant habitat, these areas are also the fastest growing regions of Los Angeles County. Without careful planning and protection, important wildlife corridors to the San Gabriel Mountains could be lost.

Impacts from climate change may threaten area water supply and wildlife habitat. Rising temperatures and altered rainfall may cause additional stress on native habitat and increase air pollution. Such changes may cause native and endemic plants to move northward and toward the coast, following the shifts in their preferred climate. Native and endemic plants in southern California

could move up mountains into cooler but highly vulnerable refugia. The San Gabriel Mountains are predicted to be an area for native plants and animals seeking refuge when the climate change begins to impact their habitat. Enhanced protection of these areas and their connections to other significant habitat areas in the region may help to offset future habitat stressors from global climate change. Protecting corridors through which plants and animals can move to such refugia, and assisting plants and animals in reestablishing themselves in new regions, may help conserve these species (University of California 2008).

CONCLUSION

Despite these resource impacts and threats, approximately two-thirds of the study area contains protected lands with significant resources of high integrity. These areas are not subject to resource degradation or threats that would preclude management as a unit of the national park system.

Public Interest and Support

Extensive public involvement efforts, first in 2005 and 2006, and then again in late 2009, identified strong interest in additional NPS involvement in the region to help protect significant resources and provide additional recreation and public enjoyment opportunities.

The NPS held numerous meetings with federal, state and county agencies that are responsible for conservation and recreation within the study area. These agencies have been supportive of a National Park Service management and/or technical assistance role in the study area. They also stressed the value of having another federal partner to leverage the funds necessary to conserve lands for open space and recreation.

In the public scoping period, public suggestions for an appropriate NPS role ranged from creating momentum in bringing communities together to address resource protection and recreational needs to providing park rangers along the San Gabriel River. It was also suggested that the NPS could play a role in coordinated or joint management with and among existing agencies and jurisdictions. Emphasis was placed on the potential for the NPS to leverage more resources for the region.

Concerns about an NPS presence in the study area included the potential for duplication of efforts, the need to maintain local land use control, water rights and private property rights, and concern over unnecessary regulatory overlays. In response to these concerns, the NPS considered only those

alternatives that respect and retain the local land use authority of jurisdictions within the study area, and considered limited land acquisition only in areas where there are willing sellers.

In 2009, when alternative management concepts were first presented to the public, support for an expanded NPS role intensified. Almost 5,000 written comments were received, with the vast majority supporting more NPS involvement and designation of a larger park unit than previously proposed. While some cities and agencies, along with a number of individuals, expressed concerns about possible loss of local control or restrictions on their ability to carry out necessary functions, the majority of governmental and private respondents, including seven Congressional representatives, the U.S. Forest Service, and the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC), supported an NPS-led, partnership-based national recreation area.

CONCLUSION

Public outreach for this study including numerous meetings with public officials and land management organizations, has demonstrated significant public interest and support for the NPS to play a collaborative role in the area in partnership with other land management and resource protection organizations.

Social and Economic Impact

Designation of a national park unit within some portion of the study area would likely have a number of economic and social impacts on the area. Most of these impacts would likely be beneficial. Social and economic benefits could follow from improved public access to open space and recreational opportunities. Socioeconomic issues identified during the public scoping process included requests for evaluating any potential impacts to property values and the local economy within and adjacent to the proposed area. It was also suggested that the NPS evaluate potential recreation opportunity effects on traditionally underserved communities. A more complete analysis of social and economic impacts is explored in Chapter 7, *Environmental Consequences*.

CONCLUSION

The social and economic impacts appear to be largely beneficial and would support the feasibility of NPS designation.

Costs Associated with Operation, Acquisition, Development and Restoration

Costs associated with a national park unit include annual operations costs and periodic costs of land acquisition, development of facilities, and resource restoration.

Operations costs of national park units vary widely, depending on the amount and type of resources managed, number of visitors, level of programs offered, and many other factors. Operating costs for a partnership park unit or NPS technical/administrative assistance would typically be lower than the operating expenses of a traditional national park. Chapter 6, *Alternatives*, explores potential operational costs in more detail for each management alternative. The tables in that chapter provide some comparative base budget numbers for various partnership-based park units. Budgets for park units with very little NPS landownership range from approximately \$1.2 million to \$3.5 million. By comparison, a more traditional, larger national park unit (not recommended by this study) could require an annual operating budget of \$2-15 million. The smaller budgets for partnership parks typically provide funding for core staff to handle park coordination and outreach, assist partners with conservation planning, and provide interpretive and educational programs. Operational partnerships with other land management organizations, such as the Angeles National Forest and Los Angeles County Department of Public Works, would create more efficiency in staffing across various agencies.

Land acquisition costs cannot be estimated without more specific proposals for acquisition of specific areas. NPS funds for land acquisition are very limited, and proposed acquisitions compete for funds nationally with many other worthy sites. Given the high cost of land in Los Angeles County, only acquisition of targeted sites would be feasible. Subject to available funds, the NPS would consider land acquisition or land management in specific areas that are found to be nationally significant, meet NPS criteria for suitability and feasibility, and where there are interested and supportive sellers and landowners.

Collaborative management between the NPS and other land management agencies would provide greater advantages for obtaining land acquisition funding which is highly competitive and requires considerable public and political support. Partnerships with existing organizations such as the Rivers and Mountains Conservancy that have

access to land acquisition funds would be essential. Funding could be obtained from multiple sources over time for targeted lands as those areas become available for acquisition.

Development costs of new national park units vary widely, depending on existing conditions and facilities and the types of conditions and facilities desired. New national park units frequently invest funds to inventory and document park resources, developing management or treatment plans for those resources, developing educational and interpretive materials, and developing or improving facilities for visitors and for park operations. Under partnership park scenarios, the NPS could share facilities with existing agencies or share costs for any new facilities deemed necessary.

For the purposes of this study, the NPS has developed cost estimates that are based on very broad needs typically associated with the operational requirements of a new park unit. If a new unit is established, the NPS would prepare a general management plan that would guide future management of the area, and would include more detailed cost estimates for operations and facilities development.

CONCLUSION

Costs for establishment of a national park unit appear to be feasible, provided that partnership opportunities are pursued to support collaborative operations, land acquisition, and development. Given the high cost of land in Los Angeles County, only acquisition of targeted sites would be feasible, and only where there are supportive landowners.

Feasibility Summary

The study team has found that a collaborative partnership-based park unit, which respects the complex mix of land use, ownership, and regulatory authority in the study area is feasible. Opportunities for collaborative management with local, state and federal managers to protect natural and cultural resources, provide recreation, public access, interpretation and educational opportunities, and other compatible uses in an NPS partnership-based park unit have been demonstrated to exist. A large traditional national park unit, owned and operated solely by the National Park Service, is determined to be infeasible.

Table 8: Feasibility Factors Issues and Conclusions

Boundary size and configuration	The study area is of adequate size and configuration to include and protect the area's nationally significant resources.
Land use, ownership patterns, planning and zoning	Designation of a collaborative national park unit that works with local, state, and federal managers to protect natural and cultural resources, provide recreation, public access, interpretation, education, and other compatible uses could be compatible with existing ownership patterns and regulatory authorities.
Access and public enjoyment potential	There is considerable potential for public access and enjoyment within the study area. There are opportunities for a wide variety of recreational uses in the nationally significant San Gabriel Mountains and Puente-Chino Hills, and there is ample potential for development of additional recreation opportunities and improved access elsewhere.
Existing resource degradation and threats to resources	Approximately two-thirds of the study area contains protected lands with significant resources of high integrity. These areas are not subject to resource degradation or threats that would preclude management as a unit of the national park system.
Public interest and support	Outreach for this study including numerous meetings with public officials and land management organizations, has demonstrated significant public interest and support for the NPS to play a collaborative role in the area in partnership with other land management and resource protection organizations.
Social and economic impact	The social and economic impacts appear to be largely beneficial and would support the feasibility of NPS designation.
Costs associated with acquisition, development, restoration and operation	Costs for establishment of a national park unit appear to be feasible, provided that partnership opportunities are pursued to support collaborative operations, land acquisition, and development. Given the high cost of land in Los Angeles County, only acquisition of very targeted sites would be feasible, and only where there are supportive landowners.

Need for NPS Management

The need for direct NPS management is the final criterion for a favorable recommendation for a proposed unit of the national park system. The criterion requires a finding that NPS management would be superior to other potential alternative management arrangements by other entities.

The study team has determined that a collaborative or partnership-based management approach which includes a leadership role for the national park service is a superior management option for meeting the complex conservation and recreation needs of the study area.

- The NPS has the ability to work in a coordinated fashion, on a regional basis, to address the current lack of equitable access to open space and to protect significant resources. Existing land management agencies have not been able to address these issues and have specifically requested assistance from the NPS.
- The NPS is well-known and respected for its expertise in interpretation and education, and can use this expertise in partnership with other land managers to increase the level of understanding of the area's significance.
- Existing NPS assistance programs are currently insufficient to address these needs.

COLLABORATIVE MANAGEMENT AND REGIONAL PLANNING

As identified in the issues to be addressed in Chapter 2 of this study, the area's natural, cultural, and recreation resources lack a comprehensive management plan and could benefit from a regional planning structure. Regional planning needs include greater cooperation among regional land managers, governments, and other organizations to leverage resources for protection and public enjoyment, share scientific information, create a regional identity and public understanding about resource significance, and to meet the needs of a complex social and ecological region.

The NPS is well-suited to administer a partnership park in the greater Los Angeles metropolitan region. The nearby Santa Monica Mountains National Recreation Area, which has been working cooperatively with agencies and organizations to protect resources of the Santa Monica Mountains for over three decades, is a model for partnership management. There are many lessons learned and excellent cooperative management models to draw

from. The Golden Gate National Recreation Area in the San Francisco Bay Area also provides an excellent model of partnership management in California.

NEED FOR COORDINATED INTERPRETATION AND EDUCATION

The study area lacks coordinated educational and interpretative opportunities about the significance of the area's resources. An improved understanding of resource significance would help to expand people's awareness of the natural systems, cultural heritage, and recreational opportunities in their communities, and increase the political and financial viability of conservation and recreation-related projects. Increased education about resource significance could also help to reduce visitor-related impacts in highly used recreation areas.

NEED FOR ASSISTANCE BEYOND EXISTING NPS PROGRAMS

The NPS ability to provide regional planning and coordinated management through existing technical assistance programs such as the Rivers, Trails, and Conservation Assistance Program (RTCA) is limited. The NPS RTCA program currently provides planning and conservation assistance to organizations and communities in the southern California region on a case-by-case basis, with assistance typically lasting no more than two years. The long term regional planning and assistance needed in the San Gabriel Mountains and Watershed goes beyond the function of this program. Coordinated interpretation and education about the area's significance is also lacking in the study area.

The study team held several workshops with primary land management and recreation agencies within the study area and southern California-based RTCA staff to assist in the development of preliminary alternatives for the special resource study. Agency representatives expressed that the National Park Service's proven leadership in partnership/collaborative management, interpretation, and education is needed to address the previously mentioned gaps in current management.

CONCLUSION

NPS management in partnership with existing agencies and organizations is the best option for enhancing protection of significant resources, for improving access to recreational opportunities in the region, and for providing coordinated interpretation and education about significant resources.



Alternatives

6

Photos (clockwise): 1. Lashbrook Park. NPS photo. 2. Study team collaboration. NPS photo. 3. Puente Hills. NPS Photo. 4. Downtown LA skyline, city view, and the San Gabriel mountains (with Mt. Baldy in the center. Photo © David Liu.

Chapter 6: Alternatives

Introduction

The NPS evaluates four management alternatives in this special resource study. The “no action,” or current management, serves as a baseline of existing conditions. Alternatives A, C, and D, the action alternatives, emphasize collaborative management approaches to nationally recognize and protect the significant resources of the San Gabriel Watershed and Mountains study area. Two of the three action alternatives call for National Park Service (NPS) recognition and involvement.

Issues Addressed in the Alternatives

Through the scoping process, numerous stakeholders including public agencies, local residents, organizations, and elected officials identified specific issues and concerns that should be addressed in this special resource study. Based on this input, the following issue statements were developed by the study team to describe the context for this study. The alternatives explore various approaches to addressing the issues identified.

Funding

Many land management agencies in the study area lack adequate funding and staffing to meet their resource protection and recreation objectives. Nationally significant resources may warrant enhanced funding from outside of the region. While new partnerships among the region’s land management agencies and private organizations may provide additional resources and funding opportunities, some agencies lack the authorities or staffing needed to pursue such strategies.

Barriers to Outdoor Recreation

Barriers to outdoor recreation in the area include: insufficient close-to-home recreational opportunities, lack of awareness of recreational opportunities, poor public transit connections to park and forest entry points, personal safety concerns, and opportunities that do not match the desired recreational activities of growing segments of the population. This is particularly apparent in some low-income and minority communities. Many children in these communities disproportionately suffer from health issues related to poor access to parks and open space, such as obesity and diabetes.

Recreation Demands

The Los Angeles area continues to experience tremendous population growth, contributing to crowding, user conflict, and resource degradation in some recreational areas. Recreation opportunities have not kept pace with demand. There is a need to disperse recreational use from the most congested and impacted areas, and to stabilize and rehabilitate areas where visitor use has negatively affected natural and cultural resources, recreation experiences, and public safety.

Ecological Communities

Greater protection is needed for the region’s threatened ecological communities, including coastal sage scrub, alluvial fan sage scrub, riparian areas, walnut woodland communities, and other native habitats, as well as for the region’s wildlife corridors and habitat linkages. Protection of these communities could be enhanced by additional scientific knowledge, expertise, technical assistance, and cooperative planning and management.

Cultural Resources

The area’s cultural resources, including the heritage resources of the Angeles National Forest and sites associated with Native Americans, Hispanic and American settlement and exploration, and other local stories, would benefit from further documentation, designations, protection, and interpretation.

Regional Identity

The study area lacks a clear sense of identity that could help connect communities to the natural and cultural resources of the San Gabriel Mountains and the Puente-Chino Hills. A stronger sense of identity would help to expand people’s awareness of the natural systems, cultural heritage, and recreational opportunities in their communities, and increase the political and financial viability of conservation and recreation-related projects.

Regional Coordination

The region’s natural, cultural, and recreation resources lack a comprehensive management plan and could benefit from a regional planning structure. Greater cooperation among regional land managers, governments, and other organizations would support leveraging resources, sharing scientific information, creating a regional identity, and meeting the needs of a complex social and ecological region.

Water

There is an ongoing need to protect and restore riparian ecosystems and provide appropriate recreational use of waterways while improving water quality, enhancing efficiency of water storage and use, and providing flood protection.

Overview of the Alternatives

The management alternatives presented in this chapter were developed in cooperation with multiple land management agencies after an analysis of public comments, recreational needs, resource issues, and significant resources. Three preliminary alternative concepts were presented for public review in the fall of 2009. Based on the comments received and further input from stakeholders, the NPS revised the preliminary alternatives. Many commenters suggested that the NPS develop an alternative that combines the best components of each of the preliminary alternatives. Therefore, the NPS developed "Alternative D: San Gabriel Region National Recreation Area: A Partnership Linking Significant Resources and Recreation." Based on public comments, preliminary alternative B, "Parks and Open Space Network," has been dropped from further consideration (see section "Alternatives Considered but Dismissed" for more information on why this alternative was dismissed).

The term "action alternative" is sometimes used to refer to all alternatives that propose a set of actions that are different from current management. The common focus of all three action alternatives is an emphasis on encouraging cooperative management of existing public lands and federal recognition for a national recreation area. These alternatives do not propose large federal land acquisitions, although small strategic purchases from willing sellers to support partnership objectives may be possible. Each action alternative seeks to enhance the capabilities of existing agencies by leveraging resources, sharing information, and cooperative planning and administration.

The alternatives described in this chapter explore a range of possible actions to address the issues described above, including federal recognition of nationally significant resources, new funding opportunities, coordinated recreational and resource planning, technical assistance, cooperative management, and resources from the NPS.

The full range of alternatives presented for consideration includes:

- **Continuation of Current Management (No Action Alternative):** Current programs and policies of existing federal, state, county and non-profit conservation organizations would remain in place and current conditions and trends would continue.
- **Alternative A: San Gabriel Mountains National Recreation Area (A U.S. Forest Service Designation):** The Angeles National Forest unit within the San Gabriel Mountains would be designated by Congress as a National Recreation Area which would continue to be managed solely by the U.S. Forest Service (USFS).
- **Alternative B- San Gabriel Parks and Open Space Network (Dismissed):** See alternatives dismissed from further consideration.
- **Alternative C: San Gabriel Watershed National Recreation Area:** A river-based national recreation area would raise the visibility of the San Gabriel River Watershed, improve river-based recreation, and offer new educational and interpretive opportunities along the river and throughout the watershed.
- **Alternative D: San Gabriel Region National Recreation Area (A Partnership Linking Significant Resources and Recreation):** Alternative D proposes a broader national recreation area (NRA) that would recognize the significant resources associated with the San Gabriel Mountains and Puente Hills, explore opportunities to protect and enhance interconnected ecosystems, provide important open space connections for recreation, and offer new educational and interpretive opportunities. The NPS would offer technical assistance to surrounding communities for recreation and conservation planning.

Case Studies

Throughout the chapter, case studies are presented to help illustrate the ideas in the alternatives. The case studies emphasize how partnership and cooperative management efforts in urban areas have been successfully implemented in other park and recreation areas.

Alternatives Considered But Dismissed

Public review of the preliminary alternatives revealed a high level of dissatisfaction for preliminary alternative B, the San Gabriel Parks and Open Space Network (see Appendix F for a description of preliminary alternative B). Commenters who favored components of alternative B preferred these components in combination with proposals included in preliminary alternatives A and C. Components of alternative B that were favored include the potential protection of rivers and riparian areas, and the opportunity for NPS technical assistance to plan for habitat connections and provide close to home recreation for urban communities. Some commenters expressed concerns about potential impacts on local land use control in alternative B. Technical assistance from the NPS for conservation and recreation planning has been incorporated into alternative D.



Photos (top to bottom): 1. Paseo del Rio, San Gabriel River Coastal Spreading Grounds. NPS photo. 2. Lake Palmdale. NPS photo. 3. Puente Hills. NPS photo.

Items Common to All Action Alternatives

A Partnership Approach

The National Park Service recognizes that many other public agencies, private conservation organizations, and individuals successfully manage important natural and cultural resources and recreational opportunities within the study area. The NPS applauds these accomplishments and actively encourages the expansion of conservation activities by state, local, and private entities and by other federal agencies. The alternatives presented retain current management and build on existing efforts by suggesting new partnerships, funding sources, and technical assistance opportunities.

U.S. Forest Service Management

U.S. Forest Service management and ownership of existing Angeles National Forest lands would be maintained in all of the alternatives. U.S. Forest Service policies would continue to be applied to management of these lands.

National Recreation Area (NRA)

Each of the three action alternatives proposes a national recreation area designation to increase the capacity to protect significant resources and to provide improved recreational opportunities for the region. Two of the national recreation area alternatives would include the establishment of a national park unit to be managed in partnership with existing agencies. The other would be a U.S. Forest Service national recreation area designation applied to existing Angeles National Forest lands. The NPS would have no role in that alternative (alternative A).

Retention of Local Land Use and Existing Regulatory Authorities

The designation of a NPS national recreation area would not establish additional regulatory or land use authorities over local governments. The NPS is not a regulatory agency. NPS land management policies and regulations would only apply to lands that the NPS acquires. The NPS would only consider acquiring land on a limited basis from willing sellers.

All of the alternatives would respect existing general plans and local zoning, as well as state and local laws and policies for lands that are not federally owned.

Protection of Water Supply, Flood Protection, and Sanitation Infrastructure Facilities and Functions

The Los Angeles metropolitan region has highly complex systems of public infrastructure to transport and store local and regional water supplies. In addition, numerous facilities are necessary to treat wastewater and manage solid waste. No alternative presented would change existing water rights, water supply operations, water treatment operations, flood protection efforts, or other agency functions necessary to maintaining public infrastructure essential for public health and safety.

All of the proposed alternatives would retain existing and future water rights. Management of water supply and treatment plants would continue under current authorities. The NRA designation would not entail any new or future beneficial uses or requirements for water supply, water quality, or air quality regulations.

This study recommends that any resulting legislation ensure that existing sanitation facilities and operations such as landfills and water treatment plants, would continue to be operated and regulated by existing agencies and would not be affected by the NRA designation.

Private Property Rights

Any legislation proposed to implement this study should specify that eminent domain would not be used for land acquisition within the NRA. The NPS would only consider acquiring land on a limited basis from willing sellers. Designation would not impact local land use authority over lands not owned by the NPS.

Fire Protection

Fire protection would remain the responsibility of existing federal, state, and local agencies (Los Angeles County, U.S. Forest Service, California Department of Forestry and Fire Protection). The NRA partnership could work together to take a pro-active approach to coordinated resource management to reduce catastrophic fires.

Description of the Alternatives

CONTINUATION OF CURRENT MANAGEMENT (NO ACTION ALTERNATIVE)

CONCEPT

The no action alternative is required by the National Environmental Policy Act to provide a baseline from which to compare action alternatives. Under this alternative the NPS would have no role in the study area beyond existing national park units and programs (segments of two national historic trails and the Route 66 corridor), and financial and technical assistance programs such as the Land and Water Conservation Fund grant program, the Rivers, Trails and Conservation Assistance Program, and the National Historic Landmark program. This alternative assumes that current programs and policies of existing federal, state, county and non-profit conservation organizations would continue at existing levels and current conditions and trends would continue.

MANAGEMENT

Existing cooperative management efforts between agencies would continue. Current efforts to protect wildlife corridors and provide new recreational opportunities would continue to occur on a case-by-case basis as existing funding allows.

The following section briefly describes the current efforts of existing land management agencies, local governments, non-profit conservation activities, and existing partnership efforts. Although fluctuations are inevitable, in most cases it is assumed for the purposes of comparison, that these actions will continue at their current levels.

Public Land Management and Access

Under the no action alternative, public land management agencies would continue their land management, visitor services, public education, and interpretation programs at approximately the current levels of activity and funding, according to current plans.

Federal, state, and local government agencies manage significant amounts of land in the study area. Over two-thirds of the study area is currently managed by the U.S. Forest Service as part of the Angeles National Forest. Other agencies that manage land include the Army Corps of Engineers, the Bureau of Land Management, Los Angeles County Parks, Los Angeles County Department of Public Works, the Puente Hills Landfill Native Habitat

Preservation Authority, and local governments.

Angeles National Forest (ANF): The ANF (approximately 415,000 acres within the study area) represents 70% of the open space in Los Angeles County. Although originally established in 1892 for the purpose of watershed protection, the current primary use of the ANF is public recreation. The ANF also contains extensive infrastructure that serves the Los Angeles region including power lines, water supply and flood control facilities, media communications facilities, and roads. Activities within the ANF are managed according to the 2006 Land and Resource Management Plan (Forest Plan) to allow sustained use and protection of a variety of forest resources.

The majority of funding for the ANF is dedicated to wildfire preparedness and fuels reduction. Budgets for visitor management, interpretation, and education have remained flat while visitation has continued to increase over time. In the no action alternative, the ANF would continue to remain inadequately funded for visitor management and programming.

Bureau of Land Management (BLM): The Bureau of Land Management (BLM) manages over 3,000 acres of land in the study area. These lands consist of isolated parcels scattered throughout Soledad Basin and the Antelope Valley. Most of the parcels are designated for sale or exchange under the Federal Land Policy and Management Act of 1976 (FLPMA). Several parcels are designated for exchange with the U.S. Forest Service. Parcels with habitat value in the Antelope Valley will be retained or consolidated to reflect their value (BLM 1994 and 2006).

California State Land Conservancies: Two California state land conservancies have jurisdictions within the study area. The entire study area is within the jurisdiction of the Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy (RMC). The western San Gabriel Mountains are also included in the jurisdictional boundary of the Santa Monica Mountains Conservancy. Both state land conservancies would continue to work in partnership with local governments, other public agencies, nonprofit organizations, and private landowners to purchase, protect, restore, and enhance resources, and to provide public access to open space.

National Park Service: No new unit of the national park system would be established under this alternative. The NPS would continue to provide technical and financial assistance through existing park system units and through technical assistance

and grant programs. The Juan Bautista de Anza National Historic Trail would continue to partner with local parks and recreation agencies to provide interpretation of the Anza Trail and mark the historic route. The recently established Old Spanish National Historic Trail would likely have some local interpretation following the completion and implementation of its comprehensive management plan. The Route 66 Corridor Program would continue to administer cost-share grants to preserve and interpret the Route 66 corridor, and provide technical assistance to public and private entities to address Route 66 preservation needs.

The National Park Service would continue to provide technical assistance to local communities and organizations through the Rivers, Trails and Conservation Assistance Program. Grants for local recreation and conservation would continue to be administered through the Land and Water Conservation Fund. Such assistance programs would be assumed to continue at current levels.

California State Parks: The Angeles District of the California Department of Parks and Recreation (California State Parks) is responsible for managing state parks within the study area, including the Pio Pico State Historical Park. Currently the park's hours of operations have been limited by funding cuts. Under the no action alternative, the Pio Pico State Historical Park would continue to operate on a limited basis contingent on funding availability.

Los Angeles County Parks: Within the study area, the Los Angeles County Department of Parks and Recreation manages trails and parks. Under the no action alternative, these parks and trails would continue to be managed according to current plans. The county would continue planning and development of its trail system.

Puente Hills Landfill Native Habitat Preservation Authority (Habitat Authority): The Habitat Authority is dedicated to the acquisition, restoration, and management of open space in the Puente Hills for preservation of the land in perpetuity, with the primary purpose of protecting biological diversity. The agency also provides opportunities for outdoor education and low-impact recreation. The Habitat Authority's jurisdiction extends within eastern Los Angeles County approximately from the intersection of the 605 and 60 Freeways in the west to Harbor Boulevard in the east. The Habitat Authority currently manages approximately 3,860 acres of preserved public open space, of which 1,878 is owned by the Habitat Authority. In the no action alternative, the Habitat Authority would continue to acquire and manage lands within its jurisdiction.

Local Land Use Authorities

Local governments govern and manage land within the study area. The 50 cities and unincorporated areas would continue to conserve open space and provide recreational opportunities where possible. Often local governments rely on state and federal grant programs to acquire land for recreation and conservation. Local agencies would continue to provide services as funding allows. Coordination and communication between local governments would continue to occur on a case-by-case basis.

Non-Profit Conservation Activities

It is assumed that non-profit conservation activities would continue at approximately the same levels. Numerous organizations in the region work to conserve lands and recreation areas. This includes a network of land trusts in the San Gabriel Mountains foothills that work towards conserving open space and habitat on the urban-wildland fringe. The Amigos de los Rios is a non-profit organization that led the effort to define the Emerald Necklace vision. The San Gabriel Mountains Forever Campaign is a coalition of environmental, wilderness, and social justice organizations working to create more recreational opportunities and protect resources. Many other organizations, local community groups, and clubs also play important roles in supporting, maintaining, and advocating for resources and recreational opportunities.

Existing Partnership Efforts

Existing partnership efforts would continue at current levels. The following section describes current partnership efforts within the study area.

Joint Power Authorities: A Joint Powers Authority (JPA) is an entity permitted under state law, whereby two or more public authorities (e.g. local governments, or utility or transport districts) can operate collectively. Joint powers agencies have been successful in leveraging funding and implementing projects which serve the purposes of each member agency. Several joint powers authorities that are responsible for recreation and land management within the study area are described below.

The Mountains Recreation and Conservation Authority (MRCA) is a joint powers public agency established in 1985. A partnership between the Santa Monica Mountains Conservancy and the Conejo and Rancho Simi Recreation and Park Districts, the MRCA is dedicated to the preservation of open space and parkland, watersheds, trails, and wildlife habitat. In addition, the MRCA manages

and provides ranger services, fire protection, planning and natural resources expertise, and educational programs for almost 50,000 acres of public lands and parks under its or the Santa Monica Mountains Conservancy's ownership.

The Watershed Conservation Authority (WCA) is a joint powers entity of the RMC and the Los Angeles County Flood Control District (LACFCD). Through the WCA, the RMC and Los Angeles County conduct joint projects to provide open space, habitat restoration, and watershed improvement in the watersheds of both the San Gabriel River and the Lower Los Angeles River.

The Wildlife Corridor Conservation Authority (WCCA) was established to provide for the proper planning, conservation, environmental protection, and maintenance of lands within the Puente-Chino Hills corridor area. WCCA's governing board consists of representatives from the cities of Brea, Whittier, Diamond Bar, La Habra Heights, the Santa Monica Mountains Conservancy, California Department of Parks and Recreation, California Department of Fish and Game (ex officio member), and Los Angeles County, plus two public members.

San Gabriel River Master Plan: This plan represents a shared vision for the San Gabriel River corridor. A steering committee representing cities, other public agencies, water groups, and community and environmental groups developed this shared vision of the river and a plan for how to achieve it.

The master plan integrates many objectives, including habitat, recreation, open space, flood control, water supply and economic development, and it identifies priorities, provides guidance, and coordinates multiple goals of the many jurisdictions and other stakeholders that share the river.

Emerald Necklace – Park Network: The Emerald Necklace is a vision for a 17-mile loop of parks and greenways connecting 10 cities and nearly 500,000 residents along the Río Hondo and San Gabriel Rivers. The Emerald Necklace Accord is an agreement among agencies of the region to preserve the rivers and tributaries for recreational, open space and native habitat conservation and restoration purposes. Examples of projects completed by the partnership include the Encanto Nature Park Bioswale and Outdoor Classroom project in Duarte and Lashbrook Park in El Monte.

Greater Los Angeles County Region Integrated Regional Water Management Plan (IRWMP): Local agencies, organizations, cities, and county government within the greater Los Angeles County region collaborated to develop the Integrated

Regional Water Management Plan (IRWMP) that focuses on water resource management while creating a platform for future funding. A critical component of the planning effort is identifying projects that would help achieve the goals and objectives of the IRWMP. The plan is being funded by Proposition 50, and Chapter 8 grants administered by the State Department of Water Resources. The IRWMP for the Greater Los Angeles County Region seeks to make the region more competitive for funding beyond Proposition 50.

Water Supply, Flood Protection, and Sanitation Infrastructure

Much of the study area includes densely developed urban areas within the San Gabriel Valley. These areas require extensive public infrastructure for water supply, flood protection, and sanitation infrastructure. In the no action alternative, water districts and public agencies would continue to manage water supply, flood protection, and sanitation infrastructure at current levels. Such agencies would also continue existing partnership efforts. Regulatory and management agencies responsible for flood control and sanitation include the Los Angeles County Department of Public Works, the Army Corps of Engineers, and the Los Angeles County Sanitation Districts.

Los Angeles County Department of Public Works: The Los Angeles County Department of Public Works (DPW) is responsible for much of the flood control and watershed management services within the study area, and manages watersheds to provide a balance between flood control, recreation, and protecting the natural environment. The DPW manages dams and spreading grounds along the San Gabriel and Rio Hondo Rivers. The DPW partners with many other agencies in its efforts to promote best management practices for activities that may affect the watershed.

Army Corps of Engineers (ACOE): The Los Angeles District of the ACOE has jurisdiction over various flood protection facilities within the San Gabriel River Watershed. The ACOE jurisdiction includes dams, floodways, and debris basins. The ACOE has agreements with the Los Angeles County Department of Recreation for its management of the recreational lands around the Santa Fe Dam, Puddingstone Reservoir, and Whittier Narrows.

Sanitation Districts of Los Angeles County: The Los Angeles County Sanitation Districts are responsible for managing wastewater and solid waste management. The Sanitation Districts function on a regional scale and consist of 23 independent special

CASE STUDY: ENCANTO NATURE PARK, BIOSWALE AND OUTDOOR CLASSROOM

Background

- The Encanto Nature Park Bioswale and Outdoor Classroom is one of the newest additions in the regional Emerald Necklace project, completed in December 2010.
- The project includes a 1,000 feet bioswale along the western perimeter of the park. The bioswale filters the surface water from the park before it reaches the San Gabriel River, and includes interpretive signage, native landscaping, and a small infiltration basin to manage storm runoff from the park. Other components of the project include a small outdoor nature center with interpretive displays and a kiosk, and an outdoor classroom. A nature 1,500 feet multi-use path with interpretive signage is included along the west bank of the San Gabriel River to a view point which projects nearly 200 feet out into the river channel to enhance the connection between the park and the river.
- The City of Duarte also involved at-risk youth in the project by contracting with the Los Angeles Conservation Corps for construction of the river trail and viewpoint. The City's street maintenance staff will provide long-term maintenance for the project and will receive training for native landscape maintenance from Amigos de los Rios.

Benefits

- Helping at-risk youth and providing opportunities for local employment
- Preventing pollution and contaminants from entering the San Gabriel River
- Encouraging education and exploration with its outdoor classroom and interpretive displays

Source:

<http://www.accessduarte.com>

CASE STUDY: LASHBROOK PARK, MULTIPLE-USE BENEFITS ALONG THE SAN GABRIEL RIVER

Background

- Lashbrook Park is a recently completed park established as part of the Emerald Necklace.
- Lashbrook Park is located along the east bank of the Rio Hondo bike trail within the Army Corps of Engineers jurisdiction. This 1.8-acre park was completed in 2006.

Benefits

- The park site was cleared of trash and debris.
- A vegetated bioswale winds through the length of the site, using plants native to the watershed. The bioswale is designed to remove silt and pollution from surface runoff water.
- Recreational amenities located in Lashbrook Park include picnic areas, benches, wayfinding signage, and a water fountain for use by the local community and regional trail users.



Lashbrook Park. NPS Photo.

Source:

<http://www.amigosdelosrios.org/project2.htm>

districts serving Los Angeles County. Within the study area, the Sanitation Districts manage water reclamation plants at Whittier Narrows, Pomona, and San Jose Creek; landfills in the Puente Hills and Spadra (closed); and intermodal and materials recovery facilities in the Puente Hills.

EDUCATION AND INTERPRETATION

Existing national forest lands, national historic landmarks, museums, visitor centers, parks, and other sites owned by federal, state and local agencies and nonprofit organizations would continue to be interpreted as they are today. Existing national park units would continue to provide interpretation and education opportunities. Improvements in interpretive programs and media may occur as funding becomes available. Coordinated efforts to interpret the significant resources of the San Gabriel Watershed and Mountains would not occur. Education and interpretation efforts would continue to occur on a project-by-project basis.

RECREATIONAL OPPORTUNITIES AND ACCESS

New recreational opportunities and access would occur through existing agencies, organizations, and local governments as funding permits.

RESOURCE PROTECTION (ECOLOGICAL COMMUNITIES AND CULTURAL RESOURCES)

Protection of natural and cultural resources under the management of existing agencies would continue. Government grant programs, California state land conservancies, local governments, and non-profit land conservancies/trusts throughout the study area would continue to conserve and restore native ecosystems and habitat. It is assumed that these efforts would continue at current levels. Existing planning efforts to link habitat connections such as the South Coast Missing Linkages Project would continue. Implementation would be the responsibility of existing agencies and landowners.

The California Department of Fish and Game (CDFG): The CDFG works to maintain native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to the public. The CDFG is responsible for planning and regulatory activities related to threatened and endangered species of special concern, and related resources and activities. The CDFG also regulates hunting and sport fishing seasons in the study area, including on Angeles National Forest lands. In the no action alternative, CDFG would continue to plan for and regulate these resources and activities at current levels.

The *U.S. Fish and Wildlife Service (USFWS)* would continue to work with private landowners, local and state governments, federal agencies, corporations, and other entities to conserve and protect threatened and endangered species and other species of concern on both public and private lands. The USFWS also offers incentive and grants programs for wildlife and habitat conservation.

Cultural Resource Management: Historic sites and other cultural resources on public lands would continue to be protected by the managing agencies. Documentation and preservation would be limited by current funding availability and would continue to be managed on a project by project basis. Cultural resources on private lands would be protected at the discretion of the landowner. Coordinated interpretation of cultural themes would occur on a limited basis.

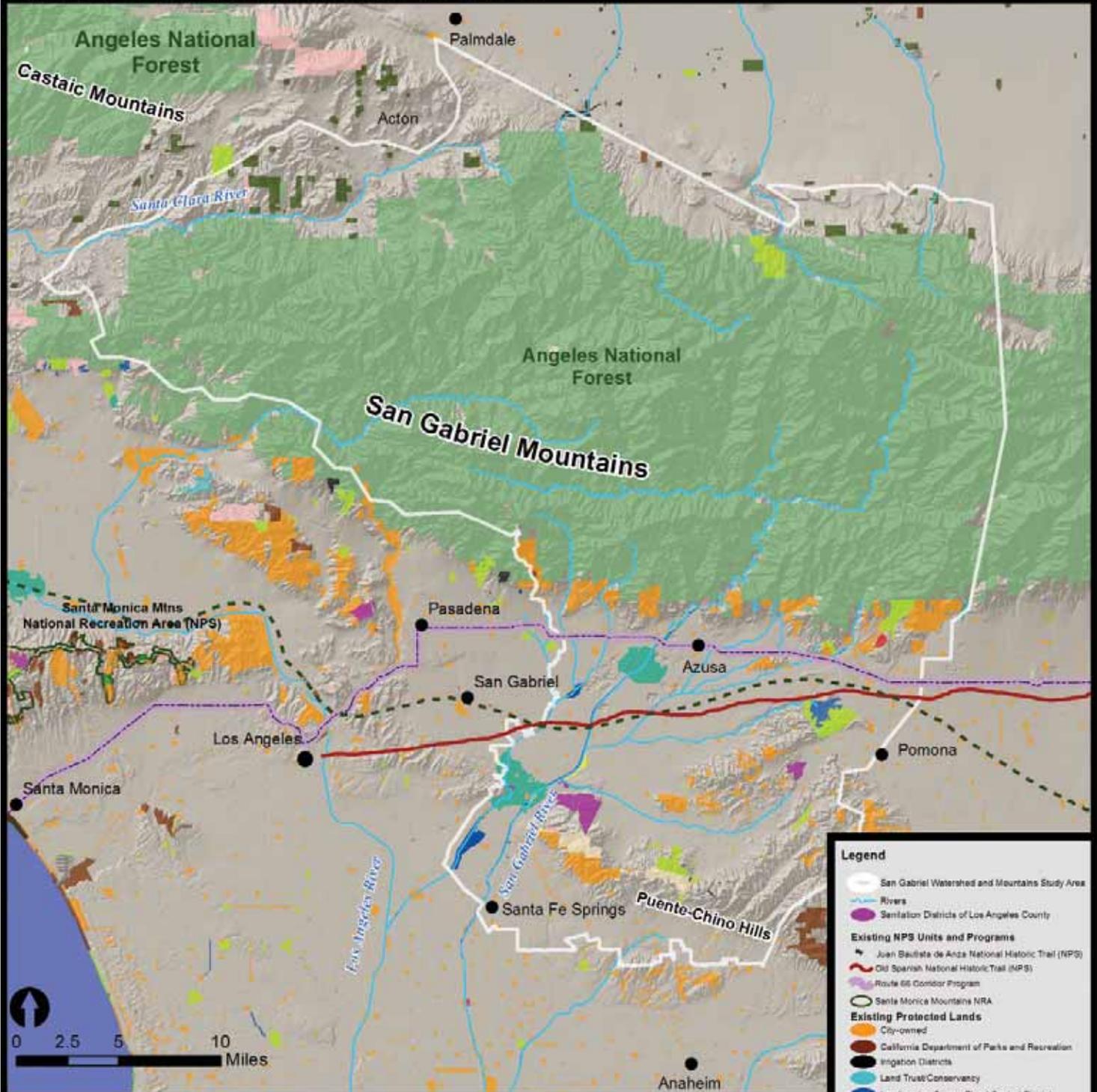
National Park Service technical assistance would continue to be available for National Historic Landmarks (NHLs), nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. Limited federal grants are also available through the Historic Preservation Fund.

OPERATIONS AND MAINTENANCE

Operations and maintenance of existing parks and open space would be assumed to remain at existing levels. For some agencies, more resources are available for the acquisition of lands than are available for operations and management.

Continuation of Current Management (No Action)

San Gabriel Watershed and Mountains Special Resource Study



Continuation of Current Management Highlights

Current programs and policies of existing federal, state, county, and non-profit conservation organizations would remain in place.

Current conditions and trends would continue.

No new unit of the national park system would be established.

National Park Service, Pacific West Regional Office
Updated August 2011

The NPS makes no warranty, express or implied, related to the accuracy or content of this map.

Sources: Existing Protected Lands, California Protected Areas Database (June 2010), Proposed Alternatives and Study Area (NPS), Rivers (National Hydrography Dataset, USGS).

ALTERNATIVE A: SAN GABRIEL MOUNTAINS NATIONAL RECREATION AREA (A U.S. FOREST SERVICE DESIGNATION)

CONCEPT

Congress would designate the San Gabriel Mountains unit of the Angeles National Forest (ANF) a U.S. Forest Service National Recreation Area (NRA) that would continue to be managed solely by the U.S. Forest Service. The designation would bring additional recognition, tools, and resources to the Angeles National Forest in order to steward watershed resources and ecosystems, and improve recreational opportunities.

Legislation establishing the NRA would reaffirm the primary importance of the ANF in preserving watershed and natural resources and emphasize future management practices that are compatible with resource protection. Authorizing legislation would also recognize the importance of the NRA for its recreational value and establish mechanisms to increase funding for facilities, maintenance, ecological restoration, visitor management, educational programming, and stewardship activities.

No unit of the national park system would be established.

PROPOSED AREA

The NRA would encompass the existing Angeles National Forest lands associated with the San Gabriel Mountains (see Map, Alternative A: San Gabriel Mountains National Recreation Area).

MANAGEMENT

The NRA lands would continue to be owned and managed by the USFS and managed according to existing USFS management policies. The legislation establishing the NRA would authorize the USFS to enter into cooperative management agreements with local agencies and conservancies to protect biodiversity and watershed resources, interpret significant resources, enhance recreational opportunities, and provide more educational and interpretive opportunities within and beyond the NRA. In addition, the legislation would provide the Angeles National Forest with the ability to accept donations from philanthropic and partner organizations to improve facilities and resources within the NRA. The NRA legislation would also direct the USFS to engage in partnership efforts and interagency coordination.

NPS Role

Existing units of the NPS outside of the proposed NRA would continue current management. The Santa Monica Mountains National Recreation Area would continue to partner with the USFS, as it currently does, on an informal basis. The NPS would continue to provide technical and financial assistance through existing programs in the greater Los Angeles area, but there would not be any specific focus or emphasis on providing new recreational opportunities and open space protection in the study area. No unit of the national park system would be established.

EXISTING AGENCIES, REGULATORY AUTHORITIES, AND LAND USE

Alternative A would not impact the authority of existing agencies and local governments or impact existing water rights and agreements. The designation would only apply to lands currently owned and managed by the USFS. The legislation would not affect existing inholdings. However, funding from appropriations, partnerships, and donations could be made available to purchase land.

EDUCATION AND INTERPRETATION

The Angeles National Forest would be recognized for its nationally significant resources associated with the San Gabriel Mountains. Through partnerships and additional staff, as funding allows, the U.S. Forest Service would provide more interpretive information about significant resources and offer new educational programs. Educational programs would emphasize to visitors the value of watershed resources and how to recreate in a way that is compatible with protecting such resources.

The NRA could also explore new opportunities for educational programs associated with the San Dimas Experimental Forest.

RECREATIONAL OPPORTUNITIES AND ACCESS

Recreation is the primary use of the Angeles National Forest. With over 3 million annual visitors, the ANF has one of the highest national forest visitation levels in the nation. Over the past ten years, funding for recreation, interpretation, and education has remained flat.

Existing recreational opportunities would remain on the Angeles National Forest. However, increased attention and a narrower management focus resulting from the designation may encourage additional or reprioritized federal funding for enhanced recreational experiences in the San

Gabriel Mountains. This could include improved visitor management in heavily used recreational areas as a result of more forest rangers, better facilities, improved trail connections and trailheads, better educational efforts, and new approaches to manage visitation.

New partnership opportunities may also assist the ANF in fundraising for improved recreational experiences and planning for recreational connections (e.g. trails, bicycle paths).

RESOURCE PROTECTION (ECOLOGICAL COMMUNITIES AND CULTURAL RESOURCES)

The Angeles National Forest would continue to balance use and resource protection in accordance with its multiple-use policy. Legislation establishing the NRA would direct that any proposed new uses would need to be compatible with the original legislative intent of the national forest to protect watershed resources. The NRA would also bring additional recognition, tools, and resources to the ANF in order to steward the significant geological and biological resources associated with the San Gabriel Mountains. For example, the San Gabriel Mountains function as a refuge for many rare and endangered species. To protect the habitats and ecosystems associated with these species, the USFS could enter into cooperative management agreements with other agencies to protect habitat that spans multiple jurisdictional boundaries providing opportunities for the dispersal of wildlife and plants within the forest and into other areas. Protection of habitat across the region would also benefit wildlife and plant adaptation to climate change.

A higher priority would be placed on ecological restoration. Extensive restoration efforts will ensue to assist in recovery from the 2009 Station Fire.

The San Gabriel Mountains are rich in cultural resources including archeology, Native American



North Fork San Gabriel River, Angeles National Forest. NPS Photo.

resources, historical recreation sites, historic mining sites, architecture, and historic flood protection structures. New resources would be allocated to document, protect, and interpret cultural resources in the San Gabriel Mountains. Programs would be designed for the public to experience the cultural, historical, and spiritual value of the San Gabriel Mountains.

OPERATIONS AND MAINTENANCE

Authorizing legislation may direct additional funding for operations and maintenance of the NRA allowing the ANF to provide more rangers and other staff in heavily used visitor areas. New volunteer programs would be developed to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources.

The NRA would also have dedicated staff to coordinate new partnerships and volunteer efforts.

FUNDING AND COSTS

In order to accomplish the goals of the NRA, substantial additional funding would be required, either through appropriations, partnerships, or philanthropy. The increased attention and a narrower management focus resulting from the special designation may encourage additional or reprioritized federal funding, over time, for the ANF to achieve resource restoration and protection goals, as well as provide improved recreation, interpretation, and educational facilities, and programs.

The Angeles National Forest receives the majority of its funds through allocations appropriated by Congress. In FY2011, the ANF received \$32 million in funding for the entire forest. Of this amount, 60%, or \$19.3 million, was budgeted for wildfire preparedness and fuels reduction, with the remaining 40 percent, or \$12.7 million, covering all other operations. Of this funding, \$2.9 million was appropriated for recreation, planning, resources, and wildlife management. Capital Improvement funds which includes facilities, trails, and roads maintenance was \$900,000 for the entire forest (\$131,000 of this total is for trails). When adjusted for inflation, the ANF has had a continuing drop in non-fire operational funding on the ANF since 1995.

Within the study area, total funding for the ANF for FY2011 is \$7.4 million (non-fire). Of this amount, \$1.7 million is allocated to recreation (700k), planning, resources, and wildlife management. Only \$540,000 is allocated to capital improvements including facilities, trails, and roads maintenance,

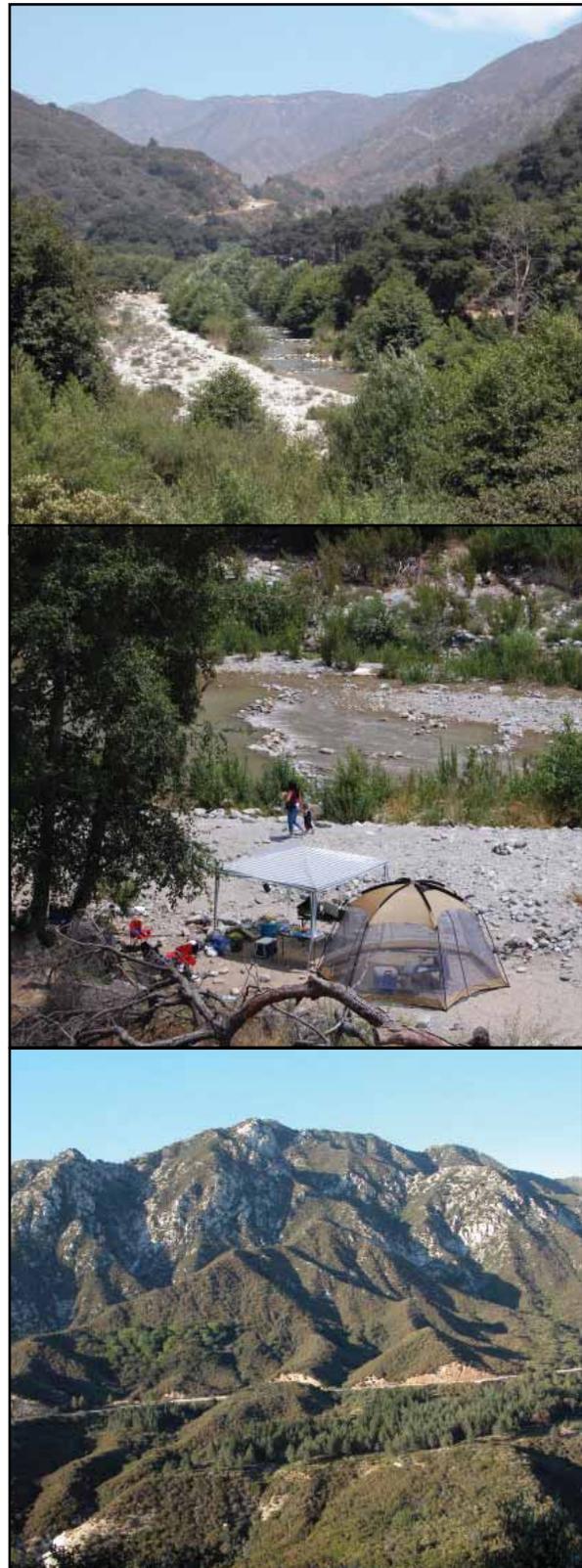
\$78k of this is allocated for trail maintenance.

The Angeles National Forest does receive revenue from a variety of forest programs and users, especially use fees collected under the Recreation Enhancement Act (the Adventure Pass). This source of funding has become increasingly important, as it can be used for a wider range of purposes than reimbursable revenue, and has helped to supplement appropriated funds. However, the cost of enforcing and administering this program is almost equal to the revenue.

Designated national recreation areas in the U.S. Forest Service do not receive stand-alone budgets separate from total forest budgets. Because all such NRAs have been carved from larger forests and retain the preexisting funding structures, the funding that flows exclusively to an NRA is difficult to track. Nor can it be shown that designations elsewhere have led to significant increases in appropriated funding.

This study recommends that the establishing legislation require specific additional funding to be allocated each year for recreation, planning, visitor services, wildlife management, and resource protection. Without this, the ANF is not likely to experience an increase of appropriated funds simply through designation of the San Gabriel Mountains as a national recreation area.

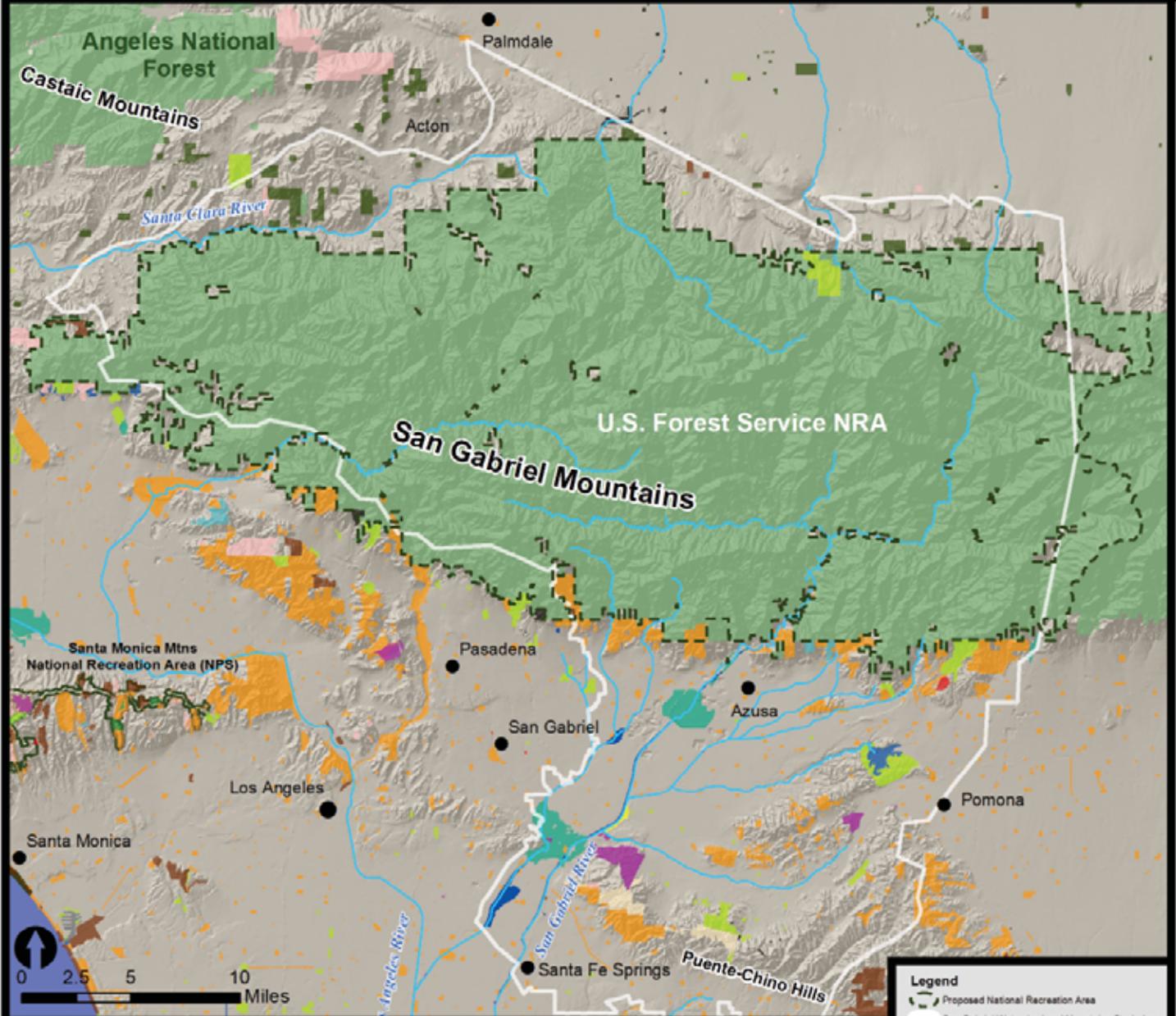
Additional opportunities for increased funding exist from outside sources. The legislation can authorize the forest to receive direct donations and provide a mechanism for establishing a nonprofit fundraising or “friends” group. The elevated visibility and attention of a new designation, coupled with an increased sense of identity for those living in the region, would enhance the ability of the ANF to more successfully raise private funds and seek special appropriations for particular projects.



Photos (top to bottom): 1. East Fork San Gabriel River, Angeles National Forest. NPS photo. 2. Day use activities, Angeles National Forest, NPS photo. 3. Western San Gabriel Mountains. NPS Photo.

Alternative A: San Gabriel Mountains National Recreation Area (A U.S. Forest Service Designation)

San Gabriel Watershed and Mountains Special Resource Study



Alternative A Highlights

- The San Gabriel Mountains unit of the Angeles National Forest would be designated a National Recreation Area (NRA).
- The NRA would continue to be managed solely by the U.S. Forest Service.
- Designation would bring additional recognition, tools, and resources to the Angeles National Forest to steward resources and improve recreational opportunities.
- The NRA would reaffirm the primary importance of the Angeles National Forest in preserving watershed resources.
- Existing recreational uses would continue.
- Future management practices and uses would be compatible with protecting watersheds and significant resources.
- No unit of the national park system would be established.

Legend

- Proposed National Recreation Area
- San Gabriel Watershed and Mountains Study Area
- Santa Monica Mountains NRA (NPS)
- Rivers
- Sanitation Districts of Los Angeles County

Existing Protected Lands

- City-owned
- California Department of Parks and Recreation
- Irrigation Districts
- Land Trust/Conservancy
- Los Angeles County Flood Control District
- Los Angeles, County of
- Mountains Recreation and Conservation Authority
- Native Habitat Preservation Authority
- Santa Monica Mountains Conservancy
- United States Army Corps of Engineers
- United States Bureau of Land Management
- United States Forest Service
- Watershed Conservation Authority
- Water District Lands

National Park Service, Pacific West Regional Office
August 2011

The NPS makes no warranty, express or implied, related to the accuracy or content of this map.

Sources: Existing Protected Lands, California Protected Areas Database (June 2010), Proposed Alternatives and Study Area (NPS), Rivers (National Hydrography Dataset, USGS).

ALTERNATIVE C: SAN GABRIEL WATERSHED NATIONAL RECREATION AREA

CONCEPT

Alternative C proposes a river-based national recreation area (NRA) that would raise the visibility of the San Gabriel River watershed, offer new educational and interpretive opportunities along the river and throughout the watershed, and improve river-based recreation.

The NRA would be established by an act of Congress, which would provide the U.S. Forest Service, the NPS, and other land management agencies and organizations with guidance and direction to collaborate in protecting significant resources, providing new recreational opportunities, and improving visitor use of existing recreation areas.

Very little land would need to be acquired for direct management by the National Park Service. Instead, partnership arrangements among federal and state agencies, local governments, non-profit organizations, and area landowners would achieve the conservation, recreational, and educational goals of the NRA.

PROPOSED AREA

The NRA would encompass the upper San Gabriel River watershed within the Angeles National Forest and a half-mile corridor around the San Gabriel and Rio Hondo Rivers, down to Santa Fe Springs. The general rule for planning community parks is that the park should serve areas within a one-half-mile walking distance of the park. That translates into a one-mile wide circle, with the park at its center. When applied to the San Gabriel River, this park-planning standard translates into a half-mile distance from the centerline of the river on either side, forming a one-mile wide corridor. This is the same corridor width used for the San Gabriel River Master Plan. (See Maps, Alternative C: San Gabriel Watershed NRA and Alternative C: San Gabriel Watershed NRA River Corridor Detail). The NRA would include approximately 178,000 acres of land, 89% of this area is already protected by existing agencies and organizations.

MANAGEMENT

NRA Partnership

The NRA would be managed by a voluntary partnership that would include agencies and organizations with land and interests in the area. Each partner and jurisdiction would retain

landownership, management, and decision-making authorities for lands that it owns. Private lands would continue to be regulated by local land use authorities.

The NRA partnership could include, but would not be limited to, the following agencies: the U.S. Forest Service, the National Park Service, the Rivers and Mountains Conservancy, the Army Corps of Engineers, California Department of Parks and Recreation, the California Department of Fish and Game, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, Los Angeles County, and the Watershed Conservation Authority. Through coordinated management agreements, NRA partners would be able to provide coordinated educational and recreational programming, and share funding, staff, and buildings. Other partnerships could also be established, such as with community-based organizations and tribal groups.

There are excellent examples of such partnership efforts between the NPS and other agencies. For example, the California Department of Parks and Recreation (CDPR) has the authority to enter into agreements with federal agencies for the care, maintenance, administration, and control of lands under their jurisdiction. Examples of such agreements are in place at Redwoods National and State Parks and Santa Monica Mountains National Recreation Area. Through formal management agreements, the NPS and CDPR share funding and operational functions such as interpretation, resource management, and facility maintenance.

The primary functions of the NRA partnership would be to: 1) develop and implement a coordinated management strategy for the NRA to improve recreational experiences, public safety, research opportunities, information and educational programs, and habitat and wildlife protection, 2) seek outside funding for the goals and programs of the partnership and its members, and 3) coordinate a voluntary, shared information network in which local communities within NRA and surrounding communities could participate in delivering coordinated interpretive messages and education programs about the San Gabriel River.

Land Management

Agencies and organizations that own and manage land within the NRA would continue to manage their lands according to their own policies and regulations.

NPS Role

The primary role of the NPS in alternative C would be: 1) coordinating the formal partnership that would manage or coordinate activities within the NRA and 2) providing interpretation and education.

The NPS would take the lead in the coordination and administration of the NRA partnership, providing technical, planning, and administrative services, and developing a comprehensive management strategy for the NRA. Through cooperative management agreements, the NPS could also provide education, interpretation, law enforcement and other services to partner agencies.

The NPS would have a role in developing coordinated interpretive messages for the watershed information network. The NPS would offer interpretive and educational programs within the NRA and at area schools.

The NPS would have no land use regulatory authority for lands that it does not own. As funding permits, the NPS would be authorized to acquire lands from willing sellers within the NRA to protect significant resources. Any land areas acquired by the NPS would likely be relatively small. Most of the lands within the proposed NRA are publicly owned and would continue to be managed by existing agencies and organizations.

U.S. Forest Service Role

The Angeles National Forest lands would continue to be owned and managed by the U.S. Forest Service. As in alternative A, the NRA legislation could provide the U.S. Forest Service with the authority to enter into cooperative management agreements to protect biodiversity and watershed resources, interpret the significance of its resources, enhance recreational opportunities, and provide more educational and interpretive opportunities within San Gabriel River watershed. In addition, the legislation would provide the ANF with the ability to accept donations from philanthropic and partner organizations to improve facilities and resources within the NRA. The NRA legislation would also direct the USFS to engage in partnership efforts and interagency coordination. The U.S. Forest Service may require additional funding to participate in new partnership and coordination efforts.

EXISTING AGENCIES, REGULATORY AUTHORITIES, AND LAND USE

The majority of the lands within the proposed NRA (almost 90%) are already protected by various agencies and organizations. Each agency and organization would continue to protect these lands

according to their own management authorities and policies.

The Sanitation Districts of Los Angeles County facilities would be exempted by the legislation establishing the NRA from the special use permit provisions typically required for landfills within national recreation area; however, all existing permit requirements would stay in place.

With this exemption in place, Alternative C would not impact the authority of any existing agencies, local governments. Nor would it impact water rights and agreements. NPS policies would apply only to those lands acquired by the NPS. Private lands and inholdings would continue to be regulated by local land use authorities (See Actions Common to All Alternatives).

EDUCATION AND INTERPRETATION

Through new interpretive and educational programs, the NRA partnership would provide opportunities for learning and education to help teach and engage residents of all ages about the significant natural and cultural resources within the San Gabriel River watershed. Examples of interpretive messages would include the history and importance of water resources, regional biodiversity, the geological significance of the San Gabriel Mountains, Native American history and prehistory, the role of fire on the landscape, the impacts of the Station Fire, and early California settlement.

The NRA partnership would coordinate a voluntary information network to partner with established environmental education centers, visitor centers, etc. throughout the watershed to help augment and enrich interpretive and educational programming related to the significance of the San Gabriel River Watershed. The primary role of the NPS within the NRA would be to lead the effort to provide coordinated interpretive messages and educational programs. An example of such a network is described in the *Chesapeake Bay Gateways Network case study*.

In addition to programs conducted within the NRA by NPS and US Forest Service staff and volunteers, NRA staff would coordinate with local school districts and area youth organizations to conduct programs to instill messages of environmental stewardship and engage youth about the natural world around them. When needed and as funding permits, new facilities and programs may be developed to support educational efforts. The NPS Junior Ranger program could be promoted for visiting school-aged children. Given the rich cultural heritage of the region, there is also opportunity to

inspire youth about the history and culture of the NRA resources.

RECREATIONAL OPPORTUNITIES AND ACCESS

Recreational uses and activities would be determined by the existing land management agency (e.g. the U.S. Forest Service and local park districts would continue to determine what recreational activities are appropriate according to their own agency policies).

The NRA partnership would explore various opportunities to increase the amount and variety of public open space, parks and recreational lands along the San Gabriel and Rio Hondo river corridors. Recreational opportunities that are compatible with maintaining watershed values and high quality habitat would be emphasized.

The NRA partnership would seek to provide a higher level of management for impacted recreation areas through more law enforcement staff, more educational programming, and improvements to maintenance, facilities, and interpretive features. Agency partnerships would provide more resources to manage highly used existing recreation areas. For example, the Angeles National Forest could enter into management agreements with partner agencies to provide more staff and resources to manage visitor use in the highly used San Gabriel Canyon to provide more opportunities for visitor education and safety.

Because much of the proposed NRA outside of the Angeles National Forest is urbanized, additional opportunities to provide open space and recreational opportunities would be actively pursued. This may include working with local redevelopment authorities and private landowners to reclaim lands involving former aging industrial and commercial infrastructure and converting sites into new green public parks and open spaces. Additionally the partnership could explore enhancing existing parks and open space to achieve multiple objectives such as improved water quality, habitat enhancement, and recreational opportunities.

The partnership would seek to provide urban populations with better access to the public lands of the NRA through enhanced public transportation services. Weekend special buses from park-and-ride lots, school sites, and other transportation ideas should be fully explored to enhance public recreation access to these lands. See case study, *Transit to Trails Program*.

CASE STUDY: CHESAPEAKE BAY GATEWAYS NETWORK

Congress authorized the Chesapeake Bay Gateways and Watertrails Network (Gateways Network) in 1998, to be administered by the National Park Service. The Chesapeake Network Gateways Network connects visitors to the Chesapeake Bay and its rivers through a network of more than 160 sites throughout the Chesapeake Bay Watershed.

Voluntary Information Network

- The Gateways Network is a partnership effort to help visitors find, enjoy, and learn about the special places and stories of the Chesapeake Bay. Participants in the Gateways Network include over 160 sites including parks wildlife refuges, museums, sailing ships, historic communities, and trails. The NPS brings these places together with the goal of helping visitors understand and care about the Bay.
- Participation in the Gateways Network allows each site to become part of an integrated system for providing information to the public—through the visitor-friendly web site, guides, maps, signage, and Gateways logo.
- The NPS does not own any sites or land as part of the Gateways Network, but instead facilitates technical assistance, and interpretation for the partners. The NPS has also offered matching grants to Gateway partners for interpretation, access, conservation, and restoration projects.
- Gateways are nominated by the organizations that manage them. Nominations are reviewed by a working group that includes representatives of 14 non-profit organizations, and state and federal agencies. The Gateways participate on a voluntary basis.
- The Friends of Chesapeake Gateways, is a key non-profit partner that works to enhance the programmatic and financial capacity of the Gateways Network and provide assistance for interpretive, education, outreach, public relations, and stewardship goals.

Accomplishments

- Each Gateway is part of an integrated system for providing information to the public about the Chesapeake Bay.
- The 160 existing Gateways provide unique opportunities for the public to access, enjoy, understand and appreciate the natural, cultural, historic and recreational resources and values of the Chesapeake Bay.
- Over eleven years, Congress has appropriated \$15.4 million for the Gateways Network, with \$10 million in financial assistance awarded directly to Gateway partners through matching grants. Each \$1 of Federal money awarded has been matched by \$1.55 in non-federal funds.

Sources:

NPS 2009 Year in Review Document – Chesapeake Bay Office

The voluntary information network would identify parks and sites with recreational and learning opportunities related to the San Gabriel River Watershed. Participating sites would work together in coordinating marketing approaches for sharing information to the public. A logo could be developed for the sites to use in their materials and signs/wayfinding. At each site, visitors would find maps and guides linking one site with others pertaining to the same or related themes.

RESOURCE PROTECTION (ECOLOGICAL COMMUNITIES AND CULTURAL RESOURCES)

Primary responsibility for resource protection would remain with existing agencies and landowners. The NRA partnership would facilitate opportunities to work collaboratively to conserve and enhance resources through research, cooperative management, and restoration. Ecological communities could be enhanced by additional scientific knowledge, expertise, technical assistance, and cooperative management. The NRA partnership would also seek additional funding for resource protection.

Coordinated cultural resource protection would be an emphasis of the partnership. Cultural resources within the NRA would benefit from further study, documentation, and protection. Such efforts would improve the ability of the NRA to develop interpretive materials and programming related to cultural resources.

OPERATIONS AND MAINTENANCE

Existing agencies would continue to be responsible for the operation and maintenance of their lands and facilities.

Staffing

Given NPS budget constraints, it is likely that the NRA would initially have a small staff that would increase over time as funding is available. A general management plan would identify park priorities, management emphases, and required staffing for a 15-20 year timeframe. For example, the Rosie the Riveter World War II Home Front National Historical Park, established in 1999, had only two full-time equivalent staff (FTE) during its first five years of operation, a superintendent, and a chief of interpretation. By the time the park's draft general management plan was completed in 2007, the park had 6.5 FTE. The general management plan recommended 21.5 FTE over the 15-20 year period of the plan to support implementation.

Because the NPS would be managing the national recreation area in partnership with other agencies,

less staff would be required than what would be expected in a traditional national park. Partnership parks typically require staff to handle park coordination and outreach, assist partners with conservation planning, and provide interpretive and educational programs.

Based on comparisons of staffing levels for existing partnership parks with small NPS landownership, the following types of staff positions could be recommended for alternative C:

- Partnership Specialist
- Superintendent
- Administrative Assistant
- Visitor Use Assistant
- Interpretive Park Rangers
- Law Enforcement Park Rangers
- Teacher Ranger
- GIS Technician
- Volunteer/Outreach Program Coordinator
- Education Program Specialist
- Cultural Resource Specialist
- Outdoor Recreation Planner/Community Planner
- Wildlife Ecologist
- Biological Technician

In early years of park establishment, the NRA could possibly share positions with the Los Angeles-based Rivers, Trails, and Conservation Assistance Program (RTCA) and seek assistance from the Santa Monica Mountains National Recreation Area and other parks in the area. As previously mentioned, staffing recommendations would be refined through completion of a general management plan which would identify management priorities for the NRA for a 15-20 year timeframe. The ability of the NPS to fulfill such positions would be dependent on NPS and partner funding.

Through cooperative management agreements, the NRA agency partners would be able to share staff, facilities, and funding to assist in the operations and maintenance of heavily used visitor areas. The NPS would coordinate new partnerships and facilitate the development of more volunteer programs to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources. The NRA partnership could also leverage funding and resources to improve existing facilities or provide new facilities where necessary.

Job training and conservation stewardship programs for youth and nearby community members would be offered. In addition to the positions listed above, area youth would be encouraged to be involved with service organizations by applying for positions through existing programs such as the Student Conservation Association, Youth Conservation Corps, AmeriCorps and other organizations which expose youth to the conservation and stewardship of our public lands.

LAND ACQUISITION

Lands within the NRA would remain under their current jurisdictions, with each land management agency continuing to fund its own operations. As almost 90% of the land in the proposed NRA is already protected for recreation and conservation by partner agencies (158,000 of approximately 178,000 acres), land acquisition needs would be small. Much of the remaining 20,000 acres are comprised of urbanized lands in commercial and residential use that would not be appropriate or feasible for NPS land acquisition. The NRA partnership would be eligible to request NPS funding for land acquisition within the NRA for acquisition of small areas with resource significance such as a historic site or open space with native habitat. However, it should be noted that such funding is extremely limited. Funding for land acquisition would also be available from partner agencies and through local fundraising efforts.

OPERATIONAL AND VISITOR FACILITIES

Construction of new administrative facilities for NPS operations and management would not necessarily be required to support the proposed NRA. Given the existing amount of office space available in and near the proposed NRA, it is likely that the NPS could lease administrative and operational facilities from partner agencies or through existing office space available in the area. There may also be opportunities to adaptively reuse a historic building or property through leasing if the NPS acquired land that contained such facilities. The NPS could also use partner facilities or adaptively reuse buildings to provide visitor facilities. If established, the NRA partnership would identify specific operational and visitor facilities needs through a general management plan.

CASE STUDY: TRANSIT TO TRAILS PROGRAM

Background

Transit to Trails is a pilot project created by a partnership between the NPS, the Anahuak Youth Association, The City Project, Mountains and Recreation Conservation Authority, and an anonymous donor. Transit to Trails takes inner city youth and their families on different mountain, beach, and river trips.

Program Description

- Santa Monica Mountains NRA partners with Transit to Trails to provide buses that allow school and community groups to visit the national recreation area.
- By bridging the gap between urban youth and the outdoors, Transit to Trails is not only encouraging physical activity, but also a healthy and better mental lifestyle.
- Currently, the City Project is hoping to expand the Transit to Trails pilot project to throughout Southern California and beyond. It is encouraging other park agencies to join the Mountains Recreation Conservation Authority and the NPS in providing buses, rangers, and programs for Transit to Trails.

Accomplishments

- Transit to Trails provides more opportunities for area youth and their families to learn about water, land, wildlife, cultural history, and engage in physical activity through recreational opportunities.
- It also helps reduce traffic congestion and parking problems, improve air quality, and reduce run-off of polluted water into rivers and the ocean by providing a more accessible, public transportation.

Sources:

<http://www.cityprojectca.org/ourwork/forests.html>,
Public Transportation to Local National Forests Study
by USC Dept. of Geography

FUNDING AND COSTS

The NRA in this alternative would rely on the funding streams of partner agencies. Lands within the NRA would remain under their current jurisdictions, with each land management agency continuing to fund its own operations. As discussed under alternative A, legislation creating a special designation on the ANF may enhance funding or fundraising opportunities for the U.S. Forest Service to achieve resource restoration and protection goals, as well as provide improved recreation, interpretation, and educational facilities and programs.

The NPS would need additional federal funding for its administrative, educational, technical assistance, and interpretive roles. In addition, the NRA partnership could establish a fundraising organization, be a coordinating body for existing grant programs, and work together to leverage funds from a variety of sources (e.g. state bonds, Land & Water Conservation Fund) to increase and prioritize funding for projects and staff in the NRA and San Gabriel Watershed. Organizations participating within the partnership could also work together to leverage private funding and donations.

NPS operating costs of national recreation areas vary widely, depending on the amount and type of resources managed, number of visitors, level of programs offered, safety and security issues, and many other factors. Table 9: National Park Service National Recreation Area Annual Operating Budgets, shows the park operational base budgets for fiscal year 2009 of several partnership-based units that could be comparable to the NRA partnership proposed in this alternative. While no formal estimates of operating costs have been completed for this study, these examples illustrate the potential range. Boston Harbor Islands NRA, Chattahoochee River NRA, Mississippi National River and Recreation Area, and Santa Monica Mountains NRA are all partnership-based NPS units comprised primarily of non-NPS lands. The annual operating base budgets for these units range from \$1.22 million to \$8.6 million. While the NRA in alternative C would be similar to Santa Monica Mountains in total acreage, the NPS-owned portion would be comparatively insignificant. Based on the size of the area, and the types of services and assistance offered through the partnership, the cost of NPS operations for the NRA could be expected to be \$1 to \$3 million. The estimated operational budget would primarily fund salaries. Additional costs would include leasing or maintaining administrative space, interpretive and educational programs, and cyclical maintenance of any NPS-owned facilities.

PLANNING AND IMPLEMENTATION PROJECTS

Planning and implementations projects are not reflected in the operational budgets described in Table 9. With an NPS designation, the NRA would be eligible to receive funding for planning and projects through the NPS. For example, soon after establishment of the NRA, the NPS could provide initial planning funds for a general management plan which would define management priorities, more specific actions, and funding needs for the NRA. The general management plan would be completed in collaboration with the partnership agencies. A general management for a partnership park the size and scale of which is proposed in alternative C would likely take 4 to 5 years to complete and could cost between \$500,000 and \$700,000. Additional NPS funding may also be available for specific projects such as trail planning and development and interpretive materials. A general management plan would identify more specific implementation needs.

The example partnership parks listed in Table 9 also rely on private fundraising through “friends” groups. The funds raised through these groups can be used to supplement the operating budgets of the partners. At Boston Harbor Islands NRA, for example, the Boston Harbor Island Alliance is a nonprofit organization authorized through legislation to raise and manage funds for facilities and programming on partner lands. In 2008, the Alliance spent \$2.25 million for visitor programming and capital improvements within the NRA on lands owned by state, federal, municipal, and private entities. In addition, the Alliance received \$5 million for environmental mitigation projects over several years, to be used on partner lands.

These partnerships also rely on private fundraising through “friends” groups. The funds raised through these groups can be used to supplement the operating budgets of the partners. At Boston Harbor Islands NRA, for example, the Boston Harbor Island Alliance is a nonprofit organization authorized through legislation to raise and manage funds for facilities and programming on partner lands. In 2008, the Alliance spent \$2.25 million for visitor programming and capital improvements within the NRA on lands owned by state, federal, municipal, and private entities. In addition, the Alliance received \$5 million for environmental mitigation projects over several years, to be used on partner lands.

Table 9: National Recreation Area Annual Operating Budgets

NRA	NPS Acres	Total Acres	2009 NPS Base Budget	Staffing
Boston Harbor Islands NRA	241	1,482	\$1.2 Million	14 FTE
Mississippi NRRRA	62	53,775	\$2.1 Million	28 FTE
Chattahoochee NRA	4,891	9,886	\$3.5 Million	39 FTE
Santa Monica Mountains NRA	23,120	156,673	\$8.6 Million	99 FTE

FTE (Full-time equivalent employees). One FTE is one person working 40 hours per week for one year, or the equivalent.

CASE STUDY: COOPERATIVE MANAGEMENT AGREEMENTS - SANTA MONICA MOUNTAINS NATIONAL RECREATION AREA

Background

- The Santa Monica Mountains National Recreation Area (SMMNRA), a unit of the National Park System since 1978, includes 150,000 acres of private, local, state and federal lands. The SMMNRA is managed under a unique partnership umbrella in which the federal government owns approximately 15 percent of the land.
- SMMNRA parklands and open space are managed in collaboration with city, county, and state agencies as well as organizations such as the California Native Plant Society and Mountains Restoration Trust

Cooperative Management Agreement

- A cooperative management agreement among the NPS, California State Parks, the Santa Monica Mountains Conservancy, and the Mountains

Recreation and Conservation Authority allows these agencies to share funding, staff, and buildings; cooperate on programs; and jointly manage recreation areas. By signing into this voluntary agreement, these parties become official partners that work together toward SMMNRA's shared conservation and recreational goals. Cooperative management allows for greater operational efficiencies, enhanced resource protection, and improved public services.

Accomplishments

- The participating agencies under the cooperative management agreement realize greater efficiency and cost savings from shared operating procedures, cohesive law enforcement management (both resource and visitor protection), and collaborative educational programming that serves a much greater segment of the public than if agencies worked individually.

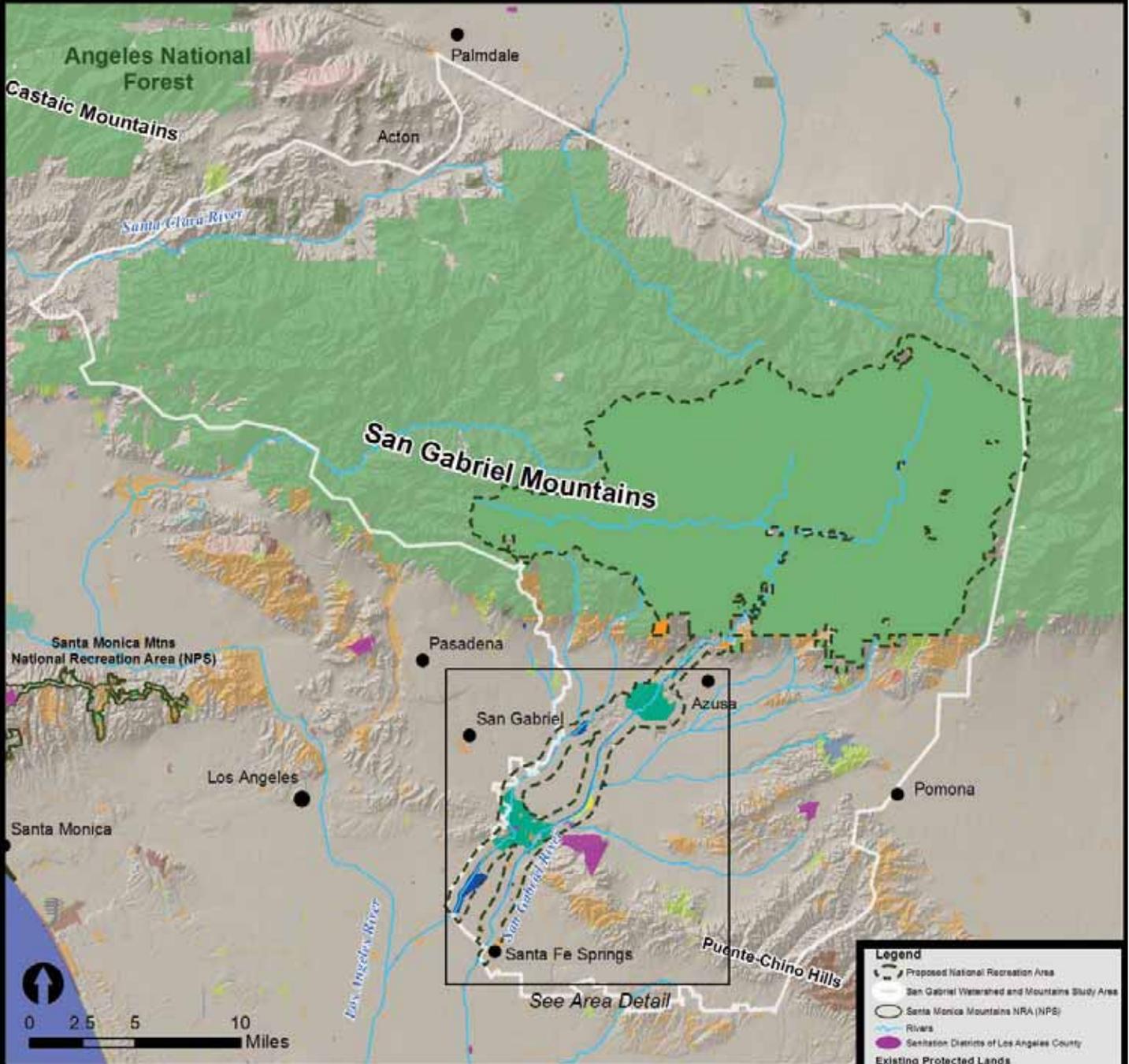
Source:
<http://www.nps.gov/samo>



Glendora Canyon Road, Angeles National Forest. NPS Photo.

Alternative C: San Gabriel Watershed National Recreation Area

San Gabriel Watershed and Mountains Special Resource Study



Alternative C Highlights

- River-based national recreation area emphasizing new educational and interpretive opportunities in the watershed
- Enhanced access to existing public lands in the NRA
- Improved recreation opportunities for urban communities
- Interpretive and educational programs and outreach to youth
- Various public and private funding sought to achieve goals

National Park Service, Pacific West Regional Office
Updated August 2011

The NPS makes no warranty, express or implied, related to the accuracy or content of this map.

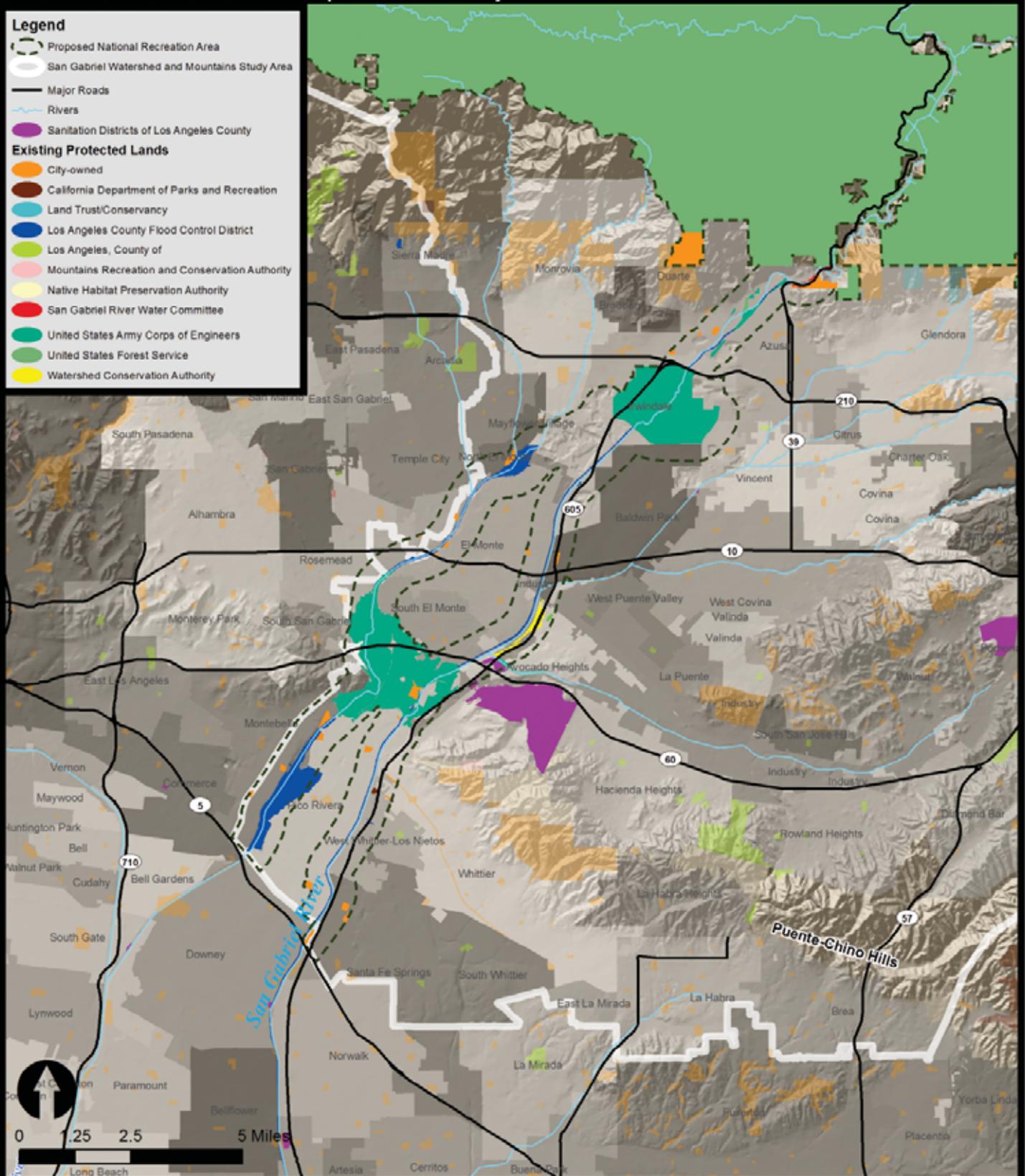
Sources: Existing Protected Lands, CPAD 1.5, ©June 2010
GreenInfo Network - www.calands.org - Proposed Alternatives and Study Area (NPS), Rivers (National Hydrography Dataset, USGS)

Alternative C: San Gabriel Watershed National Recreation Area River Corridor Detail

San Gabriel Watershed and Mountains Special Resource Study

Legend

-  Proposed National Recreation Area
-  San Gabriel Watershed and Mountains Study Area
-  Major Roads
-  Rivers
-  Sanitation Districts of Los Angeles County
- Existing Protected Lands**
-  City-owned
-  California Department of Parks and Recreation
-  Land Trust/Conservancy
-  Los Angeles County Flood Control District
-  Los Angeles, County of
-  Mountains Recreation and Conservation Authority
-  Native Habitat Preservation Authority
-  San Gabriel River Water Committee
-  United States Army Corps of Engineers
-  United States Forest Service
-  Watershed Conservation Authority



National Park Service, Pacific West Regional Office
Updated August 2011
The NPS makes no warranty, express or implied, related to the accuracy or content of this map.

Sources: Existing Protected Lands, CPAD 1.5, ©June 2010
GreenInfo Network - www.calands.org, Proposed Alternatives and Study Area (NPS), Rivers (National Hydrography Dataset, USGS).

ALTERNATIVE D: SAN GABRIEL REGION NATIONAL RECREATION AREA (A PARTNERSHIP LINKING SIGNIFICANT RESOURCES AND RECREATION)

CONCEPT

Alternative D represents a combination of ideas from the preliminary alternatives that were presented to the public in fall 2009. Alternative D proposes a larger scale national recreation area (NRA) that would recognize and protect the significant resources associated with the San Gabriel Mountains and Puente Hills, explore opportunities to protect and enhance interconnected ecosystems, provide important open space connections for recreation, and offer new educational and interpretive opportunities. Ecological restoration would be emphasized.

The management approach of alternative D would be the same as alternative C. The NPS, U.S. Forest Service, and numerous other agencies and organizations with land and interests in the area would work collaboratively to protect significant resources and improve recreational opportunities. Very little land would need to be acquired for direct management by the NPS.

Unlike the other alternatives, in alternative D the NPS and the NRA partnership would offer technical assistance to willing communities for conservation planning to extend open space connections and form a network of parks, habitats, and open spaces.

PROPOSED AREA

Alternative D proposes the largest NRA of the three action alternatives, providing more opportunities for resource protection, inter-agency coordination, and recreation. The NRA would include the San Gabriel Mountains, portions of the San Gabriel and Rio Hondo Rivers, and a portion of the western Puente Hills.

Within the San Gabriel Mountains, the NRA would include the ANF, adjacent foothill areas with ecological resource values and areas near the San Andreas Fault. Areas with ecological resource values include designated critical habitat for federally listed threatened or endangered species, and/or are within one of the Los Angeles County proposed significant ecological areas. Below the Angeles National Forest, the NRA would include a half-mile corridor around the San Gabriel and Rio Hondo rivers, south to Santa Fe Springs. Portions of the western Puente Hills with ecological resource value

and recreational potential (areas west of Harbor Boulevard) would also be included. This primarily includes lands owned and managed by the Puente Hills Landfill Native Habitat Authority and lands proposed by Los Angeles County to be included in the Puente Hills Significant Ecological Area (See Maps: Alternative D – Linking Resources and Recreation and Alternative D – River Corridor and Puente Hills Detail).

The NRA would include approximately 581,500 acres of land, 82% of this area is already protected by existing agencies and organizations.

MANAGEMENT

NRA Partnership

The management structure and primary functions of the NRA partnership would primarily be the same as alternative C, a voluntary partnership that would include agencies and organizations with land and interests in the area. However, the functions of the partnership would be somewhat broader. The NPS and the partnership would offer additional conservation planning assistance to interested local communities in order to extend open space connections and form a network of parks, habitats and open spaces.

Because of the diversity of communities throughout the broader NRA and differing recreation and resource protection needs, the NRA partnership could have different management approaches to address the various needs. For example, in the more urban areas associated with the river corridors, the NRA partnership could work with interested surrounding communities to increase the amount and variety of public open space, parks and recreational lands, particularly in under-served areas, and to enhance public transportation access between urban populations and the public lands of the NRA.

In rural areas such as Soledad Basin, Antelope Valley or Mt. Baldy, where future growth pressures may threaten open space, and the rural quality of life, the NRA could work with communities to preserve additional open space and improve recreational trail connections and staging areas.

In existing public land areas, interagency agreements could augment agency staffing to manage highly used areas such as the San Gabriel Canyon, providing higher levels of visitor services, education, and safety.

The NRA partnership could include, but would not be limited to, the following agencies: the U.S. Forest Service, the National Park Service, the

Rivers and Mountains Conservancy, the Puente Hills Landfill Native Habitat Authority, the Army Corps of Engineers, California Department of Parks and Recreation, the California Department of Fish and Game, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, Los Angeles County, the Santa Monica Mountains Conservancy, and the Wildlife Corridor Conservation Authority. Through coordinated management agreements, NRA partners would be able to provide coordinated educational and recreational programming, and share funding, staff, and buildings. Other partnerships could also be established, such as with community-based organizations and tribal groups.

Land Management

Agencies and organizations that own and manage land within the NRA would continue to manage their lands according to their own policies and regulations.

NPS Role

As in alternative C, the NPS would take a lead role in the formal partnership that would manage or coordinate activities within the NRA. Through cooperative management agreements, the NPS could also provide educational, interpretive, law enforcement and other services to partner agencies. See case study, *Cooperative Management Agreements – Santa Monica Mountains National Recreation* for more information about cooperative management agreements. The NPS would also take a lead role in providing coordinated interpretive and educational messages about the significance of the NRA resources for existing nature centers, museum, park programs, etc. The U.S. Forest Service may require additional funding to participate in new partnership and coordination efforts.

The NPS would have no land use regulatory authority for lands that it does not own. As funding permits, the NPS would be authorized to acquire lands from willing sellers within the NRA to protect significant resources. Any land areas acquired by the NPS would likely be relatively small.

In alternative D, the NPS would offer technical assistance to interested public agencies, private landowners, and organizations to create and connect parks, conserve habitat, provide new recreational experiences, and foster a sense of regional identity. The NPS could also assist in organizing volunteer programs within the NRA.

As in alternative C, the NPS would have no land use regulatory authority for lands that it does not own. The NPS could be authorized to acquire lands within

the NRA if they became available from willing sellers for operational purposes and to protect significant resources. As most of the lands within the NRA are currently in public ownership, land acquisition by the NPS would be limited.

U.S. Forest Service Role

The Angeles National Forest role would be the same as alternative C, although the entire ANF unit within the San Gabriel Mountains would be included. The U.S. Forest Service would continue to own and manage its lands in the San Gabriel Mountains according to its policies. However, the NRA designation would reaffirm the original intent of the Angeles National Forest to protect watershed resources, provide the U.S. Forest Service with more authorities to enter into cooperative management agreements with other agencies, and to retain fees and donations. The NRA legislation would also direct the USFS to engage in partnership efforts and interagency coordination.

EXISTING AGENCIES, REGULATORY AUTHORITIES, AND LAND USE

The majority of the lands within the proposed NRA (over 80%) are already protected by various agencies and organizations. Each agency and organization would continue to protect these lands according to their own management authorities and policies.

Authorizing legislation would exempt the Sanitation Districts of Los Angeles County from the special use permit provisions typically required for landfills within national park boundaries to avoid impacting operations necessary for public health and safety.

With this exemption in place, alternative D would not impact the authority of any existing agencies or local governments or impact existing water rights and agreements. NPS policies would apply only to those lands acquired by the NPS. Private lands and inholdings would continue to be regulated by local land use authorities. See Actions Common to All Alternatives on page 146.

EDUCATION AND INTERPRETATION

The approach to education and interpretation would be the same as alternative C. The NPS would provide assistance for coordinated education and interpretive messages, provide on-site educational and interpretive programs, and reach out to youth through targeted programs. Such programs would be expanded beyond the watershed focus of alternative C, to cover the broader NRA of alternative D, offering more opportunities to interpret the significance of the

CASE STUDY: PARTNERSHIP MANAGEMENT- BOSTON HARBOR ISLANDS NATIONAL RECREATION AREA

Background

Boston Harbor Islands National Recreation Area (BHINRA) is a national park unit established in 1996 to preserve the Boston Harbor's natural systems. Initially, the 34 Boston Harbor Islands were managed separately by a dozen federal, state, municipal, and non-profit agencies, each with its own priorities, programs, and needs. The establishment of BHINRA provided a common vision for the islands and provided a framework for cooperative management. The NPS does not own any land within BHINRA.

Management Structure

- Management of BHINRA is coordinated by the Boston Harbor Islands Partnership (Partnership). The Partnership includes 13 federal, state, city, and nonprofit agencies, the Boston Harbors Islands Advisory Council, tribes, not-for-profit organizations, colleges and universities, and businesses. The partners operate subject to their own governing laws or through formal agreements among the partner agencies. The BHIP includes a range of 13 federal, state, city, and nonprofit agencies, the Boston Harbors Islands Advisory Council, tribes, not-for-profit organizations, colleges and universities, and businesses. The partners operate subject to their own governing laws or formal agreements.

- The Boston Harbor Islands Advisory Council was established by the BHINRA's enabling legislation, and advises the BHIP on the development and implementation of a general management plan for the islands, including ongoing operations.
- The Partnership agencies provide funding and staff, including volunteers for management and operation of the BHINRA. Funds are not shared across agencies, nor does the NPS receive any funds from participating agencies. The Island Alliance is charged by the Boston Harbor Islands Partnership with generating private revenue to support the park.
- The BHINRA also relies on private- and public-sector investments since the authorizing legislation limits federal spending to ¼ of the operating budget. The Island Alliance is a non-profit organization charged by the Partnership with generating private revenue to support the BHINRA.

Accomplishments

- The BHINRA benefits from more resources and coordinated research and resource management, leading to greater conservation efforts.
- By branding BHINRA's identity throughout Boston and using media to make visitors aware of recreational opportunities, the islands have become a much loved and popular destination.

Source:

www.nps.gov/boha, <http://www.bostonislands.com>

San Gabriel Mountains. Interpretation could also be expanded to include natural and cultural resources of the Puente Hills. See case study, *Coordinated Interpretation – Rosie the Riveter/World War II National Historical Park*.

RECREATIONAL OPPORTUNITIES AND ACCESS

Within the NRA, a variety of recreational opportunities would be available to the public. Recreational uses and activities would be determined by the existing land management agency (e.g. the U.S. Forest Service would continue to determine what recreational activities are appropriate according to its own agency policies). In alternative D, the NRA partnership would seek to improve recreational access and opportunities in urban areas that are deficient in recreation and park lands by offering assistance in planning for close-to-home recreational opportunities, better trail access, and improved public transportation options to recreational areas. Additionally, the partnership would explore opportunities to restore vacant or unused land to provide new recreational opportunities. See next page for case study *Lashbrook Park, Multiple-Use Benefits along the San Gabriel River*.

The NRA partnership would also seek ways to improve the recreational experience in more heavily impacted areas such as the San Gabriel Canyon by providing more education, improving facilities, improving maintenance and law enforcement, and enhancing visitor management to reduce impacts. Improved recreational experiences in more rural areas such as the Antelope Valley could focus on protecting the rural recreational experience by providing better trail connections and improved equestrian staging areas.

Similar to alternative C, the voluntary information network would identify parks and sites with recreational and learning opportunities. However, in alternative D, this network would be more expansive, including sites with recreational and learning opportunities associated with the San Gabriel River Watershed, the Puente Hills, and the San Gabriel Mountains. At each site, visitors would find maps and guides linking one site with others pertaining to the same or related themes.

RESOURCE PROTECTION (ECOLOGICAL COMMUNITIES AND CULTURAL RESOURCES)

Alternative D would emphasize protecting significant resources associated with the San Gabriel

Mountains and Puente Hills. The NRA partnership would explore opportunities to preserve and restore open space and to protect and enhance wildlife corridors within the NRA.

As in alternative C, primary responsibility for resource protection would remain with existing agencies and landowners. The NRA partnership would facilitate opportunities to work in collaboration with partner t agencies and organizations to conserve and enhance resources through research, cooperative management, and restoration. Ecological communities could be enhanced by additional scientific knowledge, expertise, technical assistance, and cooperative management.

Alternative D emphasizes protecting ecosystems and wildlife corridors. For example, the San Gabriel Mountains and Puente-Chino Hills are refuges for rare and endangered species. These species need to be able to move to and from these open space areas, particularly in the case of wildfire events and for adaptation associated with climate and habitat change. Better ecosystem connectivity also fosters greater biodiversity. The NRA partnership would seek to leverage additional funding for ecological restoration and wildlife and habitat management and conservation efforts.

Coordinated cultural resource management would be the same as in alternative C, but would cover a broader area with the larger NRA. Cultural resources within the study area would benefit from further study, documentation, and protection. Such efforts would improve the ability of the NRA to develop interpretive materials and programming related to cultural resources.

OPERATIONS AND MAINTENANCE

Existing agencies would continue to be responsible for the operation and maintenance of their lands and facilities.

Staffing

Similar to alternative C, the NPS would manage the national recreation area in partnership with other agencies. Given NPS budget constraints, it is likely that the NRA would inwould initially have a small staff that would increase over time as funding is available, and following the completion of a general management plan which would identify park priorities, management emphases, and required staffing for a 15-20 year timeframe.

Because alternative D incorporates a larger land area and broader set of programs than alternative C, it would be expected to require slightly higher

CASE STUDY: COORDINATED INTERPRETATION ROSIE THE RIVETER/ WORLD WAR II NATIONAL HISTORICAL PARK

Background

Rosie the Riveter/ World War II National Historical Park was established in 2000 to commemorate the sacrifices and accomplishments of the City of Richmond and the people's contributions to the World War II Home Front effort. Located in Richmond, California, the park tells the story of the home front effort during World War II.

Partnership Management

- Park sites include an historic shipyard, the SS Red Oak Victory, the Rosie the Riveter Memorial, several historic structures, trails, and parks along Richmond's waterfront, and reflects one of the most intact histories of the World War II Home Front.
- The NPS does not own any of the sites in the historical park. Most of the sites are owned by the City of Richmond.
- NPS operates the park through partnerships with a range of local and regional groups, the City of Richmond, and different nonprofit and private organizations.

Coordinated Interpretation

- The NPS provides visitors with opportunities to learn and experience the home front stories that are preserved and interpreted.
- The roles of the NPS are mainly to develop interpretive exhibits, orient visitors to the national historical park, develop and coordinate visitor programs, provide technical assistance to the sites and partners, and collect and preserve the WWII home front artifacts and histories.

Accomplishments

- The NPS has brought national focus and attention to the World War II-era resources of Richmond and has helped to leverage grants and endowments to other cooperating partners.
- The NPS also provides technical assistance in preserving historic resources and telling the American home front stories.

Source:

<http://www.nps.gov/samo>

staffing levels. For example, additional rangers and resource specialists would be required. Based on comparisons of staffing levels for existing partnership parks of similar size and with small NPS landownership, the following types of staff might be recommended for alternative D:

- Partnership Specialist
- Superintendent
- Administrative Assistant
- Visitor Use Assistant
- Interpretive Park Rangers
- Law Enforcement Park Rangers
- Teacher Ranger
- GIS Technician
- Volunteer/Outreach Program Coordinator
- Education Program Specialist
- Cultural Resource Specialist
- Outdoor Recreation Planner/Community Planner
- Wildlife Ecologist
- Biological Technician

In early years of park establishment, the NRA could possibly share positions with the Los Angeles-based Rivers, Trails, and Conservation Assistance Program (RTCA). Staffing recommendations would be refined through completion of a general management plan which would identify management priorities for the NRA for a 15-20 year timeframe. The ability of the NPS to fulfill such positions would be dependent on NPS and partner funding.

The NRA partnership would also provide the opportunity for agencies to share staff, facilities, and funding to assist in the operations and maintenance of heavily used visitor areas. Through cooperative management agreements the NPS could share staff with other land management agencies. For example, the NPS could provide rangers to supplement U.S. Forest Service staff in high use areas of the Angeles National Forest. The NRA partnership could also leverage funding and resources to improve existing facilities or provide new facilities where necessary.

The NPS would coordinate new partnerships and facilitate the development of more volunteer programs to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources. Additionally, the NPS would provide opportunities for job training and conservation stewardship programs for youth and nearby community members. See case study: *Minority Youth Education and Employment Program: Santa Monica Mountains NRA*.

LAND ACQUISITION

Lands within the NRA would remain under their current jurisdictions, with each land management

agency continuing to fund its own operations. Approximately 82% of the land in the proposed NRA is already protected for recreation and conservation by partner agencies (479,000 of approximately 581,500 acres). Much of the remaining 100,000 acres are comprised of urbanized lands in commercial and residential use that would not be appropriate or feasible for NPS land acquisition. However, the alternative D NRA would include more unprotected lands with significant resources than alternative C. The NRA partnership would be eligible to request NPS funding for land acquisition within the NRA for acquisition of small areas with resource significance such as a historic site or open space with native habitat. However, partner agencies would also be expected to contribute funding to land acquisition within the NRA. NPS land acquisition funding is extremely limited.

OPERATIONAL AND VISITOR FACILITIES

Construction of new administrative facilities for NPS operations and management would not likely be required to support the proposed NRA. Given the existing amount of office space available in and near the proposed NRA, it is likely that the NPS could share administrative and operational facilities with partner agencies or lease other office space available in the area. There may also be opportunities to adaptively reuse an historic building or property if the NPS acquired land that contained such facilities. The NPS could also use partner facilities or adaptively reuse buildings to provide visitor facilities. The Angeles National Forest and various local and state park and recreation agencies also operate and manage existing visitor facilities within the proposed NRA. If established, the NRA partnership would identify specific operational and visitor facilities needs through a general management plan.

FUNDING AND COSTS

Lands within the NRA under alternative D would remain within their current jurisdictions, with each existing land management agency continuing to fund its own operations.

As with each action alternative, legislation establishing a special designation on the Angeles National Forest may enhance funding or fundraising opportunities for the U.S. Forest Service to achieve resource restoration and protection goals, as well as provide improved recreation, interpretation, and educational facilities and programs.

The NPS would also require additional federal funding for its administrative, educational, technical

assistance, and interpretive roles. In addition, the NRA partnership could establish a fundraising organization, be a coordinating body for existing grant programs, and work together to leverage funds from a variety of sources (e.g. state bonds, Land & Water Conservation Fund) to increase and prioritize funding for projects and staff in the NRA and San Gabriel Watershed.

The NRA partnership under alternative D would operate much the same as the partnership under alternative C, with the NPS and the partnership seeking funding from similar sources. Two key differences between the alternatives are the size of the NRA managed by the partnership and the scope of technical assistance by the NPS outside of the NRA. A larger NRA would require more from the NPS in terms of its administrative, educational, and interpretive assistance to the partnership. In addition, alternative D provides technical assistance from the NPS to communities, organizations, and landowners outside of the NRA for the purposes of enhancing recreational access and protecting resources. Based on the larger size of the area, and the additional types of services and assistance offered through the partnership, the cost of NPS operations for the NRA could be expected to be toward the middle end of the scale of comparable park budgets provided in Table 10. The estimated annual operating budget for the NPS could range from between \$2 to \$4 million. As with alternative C, the partnership would also benefit from private fundraising. Funds raised through the types of groups described under alternative C could be used to supplement the operating budgets of the partners.

PLANNING AND IMPLEMENTATION PROJECTS

Planning and implementation projects are not reflected in the operational budgets described in Table 10. With an NPS designation, the NRA would be eligible to receive funding for planning and projects through the NPS. For example, soon after establishment of the NRA, the NPS could provide initial planning funds for a general management plan which would define management priorities,

more specific actions, and funding needs for the NRA. The general management plan would be completed in collaboration with the partnership agencies. A general management for a partnership park the size and scale of which is proposed in alternative D would likely take 4 to 5 years to complete and could cost between \$500,000 and \$700,000. Additional NPS funding may also be available for specific projects such as trail development, interpretive signage, and materials. A general management plan would identify more specific implementation needs.

CASE STUDY: MINORITY YOUTH EDUCATION AND EMPLOYMENT PROGRAM: SANTA MONICA MOUNTAINS NRA

Background

Santa Monica Mountains NRA is adjacent to one of the largest urban areas in the United States. However, many youth, especially minorities, lack knowledge about national parks and employment opportunities with the National Park Service (NPS) or other conservation agencies. Employing minority youth within the environmental field adds to a broadening diversity of perspectives in NPS operation and management decisions.

Accomplishments

The National Park Service provides high school students with summer jobs working as a team outdoors. In return, the employment program provides the NPS with bright, capable students who already have an interest and educational background in diverse aspects of park management.

The program allows students to meaningfully contribute to the national recreation area's mission. A benefit of this is that it encourages students to pursue long-term careers in the National Park Service, or in the natural and environmental fields.

Sources:

http://www.nps.gov/partnerships/minrty_yth_santa_monica.htm, www.nps.gov/samo

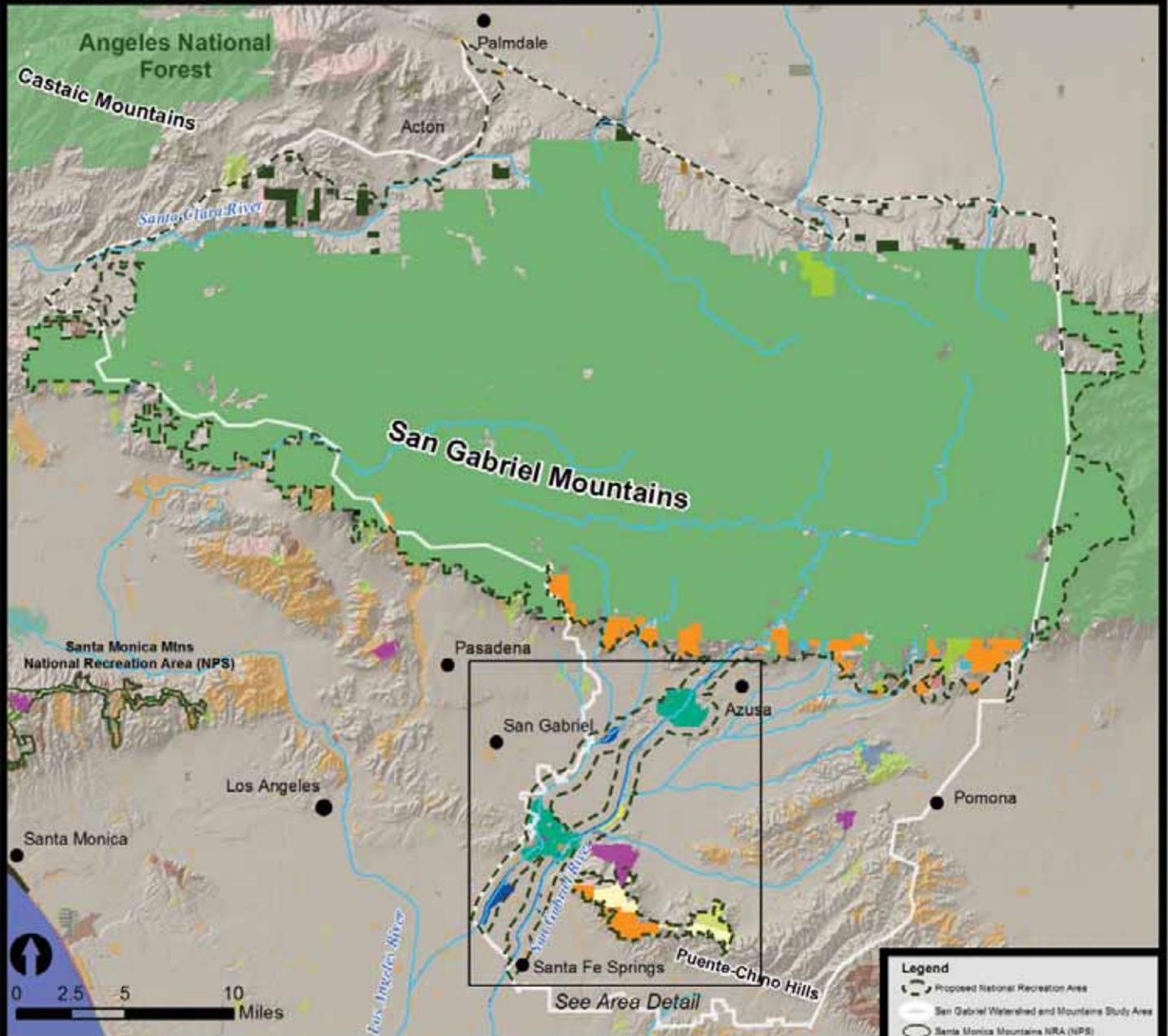
Table 10: National Recreation Area Annual Operating Budgets

NRA	NPS Acres	Total Acres	2009 NPS Base Budget	Staffing
Boston Harbor Islands NRA	241	1,482	\$1.2 Million	14 FTE
Mississippi NRRRA	62	53,775	\$2.1 Million	28 FTE
Chattahoochee NRA	4,891	9,886	\$3.5 Million	39 FTE
Santa Monica Mountains NRA	23,120	156,673	\$8.6 Million	99 FTE

FTE (Full-time equivalent employees). One FTE is one person working 40 hours per week for one year, or the equivalent.

Alternative D: San Gabriel Region National Recreation Area: A Partnership Linking Significant Resources and Recreation

San Gabriel Watershed and Mountains Special Resource Study



Alternative D Highlights

- A larger NRA focused on conservation of significant resources, recreation and education
- Enhanced access to existing public lands
- New recreation opportunities for urban communities
- Protection of significant resources
- Interpretive and educational programs and outreach to youth
- Technical assistance program to form a network of parks, habitats, and open spaces.
- Various public and private funding sought to achieve goals



National Park Service, Pacific West Regional Office
Updated August 2011
The NPS makes no warranty, express or implied, related to the accuracy or content of this map.

Sources: Existing Protected Lands, CPAD 1.5, ©June 2010
GreenInfo Network - www.calands.org, Proposed Alternatives and Study Area (NPS), Rivers (National Hydrography Dataset, USGS)

Table 11: Summary of Alternatives

Component	No Action	Alternative A
Concept	<p>Current programs and policies of existing federal, state, county and non-profit conservation organizations would remain in place and current conditions and trends would continue.</p> <p>No new unit of the national park system would be established.</p>	<p>Congress would designate the San Gabriel Mountains unit of the Angeles National Forest (ANF) a U.S. Forest Service National Recreation Area (NRA) that would continue to be managed solely by the U.S. Forest Service. The designation would bring additional recognition, tools, and resources to the ANF in order to steward watershed resources and ecosystems, and improve recreational opportunities.</p> <p>The NRA designation would reaffirm the primary importance of the ANF in preserving watershed resources and emphasize future management practices that are compatible with resource protection. Authorizing legislation would also recognize the importance of the NRA for its recreational value and establish mechanisms to increase funding for facilities, maintenance, visitor management, and programming.</p> <p>No unit of the national park system would be established.</p>
Proposed Area	N/A	The NRA would encompass the existing ANF boundary within the San Gabriel Mountains.
Management structure	<p>Existing federal, state, and local governments, nonprofit organizations and private property owners would continue to own and manage lands and resources within the study area.</p> <p>Existing coordination and collaboration between existing agencies and organizations for resource protection and recreational opportunities would continue.</p>	<p>The ANF would continue to manage the NRA according to existing policies.</p> <p>The legislation establishing the NRA would provide the ANF with new authorities that would allow the U.S. Forest Service to partner with organizations to provide additional resources for recreation, resource protection, maintenance, and safety.</p>
NPS role	<p>There would be no new NPS role.</p> <p>Existing units of the NPS would continue current management.</p> <p>The NPS would continue to provide technical and financial assistance through existing programs.</p>	<p>No unit of the national park system would be established.</p> <p>Existing units of the NPS would continue current management. The Santa Monica Mountains National Recreation Area would continue to partner with the U.S. Forest Service, as it currently does, on an informal basis.</p> <p>The NPS would continue to provide technical and financial assistance through existing programs.</p>

Alternative C	Alternative D
<p>Alternative C proposes a river-based national recreation area that would raise the visibility of the San Gabriel River Watershed, offer new educational and interpretive opportunities along the river and throughout the watershed, and improve river-based recreational opportunities.</p> <p>The NRA would be established by an act of Congress, which would provide the U.S. Forest Service, the NPS, and other land management agencies and organizations with guidance and direction to work together in new ways.</p> <p>This would be a new model for a national park unit. Very little land would be acquired for direct management by the NPS. Instead, partnership arrangements among federal and state agencies, local governments, non-profit organizations, and area landowners would achieve the conservation, recreational, and educational goals of the NRA.</p>	<p>The hallmark of alternative D is a national recreation area (NRA) that would recognize the significant resources associated with the San Gabriel Mountains and Puente Hills, explore opportunities to protect and enhance interconnected ecosystems, provide important open space connections for recreation, and offer new educational and interpretive opportunities.</p> <p>The management approach of alternative D would be the same as alternative C- a new model of national park management where the NPS, USFS, and numerous other agencies and organizations with land and interests in the area would work collaboratively. Very little land would be acquired for direct management by the NPS.</p> <p>Alternative D would also offer technical assistance programs for conservation planning in coordination with willing communities to extend open space connections and form a network of parks, habitats, and open spaces.</p>
<p>The NRA would encompass the upper San Gabriel River Watershed within the ANF, portions of the San Gabriel and Rio Hondo river corridors in the San Gabriel Valley, and associated trails and access points, and adjacent public lands.</p>	<p>The NRA would encompass the ANF boundary within the San Gabriel Mountains, portions of the San Gabriel and Rio Hondo River corridors, and portions of the western Puente Hills. This larger NRA would include both urban areas, rural undeveloped areas, and large areas of protected open space.</p>
<p>The NRA would be managed by a voluntary partnership that would include agencies and organizations with land and interests in the area.</p> <p>In existing public land areas, interagency agreements could augment agency staffing to manage highly used areas such as the San Gabriel Canyon, providing higher levels of visitor services, education, and safety.</p> <p>The NRA would partner with existing environmental education centers, school districts, visitor centers, and youth organizations to provide ranger programs and opportunities to engage children and residents of all ages in learning about environmental stewardship and the natural and cultural significance of the San Gabriel River Watershed.</p>	<p>The management structure would primarily be the same as alternative C, with broader functions. The NPS and the partnership would offer conservation planning assistance to interested communities to extend open space connections and form a network of parks, habitats, and open spaces.</p> <p>In the more urban areas associated with the river corridors, the NRA partnership would work with interested surrounding communities to increase the amount and variety of public open space, parks and recreational lands, particularly in under-served areas, and to enhance public transportation access between urban populations and the public lands of the NRA.</p> <p>In rural areas such as Soledad Basin, Antelope Valley or Mt. Baldy, where future growth pressures may threaten open space and rural quality of life, the NRA would work with communities to preserve additional open space and improve recreational trail connections and staging areas.</p> <p>In existing public land areas, interagency agreements could augment agency staffing to manage highly used areas such as the San Gabriel Canyon, providing higher levels of visitor services, education, and safety.</p>
<p>The primary role of the NPS would be: 1) coordinating the formal partnership that would manage activities within the NRA and 2) providing interpretation and education.</p> <p>The NPS would take the lead in coordinating a voluntary information network throughout the San Gabriel Watershed to provide interpretative and educational messages about significant resources.</p>	<p>Same as alternative C, plus:</p> <p>The NPS would offer conservation planning assistance to interested public agencies, private landowners, and organizations to create and connect parks, conserve habitat, and provide new recreational experiences.</p>

Component	No Action	Alternative A
Existing Agencies and Authorities	Existing federal, state, and local governments, nonprofit organizations and private property owners would continue to own and manage lands and resources within the study area.	The designation would only apply to lands currently owned and operated by the U.S. Forest Service. Private lands and inholdings would continue to be regulated by local land use authorities.
Education and Interpretation	Current interpretive programs at existing parks, open spaces, and cultural sites would continue. Coordinated interpretation about the San Gabriel Mountains and Watershed would be limited.	The ANF would be recognized for its nationally significant resources associated with the San Gabriel Mountains. New partnership efforts and additional funding for education and interpretation staff would allow for interpretive media and programs within the ANF. The NRA could explore new opportunities for education and research associated with the San Dimas Experimental Forest.
Recreational Opportunities and Access	Existing agencies and organizations would continue to provide recreational opportunities for the public. Recreational access would continue to be limited for some portions of the study area. Transportation options would continue to be limited.	Increased attention and a narrower management focus resulting from the designation may encourage additional or reprioritized federal funding for improved recreational experiences in the San Gabriel Mountains. New partnership opportunities may assist the ANF in fundraising for improved recreational experiences and planning for recreational connections (e.g. trails, bicycle paths).
Resource Protection	Resource protection would continue to be managed by existing federal, state and local agencies, nonprofit organizations, and private property owners. Coordination among agencies to protect wildlife corridors and habitat would occur on a case-by-case basis. Examples include the Integrated Water Resources Management Plan, the Emerald Necklace, and the San Gabriel River Master Plan.	The ANF would continue balancing use and resource protection in accordance with its multiple-use policy. The legislation establishing the NRA could direct that any proposed new uses would need to be compatible with the original legislative intent to protect watershed resources. The NRA would bring additional recognition, tools and resources to the ANF in order to steward significant resources associated with the San Gabriel Mountains. For example, to protect habitats and ecosystems, the U.S. Forest Service could enter into cooperative management agreements with other agencies to protect habitat that cross jurisdictional boundaries. Ecological restoration would be emphasized. New resources would be allocated to document, protect, and interpret cultural resources in the San Gabriel Mountains.

Alternative C	Alternative D
<p>The designation of the NRA would not apply additional regulatory or land use authorities over existing agencies or local governments. Each partner and jurisdiction would retain landownership, management, and decision-making authorities for lands that they own.</p> <p>NPS land management policies and regulations would only apply to lands that the NPS acquires.</p> <p>Private lands would continue to be regulated by local land use authorities.</p>	<p>Same as alternative C.</p>
<p>The NRA would partner with existing environmental education centers, school districts, visitor centers, and youth organizations to provide ranger programs and opportunities to engage children and residents of all ages in learning about environmental stewardship and the natural and cultural significance of the San Gabriel River Watershed.</p> <p>Through cooperative management agreements, the NPS could provide interpretive programs at existing recreation areas, schools, interpretive centers, and historical sites/areas within the NRA.</p> <p>The NRA partnership would coordinate a voluntary, shared information network in which sites within the San Gabriel Watershed would deliver coordinated interpretive messages about the watershed.</p>	<p>Same as Alternative C. However, with a larger NRA in alternative D, a wider array of interpretive topics and themes, and on-site interpretive and educational programming would occur throughout the San Gabriel Mountains, along the San Gabriel River, and in the Puente-Chino Hills.</p>
<p>Recreational uses and activities would be determined by the existing land management agency (e.g. the U.S. Forest Service would continue to determine what recreational activities are appropriate according to its own agency policies).</p> <p>The NRA partners would work together to improve and enhance the quality of existing recreational experiences through facility improvement, additional staff (rangers and interpreters), monitoring efforts, and cooperative planning.</p> <p>Within the NRA, the partnership would work to foster new recreational opportunities that are compatible with maintaining watershed values, water supply, flood protection, and habitat values.</p> <p>Better transportation/connections to destinations within the NRA, such as the ANF, would be explored.</p>	<p>Same as Alternative C, plus:</p> <p>The NRA partnership would offer technical assistance in planning for close-to-home recreational opportunities, better trail access, and improved public transportation options to recreational areas.</p>
<p>The NRA partnership would seek additional funding for resource protection and facilitate opportunities to work collaboratively to conserve and enhance resources along the San Gabriel River and its upper watershed through research, cooperative management, and ecological restoration.</p> <p>New resources would be allocated to document, protect, and interpret cultural resources within the NRA.</p>	<p>The NRA partnership would facilitate opportunities to work collaboratively to conserve and enhance significant resources associated with the San Gabriel Mountains, Watershed, and Puente Hills through research, cooperative management, and ecological restoration.</p> <p>The NRA partnership would seek to leverage additional funding for wildlife and habitat management and offer conservation technical assistance when requested.</p> <p>Coordinated cultural resource management would be the same as in alternative C, but would cover a broader area with the larger NRA.</p>

Component	No Action	Alternative A
Operations and Maintenance	Funding and staffing for operations and maintenance would remain at current levels.	<p>Authorizing legislation would direct additional funding for the operation and maintenance of the NRA.</p> <p>The NRA would coordinate new partnerships and develop more volunteer programs to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources.</p>
Costs and Funding	No new federal capital or operating costs other than through existing authorities.	<p>In order to accomplish the goals of the NRA, substantial additional funding would be required, either through appropriations, partnerships, or philanthropy.</p> <p>Legislation could allow the forest to receive direct donations and provide a mechanism for establishing a nonprofit fundraising or "friends" group. The elevated visibility and attention of a new designation, coupled with an increased sense of identity for those living in the region, would enhance the ability of the ANF to more successfully raise private funds and seek special appropriations for particular projects.</p>

Alternative C	Alternative D
<p>Lands within the NRA would remain under their current ownership and jurisdictions, with each land management agency continuing to fund its own operations.</p> <p>The need for land acquisition by the NPS would be small, targeted for protection of significant resources, and subject to available funding. Partner agencies would also contribute funds for land acquisition within the NRA.</p> <p>The NPS would share office space with partner agencies or lease office space in or near the NRA for operations and administration. The NPS could also seek use of existing buildings for visitor serving facilities.</p> <p>The NPS would require funding for staff including administration, interpreters, planners, law enforcement, outreach coordinator, education specialists, and resource management specialists.</p> <p>Through cooperative management agreements, the NRA would provide the opportunity for agencies to share staff, facilities, and funding to assist in the operations and maintenance of heavily used visitor areas.</p> <p>The NRA would coordinate new partnerships and develop more volunteer programs to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources.</p> <p>Job training programs could be made available for youth.</p>	<p>Lands within the NRA would remain under their current ownership and jurisdictions, with each land management agency continuing to fund its own operations.</p> <p>The need for NPS land acquisition would be small, targeted for protection of significant resources, and subject to funding availability. Partner agencies would also contribute funds for land acquisition within the NRA.</p> <p>The NPS would share office space with partner agencies or lease space in or near the NRA for operations and administration. The NPS could also seek use of existing buildings for visitor serving facilities.</p> <p>Required NPS staff for the NRA would be similar to alternative C. However, with a larger land area and a broader set of programs, alternative D would be expected to require slightly higher staffing levels.</p> <p>Through cooperative management agreements, the NRA would provide the opportunity for agencies to share staff, facilities, and funding to assist in the operations and maintenance of heavily used visitor areas.</p> <p>The NRA would coordinate new partnerships and develop more volunteer programs to assist in the maintenance of facilities, preservation/restoration efforts, and interpretation of significant resources.</p> <p>Job training programs could be made available for youth.</p>
<p>Legislation creating a special designation on the ANF may enhance funding or fundraising opportunities for the U.S. Forest Service.</p> <p>The NPS would require federal funding for its administrative, educational, technical assistance, and interpretive roles.</p> <p>The NRA partnership could be a coordinating body for existing grant programs, and work together to leverage funds from a variety of sources (e.g. state bonds, Land & Water Conservation Fund) to increase and prioritize funding for projects in the NRA and San Gabriel Watershed.</p> <p>Based on comparisons with existing partnership parks of similar size and function, alternative C could require an annual NPS operating budget of approximately \$1-3 million.</p>	<p>Same as alternative C. However, a larger NRA would require more from the NPS in terms of its administrative, educational, and interpretive assistance to the partnership. In addition, alternative D provides conservation planning assistance from the NPS to communities, organizations, and landowners outside of the NRA. For these two reasons, the annual NPS operating budget for the NRA is estimated to be approximately \$2-4 million.</p>



Environmental Consequences

7

Photos (clockwise): 1. Puente-Chino Hills. NPS Photo. 2. Mount Baldy. Photo © Tim McCaig. 3. Fish Canyon in Azusa. Photo © S. Greg Panosian.

Chapter 7: Environmental Consequences

Introduction

Before taking an action, the National Environmental Policy Act (NEPA) requires federal agencies identify a range of alternatives for that action and to analyze the potential environmental impacts of that action, including any potential adverse environmental effects that cannot be avoided if the proposed action is implemented. This chapter describes the potential environmental impacts of implementing each of the alternatives (i.e., the no action alternative and the three action alternatives) on the socioeconomic environment, land use, visitor experience and recreational resources, water resources, biological resources, and cultural and historic resources.

The first part of the chapter discusses the methodology used to identify impacts and includes definitions of terms. The impact topics are then analyzed with reference to each of the three alternatives. The discussion of each impact topic includes a description of the positive (beneficial) and negative (adverse) effects of the alternatives, a discussion of cumulative effects, if any, and a conclusion. The conclusion includes a discussion of whether, and to what extent, the alternatives would impair study area resources and values.

Methods and Assumptions

Consequences are determined by comparing likely future conditions under each alternative with the existing baseline conditions as described in the no action alternative. The analysis includes consideration of the context, intensity, and duration of direct and indirect effects of the alternatives. The NPS based this analysis and its conclusions on a review of existing literature, information provided by experts within the NPS, as well as outside organizations, analysis of case studies of existing programs in other locations, and the professional judgment of the study team members.

Ordinarily in a NEPA document, the environmental consequences for a given topic are presented in the context of its affected environment. The affected environment conveys the current condition of the resource and represents a baseline against which the effects of the proposed action are compared. Much of the affected environment for each impact topic is discussed in Chapter 2, *Resource Description*, and will merely be referenced here

to avoid duplication. The affected environment sections included in this chapter provide supplementary information relevant to the impact analysis.

In a typical environmental document, proposed actions are activities whose physical impacts can be estimated, modeled or projected. In this study, proposed actions are more in the nature of policy alterations and plans having no immediate physical impact on the land or its resources. Without specific information regarding the type and location of new facilities, or prescriptive measures to be applied, the NPS has no ability to project specific impacts of those activities either individually or cumulatively. Similarly, as alternatives call for the formation of partnerships and agreements whose terms are yet to be spelled out, it would be speculative to assess the environmental outcomes, except to describe the objectives and benefits the agencies wish to achieve in working with other entities. These are largely described in the alternatives themselves.

Given the broad nature of the study, the impact analysis must also be broad, by necessity, and avoid speculation as to site-specific types of impacts. The outcome of the study will be a recommendation to Congress. If Congress takes action, then new environmental analysis would be undertaken prior to specific implementation actions. This new analysis would propose specific actions, and alternatives to them, whose site or area specific impacts would be assessed prior to implementation of the plan.

Analysis Assumptions

Given the level of analysis as described here, it is meaningful to discuss impacts in relative terms. That is, the general impacts of each alternative are found in the differences between the alternatives and the existing condition (no action). The key elements of this analysis address the following often related factors:

1. new and coordinated management
2. new land designations
3. the amount of newly designated lands
4. additional funding for management
5. the effects of new educational opportunities
6. the effect of ongoing partnerships between federal agencies and local stakeholders
7. new land use designation to recognize significant resources
8. the amount and type of recreation opportunities that are accessible to the public

9. the effects of visitors on local infrastructure, social services, resources and the quality of visitor experience

Factors 1 through 6 are generally assumed to be positive influences and approaches to meeting the legislative challenge to improve recreation access, protect resources, and enhance the quality of life regionally and locally. These features are included in the action alternatives to change the existing condition for the better. Factors 7 and 8 have both beneficial and adverse effects. Beneficial when the outcomes meet identified needs of the study area and adverse when they result in resource degradation as a function of factor 9.

The action alternatives seek primarily to enhance the quality of life for local residents through increased access to outdoor recreation and protection of their significant natural and cultural resources. The alternatives attempt to improve the amount of, and access to, healthful recreation activities. As recreation use grows, however, there is a concomitant amount of stress placed upon natural resources. There is also a tension between the availability and accessibility of recreation opportunities and the quality of the experience provided in a public land setting. As use increases, particularly in previously unused or lightly used areas, the impacts of crowding, sound, visual intrusions, and the like tend to erode the quality of the experience for some users. Similarly, as recreation is emphasized, use expands and increases the potential for impacts on natural resources. What may be expected as a benefit to recreationists is balanced by the potential for adverse impacts on natural resources and their qualities. The resultant impacts may be mitigated by educating recreation users, partnering with user groups, providing appropriate facilities, continually monitoring and assessing impacts, distributing use, and employing regulatory and interpretive staff, among other strategies.

The key assumptions that grow from this logic, and are applied to the analysis of alternatives, are these:

- The beneficial impacts associated with factors 1, 2, 3, 7 and 8, above, may be indexed to the amount of newly designated and protected lands in each alternative. That is, the relative benefit increases proportionally to the amount of newly protected lands.
- Additional funding is applied to new and appropriate recreation and visitor facilities, ongoing facility maintenance, sufficient management and administrative staff, and monitoring of resource conditions over time.

Increased amounts of funding are associated with relatively increased beneficial impacts.

- Partnerships between federal agencies with jurisdiction and state and local stakeholders result in appropriate actions on the ground to the benefit of both visitors and resources. Greater encouragement of such partnerships yields relatively greater benefits in the areas of recreation opportunity, resource quality, and employment.
- Visitors and local communities will become more knowledgeable, appreciative, and understanding of resource values through enhanced education and interpretation afforded in each alternative. Greater efforts in this regard are functions of funding, partnerships, and management agency staffing.
- New designations could increase non-local visitor use. While benefitting the local economy through the influx of new dollars, this could adversely impact local infrastructure and support services.
- Adverse impacts on recreation visitor experience and resource quality could result as a function of increased use and inappropriate user behaviors. Increased use, when concentrated, may overburden local resources and damage those that are sensitive, such as critical wildlife habitats, wetlands or perennial water courses. Such impacts may be mitigated by other factors in the analysis including restoration, education, and more staffing for on-site visitor management.

With the preceding in mind, NPS notes that potential environmental effects for this study are meaningful if placed in the context of public concerns articulated thus far in the process. Analysis methods are mostly subjective. Impacts are deduced from management actions and proposed policy changes as described in any given alternative. NPS policy also requires potential impacts to be compared to criteria that are more applicable to site-specific types of impact, rather than broad, non-specific statements of consequences. Nonetheless, these criteria are set out below and used to the extent possible.

Regarding the implementation of any alternative being considered, compliance with federal and state natural and cultural resource laws and regulations, as well as local zoning and permitting regulations and processes would be required. While the intent of each alternative is to improve or enhance resource quality, in accordance with the purpose and need for action, it is intended that any need for

mitigation for social or economic impacts be applied at implementation.

Impact Criteria

The following definitions, standards, and guidelines will be used in describing consequences:

- **Context:** Impacts are considered at their local, regional, or national context as appropriate.
- **Intensity:** For the purposes of this analysis, intensity or severity of the impact is defined as:
 - **Negligible** - Impact to the resource or socioeconomic environment is at the lower level of detection; no discernible effect
 - **Minor** - Impact is slight, but detectable; impacts present, but localized, and not expected to have an overall effect.
 - **Moderate** - Impact is readily apparent; clearly detectable and could have appreciable effect on the resource or socioeconomic environment
 - **Major** - Impact is severely adverse or exceptionally beneficial; would have a substantial, highly noticeable influence on the resource or socioeconomic environment
- **Duration:**
 - **Temporary** – Impact is temporary or transitional, associated with a specific action or with a predictable endpoint.
 - **Near term** – Impact will begin within the next 1-10 years, and will continue in the long-term or have permanent effects
 - **Long-term** – Impact will not likely begin until after the next 1-10 years, but will likely have permanent effects on the resource or socioeconomic environment.
- **Incidence:** (Note: in a NEPA analysis it is not necessary to distinguish between direct and indirect impacts)
 - **Direct effects** - Impact is caused by the action and occurs at same time and in the same place as the action.
 - **Indirect effects**- Impact is caused by the action, occurs later in time and at some distance from the action, but must be reasonably foreseeable. Indirect effects may include changes in ecological processes that result in a change to the environment.
- **Timing:** It is impossible to predict when any specific actions within either of the alternatives

would be implemented. Hence the specific timing of impacts is not addressed in this environmental assessment. The timing of impacts would need to be addressed during future planning processes. For the purposes of this EA, the time frame in which impacts are analyzed is roughly the next three decades, except where different time frames are specified.

Cumulative Impacts

The Council of Environmental Quality (CEQ) regulations require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

Cumulative impacts are determined by combining the impacts of the alternatives actions with other past, present, and reasonably foreseeable future actions. For each resource topic, an area of concern is identified. For example, cumulative impacts on wildlife may occur within an area identified as a crucial wildlife corridor, and all activities that might affect the viability of the corridor would be examined collectively along with the additional activities that are being proposed. Or, cumulative impacts on water quality would be examined by identifying a watershed and reviewing all the actions that might be expected to impact water quality along with aspects of the proposed action that could have the same effect. Generally, in accordance with CEQ guidelines for cumulative effects analysis, only natural resources (physical and biological) or ecological processes are subject to this kind of analysis.

In this case, no specific actions are being proposed in a way that their site-specific effects can be determined. This being the case, it is difficult to assess the overall impact by adding them to a body of other actions. It is more appropriate (and possible) to gauge cumulative impacts in future environmental analysis, looking at specific plans and actions to be taken.

Conceptually, it can be said that the purpose of this study is to evaluate the means whereby resource conditions can be enhanced to the benefit of the land and the communities they serve. If the overall current condition is considered as a baseline for cumulative effects, each of the action alternatives

seeks to maintain or improve the condition. Hence, the overall level of cumulative impact would either be arrested or it would decline as compared to the no action alternative.

Potential Environmental Impact Topics

Potential impact topics are reviewed here as to their applicability in this analysis. The rationale for this review stems from the essential purpose of an environmental assessment, to determine whether there would be significant impacts requiring the preparation of an environmental impact statement to proceed with the action. The dismissal of topics, with rationale, demonstrates there is no concern at least in those areas.

Mandatory Topic	Discussion and Rationale	Disposition
Possible conflicts between the proposal and land use plans, policies or controls (local, state or Indian tribe) for the area	Any potential conflict of this nature will be broadly noted and explored under the socioeconomic impact topic.	See Effects on Land Use
Energy requirements and conservation potential	The proposed action does not affect the production, conservation or demand for energy-related resources.	This topic is dismissed from analysis
Natural or depletable resource requirements and conservation potential	There are a variety of natural resources within the project area that require conservation pursuant to USFS or NPS law and policy. Of these, several were of specific concern to the public and other agencies during scoping. Water, wildlife and native plants are generally discussed.	See Effects on Biological and Water Resources
Intrinsic natural resource values that would be conserved for future generations in a national park	A multiplicity of outstanding natural resources exist within the study area, beyond water, wildlife and native plants. Among these are air quality, geology, lightscares, soundscapes, non-sensitive wildlife species. Geology in the area is unique, contributing to the eligibility of the study area for special recognition. However, there is no potential for geology to be affected by this action. Regarding other potential resource topics, analysis of impacts would be speculative and premature until such time as specific proposed actions are made.	Resources other than the above are dismissed from analysis in this document. General impacts might be inferred from discussion of water, wildlife and plants.
Urban quality, historic and cultural resources, and design of the built environment	Quality of open spaces is a key adjunct to urban quality and quality of life issues. Urban qualities located within the study area are broadly evaluated in this chapter.	See Effects on Socioeconomics and Land Use
Socially or economically disadvantaged populations: environmental justice	The public and several stakeholder groups have raised concerns about inequities in access to parks and open space for socially and economically disadvantaged populations. This is primarily addressed in the socioeconomic impact topic.	See Effects on Socioeconomics and Land Use and Effects Recreation Use and Visitor Experience_

Table 12: Potential Environmental Impact Topics

Mandatory Topic	Discussion and Rationale	Disposition
Wetlands and Floodplains	The broader discussion of water resources is presented in this document. Wetland and floodplain protection and enhancement is an important component in preserving water quality and conserving water supply. Wetlands and floodplains also provide habitat to an abundance of wildlife including rare, threatened, and endangered species.	See Effects on Water Resources
Prime and unique agricultural lands	There are 16 small areas, constituting 548 acres, within the study area categorized as prime and unique farmlands. These areas are primarily in the Antelope Valley.	See Effects on Socioeconomics and Land Use
Endangered or threatened plants and animals and their habitats	The potential effects on these species are broadly discussed in this chapter.	See Effects on Biological Resources
Important scientific, archeological, and other cultural resources, including historic properties listed or eligible for the National Register of Historic Places	Potential impacts are broadly discussed in this chapter.	See Effects on Cultural Resources
Ecologically critical, specially designated areas, or unique resources	Potential impacts are discussed in this chapter. Any existing specially designated areas will remain unaffected by this proposed action.	See Effects on Biological Resources
Public health and safety	This topic is an underlying, fundamental need in action proposed for this study. However, it does not lend itself to separate analysis, at least at this level of study. Indirect effects on public health are described where appropriate under the impact topics, recreation use and visitor experience and water resources.	See Effects Recreation Use and Visitor Experience and Water Resources
Sacred sites	As noted, the level of analysis in this document is broad. Discussion of this topic is incorporated generally into cultural and historic resources, at the policy level.	See Effects on Cultural Resources
Indian Trust resources	There are no Indian Trust resources within or near the project area.	This topic is dismissed from further analysis

Effects on Biological Resources

Affected Environment

Consequences of the alternatives could potentially affect plant and animal species habitat, resulting in changes in their populations or overall well-being. Various features of the alternatives could also affect specific plant communities that are of rare and limited size and distribution. A complete listing and description of species and rare habitat is provided in Chapter 2, *Resource Description and Appendix B*. The section below describes current trends and threats related to biological resources.

SPECIES OF SPECIAL CONCERN

The Southern California region is recognized as one of the world's hotspots of biological diversity and is home to a total of 476 vertebrate animal species, approximately 38 percent of all the vertebrate species found in California. This region has also experienced tremendous population growth and related urban development that has significantly transformed the landscape since the 1940s. This intersection of biological resources and urbanization has made the South Coast the most threatened biologically diverse area in the continental U.S. (CDFG 2007).

Within the study area, there are threatened and endangered plant and animal species listed by state and federal agencies, 2 species listed as candidate for federally threatened or endangered listing status, and another 189 species considered rare or of special concern. A description of rare and listed species is included in Chapter 2, *Resource Description* and listed in Appendix B. Table 13 includes a summary of threats and trends affecting federally- or state-listed species within the study area.

RARE OR UNUSUAL HABITAT

Many of the study area native habitat types are endangered or severely reduced from their former range. This includes riparian areas, wetlands, floodplains, coastal sage scrub, and California Walnut Woodlands. Bigcone Douglas-fir, relict juniper communities, and subalpine habitat are rare habitats of limited extent. Many of the rare, threatened, and endangered species within the study area depend on these habitats for their survival. Impacts are primarily from the threats listed above.

TRENDS

Despite the region's rapid growth and subsequent loss of habitat, Southern California retains some large and valuable natural areas, including the national forests, which form an interconnected system of wildlands and important wildlife corridors through metropolitan areas (CDFG 2007).

With the expansion of the urban wildland interface, remaining natural lands become more vulnerable to the incursion of invasive plants and animals, air and water pollution, and altered fire regimes. Developed areas, roads, and utility corridors fragment landscapes and sever connections between habitat areas. The effects of climate change will also cause additional stressors on rare species and habitat. The section below further describes the most common threats affecting species and habitat within the study area.

Urban Development. Urban development is cited as one of the primary threats to almost every threatened and endangered species listed in Table 13. Southern California's wetlands and floodplains have been particularly affected by urbanization. California has lost 91% of its historical wetlands over the past century. Wetlands have been filled, dammed, diverted, channelized, and polluted, primarily as result of urban development.

Within the study area, urbanization has altered or removed much of the palustrine (94%) and riverine (75%) wetlands that historically existed. However, remnants and opportunities for restoration exist in places such as Whittier Narrows and the San Gabriel Mountain foothills. In some instances there are also historic signatures (existing moist/wet areas that could be restored to functioning wetlands) throughout the floodplain (Stein et.al 2008).

Urbanization also affects other rare habitat such as coastal sage scrub and walnut woodlands. Much of this habitat is located at lower elevations, at sites that are easily developed. The Puente-Chino Hills in particular are threatened by future development that could further fragment habitat in this wildlife corridor, affecting species like the federally threatened Coastal California gnatcatcher.

Invasive Species. Invasive species problems in the study area and throughout Southern California are tied to regional land use and management issues. A number of highly aggressive nonnative plant species invade grasslands and scrub communities, including yellow star thistle, artichoke thistle, medusahead, Pampas grass, fennel, pepper weed, black mustard, and castor bean. These species lower habitat quality for sensitive wildlife species such as the Quino

checkerspot butterfly and the Coastal California gnatcatcher. Some of these species dry out earlier in the summer than native species and contribute to increased wildfire frequencies.

Access roads and rights-of-way for infrastructure and power line maintenance, as well as recreational use of natural areas, can facilitate the spread of nonnative species. For example, in the Puente-Chino Hills, nest parasitism by brown-headed cowbirds threatens sensitive bird species such as the least Bell's vireo, southwestern willow flycatcher, and California gnatcatcher. Cowbirds thrive in many human-altered habitats, including suburban areas and agricultural and grazing lands, where they are attracted to livestock droppings and feed. With the expansion of these land uses over the last century, cowbirds have thrived, greatly expanding both their range and population across California.

In aquatic systems, the most problematic nonnative plant species is arundo, or giant reed. Arundo is widespread along major coastal river basins. Tamarisk is less widespread but also invades regional riparian habitats. Tamarisk is distributed in coastal and desert drainages (Stephenson and Calcarone 1999). Both species choke waterways, increase flash flood risks, crowd out native plants, and provide inferior habitat for riparian species. Tamarisk also consumes prodigious amounts of water, reducing available surface water, and arundo provides limited shade, resulting in higher water temperatures and lower dissolved oxygen levels.

Among nonnative wildlife species, bullfrogs, African clawed frogs, nonnative crayfish, mosquito fish (which are sometimes introduced for mosquito control), and introduced sport and bait fish (including sunfish, bass, and bluegill) all pose predatory or competitive threats to native fish and amphibians. Many of these species are well adapted to the deep water conditions in ponded areas above dams, and dam releases can introduce them to downstream habitats. Most voracious and widespread are bullfrogs, which are documented predators of California red-legged frogs, arroyo toads, Western pond turtles, and two-striped garter snakes (Stephenson and Calcarone 1999). A broad diet and an extended breeding season give bullfrogs a competitive advantage over native amphibians. Bullfrogs are also favored by human-modified habitats. They can tolerate elevated water temperatures and, unlike native amphibians, make use of standing pools resulting from urban runoff to complete their two year life cycle (CDFG 2007).

Altered Fire Regimes. Wildfire is a natural and important ecological process in the Southern

California region, particularly in the native chaparral communities that dominate the study area. Widespread forest management practices, as well as increases in human-caused wildfires, have altered fire regimes, in some cases causing dramatic changes in regional habitats.

The expansion of residential development into rural and natural areas has increased the incidences of human caused fire, altering natural fire regimes. Natural fire regimes, or fire intervals, have been changed dramatically by human land management efforts and urbanization. More frequent fire regimes can result in the conversion of chaparral and other native habitat to nonnative grasslands. Efforts to establish fire regimes that approximate historical fire patterns and frequencies, while also minimizing loss of property and life, are important to maintain and restore wildlife habitat (Halsey 2008).

The causes and ecological consequences of wildfires differ among the region's ecological communities. In coastal sage scrub, chaparral, and grassland systems, lightning-induced fires are fairly infrequent. The natural fire regime for chaparral-type habitat, which would have primarily occurred from lightning strikes, would have been 30-100 years. With adequate rainfall, chaparral habitat can recover from fire within 15-20 years. Human-caused fires, however, have resulted in unnaturally high fire frequencies, especially along roads and near the urban-wildland interface, with some locations experiencing three fires within a period of 15 to 20 years (CDFG 2007).

Increased fire frequencies favor the Mediterranean grasses that were introduced to the region with the arrival of European settlers and livestock. Once established, the nonnative grasses grow in a dense thatch pattern that chokes out native vegetation and lowers habitat quality for wildlife. The dense grass also provides ample fuel for the cycle of frequent burning. Spread of nonnative species during fire recovery is one of the major threats to full recovery of habitat on the forest. Fire management issues in forest communities are different than those in scrub, chaparral, and grasslands. Lightning-induced wildfires are a more regular part of the ecology of the area's coniferous forests and oak woodlands and do not result in the same threat of conversion to nonnative grasslands (CDFG 2007).

Climate is also a primary determinant of fire patterns. Climate change will add a significant variable to efforts to understand historical fire regimes and to find management measures that can maintain the region's habitats. Additionally,

the expansion of residential communities into fire-dependent forest ecosystems creates a conflict between maintaining ecological integrity and protecting property (Halsey 2008 and CDFG 2007).

Recreational Pressures. With nearly 20 million people living within driving distance of Southern California's national forests and other public lands, recreational access can impact biological resources. Recreational off-road vehicle use can have adverse effects on natural communities and sensitive species. On public lands, off-road vehicle trails often open relatively undisturbed areas to increased use. The vehicles can disturb or run over wildlife, crush and uproot plants, spread seeds of invasive plants, and disturb soils, contributing to erosion and the sedimentation of aquatic habitats. Off-road vehicle use also increases the risk of human-caused fires (CDFG 2007).

Concentrated recreational use of streams and riparian areas also impacts biological resources. Not only off-road vehicles, but hikers, picnickers, and equestrians, in large numbers, can damage these systems, reducing vegetative cover and disturbing sensitive species. Some recreational users build rock dams on streams to create ponds for swimming. The San Gabriel River, for example, has been altered by extensive ponded areas, as well as other effects of heavy recreational use, such as the deposition of trash and human waste. Particularly vulnerable riparian species include the two-striped garter snake, mountain yellow-legged frog, and arroyo toad (CDFG 2007).

Climate Change. Based on some climate projection models, it is predicted that annual temperature increases will nearly double before 2100. By the end of the century, heat waves and extreme heat in Los Angeles may also increase in frequency. Throughout California, ecological diversity on the whole would change little. However, certain rare habitats, particularly in warm and dry areas, would be more affected. Coastal sage scrub could be reduced up to 20% and alpine/subalpine forests could be reduced by over 50% (Hayhoe, et.al. 2004).

Impact Analysis – Wildlife Resources

PUBLIC CONCERNS

During review of the preliminary alternatives, the public expressed concern about the potential for increased visitation and subsequent impacts on wildlife. Specifically, some felt that increased visitation would disrupt wildlife and affect the abundance of game species. This general concern would apply not only to wildlife in general, but from the U.S. Forest Service and NPS standpoints, it could apply to threatened or endangered species, sensitive species listed by both agencies, and other species that do not fall into the category of hunted populations.

It is the intent of all alternatives being considered to improve the relationship between recreation users and the habitats that are and can be affected. With more staff and funding available for visitor management and education, impacts to wildlife from visitation would be expected to decrease. It is expected that better visitor management through improved interpretative facilities, education, and administrative staffing would ameliorate impacts from the entire visitor population.

Management of biological resources, wildlife habitat and populations, is a joint concern. Both federal and state wildlife officials have this interest in mind, and it is part of each mission. In brief, NPS and the U.S. Forest Service manage habitat while state officials manage populations. This has always been accomplished in partnership and through joint agency planning. Nothing in any of the alternatives would contravene existing partnerships or plans, and if anything, the quality of partnerships, plan implementation, cooperation, and habitat management should be enhanced. Agency and academic research, and the means whereby it is accomplished, would be permitted as in the past. In all of the alternatives there would be more interagency collaboration and coordination to leverage funding for restoration.

Some commenters suggested that greater protection is needed for the region's threatened ecological communities, native habitats, wildlife corridors and habitat linkages. They suggest that the potential beneficial effects of proposed designations be analyzed.

Each of the action alternatives emphasizes increased natural resource protection, particularly in regards to preserving habitat and wildlife corridors. The amount of available funding would be dependent on congressional appropriations. In alternatives C and D, funding would also be

Table 13: Threats to Federal and State Listed Threatened and Endangered Plant and Animal Species

Species	Status	Threats
Plants		
<i>Astragalus brauntonii</i> Braunton's milk-vetch (endemic)	FE	Altered fire regimes, urban development, fragmentation of habitat, reduced capability for sustained ecologic processes, fragmented ownership populations, and extinction from natural occurring events due to small population sizes and low individual numbers.
<i>Orcuttia californica</i> California Orcutt grass	FE, CE	Urban development, grazing, disking, agriculture, off road, border patrol use, and roads.
<i>Berberis nevinii</i> Nevin's barberry (endemic)	FE, CE	Construction, urban development, off-road vehicles, horseback riding, invasive nonnative species, vandalism, and altered fire regimes.
<i>Dodecahema leptoceras</i> slender-horned spineflower (endemic)	FE, CE	Loss of habitat from urbanization and agriculture, nonnative annuals, sand and gravel mining, grazing, flood control, hydrological alteration, proposed reservoir construction, off road vehicles, and herbivory.
<i>Brodiaea filifolia</i> thread-leaved brodiaea (endemic)	FT, CE	Loss and degradation of habitat, invasive species which alter the vegetation composition and structure of its habitat, recreational use of the land, mowing, disking and sewage dumping.
Animals		
<i>Catostomus santaanae</i> Santa Ana sucker	FT	Dams, water diversion, pollution (including gold mining wastes), channelization, gravel extraction, urbanization of watershed, heavy recreational use of habitat, introduced species, accidental high flows from Cogswell Reservoir; increased gold mining (suction dredging), drought.
<i>Gasterosteus aculeatus williamsoni</i> Unarmored threespine stickleback	FE CE	Stream channelization, urbanization (cause of extirpation in Los Angeles Basin), agricultural development, groundwater pumping, introduction of predators and competitors, off-road vehicle use, and chemical spills.
<i>Oncorhynchus mykiss</i> Southern steelhead	FE	Water development, including impassable dams and dewatering, and urbanization, genetic introgression from past steelhead plants and from planting of rainbow trout, increased fire intensity and duration.
<i>Bufo californicus</i> Arroyo toad	FE	Habitat degradation from urbanization, dam construction and ill-timed water releases, agriculture, road construction, off-road vehicle use, overgrazing, and mining activities, drought and wildfires, recreational use of habitat, predation by introduced fishes and bullfrogs, and small population sizes.
<i>Rana aurora draytonii</i> California red-legged frog	FT	Wetland destruction and degradation/fragmentation, urbanization, residential development, reservoir construction, stream channelization, livestock grazing of riparian vegetation, off-road vehicle activity, drought, overharvesting, and nonnative fishes, conversion of habitat to more permanent ponds, global warming, UV-B radiation, airborne contaminants (pesticide drift), and disease.

Species	Status	Threats
<i>Rana muscosa</i> mountain yellow-legged frog	FT (proposed endangered)	Introduced trout, recreational suction dredging for gold, human activities at campgrounds and day-use areas, and usual problems associated with small population size and population isolation (e.g., fire, flood, or drought could extirpate small populations, with little chance of reestablishment due to poor connectivity of populations).
<i>Gopherus agassizii</i> Desert tortoise	FT, CT	Declines have been due to habitat loss and degradation, through livestock grazing, invasion of nonnative annuals, energy and mineral development, off-road vehicle use, road traffic collisions with tortoises, trail construction, disease, vandalism, and collecting.
<i>Buteo swainsoni</i> Swainson's hawk	CT	Threats include expansion of cropland unsuitable for foraging (see GHABCOM) and residential and commercial development in former agricultural and grassland areas.
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	FC, CE	The primary threat is the loss and degradation of habitat, particularly riparian forests
<i>Empidonax traillii extimus</i> Southwestern willow flycatcher	FE	Decline is due primarily to destruction and degradation of cottonwood-willow and structurally similar riparian habitats. The causes of habitat loss and change are water impoundment, water diversion and groundwater pumping, channelization and bank stabilization, riparian vegetation control, livestock grazing, off-road vehicle and other recreational uses, increased fires, urban and agricultural development, and hydrological changes resulting from these and other land uses.
<i>Falco peregrinus</i> American peregrine falcon	CE	Primarily environmental toxins, habitat loss, human disturbance, and illegal take.
<i>Gymnogyps californianus</i> California condor	FE, CE	A large proportion of reintroduced condors and condor nestling have died from anthropogenic causes (e.g., collisions with power lines, ingestion of toxins). As of 2008, mortality from lead poisoning continued to be a significant threat in California and Arizona.
<i>Haliaeetus leucoccephalus</i> Bald eagle	FT, CE	Major threats include habitat loss, disturbance by humans, biocide contamination, decreasing food supply, and illegal shooting.
<i>Polioptila californica californica</i> Coastal California gnatcatcher	FT, None	Urban development has destroyed much coastal sage scrub habitat. Intense housing development and construction or expansion of transportation corridors in Orange, Riverside, and San Diego counties, California, threaten remaining large tracts of habitat. Additional threats include parasitism by the brown-headed cowbirds and wildfires which periodically eliminate (temporarily) significant areas of gnatcatcher habitat.
<i>Vireo bellii pusillus</i> Least Bell's vireo	FE, CE	Loss of breeding habitat (especially thick low riparian growth) attributable to agricultural, urban, and commercial developments, flood control and river channelization projects, livestock grazing, and other activities; reduced reproductive success due to nest parasitism by cowbirds has been a major factor in the decline.
<i>Spermophilus mohavensis</i> Mohave ground squirrel	CT	Primarily conversion of habitat to urban, suburban, agricultural, military, and other human uses, including livestock grazing, off-highway vehicle use, energy production, and transportation infrastructure.
Source: NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer (Accessed: November 24, 2010).		

dependent on partnership efforts to leverage support.

NO ACTION ALTERNATIVE

The Southern California region is recognized as one of the world's hotspots of biological diversity. This region has also experienced tremendous population growth and related urban development that has significantly transformed the landscape since the 1940s. This intersection of biological resources and urbanization has made the South Coast the most-threatened biologically diverse area in the continental U.S. (CDFG 2007). With the expansion of the urban wildland interface, remaining natural lands has become more vulnerable to the incursion of invasive plants and animals, air and water pollution, and altered fire regimes. Developed areas, roads, and utility corridors have fragmented landscapes and severed connections between habitat areas. The effects of climate change will also cause additional stressors on rare species and habitat.

Many of the study area native habitat types are endangered or severely reduced from their former range. This includes riparian areas, wetlands, floodplains, coastal sage scrub, and California walnut woodlands. Bigcone Douglas-fir, relict juniper communities, and subalpine habitat are rare habitats of limited extent. Many of the rare, threatened, and endangered species within the study area depend on these habitats for their survival.

Threats to wildlife resources such as habitat loss and fragmentation as a result of development, air pollution, water pollution, and altered fire regimes would continue having minor to moderate adverse effects on the viability of many species and communities, including those that are threatened or endangered. Current efforts by local, state, and federal agencies to manage wildlife, restore habitat, and protect wildlife corridors would continue to have beneficial effects, although regional coordination would be limited.

ALTERNATIVE A

In alternative A, the new proposed designation would bring more resources to the U.S. Forest Service for resource protection measures such as habitat restoration, conservation, research, and planning for wildlife corridors. Designation would prevent proposed new or future uses on the national forest that could impact significant resources and watershed values. This would have an overall beneficial effect in protecting natural resources within the proposed NRA. This alternative

improves the ability of national forest staff to work across boundaries to establish and protect wildlife corridors.

ALTERNATIVE C

This alternative alleviates current conditions, as expressed in the no action alternative, to a greater degree. In alternative C, the new proposed designation would bring more resources to both the U.S. Forest Service and the San Gabriel River corridor for resource protection. Additionally, partnering entities would work to leverage greater funding for conservation (open space protection) along the San Gabriel River. Designation would prevent proposed new or future uses on portions of the ANF included in the NRA that could impact significant resources and watershed values. However, this would be less beneficial in terms of resource protection than in alternatives A or D because the NRA would be smaller. The potential for increased water and land-based recreation opportunities, and increased use, could result in a minor adverse effect on wildlife and wildlife habitat. This effect would likely be mitigated as previously described through more public education, monitoring, enhanced visitor management, and with careful siting and design of future facilities.

ALTERNATIVE D

This alternative alleviates current conditions, as expressed in the no action alternative, to a greater degree than either of the other action alternatives. Alternative D would contribute greater beneficial effects as the NRA would be larger, including more significant resources with more opportunities to work regionally to protect and connect wildlife corridors. This alternative provides the greatest potential for improving wildlife corridors.

Partnerships would work together to protect wildlife corridors that connect the San Gabriel Mountains and the Puente Hills. The NPS would provide regional technical assistance in terms of planning and leveraged funding to protect wildlife corridors. The potential for increased water and land-based recreation opportunities, where use to date has been light or nonexistent, could result in a minor adverse effect on wildlife and wildlife habitat. This effect would likely be mitigated as previously described through more public education, monitoring, enhanced visitor management, and with careful siting and design of future facilities.

CUMULATIVE IMPACTS

Threats to wildlife such as spread of nonnative species, loss of habitat due to development, altered fire regimes, air and water pollution, and climate change will continue to adversely impact wildlife and wildlife habitat as described in the affected environment. The study area alternatives seek to ameliorate these conditions to a greater or lesser degree. Therefore, the cumulative effect of growth and land use trends plus the beneficial effects of the action alternatives would likely result in a net beneficial condition in regard to wildlife resources within the study area as a whole. The identification and protection of critical wildlife habitats and corridors would serve as a highly positive function in the analysis. However, a new emphasis on river-based recreation and trail use over a broad area, where use is expected to increase, has the potential to add to existing impacts within the study area.

Conclusions

The emphasis on new recreational opportunities in each of the action alternatives holds the potential for additional impacts on wildlife and ecological communities. The area that is generally protected differs among the alternatives, but actual abatement of impacts from recreation would be heavily dependent upon monitoring, education, and applied management. With appropriate applied management, a new stress on education, and enhanced monitoring, adverse impacts on wildlife and wildlife habitat would be minor. An important consideration is that user/wildlife impacts would be mitigated by increased emphasis on recreation planning and partnerships with wildlife agencies to resolve such conflicts. Each of the three action alternatives emphasize restoration and increased partnerships to protect and enhance wildlife corridors and native habitat. Alternative D has the greatest potential for improving wildlife corridors and habitat given that the NRA partnership would be authorized to engage in regional conservation planning efforts.

Impact Analysis - Native Plants

PUBLIC CONCERNS

Public comments indicate a need for improved awareness, understanding and protection of native plants throughout the study area. This study recognizes that there are nationally significant native plant habitats in the San Gabriel Mountains and Puente Hills. If no action is taken as a result of this study, specific restoration and improvement projects with a native plant focus would continue to improve awareness. However, these efforts would be limited to individual projects, and there would be no comprehensive, coordinated effort to protect and improve native plants awareness. A corollary concern is that of nonnative species and the need to control or eradicate them from the study area. With an emphasis on protection of native habitat and interpretation/education, each of the action alternatives would likely have a positive influence on the control of nonnative species.

NO ACTION ALTERNATIVE

The affected environment section on page 188 discusses current conditions relating to problems associated with invasive species. Invasive species problems in the study area and throughout Southern California are tied to regional land use and management issues. A number of highly aggressive nonnative plant species invade grasslands and scrub communities, including yellow star thistle, artichoke thistle, medusahead, Pampas grass, fennel, pepper weed, black mustard, and castor bean. These species lower habitat quality for sensitive wildlife species. Roads and infrastructure, along with recreational use, can facilitate the spread of nonnative species. Decreased wildlife habitat connectivity is a major threat to the spread of nonnative species. For example, the spread of nonnative species following the Station Fire is one of the greatest threats to the recovery of native ecosystems within the burn area.

In aquatic systems, several nonnative plant species (e.g. tamarisk and arundo) are widespread along major coastal river basins. These species choke waterways, increase flash flood risks, crowd out native plants, and provide inferior habitat for riparian species. Tamarisk also consumes prodigious amounts of water, reducing available surface water, and arundo provides limited shade, resulting in higher water temperatures and lower dissolved oxygen levels.

Existing threats to native plant habitat would continue to have minor to moderate adverse impacts on native plant communities.

ALTERNATIVE A

Alternative A would seek greater recognition, interpretation, and funding to protect native habitat in the San Gabriel Mountains unit of the Angeles National Forest. Within the San Gabriel Mountains there would be beneficial effects on native plant protection and increased public awareness through enhanced interpretation and educational efforts due to the new designation. Along with a new emphasis and recognition of significant habitat quality in this alternative, there would be opportunities for more staff and funding dedicated to the control of nonnative species. The U.S. Forest Service would have additional authorities to work with other land management agencies to protect important wildlife connections to the forest. Studies have shown that larger native habitat corridors have more species diversity and are more resilient to threats. Connected habitats are also expected to be more resilient to the adverse effects of climate change. Working at the larger landscape scale will provide long-term beneficial effects on native plant communities.

ALTERNATIVE C

Alternative C would provide beneficial effects on native plant protection and education along the San Gabriel River and in the highly visited upper watershed. This would occur through coordinated interpretive efforts, new resources for conservation, and new agency partnerships focused on conservation of native plant communities. Information centers located throughout the study area could also provide an opportunity for greater awareness with regard to native plant protection throughout the San Gabriel River watershed. As in alternative A, a component of native plant protection would be a focus on the control of nonnative species. Coordination of conservation efforts and increased public awareness of habitat issues would lead to long-term beneficial effects on native plant communities.

ALTERNATIVE D

Alternative D would have the greatest benefit for native plant habitat as it recognizes and promotes protection of habitat in both the San Gabriel Mountains and the Puente Hills and allows the NPS to provide technical assistance on a voluntary basis to protection of habitat in surrounding communities. It is similar to alternative C, but with a larger NRA and greater technical assistance to surrounding communities, there would be an enhanced regional emphasis on protection and awareness of native plants and the control or eradication of nonnative species. The emphasis on

restoration and protection of habitat and wildlife corridors in alternative D would provide the greatest beneficial effect on native plant communities.

CUMULATIVE IMPACTS

The purpose of this study is to evaluate the means whereby resource conditions can be enhanced to the benefit of the land and the communities it serves. Continuing development, a wide variety of human uses and decreased wildlife habitat connectivity have contributed over time to the current level of invasive species impacts on native plant communities. If the current condition is considered as a baseline for cumulative effects, however, each of the action alternatives seeks to maintain or improve the condition. Hence, the overall level of cumulative impact would either be arrested or would decline as compared to the no action alternative.

Conclusions

Existing threats to native plant communities would continue to have cumulative adverse impacts. However, each of the action alternatives would provide improvements towards the protection of native plant communities, through increased restoration, interpretation and education, and increased inter-agency coordination for habitat protection efforts. The new emphasis on river-based recreation, and potentially on other recreation uses throughout the expanded NRA, may lead to additional infestations of invasive species in areas that are impacted by new visitation. This would likely be a negligible to minor adverse effect, locally. Expanded partnerships and technical assistance for the preservation of wildlife corridors in alternative D would provide the greatest beneficial effect on native plant communities.

Effects on Cultural Resources

Affected Environment

OVERVIEW

The study area contains many significant cultural resources including archeological sites, historic structures, and cultural landscape features. The percentage of the study area that has been surveyed for cultural resources is unknown. Within the Angeles National Forest (both north and south units), 4.8% has been surveyed for cultural resources, including historical, archeological, ethnographic, and tribal. Within the acreage surveyed, 962 sites have been identified (365 are prehistoric, 575 are historic, and 22 are multi-component). Eight sites are listed on the National Register of Historic Places, 154 are eligible for listing, 95 have been determined to be ineligible for listing, and 705 have not yet been determined to be eligible or ineligible for listing. Surveys have been conducted in other parts of the study area, but the methodology for inventorying resources varies. The historical background of the study area and the physical prehistoric and historic resources are discussed in Chapter 2, *Resource Description*.

Archeological sites and related artifacts consist of various forms of evidence of human activities that span at least the end of the Pleistocene through the early Holocene (13,000 to 8,500 B.P.). Archeological site types include large habitation Native American sites, domestic, trade, subsistence, sacred sites, circulation route sites, defense sites, and many others. Artifacts include pottery fragments, pictographs and petroglyphs, lithic scatters, and bedrock mortars. These sites may manifest themselves as a scatter of surface material or as subsurface or midden deposits. Sites often include surface and subsurface components. Archeological site distribution within the study area varies. For example, within the ANF, the Aliso-Arrastre Middle and North Special Interest Area includes many Native American archeological sites ranging from long-term occupation sites, seasonal encampments and special-use resource procurement, processing, and storage sites (USFS 2005). Other archeological sites within the study area have been disturbed throughout time by land use activities.

Historic buildings and structures within the study area include buildings, adobe ruins, and other historic landscape elements related to settlement, ranching, agriculture, mining, scientific study, recreation, and transportation. Within the ANF, historic resources include recreation camps, hotels, forest service administration facilities,

trails, the Mount Wilson Observatory, the San Dimas Experimental Forest, and the Mount Lowe Railway. The foothill communities, urban areas, and communities north of the forest include historic resources related to missions, ranchos, mining, agriculture, transportation, water supply and flood control, religion, and civic activities. Significant cultural resources are described in Chapter 3, *Resource Significance*.

NATIONAL SIGNIFICANT RESOURCES

The Upton Sinclair House in Monrovia is a national historic landmark. Portions of two national historic trails – the Juan Bautista de Anza National Historic Trail and the Old Spanish National Historic Trail – and a portion of the Route 66 Corridor traverse the study area. The San Dimas Experimental Forest contains Civilian Conservation Corps constructed facilities that are excellent examples of Forest Service architecture. A National Historic Landmark nomination for the Mount Wilson Observatory was prepared, but it has not gone through the full nomination process.

STATE AND LOCAL SIGNIFICANT RESOURCES

There are about 40 cultural resource sites listed on the National Register at the state or local level of significance. These sites include adobes, historic homes, civic and commercial properties, the Mount Lowe Railway district, and other cultural landscape features. The state, counties, and other local governments also maintain other systems for recording important cultural resources. A preliminary inventory of these sites and structures is listed in Chapter 2, *Resource Description*.

Ethnographic resources are defined by the National Park Service as any "...site, structure, object, landscape, or natural resource feature assigned traditional, legendary, religious, subsistence, or other significance of a group traditionally associated with it." The study area was and is the home of many Native Americans, including the Gabrielino-Tongva, and their communities continue to grow, change, and adapt. The region is one of the most racially and culturally diverse areas of the world. There is no ethnographic study for the entire study area.

Native American Interests. There are no federally recognized tribes associated with the Angeles National Forest. The Chumash, Tongva, Kitanemuk, Serrano, and Tataviam tribes had homelands associated with the Angeles National Forest area at the time of European contact. Non-federally recognized tribes within the forest's sphere of influence includes: the Fernandeño Tataviam,

Gabrielino-Tongva Tribal Council of San Gabriel, Gabrielino-Tongva Tribal Council of the Gabrielino Tongva Nation, Gabrielino Tongva Indians of California, Intertribal Council of Tongva, and the Tehatchapi Indian Tribe.

TRENDS

Within the study area, the level of protection of cultural resources varies. Because the Angeles National Forest portion of the study area has been protected over a century, many sites have been relatively undisturbed and may retain their integrity. Most research programs in the forest related to cultural resources have been funded under specific projects so that systematic and comprehensive investigations have not been carried out. Recent archeological work performed on the ANF consists of environmental and/or contract archeology.

Within the ANF, archeological and historical resources are threatened by erosion, fire, flood, vandalism, looting, and land use practices. Some cultural resources were destroyed or damaged during the 2009 Station Fire. Following the fire, additional areas within the forest were surveyed for cultural resources. Access to sites has remained closed for recovery of the lands and for safety purposes. The populated portion of the study area experienced a high degree of urban development in the last century. Cultural resources are threatened by continued development, including bulldozing, excavation, construction of buildings and other structures, as well as grading for roads and highways and expansion of transportation corridors and other infrastructure. Other threats throughout the study area include flooding, water erosion, off-road vehicle use, unauthorized collecting of artifacts, and industrial activities such as mining.

Many cultural resources have been listed on the National Register of Historic Places while other resources that have been documented as eligible for listing have not yet been listed. The ANF has numerous eligible historic and archeological sites that could be listed. Some flood control structures, such as the Morris Dam has been determined eligible for listing on the National Register of Historic Places. More than 50 archeological sites throughout the study area have been determined eligible for listing and 135 historical sites within the study area appear eligible for listing on the National Register, California Register, or other local listing as individual sites and contributors to a district.

Cultural landscapes within the study area continue to evolve. Many historic landscapes have been urbanized. The Soledad front country is rapidly converting from rural to urban due to the

development of housing tracts along the national forest boundary.

Native American organizations such as the Tongva continue to use lands within the study area for cultural, social, and ceremonial purposes. These organizations have also been protecting cultural and sacred sites and archeological resources. The Haramokngna (Place Where People Gather) American Indian Cultural Center, located at the Red Box Fire Station and Visitor Center, offers opportunities to learn about regional Native American history.

Cultural diversity has contributed important cultural and historical elements to the study area. Further studies would be needed to provide the appropriate context for the varied resources associated with the region.

Impact Analysis – Cultural Resources

Better documentation, research, protection and interpretation of cultural resources were identified as core issues to address in this study. Therefore, each alternative suggests approaches to meet these needs.

PUBLIC CONCERNS

Public comments indicate that there is a general concern regarding impacts on cultural, historic and ethnographic resources. A more specific concern was expressed in regard to the opportunities for Native Americans to engage in activities such as learning and practicing traditional plant gathering and use.

If no new federal land designations are enacted, cultural heritage programs provided by the ANF, including those involving traditional Native American activities would continue. The ANF would continue to lack resources to fully document cultural resources and develop protection plans. The integrity of cultural resources throughout the study area could be diminished as a result of uncoordinated and fragmented preservation efforts. There could be natural deterioration of some historic resources from lack of maintenance and preservation measures, and some sites could eventually be lost. There would continue to be a lack of coordinated research and interpretation programs for cultural resources within the study area. No dedicated federal funds would be available to document and interpret cultural resources in a comprehensive manner. Without action, public concerns about these resources would remain inadequately addressed.

NO ACTION ALTERNATIVE

Within the study area, the level of protection of cultural resources varies. Because the ANF portion of the study area has been protected for over a century, many sites have been relatively undisturbed and may retain their integrity. As explained in the preceding sections, however, comprehensive investigations throughout the study area have not been carried out, resources continue to be threatened by natural processes, development, crime, and land use practices. Existing threats to cultural resources would continue to have minor to moderate adverse effects on cultural resources within the study area.

ALTERNATIVE A

In alternative A, more resources would be available to the U.S. Forest Service for documentation and education and interpretation of cultural and historic

resources within the ANF. The national forest would have the authority and resources to form new partnerships for the protection of cultural resources. However, beyond the national forest portion of the study area, there would likely be a continued natural deterioration of some historic resources due to lack of maintenance and preservation measures and some sites could eventually be lost. As in the no action alternative, there would continue to be a lack coordinated research and interpretation programs for cultural resources outside of the ANF. No dedicated federal funds would be available to document and interpret cultural resources in a comprehensive manner.

Beyond the ANF, existing threats to cultural resources would continue to have minor to moderate adverse effects on cultural resources.

ALTERNATIVE C

In alternative C, NPS financial and technical assistance for cultural resource protection would reinforce best management practices for protecting structures, landscapes, archeological resources, and ethnographic resources within the proposed NRA. Coordinated protection of cultural resources would be enhanced through NRA partnership agreements. Coordinated interpretation and education would have beneficial effects on the protection and understanding of cultural resources. An increase in coordinated land conservation efforts would likely enhance the protection of cultural and ethnographic resources on lands that are as yet undisturbed.

ALTERNATIVE D

Alternative D would be fundamentally the same as alternative C, but it would expand the protective boundaries and cover more sites and cultural themes since the area includes the entire San Gabriel Mountains portion of the ANF and the Puente-Chino Hills. Alternative D would provide the most comprehensive and coordinated effort to protect cultural resources throughout the study area through:

- Comprehensive research and documentation of broader areas
- More comprehensive interpretation and education of broad cultural themes throughout the study area
- Expanded partnerships, coordination and consultation with stakeholder groups, including Native Americans

CUMULATIVE IMPACTS

Loss of sites from development, lack of documentation, and coordinated resource protection would continue to have an adverse cumulative effect on cultural resources within the study area. The study area alternatives seek to ameliorate these conditions to a greater or lesser degree. Cumulative effects from increased visitation over time could result in some amount of deterioration of historic structures or disturbance to archeological sites. This could be mitigated by better surveying and siting of recreational facilities. Therefore, the cumulative effect of current impacts to cultural resources, plus the effects of the proposed alternatives, would likely result in a net beneficial condition in regard to cultural resource protection. However, this varies by alternative. Alternative D would provide the most comprehensive approach to management of cultural resources through the larger NRA designation and NPS technical assistance.

Conclusions

Without action, the study area will continue to experience minor to moderate adverse impacts to cultural resources. Under alternative A, the ANF would be better positioned to document and protect its resources. Alternative C and D increase opportunities for documentation and protection through coordination of planning efforts, with varying degrees of geographical extent. With full implementation of the action alternatives, adverse impacts on cultural resources would likely be mitigated with some level of beneficial effect realized in each action alternative, from a modest amount in alternative A to a more pronounced benefit in alternative D.

Effects on Recreation Use and Visitor Experience

Affected Environment

A description of study area recreational resources is discussed in Chapter 2, *Resource Description*. Various features of the alternatives, depending on the degree to which they encourage expansion of access and development of recreational facilities, could affect the scale and range of outdoor recreational opportunities offered to the public in the study area.

Future growth and development may also affect the quality of the recreational experience. Likewise, changes may occur in environmental amenities such as scenic quality and natural quiet which contribute to the enjoyment of recreational experiences. Visitor experiences may also be affected by the extent to which opportunities are provided for educational or interpretive enrichment. The following section describes existing trends related to recreational use and visitor experience.

TRENDS

The population of California is expected to grow from 30 million to 50 million people by 2020. Approximately 85% of the additional 20 million people are expected to live within two hours of the coast. Insufficient funding has led to difficulties in meeting new public access demands from growth pressures (NOAA 1999).

National Forest Visitation Trends

With over three million annual visitors, the ANF has one of the highest levels of national forest visitation nationally. Approximately 75% of visitors to the ANF live within 25-50 miles of the forest boundary. Only 4% of visitors live over 500 miles from the ANF, indicating use is primarily local in nature. Recreational day use is the primary activity. The most commonly used facilities are trails, the scenic byway, the museum/visitor centers, and interpretive displays. Overnight use on the ANF is relatively low. Approximately 130,000 visitors stay at developed overnight areas. Another 95,000 attend special events and organized camps. Approximately 34,000 visitors came to visit the wilderness areas in 2009.

Visitation Trends for Special Area Designations

During public scoping and review of the preliminary alternatives, public concerns were raised regarding the effects of increased visitation resulting from the new congressional designations proposed

in the study. Some commenters suggested that federal recognition would bring positive attention to the area and would help the local economy and tourism. Others worried that designation could bring about increased traffic, noise, waste, and congestion associated with increased tourism. This was particularly a concern in the Antelope Valley area, where residents worried that increased recreation would require commercial development which could negatively impact rural communities.

The impact of special designations on visitation at existing parks or recreation areas was studied to provide context for the impact analysis. Recent research conducted on eight changes in national park unit designation between 1979 and 2000 shows that conversions have “substantial and persistent” effects on annual visitation. These changes appear to be more important to national visitors than to local or regional users. This particular research is limited to conversions of units already in the national park system, and its results are applicable in times of economic well-being. For the units studied, an immediate annual visitation increase of about 6 percent was experienced and then maintained over time (Weiler 2005).

Adequacy of Park and Recreation Areas in the Study Area

The process of prescribing a standard for the level of service for park and recreation facilities has long been problematic. The U.S. Department of Housing and Urban Development (HUD) recommends 2.5 acres of parkland for every 1,000 residents, although many consider this ratio to be low. The National Recreation and Parks Association (NRPA) gave acreage recommendations in *Recreation, Park and Open Space Standards and Guidelines* (1983) and *Park, Recreation, Open Space and Greenway Guidelines* (1996). The NRPA acknowledged that local condition and community desires should be considered in adopting local standards and stated a standard of 6-10 acres for every 1000 residents.

As described in Chapter 2, *Resource Description*, current studies on the adequacy of recreational areas in the Los Angeles Region show approximately 9.1 of recreation acres per 1,000 residents (Trust for Public Land 2004). However, county averages can mask dramatic disparities in access to green space within the county (The City Project 2007). In 2004, the Los Angeles County Department of Parks and Recreation completed the Strategic Asset Management Plan for 2020. Based on the projected population growth, the county estimated

Table 14: Visitation to Major Recreation Destinations within the Study Area

Facility	Total
Frank G. Bonelli Regional Park	463,743
Santa Fe Dam Recreation Area	753,993
Whittier Narrows Recreation Area	1,727,841
Whittier Narrows Natural Area	44,520
Devils Punchbowl County Park	99,421
Pio Pico State Historic Park	7,500 (FY 2007/2008)
Angeles National Forest	3.5M (2010)
Sources: (Los Angeles County, Rupert, pers. comm, 2010; USFS 2009; Friends of Pio Pico State Historic Park, Schoff, pers. comm. 2011)	
Note: Annual visitation data was not available for the Puente Hills Landfill Native Habitat Preserve.	

that it would not meet its standard of four acres of parkland per 1,000 residents by 2020 for four of its five supervisorial districts. Only the rural north county area, which includes the Antelope Valley portion of the study area, would meet this goal (Los Angeles County 2008).

Quantity and density, however, are not the only measures. If park, open space, and recreation amenities are not accessible to all residents, their benefits cannot be fully realized. Factors such as proximity to open space, safe and accessible transportation and walking routes, the presence of obstacles such as freeways, railroads and other physical barriers also affect access. Open space is also not often equitably distributed. Areas that fall well below meeting the standards for parks and recreation facilities are described as being “park-poor.”

In many park and recreation assessments, a ¼ mile to ½ mile radius is used to measure access to local parks. These distances are used because they represent areas that can be accessed by a 5 to 10 minute walk. Three separate analysis of the adequacy and distribution of recreational areas in the Los Angeles Region have concluded that while some communities have ample parks and recreational areas, many are severely lacking. Those communities with adequate accessibility to parks and recreational areas tend to be more affluent with a majority of non-Hispanic whites.

Visiting regional areas such as the ANF and the Santa Monica Mountains National Recreation Area pose transportation challenges for many residents (Los Angeles County 2008). Recent studies have found that statewide, Los Angeles County is one of the most disadvantaged counties in terms of access to parks and open space for children and people of color (The City Project 2007, Trust for Public Land 2004). A study by the Trust for Public Lands found that with its high concentration of open space in areas far from its most densely populated communities, the Los Angeles area offers its children the worst access to parks among the cities evaluated nationally (see Table 16). A study on access to parks and park facilities conducted as part of the Green Visions Plan found that one third or less of parks in the San Gabriel Valley area appear to have transit (Sister, C., Wilson, J.P., and Wolch, J. 2008).

The communities with the least amount of access to parks and open space tend to have higher rates of childhood diseases related to obesity such as diabetes. According to the Centers for Disease Control, Americans living closer to parks

are more likely to exercise regularly, leading to weight loss, increased energy, and better overall health (Centers for Disease Control and Prevention 2001). The California Center for Public Health Advocacy analyzed the 2004 California Physical Fitness Test of 5th, 7th, and 9th graders. The analysis shows that among students in Los Angeles County, 31.3% are overweight. Overweight children face a greater risk of developing many health problems during childhood, including Type 2 diabetes, high blood pressure, asthma, orthopedic problems and gallstones, as well as low self-esteem, poor body image, and depression. Overweight children are more likely to be obese as adults, putting them at a much higher risk for heart disease, cancer, stroke, and diabetes later in life (California Center for Public Health and Advocacy 2006).

People of color are less likely to have adequate access to parks in the Los Angeles area. Studies by the Green Visions Plan for a 21st Century Southern California and the City Project both found that Whites currently have disproportionately greater access to parks and open space, compared to Latinos and African-Americans. These ethnic groups are 12-15 times more likely to have less park acreage per capita when compared to Whites (Sister, C., Wilson, J.P., and Wolch, J. 2008, The City Project 2007).

Los Angeles County trends for access to parks, as described previously, correlate with trends within the study area. Access to parks and open space is readily available to communities in the Antelope Valley, Soledad Basin, and wealthier communities in the San Gabriel Mountains foothills. The map “Park Acres Per 1,000 Residents,” on the following page, includes park and recreation acreages for study area cities and communities. The map conveys that foothill communities and communities in the northern portions of the study area have the largest amounts of parks and recreation space per 1,000 residents. Many of the more urban communities in the San Gabriel Valley have smaller park acreages per 1,000 residents and fall well below the Los Angeles County standard of 4 acres per 1,000 residents. Given the limited availability

Table 15: Standards for Parks and Open Space

Standard	Acres/1,000 Population
HUD	2.5
National Recreation and Parks Association Park Acreage/Population Standard	6.25-10.5
Los Angeles County	4

of land in these urban areas, integrating open space into redevelopment projects and planning for more biking, hiking and equestrian trails are recommended to incrementally increase open space.

Interpretation and Education

Throughout the study area, interpretation and educational programs are found at recreation areas, nature centers, historical parks, and local museums. Common themes at these sites include native plants, geology, natural history, wildlife, and California history. Many of these sites have high quality collections, interpretive displays, programs, and events. However, coordinated interpretation of the significant themes described in Chapter 3, *Resource Significance* is lacking for the study area as a whole. Working in partnership with local agencies, NPS provides interpretation on the Juan Bautista de Anza National Historic Trail which traverses the study area. Interpretation and programs related to the Old Spanish Trail are not known to exist within the study area.

Table 16: Children’s park access in seven major cities

City	Percentage of children within one-quarter mile of a park	Number of children without access to a park
Boston	97%	2,900
New York	91%	178,500
San Francisco	85%	16,700
Seattle	79%	18,600
San Diego	65%	102,300
Dallas	42%	182,800
City of Los Angeles	33%	657,700
Los Angeles County	36%	1,694,400

Source: Trust for Public Land 2004

Impact Analysis – Recreation Use and Visitor Experience

Various features of the alternatives, depending on the degree to which they encourage expansion of access and development of recreational facilities, could affect the scale and range of outdoor recreational opportunities offered to the public in the study area.

Future growth and development may affect the quality of the recreational experience. Changes may occur in environmental amenities such as scenic quality and natural quiet which contribute to the enjoyment of recreational experiences. Recreational experience may also be affected by the extent to which opportunities are enriched through educational or interpretive activities. There is tension between the availability and accessibility of recreation opportunities and the quality of the experience in a national park unit setting. As use increases, particularly in hitherto unused or lightly used areas, the impacts of crowding, sound, visual intrusions tend to erode the quality of the experience for some users. Similarly, as recreation is emphasized and use fluctuates, the potential for impacts on natural resources increases. What may be expected as a benefit to people who recreate is balanced by the potential for adverse impacts on natural resources and the qualities associated with them.

There is considerable overlap between this issue (recreation) and that of visitation, as addressed under socioeconomic impacts. The reader is encouraged to view these as companion topics, wherein they are addressed by similar features of the alternatives being considered, resulting in similar impacts.

PUBLIC CONCERNS

Throughout the study process local residents and stakeholder groups have expressed a need for better recreational access and improved opportunities for park-poor urban communities. Many commenters also expressed concern about the lack of resources available to U.S. Forest Service for recreational resources and visitor management.

NO ACTION ALTERNATIVE

If no action is taken as a result of this study, higher demands would be placed on existing recreation areas with increases in population growth. Current inequities in open space recreational opportunities would likely continue. New recreational opportunities and access would occur through existing agencies and local governments as funding

permits. Benefits would be incremental over time. Opportunities for recreational planning and open space connections on a regional level would likely not occur without additional funding or leadership from an existing agency. Lack of resources for recreation management would continue. Few on-site rangers would be available to manage visitor activities.

Regarding the capability of the U.S. Forest Service to fund and manage recreation, lack of resources would continue unless changes are enacted as a result of this study. As stated above, few on-site rangers would be available to manage visitor activities. There would be a continued lack of educational staff to teach responsible use and a lack of funding for improving facilities. Coordinated interpretation for significant resources in the study area would not occur. Interpretation and educational programs in the ANF would continue to be greatly limited by current funding and staffing, having a moderate adverse impact on visitor experience on the national forest.

ALTERNATIVE A

Each of the alternatives proposes legislation that would authorize more funding, provide opportunities for fundraising, and work more cooperatively with partner agencies to improve visitor services. In alternative A, which would provide the least additional resources, more U.S. Forest Service staff would be available within the new NRA to manage visitors. The NPS would also be able to provide staff assistance and visitor management technical assistance on the ANF.

Additional funding for improved facilities and more interpretive and educational programming would have a beneficial effect on the visitor experience within the ANF. However, alternative A would do little to ameliorate the lack of recreational opportunities available to urban areas that are currently deficient in parks and open space. Poor access to parks and open space for urban communities would continue to have a moderate adverse effect on recreational use and visitor experience in those areas.

ALTERNATIVE C

Alternative C addresses the lack of urban recreation opportunities through establishment of the NRA along the urban portions of the San Gabriel and Rio Hondo Rivers. There would be a targeted effort and leveraged funds to create more recreational areas within the NRA. Access would be improved by creating new transit options connecting communities to the NRA, building more trails, and

connecting recreation areas and open spaces.

In Alternative C, more funding would be made available to improve facilities and provide services in the NRA. Through cooperative agreements, additional staff may be available for visitor management, education, and interpretation. The NPS would also be able to provide staff and visitor management assistance within the NRA.

The voluntary information network would provide more opportunities to provide interpretive and educational programs about the resources of the San Gabriel River watershed, having an overall beneficial effect on the visitor experience. The information network would better inform residents of recreational opportunities throughout the watershed, potentially connecting visitors to more recreational opportunities. Actions to improve recreational opportunities in alternative C could also provide public health benefits to those communities near the San Gabriel River corridor.

ALTERNATIVE D

More recreational opportunities and educational programs would be available within the NRA than currently exist. There would be a targeted effort to create more recreational areas within the NRA and more trail connections to surrounding communities. The partnership would leverage funding to help provide more recreational opportunities within the NRA, create new transit options, build more trails, and connect recreation areas and open spaces.

This alternative is the most likely among the action alternatives to create new open space and recreational opportunities for urban communities. More recreational opportunities and educational programs could be made available in areas beyond the NRA through technical assistance and new leveraged funding. This alternative would propose legislation to authorize more funding, provide opportunities for fundraising, and work more cooperatively with partner agencies to improve visitor services.

Through cooperative agreements, additional staff may be available to the U.S. Forest Service for visitor management, education, and interpretation. The NPS would also be able to provide staff assistance and visitor management technical assistance over a much broader area than in alternatives A or C.

The larger NRA in this alternative would allow for coordinated interpretive and educational opportunities throughout the study area, providing the greatest beneficial effects on the visitor experience. Additionally, all of the resources found

to be nationally significant would be included in the NRA providing more opportunities for residents to learn about and appreciate these resources. Alternative D would have a greater beneficial effect on public health for communities throughout the region, as comprehensive planning and technical assistance would provide the most new opportunities for outdoor recreation in local communities.

CUMULATIVE IMPACTS

Population growth trends in the study area and the surrounding region would likely continue to increase pressure on available open space. Considering that public lands in this area are currently among the most heavily visited nationally, recreation opportunities and quality are likely to diminish if nothing is done. The study area alternatives seek to ameliorate the condition to a greater or lesser degree. Therefore, the cumulative effect of growth and development trends plus the effects of the alternatives would likely result in a net beneficial condition in regard to visitation within the study area as a whole. However, the total cumulative effect is expected to at least as affected by economic conditions and population increases and distribution over time as by the actions taken as a result of this study.

Conclusions

Under the no action alternative, recreation opportunities and visitation would continue as current trends indicate. That is, there would be insufficient opportunities and access for local and non-local visitors which continue to degrade the recreation experience. Under each of the action alternatives, this trend would be arrested to some degree, and would be considered beneficial. The size of the new unit and the capacity to manage the unit are important factors in assessing the potential benefits. With these considerations, all action alternatives would have a beneficial effect, but alternative D would have the greatest beneficial impact on recreation and visitation. Alternative A's benefits could be considerable, but limited in geographical extent to the ANF. Alternative C would benefit the San Gabriel River corridor, providing more opportunities for urban communities. Use, however, could increase along the river, further impacting already heavily visited areas. Finally, alternative D supports a comprehensive regional approach to addressing recreation and open space issues.

Socioeconomic Effects

Affected Environment

The study area lies predominately within Los Angeles County, with small portions found in San Bernardino County and Orange County. This section describes the socioeconomic conditions of these three counties, with more detail provided for Los Angeles County, particularly in the San Gabriel, Santa Clarita, and Antelope valleys.

POPULATION

According to census block data, approximately 1.5 million people live within the boundary of the study area. Another 6.5 million live within 10 miles of the boundary. A total of 14.7 million live within 30 miles, in six different counties (U.S. Census Bureau 2000).

Los Angeles County

With approximately 10 million residents, Los Angeles County is the most populous county in the United States. The county is home to 88 incorporated cities and many unincorporated areas. Over a quarter of all California residents live in Los Angeles County. The population density approaches 2,500 people per square mile. Ninety-nine percent of the population lives in an urban area (U.S. Census Bureau 2000).

Most of the population lives in the southern portion of the county, along the coastline and in the inland basins and valleys. Approximately 650,000 residents live along the San Gabriel River in adjoining cities from the mouth of San Gabriel Canyon to the southern extent of the this study's boundary (LADPW 2006a). High population densities are found throughout this stretch, with a number of communities containing more than 3,000 people per square mile and at least two (El Monte and Baldwin Park) containing over 10,000 people per square mile (LADPW 2006a).

San Bernardino and Orange counties

Approximately 2 million people live in San Bernardino County, one of the largest counties in the United States by area. The population density is comparatively low, with approximately 100 people per square mile. Orange County is the second most populous county in California, with a 2008 population estimated at 3 million. The population is dense, with an estimated 3,800 people per square mile. Although characterized mostly by suburban communities, 34 incorporated cities are located in the county.

TRENDS IN POPULATION GROWTH

Los Angeles County

Los Angeles County grew 5.9 percent from 1998 to 2008 and is expected to continue growing, with one estimate projecting over 13 million residents by 2050 (California Department of Finance 2007a). The fastest growth rates, however, are found in the northern portions of the study area. For example, unincorporated portions of Los Angeles County in the Antelope Valley region are expected to double in population, from 100,000 in 2005 to 215,000, by 2035. The same unincorporated areas have already tripled in population since mid-1985, contributing to the rapid growth of the valley as a bedroom community to the Greater Los Angeles area (RWMG 2007). Likewise, the Santa Clarita Valley population grew in the 1990s by over 39 percent, reaching 212,611 by 2000 (Los Angeles County Dept. of Regional Planning 2010b). Along with Antelope Valley, Santa Clarita Valley continues to lead the county in population growth. The full build-out potential of Santa Clarita Valley, as described in city and county plans, would eventually allow 460,000 to 485,000 residents (Los Angeles County Dept. of Regional Planning 2010b).

San Bernardino and Orange Counties

San Bernardino County is one of the fastest growing counties in California, with a 22.4 percent change in population reported between 1998 and 2008. San Bernardino is expected to maintain a similar growth rate from 2005 to 2025, with a 49.2 percent increase in total number of people. 94.3 percent of the population lives in an urban area. Orange County grew by 8.6 percent from 1998 to 2008 and is expected to grow another 19.7 percent from 2005 to 2025 (NPS 2010).

SOCIAL AND CULTURAL CHARACTERISTICS

Los Angeles County

Racial and ethnic diversity is comparatively high in Los Angeles County, with 25.9 percent of the total population reporting that they belong to a minority race group and nearly half of the population reporting a Hispanic origin (47.9%). Approximately 75 percent identify themselves as white, while most others identify themselves as African American (8.4%) or Asian (13.2%) (California Department of Finance 2007b).

Along the San Gabriel River corridor, those who identify themselves as Hispanic or Latino represent the majority of residents. Although only 37 percent of residents in communities adjacent to the river in the upper San Gabriel Valley identify themselves as Hispanic or Latino, in the lower San Gabriel Valley and upper coastal plain, the Hispanic or Latino populations are 75.9 percent and 68.7 percent respectively. Those identifying themselves as Asian constitute the second largest group in the lower San Gabriel Valley (14.5%) and a quarter (24.3%) of the upper San Gabriel Valley population (LADPW 2006a).

The northern part of the Los Angeles County presents less racial and ethnic diversity than the county as a whole. Among Antelope Valley residents, 34.4 percent identify as Hispanic or Latino, 13.2 percent as African American, and only 3.7 percent as Asian (Los Angeles County Department of Public Health 2009). The Santa Clarita area is even less diverse. Only 27 percent of the City of Santa Clarita's population, for example, identifies themselves as Hispanic or Latino (U.S. Census Bureau 2005).

Over 50 percent of adults in Los Angeles County have had some college education. The two primary languages are English (49.2% of households) and Spanish (32.3%).

San Bernardino and Orange Counties

Nearly 20 percent of the total population of San Bernardino County reports that they belong to a minority race group. Of this group, 47.5 percent reports a Hispanic origin. The majority of the San Bernardino County population, 80.3 percent, identify themselves as white. Most others identify themselves as African American (9.4%) or Asian (5.9%). Nearly half of the adults in San Bernardino County have had some college education. The two primary languages in the county are English (64.5 percent of households) and Spanish (27.4 percent).

Approximately 22 percent of the total population

Table 17: Population				
County	Total Population	Population Density (people per square mile)	Recent Population Change (1998-2008)	Projected Population Change (2005-2025)
Los Angeles County	9,862,049	2,428.6	5.9%	6.7%
San Bernardino County	2,015,355	100.5	22.4%	49.2%
Orange County	3,010,759	3,814.0	8.6%	19.7%
Source: NPS 2010				

of Orange County reports that they belong to a minority race group. Of this group, 33.8 percent reports a Hispanic origin. The majority of the Orange County population, 78.4 percent, identify themselves as white. Most others identify themselves as Asian (16.2%), African American (2%), or two or more races (2.2%). A relatively high percentage of adults in Orange County have had some college education (62%). The two primary languages in the county are English and Spanish, with 62.8 percent of households primarily speaking the former and 20 percent speaking the latter. Ten percent of households primarily speak an Asian or Pacific Island language.

TRENDS IN SOCIAL AND CULTURAL CHARACTERISTICS

Los Angeles County. The Hispanic composition of the county is expected to increase. One projection estimates that by the year 2050, the Hispanic and Asian populations will account for more than 80 percent of the total county residents (California Department of Finance 2007a).

EMPLOYMENT AND INCOME

Los Angeles County

The median household income in Los Angeles County is approximately \$53,494 per year. Nearly 15 percent of the population lives in a household with income below the federally-determined poverty threshold (NPS 2010). Thirteen percent of the county's labor force was unemployed in November 2010 (CEDD 2010).

Within the study area, median household incomes ranged from \$39,914 to \$119,368 among census tracts north of the ANF. The highest incomes are reported in the tracts nearest Santa Clarita, while the lowest are found in the northernmost tracts near Palmdale. To the south of the ANF, median household incomes by census tract ranged from \$19,885 to \$110,555. Higher incomes tend to be associated with the foothill communities of the San Gabriel Mountains, the Puente Hills, and the San Jose Hills. Lower incomes tend to be

associated with valley areas, especially around the El Monte and Pico Rivera areas (See figure 2, Median Household Incomes, U.S. Census Bureau 2000).

In the San Gabriel Valley, education and health, professional and business services, retail trade, and government are the region's largest employment sectors. The region has suffered a decline in international trade and manufacturing. However, the industrial vacancy rate remains at low levels (4.1% in 2010), and the valley seems poised to rebound from the recent economic recession (LACEDC 2010).

In Antelope Valley, government, education and health, and professional business services are the largest employment sectors. The latter, along with retailing, has suffered the most through the recent economic downturn (LACEDC 2010).

Throughout the county, manufacturing and construction jobs have suffered the largest employment losses since 2008. In addition, government jobs have been declining at an increasing rate as local governments respond to growing budget problems (LACEDC 2010).

Table 18: Social and Cultural Characteristics

County	Racial Diversity (percent belonging to minority race groups)	Racial and Ethnic Composition	Educational Attainment (percent with some college)	Primary Household Language
Los Angeles County	25.9%	W 74.1%* B/AA 9.4% AI/AN 1.0% A 13.2% NH/OP 0.3% Two+ 1.9% H 47.7%	51.1%	Eng 49.2%** Spa 32.3% O/IE 6.8% AsPac 10.3% OTH 1.4%
San Bernardino County	19.7%	W 80.3% B/AA 9.4% AI/AN 1.5% A 5.9% NH/OP 0.4% Two+ 2.5% H 47.5%	49.2%	Eng 64.5% Spa 27.4% O/IE 3.2% AsPac 4.1% OTH 0.8%
Orange County	21.6%	W 78.4% B/AA 2.0% AI/AN 0.9% A 16.2% NH/OP 0.4% Two+ 2.2% H 33.8%	62.0%	Eng 62.8% Spa 20.0% O/IE 5.7% AsPac 10.5% OTH 1.0%

*W = White Alone, B/AA = Black or African American Alone, AI/AN = American Indian and Alaska Native Alone, A = Asian Alone, NH/OPI = Native Hawaiian and Other Pacific Islander Alone, Two+ = Two or More Races, H = Hispanic origin (any race).

**Eng = English, Spa = Spanish, O/IE = Other Indo-European, AsPac = Asian and Pacific Island, OTH = Other

Source: NPS 2010

San Bernardino and Orange Counties. The median household income in San Bernardino County is approximately \$55,995 per year. Twelve percent of the population lives in a household with income below the federally-determined poverty threshold (NPS 2010). Fourteen percent of the county’s labor force was unemployed in November 2010 (CEDD 2010). The median household income in Orange County is approximately \$73,107 per year. Nine percent of the population lives in a household with income below the federally-determined poverty threshold (NPS 2010). Just over nine percent of the county’s labor force was unemployed in November 2010 (CEDD 2010).

TOURISM

Los Angeles County

In 2007, the ratio of tourism establishments (arts, entertainment, recreation, accommodation, and food services) to all economic sectors in Los Angeles County was 12.1 percent. Nearly 11 percent of the labor force was employed in this sector and 4.7 percent of the county’s sales are directly related to tourism.

Since 2008, the tourism industry has been in slight decline. The number of jobs in hotel accommodations has fallen from 41,200 in 2008 to an estimated 38,500 in 2010. Jobs related to travel arrangement and reservations fell from 12,000 in 2007 to 9,000 in the same year (LACEDC 2010).

Total spending for Los Angeles County’s Park and Recreation Department in Fiscal Year 2009-2010

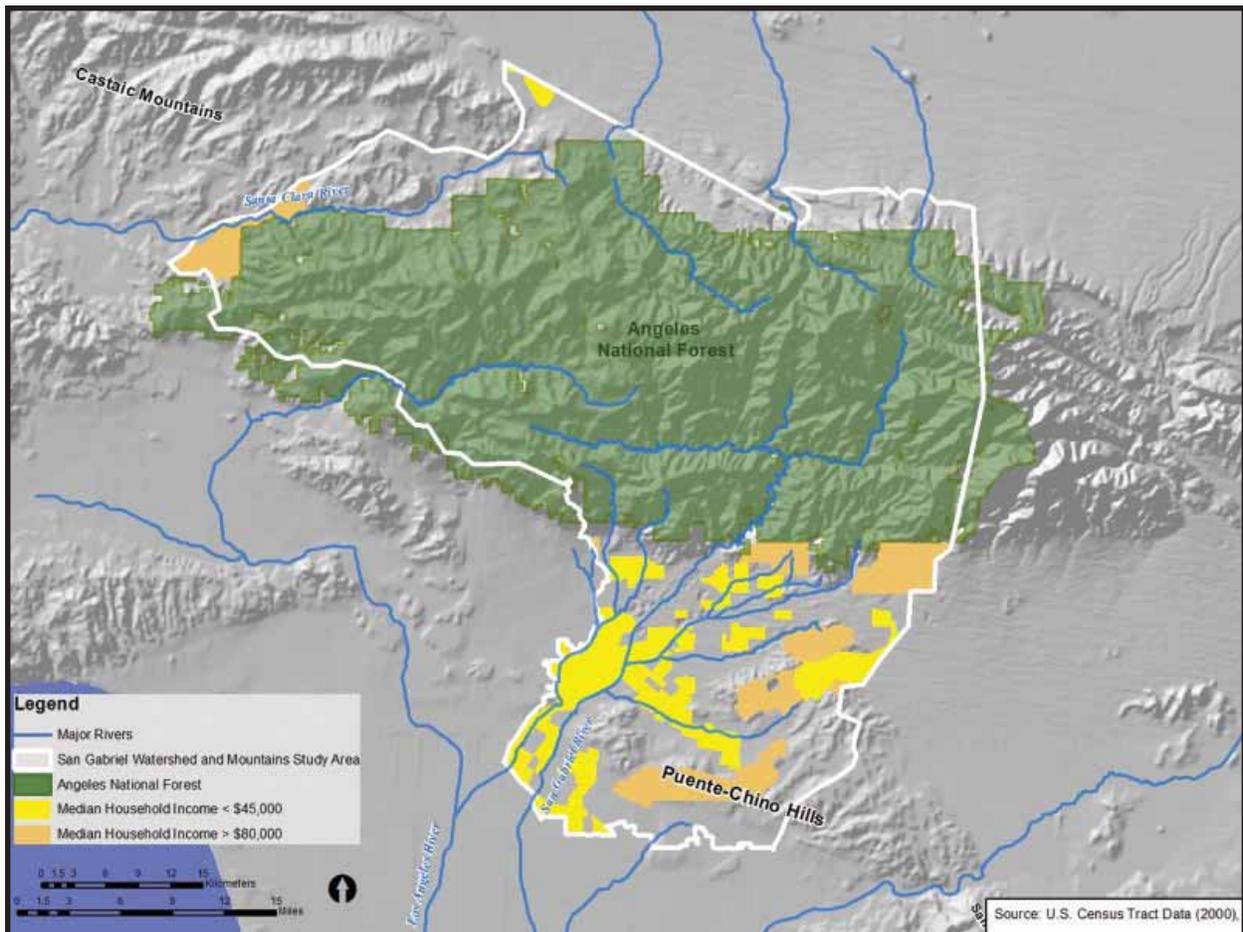
was \$148 million. Los Angeles County administers 94 local and regional parks, 337 miles of riding and hiking trails, and multiple gardens, centers, and golf courses (Los Angeles County 2009). The 88 municipalities of Los Angeles County operate numerous other parks and recreational facilities, many scattered throughout the study area.

The Angeles National Forest draws most of its visitors from the local region and very few tourists from elsewhere. Those who do visit the forest tend to spend little. (See *Recreational Use and Visitor Experience; Affected Environment*).

San Bernardino and Orange Counties

In San Bernardino County, the ratio of tourism establishments to all economic sectors in 2007 was 10.1 percent. 11.2 percent of the labor force was employed in this sector and 3.8 percent of the county's sales are directly related to tourism (NPS 2010). The ratio of tourism establishments in Orange County was 8.6 percent, with 12.2 percent of the labor force employed in this sector, and 3.3 percent of the county's sales directly related to tourism (NPS 2010).

Figure 2: Median Household Incomes



County	Median Household Income*	Poverty (percent below the threshold)*	Unemployment (November 2010)**
Los Angeles County	\$53,494	14.6%	13.0%
San Bernardino County	\$55,995	12.1%	13.9%
Orange County	\$73,107	8.9%	9.3%

*Source: NPS 2010
 **Source: CEDD 2010

ECONOMIC IMPACTS OF SPECIAL DESIGNATIONS

Public comments on the preliminary alternatives requested that the NPS analyze 1) the economic value of an NRA to local communities, including job creation, tourism spending, and improved property values for adjacent communities, and 2) the potential adverse effects of designation including the potential for new designations and increased tourism to bring about increased traffic, noise, waste, and congestion associated with new designations and increased tourism. This section reviews literature on the economic impacts of national park units and other special designations.

Economic Impacts of National Park Units

National park designation generally has a beneficial effect on the local economy. The National Park System received 274.9 million recreation visits in 2008. Park visitors spent \$11.56 billion in local gateway regions (within roughly 50 miles of the park). Visitors staying outside the parks in motels, hotels, cabins, and bed and breakfasts accounted for 55% of the total spending (NPS 2009). Over half of the spending was for lodging and meals, 17% for gas and local transportation, 9% for groceries, and 14% for souvenirs.

Local economic impacts are estimated after excluding spending by visitors from the local area (9.8% of the total). Combining local impacts across all parks yields a total impact, including direct and secondary effects, of 205,000 jobs, \$4.4 billion in labor income, and \$6.9 billion value added. The four economic sectors most directly affected by visitor spending are lodging, restaurants, retail trade, and amusements. Visitor spending supports over 50,000 jobs in each of the hotel and restaurant sectors, and over 23,000 jobs each in the retail trade and the amusements sectors (NPS 2009).

National park units also impact the local region through the NPS payroll. In FY 2008, the National Park Service employed 24,954 people with a total payroll of \$1.2 billion in wages and salaries and \$313 million in payroll benefits. Including the

induced effects of the spending of NPS wages and salaries in the local region, the total local economic impact of park payrolls are \$1.86 billion in labor income, \$2.11 billion in value added, and 36,816 jobs (including NPS jobs). The combined impacts of visitor spending and park payrolls, including secondary effects, are \$6.3 billion in labor income, \$9.0 billion in value added, and 241,442 local jobs. Visitor spending accounts for 85% of the total jobs and 77% of the total value added (NPS 2009).

In the Los Angeles Region, the Santa Monica Mountains NRA economic impacts include 215 jobs and \$5.3 million in labor income. Visitor spending for FY 2008 was \$17.1 million for all visitors. Table 21 contains visitor spending and economic impacts of partnership national parks such as Missouri River National Recreational River and Chattahoochee River NRA. While visitor counts were not available for the Boston Harbor Islands NRA, the Chesapeake Bay Gateways Network, or the Rosie the Riveter/ WWII Homefront National Historical Park, the employment benefits of the similar partnership parks is provided in Table 22(NPS 2009).

In an area as diverse as the Los Angeles Region, local governments are less likely to become dependent economic activity generated by parks and recreation areas. However, adjacent communities will receive some economic benefit from visitation.

With its close proximity to downtown Los Angeles and other large cities such as Santa Monica, ample infrastructure is available to support visitation. Therefore, impacts associated with potential development like that which occurs in gateway communities to many national park units is also not likely to occur. Gateway communities typically develop more park supporting facilities in areas that are remote. Given the close proximity to the Los Angeles metropolitan area, there is already sufficient existing infrastructure to provide services to visitors. Even the most remote areas of the San Gabriel Mountains are within a 90 minute drive of Los Angeles.

Table 20: Tourism

County	Tourism Establishments (Percent of all economic sectors)	Tourism Employment (Percent of total labor force)	Tourism Revenue (Percent of sales in the county)
Los Angeles County	12.1%	10.8%	4.7%
San Bernardino County	10.1%	11.2%	3.8%
Orange County	8.6%	12.2%	3.3%

Source: NPS 2010

Other Studies Documenting the Socioeconomic Impacts of Special Designations

Further review of the literature surrounding the economic impacts of special designations yields some broad concepts that apply, in addition to the projected increase in visitation demonstrated in the previous section, *Recreation Use and Visitor Experience*.

There have been some case studies following new federal designations such as wilderness and wild and scenic rivers. For example, information presented in the case of the South Yuba wild and scenic river designation, it is noted that property is more highly valued in the area due to the presence

of the river. It is noted that local property owners favored designation because it would further enhance the value of their property. Also, protection of the river would not jeopardize water supplies; rather it would protect water quality and conserve water for future needs. In the case of the Yuba River designation, the local parks and recreation department concluded that it is good for the local economy. Visitors generate \$10 per day, which is multiplied by a factor of three as spent in the local community. New visitors bring in more income that is available for services and offsetting costs. Further, it is noted, protection of the river resource prevents the impacts of development that might otherwise occur, and enhances recreation opportunities for the local population.

Table 21. Spending and Economic Impacts of Visitors to NPS Partnership Parks on Local Economies, 2008

Park Unit	Public Use Data		Visitor Spending 2008			Impacts of Non-local Visitor Spending	
	2008 Recreation Visits	2008 Overnight Stays	All Visitors (\$000's)	Non-local Visitors (\$000's)	Jobs	Labor Income (\$000's)	Value Added (\$000's)
Missouri National Recreational River	162,086	0	\$7,866	\$7,474	149	2,595	4,012
Chattahoochee River NRA	2,826,171	0	\$80,469	\$54,097	1016	25,150	39,112
Santa Monica Mountains NRA	419,374	144	\$17,166	\$11,443	215	5,320	8,273

Source: NPS 2009

Notes: Impacts of construction activity and park purchases of goods and services from local firms are not included. Local regions are defined as a 50-mile radius around each park.

Table 22. Payroll Impacts of National Park Partnership Parks without Visit Counts, FY 2008

Park Unit	Park Payroll			Impacts of Park Payroll		
	Salary (\$000's)	Payroll Benefits (\$000's)	NPS Jobs	Total Jobs	Labor Income (\$000's)	Value Added (\$000's)
Boston Harbor Islands NRA	608	122	16	22	930	1,064
Chesapeake Bay Program Office	1,174	301	17	29	1,862	2,120
Rosie The Riveter/WW II Homefront NHP	339	85	7	10	536	610

Source: NPS 2009

Notes:

The number of employees is estimated as an annual average for each park, so that seasonal positions are converted to annual equivalents.

Value added is the sum of labor income, profits and rents, and indirect business taxes. It can also be defined as total sales net of the costs of all non-labor inputs. Value added is the preferred economic measure of the contribution of an industry or activity to the economy.

Impact Analysis - Socioeconomics

NO ACTION ALTERNATIVE

If none of the proposed alternatives are adopted, current social and economic trends as described in the affected environment section would continue in force. Trends in property values, economic activity, income, population, employment, recreation use and distribution, tourism, community relationships (as affected by local federal land use) would remain unchanged. This applies not only to those aspects of the local socioeconomic environment regarded as beneficial, but also those where adverse impacts have been identified. Areas identified as experiencing recreational high use would continue to be congested and noisy, with negative impacts on visitor experience and infrastructure. As in many other cases, an activity may be regarded as positive to some, and negative to others. Because the local population is increasing, the effect on local economies and opportunities may be indistinguishable from increases in non-resident tourist activity resulting in changes in federal designation, as proposed in the other alternatives.

ALTERNATIVE A

In alternative A, national forest lands in the San Gabriel Mountains would be redesignated by Congress as a U.S. Forest Service managed national recreation area. Considering the existing visitation is predominantly local, and that economic indicators are at a low point, it is reasonable to expect that visitation by non-residents would be small initially and then increase slowly over time. At its greatest, the increase would likely not exceed 5 or 6 percent over current visitation.

Although greater recognition by a national audience may increase visitation in the short-term resulting in beneficial tourism impacts, its impact would be minor. Long-term visitation would increase gradually. The ANF would continue to serve mostly local and regional visitors. There would likely be modest increases in jobs associated with new visitors, and new resources would be available for ANF to add staff, improve facilities, and maintain resource quality. This new designation could improve property values in adjacent communities (NPS 1995).

Increased visitation would have modest beneficial effects on surrounding local communities which would provide supplies and services to such visitors. Increased investment in the ANF to provide more staffing for visitor services, planning, and restoration could result in additional jobs for the region.

ALTERNATIVE C

The nature of impacts on socioeconomics expected under this alternative is similar to alternative A. However, there are differences between the alternatives that might be reflected in the amount and type of visitation to be expected.

This smaller, more urban NRA by its nature would be less of a recreation attraction for a national audience. As such, visitation from this source is expected to be lower than in alternative A. However, several factors would serve to improve and enhance close-to-home recreation, making such opportunities more accessible for local residents. The smaller NRA would better serve local residents by providing more recreational opportunities for urban communities along the river corridor. Increased visitation, although small, could have modest beneficial effects on surrounding local communities which would provide supplies and services to visitors. The new designation would result in additional jobs for the region, particularly with the emphasis on job training in alternative C. However, such effects would be negligible in the regional context.

ALTERNATIVE D

Because the NRA in alternative D would be of greater size than alternatives A and C, it is likely benefits that more jobs and associated economic benefits would result.

The new designation of the forest and improved recreational opportunities throughout the study area would cause small increases in visitation over time that could have modest beneficial economic effects on surrounding local communities. These benefits would be in the form of providing supplies and services to such visitors. With a larger designation, and a greater emphasis on education and job training, alternative D may provide slightly more benefits than alternative C in terms of creating jobs. However, such effects would be negligible in the regional context.

CUMULATIVE IMPACTS

The study area is a complex region with a long and storied socioeconomic history. Adverse and beneficial impacts due to an NRA designation, whether on the ANF, the San Gabriel River, or a broader region are likely to contribute no more than a very small amount to the overall socioeconomic context of the area. Many other factors, particularly outcomes related to the recent economic downturn, are likely to have a much greater impact on the region's socioeconomics. The cumulative effect of growth and development trends plus the beneficial

effects of each alternative, however, could result in a small, net beneficial condition to some local communities as a result of improved urban quality, land protection, and economic benefits from recreation and conservation. However, the total cumulative effect is expected to be more dependent upon regional economic conditions and population increases (and distribution) over time than on the actions taken as a result of this study.

Conclusions

The action alternatives positively address current and future recreation needs. In terms of economic benefit associated with these objectives, the no action alternative would have the least benefit and alternatives A, C, and D would have beneficial effects to varying degrees. Alternative D, due to its geographic scope, particularly in urban areas, has the greatest potential for beneficial impacts to quality of life and other socioeconomic indicators.

Increased visitation would represent an adverse impact on infrastructure and social systems. Since visitation might be expected to increase in each of the action alternatives, infrastructure impacts would likely increase proportionally. The adverse impact in alternative A would likely be negligible, increasing to minor in both C and D. With congressional action approving the implementation of any of the action alternatives, or variants thereof, further planning would be undertaken. Additional environmental analysis would be prepared to look at site and area-specific activities and alternatives. Through that analysis, more specific conclusions can be drawn regarding direct, indirect and cumulative impacts. Joint planning efforts among stakeholders, and subsequent agreements, would be designed to optimize between the economic benefits and social costs so that the former is maximized and the latter is mitigated.

Impact Analysis - Socially or Economically Disadvantaged Populations Socioeconomic Impacts (Environmental Justice)

As the analysis in the *Recreation Use and Visitor Experience; Affected Environment* describes, economically disadvantaged populations in the study area lack access and the ability to partake of existing opportunities due to lack of close-to-home open space, lack of effective transportation, lack of culturally advantageous facilities or opportunities, and lack of knowledge about recreation and natural resources. Under current conditions, all contribute to an impact on these populations. As stated, each action alternative attempts to remedy these current conditions to provide a net beneficial result.

BACKGROUND ON ENVIRONMENTAL JUSTICE

Environmental justice must be considered in every major federal action by assessing environmental factors that negatively or disproportionately affect minority populations. Pursuant to Executive Order 12898, promulgated by President Clinton in 1994, federal agencies “shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.”

The NPS has numerous partnerships programs with youth corps and conservation organizations that serve as a means to introduce minority and low income children and young adults to environmental and conservation issues.

Youth corps and job corps partnerships provide a solid environmental learning experience for the youth involved, while at the same time leaving a legacy of work which significantly benefits the parks and community.

The NPS also seeks to identify opportunities to develop partnerships with Tribal governments, consistent with mission needs to provide necessary technical assistance to enhance tribal capacity to address environmental, health, and welfare concerns.

NO ACTION ALTERNATIVE

A portion of the local population can be categorized as socially or economically disadvantaged and potentially affected by each of the alternatives. Population growth trends over time will likely exacerbate the amount and intensity of

this condition. This equates directly to socially and economically disadvantaged populations who lack the means of access, and the ability to partake of existing opportunities due to physical barriers (e.g. adult and childhood obesity or other ailments). The existing deficiencies in open space, lack of effective transportation connecting communities to recreation opportunities, lack of culturally advantageous facilities or opportunities, and lack of knowledge about recreation and natural resources, under current conditions, all contribute to moderate adverse impacts on these populations.

ALTERNATIVE A

Alternative A would have a generally beneficial impact on socially and economically disadvantaged populations by providing an improved recreational experience at the ANF. However, it would likely represent only a minor improvement for communities that are currently underserved for recreation. Of all the alternatives, this one places the least emphasis on developing new effective partnerships and cooperative management efforts that have the best chance of providing a remedy for these populations. Also, it would do little to increase access to recreation from underserved populations or provide close-to-home opportunities in urban communities.

ALTERNATIVE C

Alternative C would have a greater beneficial impact on these populations, with efforts applied specifically in urban areas close to the San Gabriel River where some communities are underserved and economically disadvantaged. The alternative potentially provides job training and opportunities within these communities that have the potential both to improve economic access for recreation, but also to build programs and provide awareness regarding opportunities. To the extent that recreation opportunities can be designed to fit cultural preferences (for example, large group picnic and camping areas) for local disadvantaged populations, the greater will be the beneficial results. The development of effective and diverse partnerships in this alternative would also serve to build programs and cooperative agreements with entities that represent disadvantaged groups so that the necessary results can be obtained.

ALTERNATIVE D

Again, due its expanded geographic and programmatic scope, alternative D holds the greatest potential benefit for socially and economically disadvantaged populations. Also, it presents the most opportunities for new close-to-home recreation opportunities for areas that are

currently underserved. In short, this alternative provides the best framework for implementing NPS' environmental justice policy as outlined above.

CUMULATIVE IMPACTS

Population growth trends in the study area and the surrounding region are likely to put additional pressure on available open space. Considering that public lands in this area are currently among the most heavily visited within the system, recreation opportunities and qualities are likely to diminish if nothing is done. The study area alternatives seek to ameliorate the condition to a greater or lesser degree. Therefore, the cumulative effect of growth and development trends, plus the effects of each alternative, would likely result in a net beneficial condition in regard to recreational opportunities for disadvantaged populations within the study area. The overall level of cumulative impact, considering factors that exacerbate issues for the socially and economically disadvantaged, would decline as compared to the no action alternative.

Conclusions

In general, it is anticipated that each of the action alternatives is likely to improve conditions regarding health and well-being of disadvantaged populations. Clearly, it is the stated intent of this congressionally-mandated study to do so. To do nothing would leave these populations to current trends in development. The creation of new public land open spaces would be advantageous. At the same time, the proposed changes in land use on existing public lands is not likely to affect commercial or non-commercial resources and values that economically disadvantaged populations might be dependent upon under current conditions.

The partnership program and stakeholder agreements set forth particularly in alternatives C and D would meet the intent of the U.S. Department of the Interior and NPS Environmental Justice strategy as outlined above. Nevertheless, it is important to seek effective involvement of potentially affected social and economically disadvantaged populations when a congressionally mandated plan goes forward.

Land Use

Affected Environment

The use, ownership, and regulation of land play important roles in the protection of resources in the study area. Many thousands of landowners are found within the study area, although about two-thirds of the area is owned and managed by one entity; the U.S. Forest Service. This section examines the current state and trends of land ownership, use, and development in the San Gabriel Mountains, the northern portions of the study area (Santa Clarita and Antelope valleys), and the urban areas to the south, including the San Gabriel Valley.

The San Gabriel Mountains. The U.S. Department of Agriculture, through the Angeles National Forest, owns and administers two-thirds of the study area, including the San Gabriel Mountains. The forest is managed for multiple direct use values, including watershed protection and recreation. It is assumed that this land will continue in public ownership indefinitely and will not be subject to further residential or commercial development.

North of the San Gabriel Mountains. The Antelope Valley region, which includes the study area lands north of the mountains and continues north into Kern County, was characterized by slow growth until the mid-1980s. By the 1990s, the growth rate had accelerated dramatically. Within 15 years, the population had nearly quadrupled (RWMG 2007). The projected growth rate for unincorporated Los Angeles County lands north of the San Gabriel mountains will double the population, from 100,000 in 2005 to 215,000 in 2035 (RWMG 2007). Much of the vacant land available for development lies in the southern end of the Antelope Valley region (RWMG 2007), portions of which are contained within the northernmost boundary of the study area. Because of this, these areas potentially face tremendous development pressure as the population rapidly expands.

Antelope Valley also contains the largest amount of productive farmland in Los Angeles County, mostly in unincorporated territory and outside of the study area. Agricultural uses are declining as urbanization accelerates, but the value of Antelope Valley's agricultural production was nearly \$271 million in 2006 and remains an important part of the Valley's economy.

The northwestern corner of the study area lies in the Santa Clarita Valley, which has its own

land use challenges. The Los Angeles County Planning Department has identified a list of needs for land use planning in this region including accommodation of growth to the area's build-out capacity while preserving open space, particularly through retention and expansion of an open space greenbelt around the valley and discouraging urban sprawl into foothill areas. The City of Santa Clarita, in cooperation with partners such as the Santa Monica Mountains Conservancy, has worked to acquire lands or require developers to preserve open space in a greenbelt around the city through an acquisition plan adopted in 2002. Approximately 50 percent of these acquisition objectives have been met to date. Some of these identified lands are within the study area, along with ongoing and planned development projects (Los Angeles County 2010b).

South of the San Gabriel Mountains. The primarily urbanized areas below the San Gabriel Mountains contain a variety of land uses. Open space is relatively sparse, with residential and commercial uses dominating. The most significant open spaces within the urbanized areas are at the Santa Fe Dam Recreation Area, Whittier Narrows, the Puente Hills, and Frank G. Bonelli Regional Park. Public facilities and institutions are scattered among residential land uses, which dominate throughout the valley. Commercial uses are primarily found near freeway intersections and along other major east-west corridors (LADPW 2006a). Areas characterized by industrial uses are found in the City of Industry and in wide swaths of the river corridor from Azusa to Baldwin Park, among other places.

Prime and Unique Farmland. Prime Farmland is land with the best combination of physical and chemical features able to sustain long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. In order to have the Prime designation, this land must have been used for production of irrigated crops at some time during the four years prior to the mapping date. **Unique Farmland** is of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include non-irrigated orchards or vineyards as found in some climatic zones in California. In order to have the Unique Farmland designation, the land must have been cropped at some time during the four years prior to the mapping date.

The California Department of Conservation (CDC) Farmland Mapping and Monitoring Program (FMMP) program has identified approximately 200 acres of prime and unique farmland in the study

area. Most of which is located north of the San Gabriel Mountains in the Antelope Valley near Acton, Littlerock, and Valyermo. One small parcel of unique farmland is located in unincorporated Orange County near the City of Brea (FMMP 2008). As documented by the FMMP, the state's important farmlands and grazing lands decreased by 170,982 acres (267 square miles) between 2002 and 2004 (FMMP 2008). The highest-quality agricultural soils, known as Prime Farmland, comprised 46 percent of the loss (78,575 acres). Within the study, over 300 acres of prime and unique farmland were converted to other uses, primarily urban development between 2000-2008 (FMMP 2002, FMMP 2008). Most of the conversion occurred in the Orange County area near Brea. The majority of prime and unique farmland within the study area occurs along the 14-corridor in the Antelope Valley.

Retaining valuable farmland in Los Angeles County is expected to be difficult as projected growth in the County over the next 20 years is expected to continue. Increased population growth accompanying development may result in the conversion of farms and land with prime soil to non-agricultural uses. This scenario is especially likely in the North County area, which contains most of the Prime Farmland in Los Angeles County, and is also experiencing the most rapid population growth. Los Angeles County has designated areas surrounding agricultural lands as rural in an attempt to provide for rural development that is compatible with agricultural activities.

REGULATORY SETTING

Jurisdiction of lands inside the study area belongs to multiple federal, state, and local entities. This section describes these entities and their respective management, planning, or regulatory activities.

Federal Agencies

United States Bureau of Land Management (BLM)

The BLM manages small portions of the undeveloped or unused land in Antelope and Santa Clarita valleys. The California Desert Conservation Area Plan is used to manage BLM controlled areas.

United States Fish and Wildlife Service (USFWS)

The USFWS administers the Federal Endangered Species Act (FESA) and designates critical habitat for endangered species.

United States Forest Service (USFS)

The USFS manages approximately 420,000 acres of the Angeles National Forest.

United States Army Corps of Engineers (USACOE)

Among its responsibilities, the USACOE administers Section 404 of the Clean Water Act (CWA), which governs specified activities in waters of the United States, including wetlands. In this role, the USACOE requires that a permit be obtained if a project would place structures, including dredged or filled materials, within navigable waters or wetlands, or result in alteration of such areas.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)

The NRCS maps soils and farmland uses to provide comprehensive information necessary for understanding, managing, conserving and sustaining the nation's limited soil resources. The NRCS also manages the Farmland Protection Program, which provides funds to help purchase development rights to keep productive farmland in agricultural uses.

State Agencies

California Department of Conservation [Prime and unique farmlands]

In 1982, the State of California created the Farmland Mapping and Monitoring Program within the California Department of Conservation to carry on the mapping activity from the NRCS on a continuing basis. The California Department of Conservation administers the California Land Conservation Act of 1965, also known as the Williamson Act, for the conservation of farmland and other resource-oriented laws.

California Department of Transportation (Caltrans)

The Caltrans jurisdiction includes rights-of-way of state and interstate routes within California. Any work within the right-of-way of a federal or state transportation corridor is subject to Caltrans regulations governing allowable actions and modifications to the right-of-way. Caltrans includes the Division of Aeronautics, which is responsible for airport permitting and establishing a county Airport Land Use Commission (ALUC) for each county with one or more public airports. ALUCs are responsible for the preparation of land use plans for areas near aviation facilities.

California Department of Forestry and Fire Protection (CDF)

The CDF reviews and approves plans for timber harvesting on private lands. In addition, through its responsibility for fighting wildland fires, the CDF plays a role in planning development in forested areas.

California Department of Parks and Recreation (CDPR)

The CDPR manages and provides sites for a variety of recreational and outdoor activities. The CDPR is a trustee agency that owns and operates all state parks and participates in land use planning that affects state parkland.

Regional and Local Agencies

Southern California Association of Governments (SCAG)

As related to land use, SCAG is authorized to undertake intergovernmental review for federal assistance and direct federal development pursuant to Presidential Executive Order 12,372. Pursuant to CEQA (Public Resource Code Sections 21083 and 21087 and CEQA Guidelines Sections (15206 and 15125(b)), SCAG reviews projects of regional significance for consistency with regional plans. SCAG is also responsible for preparation of the Regional Housing Needs Assessment (RHNA), pursuant to California Government Code Section 65584(a). SCAG's RHNA provides a tool for providing local affordable housing development strategies.

SCAG's current Regional Comprehensive Plan and Guide (RCPG) 1996 is intended to provide a permissive framework for decision making by local governments regarding growth and development. The RCPG proposes strategies for local governments to use on a voluntary basis to reconcile local needs with state and federal planning requirements.

Local Agency Formation Commissions

The Local Agency Formation Commission (LAFCO) is the agency in each county that has the responsibility to create orderly local government boundaries, with the goal of encouraging "planned, well-ordered, efficient urban development patterns," the preservation of open-space lands, and the discouragement of urban sprawl. While LAFCOs have no direct land use authority, their actions determine which local government will be responsible for planning new areas. LAFCOs address a wide range of boundary actions, including creation of spheres of influence for cities, adjustments to boundaries of special districts, annexations, incorporations, detachments of areas from cities, and dissolution of cities.

General Plans

The most comprehensive land use planning for the area is provided by city and county general plans, which local governments are required by state law to prepare as a guide for future development. General plans contain goals and policies concerning topics that are mandated by state law or which the jurisdiction has chosen to include. Required topics are land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address include public facilities, parks and recreation, community design, sustainability and growth management, among others. These plans provide general definitions and implementation methods for each land use designation in the district. City and county general plans must be consistent with each other. County general plans must cover areas not included by city general plans (i.e., unincorporated areas).

Specific and Master Plans

A city or county may also provide land use planning by developing community or specific plans for smaller, more specific areas within their jurisdiction. These more localized plans provide for focused guidance for developing a specific area, with development standards tailored to the area, as well as systematic implementation of the general plan.

Zoning and Land Use Permits

City and county zoning codes are the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different uses and identifies which uses are allowed in the various zoning districts of the jurisdiction. Since 1971, state law has required the city or county zoning code to be consistent with the jurisdiction's general plan. Cities and counties typically implement their zoning codes through highly individualized land use ordinances that differ from jurisdiction to jurisdiction.

Impact Analysis – Land Use

PUBLIC CONCERNS

Local Jurisdictions and Land Use

Concerns were raised during the scoping and public review of the preliminary alternative that the proposed actions could result in loss of local land use control by local governments and agencies. This concern was anticipated, and it would not be the intent of Congress and this region's congressional representatives to contravene local land use plans and controls by virtue of proposed changes in federal land designation. Therefore, in actions common to all alternatives the NPS makes a commitment to putting forward alternatives that respect local land use control and private property rights. NPS laws and policies would only apply to lands that lie within NPS jurisdiction, and U.S. Forest Service laws and policies would similarly apply only to national forest lands. It is expected that any legislation produced from the outcome of this study would explicitly exclude use of eminent domain as a means of acquiring land. Local laws and ordinances would remain in force, and any actions undertaken through this effort would necessarily respect them.

Use of Eminent Domain

The public expressed concerns about the use of eminent domain and the possibility of regulatory authority over surrounding landowners and local agencies in alternatives B and C. This concern does not apply to alternative A, because that alternative applies only to lands currently managed by the U.S. Forest Service. Alternative B has been dismissed. In alternatives C and D, this concern is addressed by statements provided in the actions common to all alternatives; it is proposed that authorizing legislation clearly state that eminent domain would not be used as a means of acquiring land. Purchase would be from willing sellers only. Additionally, given funding availability, any land acquisition would be small and take place incrementally over time.

Private Property Owners and Inholders

Concerns were expressed that new land use designations would impact cabin owners and inholders in the ANF. There are no proposals made among the alternatives that would impact existing cabin owners and inholders. The ANF lands in question would remain within U.S. Forest Service jurisdiction in all of the alternatives.

Urban Quality

As stated in the introductory material in this document, over fifty communities and 1.5 million residents lie within the study area. Development and growth trends are such that loss of connection to land and resource values is of concern, and open spaces are diminishing. Local populations are trending towards less healthful conditions, with obesity, diabetes, and respiratory or other physical ailments exacerbated by urban pollution, being of chief concern. These concerns are, in part, the impetus behind this study as articulated by the sponsors of its enabling legislation and as presented in Chapter 1 under *Purpose and Need*. Therefore, the intent of each action alternative is to address these issues in a positive fashion by providing opportunities to counter these trends to a greater or lesser degree, thereby improving the quality of urban life and the built environment.

NO ACTION ALTERNATIVE

Existing efforts to protect and conserve land for recreation and open space would continue at current levels. Regional growth and development, and lack of regional or coordinated planning efforts would continue to challenge local agencies and organizations in their efforts to provide adequate access to recreation and open space.

Areas identified as experiencing recreational high use would continue to be congested and noisy, with negative impacts on visitor experience and infrastructure. As in many other cases, an activity may be regarded as positive to some, and negative to others. Because the local population is increasing, any resulting effect on local recreation opportunities and experiences would likely be indistinguishable from increases due to non-resident visitor activity that could occur with changes in federal land use designation, as proposed in the other alternatives.

Traffic and congestion would continue to be affected by regional growth and development. Localized congestion at heavily used recreation sites would continue to have moderate adverse impacts on traffic patterns in these areas.

Changes in federal land use designation would not occur in this alternative; hence the issue of impacts on local jurisdictions does not apply.

ALTERNATIVE A

In alternative A, national forest lands in the San Gabriel Mountains would be redesignated by Congress as an U.S. Forest Service managed national recreation area. Improved recreation

opportunities and conservation within the Angeles National Forest would have an overall beneficial effect on urban life and the built environment for surrounding communities.

Although an increase in visitation would likely exacerbate crowding, noise, congestion and traffic at heavily used sites, alternative A is designed to provide additional resources for more heavily used areas. More resources would be available for public education, improved facilities, and restoration. The ANF would also provide for improved administration and management, thereby mitigating the adverse impacts of heavy use. Activities that would likely result under the action alternatives are as follows:

- New recreational developments would be limited by terrain and sensitive resources. Changes would likely be made within the footprint of existing recreation areas. Minor expansions would be possible for increased parking and day use facilities.
- Major new recreational destinations within the ANF would not be envisioned. It is more likely that newly increased funding would be applied to improving facilities and management at existing visitor areas.

When placed in the context of current transportation patterns, which are primarily affected by regional land use, growth and development, alternative A would have very little effect on traffic patterns throughout the study area. However, with increases in visitation, alternative A could add a negligible adverse impact to local traffic patterns associated with popular recreation areas.

As actions related to alternative A would apply only to national forest system lands, there would be no impact on local land use control.

ALTERNATIVE C

The nature of impacts on land use expected under this alternative is similar to alternative A. However, there are differences between the alternatives that might be reflected in the amount and type of visitation to be expected. This smaller, more urban NRA by its nature would be less of a recreation attraction for a national audience. As such, visitation from this source is expected to be lower than in alternative A. However, several factors would serve to improve and enhance recreation opportunities that would be more accessible for local residents. The smaller NRA would better serve local residents by providing more recreational opportunities for urban communities along the river corridor. Because of a lack of remaining open

space in the NRA, new recreational opportunities would arise out of redevelopment opportunities, restoration of vacant or abandoned lands with habitat potential as they become available. The NRA would also work to improve recreational opportunities along waterways where compatible with flood protection efforts, and would work in partnership with local communities to explore new opportunities for recreation and open space. This is basically a continuation of efforts made as part of the Emerald Necklace Partnership (the no action alternative describes this partnership).

The potential for providing transportation improvements such as better transit connections to destinations within the NRA would, if implemented, make recreation opportunities more accessible for local communities thereby enhancing urban quality.

When placed in the context of current transportation patterns, which are primarily affected by regional land use, growth and development, alternative C would have very little effect. However, an emphasis on connecting people to recreation and improving transportation to major recreational destinations would help to relieve traffic congestion associated with heavy use within the national recreation area such as San Gabriel Canyon.

By providing new recreation opportunities and restoring lands along the San Gabriel River, alternative C would have an overall beneficial effect on urban life and the built environment.

NPS management policies would apply only to NPS-owned lands. There would be no impact on existing local jurisdictions and agencies.

ALTERNATIVE D

Due to the expanded geographical size of the NRA and potentially higher national visibility, alternative D has the greatest likelihood for increased visitation in the long-term. Expanding partnerships and NPS technical assistance to other agencies in this environment are likely to improve the marketing of recreation opportunities beyond the capabilities of the other alternatives. Recreational opportunities in rural areas would reflect the types of existing uses (e.g. staging areas for equestrians, better trail connections, more trailheads and river access) such that the quality of the experience would be expected to improve.

When placed in the context of current transportation patterns which are primarily affected by land use, growth and development Alternative D would have very little effect. However, with a broader emphasis on connecting people

to recreation, providing more close-to-home recreation opportunities for urban communities, and improving transportation to major recreational destinations, Alternative D could help to reduce traffic congestion in heavily used recreation areas to a greater extent than alternative C.

By emphasizing and protecting interconnected ecosystems within and among urban zones, providing more recreational opportunities, and protecting open spaces, alternative D would have the greatest beneficial effect on urban quality and the built environment.

NPS management policies would apply only to NPS-owned lands. There would be no impact on existing local jurisdictions and agencies.

CUMULATIVE IMPACTS

Population growth trends in the study area and the surrounding region are likely to put additional pressure on available open space, thereby impacting urban quality and land use. Considering that public lands in this area are currently among the most heavily visited within the system, recreation opportunities and qualities are likely to diminish if nothing is done. The study area alternatives seek to ameliorate the condition to a greater or lesser degree. Therefore, the cumulative effect of growth and development trends plus the effects of each alternative would likely result in a net beneficial condition to some local communities as a result of improved urban quality, land protection, and economic benefits from recreation and conservation. However, the total cumulative effect is expected to be more dependent upon regional economic conditions and population increases (and distribution) over time than on the actions taken as a result of this study.

Conclusions

The action alternatives positively address current and future recreation and open space needs. In terms of the economic and open space benefits associated with these objectives, the no action alternative would have the least benefit and alternatives A, C and D would have beneficial effects to varying degrees.

Increased visitation would represent an adverse impact on infrastructure and social systems. Since visitation might be expected to increase in each of the action alternatives, infrastructure impacts would likely increase proportionally. The adverse impact in alternative A would likely be negligible, increasing to minor in both C and D. With congressional action approving the implementation of any of the action alternatives, or variants thereof, further planning would be undertaken. Additional environmental analysis would be prepared to look at site and area-specific activities and alternatives. Through that analysis, more specific conclusions can be drawn regarding direct, indirect and cumulative impacts. Joint planning efforts among stakeholders, and subsequent agreements, would be designed to optimize between the economic benefits and social costs so that the former is maximized and the latter is mitigated. None of the alternatives will adversely impact local land use control, as any proposed collaborative NRA designation would not have regulatory authority over its privately and publicly-owned lands. Finally, all of the action alternatives promote the additional protection of open space. Alternative A accomplishes this along the edges of the ANF by facilitating greater cooperation with outside land protection organizations. Alternatives C and D, go further to establish mechanisms for cooperation and coordination, with alternative D realizing the greatest benefit due to its geographical scope.

Effects on Water Resources

Affected Environment

A full description of the study area's surface water, groundwater basins, flood protection systems, water rights, and supply is provided in Chapter 2, *Resource Description*. An overview of the study area's surface water quality and trends affecting water quality is provided below.

SURFACE WATER QUALITY

While the geologic, hydrologic, climatic, and ecological characteristics for watersheds are unique in the nation, Southern California has also experienced one of the most dramatic environmental transformations due to rapid growth and development. For the past 150 years, the study area watersheds and wetlands have been impacted by agricultural and urban development (California Coastal Conservancy 2001).

Water quality varies greatly throughout the study area. The following section briefly describes water quality within the study area and the primary factors that impact waters considered to be impaired. Generally, water quality in the mountains and headwaters is better than water quality in the lower, more urban portions of the study area watersheds. As described in Chapter 3, *Significance*, several of the mountainous reaches are eligible for National Wild and Scenic River designation.

Sources of surface water pollution include agriculture, industry, wastewater, urban runoff, and widespread use of fertilizers, chemicals, solvents, and household products. Pollution comes from both point sources, such as industries and wastewater treatment plants, and non-point sources such as urban and agricultural runoff and trash. Major dischargers of wastewater in the study area include the San Jose, the Whittier Narrows, and the Pomona wastewater reclamation plants. Recreational use can also impact waterways.

Surface water quality is regulated by the U.S. Environmental Protection Agency and the California State Regional Water Quality Control Boards (RWQCBs) which maintain and update lists of impaired water bodies that exceed state and federal water quality standards. Impaired reaches are river stretches that are officially recognized by the State of California as affected by specific pollutants derived from unknown or nonpoint sources. Table 23 describes California's 2006 Clean Water Act, Section 303(d) List of Water Quality Limited River Segments and Lakes. Below is a description of the impairment categories/types of pollutants (LADPW 2006a and 2006b).

WATERWAY IMPAIRMENT CATEGORIES

Metals. Metals from stormwater runoff include lead, zinc, cadmium, copper, chromium, and nickel. Such metals can be toxic to aquatic animals and can bioaccumulate. Sources of metal in urban runoff include metal, paint, automobiles, brake pads, or preserved wood.

Nutrients. Nutrient pollutants including nitrogen and phosphorous are critical to the growth of plants. However, in high amounts, nutrients can result in excessive growth of vegetation such as algae, which results in water impairment. Common sources of nutrients include fertilizers used in landscaping and agriculture, human and animal waste, and effluent from wastewater treatment facilities.

Pesticides and Other Organics. Other organic compounds, aside from nutrients, found in waterways include adhesives, cleaners, sealants, solvents, and pesticides. They enter water bodies through urban runoff and improper disposal. When these substances bioaccumulate in animals and aquatic life, they can have an adverse impact on the health of those species.

Pathogens (Bacteria). Bacteria and viruses are common contaminants in urban runoff and stormwater. High levels of indicator bacteria (such as *Escherichia coli*) in stormwater sometimes results in the closure of beaches to contact recreation. Sources include sanitary sewer leaks and spills, malfunctioning septic tanks, and fecal matter from humans and animals.

Trash. Trash pollutants include packaging and other products in urban environments, lawn clippings, animal excrement street litter and other organic matter. These substances can harbor bacteria, viruses, vectors, and depress the dissolved oxygen levels in water bodies (LADPW 2006b).

GROUNDWATER QUALITY

Groundwater basin water quality is a concern in the study area and quality varies throughout the area based on naturally occurring conditions, historical land use patterns, and groundwater extraction patterns. In some areas groundwater quality has been affected by land use and production practices such as industrial discharges, seawater intrusion due to overdrafting, industrial discharges, agricultural chemical usage, livestock operations, urban runoff, and some naturally occurring constituents. The cost and effort of cleaning up some of the contaminated groundwater basins is extensive. Several sites in the San Gabriel Valley Basin are on the EPA's National Priorities List for Remediation (LADPW 2006b). Table

24 provides an overview of groundwater pollutants for study area groundwater basins

IMPACT ANALYSIS – WATER RESOURCES

Judging by the current condition, and as an accepted tenet in land management, as recreation use grows there is a concomitant amount of stress placed upon natural resources such as water quality. As shown in other discussions, the intent of this study is to find a means whereby watershed resources and values can be conserved along with providing opportunities for people to appreciate and enjoy them. Current trends in land use and recreation include a diminishing availability of open spaces and a related deterioration in natural resource qualities associated with watershed values. The action alternatives represent incremental approaches to meet the intent of the study. Therefore, despite the projected increases in visitation that might be experienced under the alternatives, all contain measures that would, overall, improve and enhance watershed values. The major assumption to be made in this regard is that visitor populations and local communities will become more knowledgeable, appreciative, and understanding of watershed values through enhanced education and interpretation afforded in each alternative. Alternatives C and D, in particular, apply this assumption to water-based resources along the San Gabriel River System and represent affirmative approaches to watershed management, riparian values, and wetland and floodplain protection.

The alternatives are oriented to policy rather than activity. No specific actions are proposed other than federal designation and partnership development. Therefore, as with other resources, analysis of specific impacts on water resources is not possible beyond the general statement above. Should Congress act to establish new designations, further environmental analysis would be necessary to plan their implementation. That analysis would likely propose specific types of actions that can be evaluated more specifically in terms of potential effects on water resources and values associated with them.

Table 23: Impaired Surface Waters within the Study Area

Reach or Water body	Pollutant Category/Type
Walnut Creek Wash (Drains from Puddingstone Reservoir)	Miscellaneous (pH)
Sawpit Creek	Other Organics (Bis(2ethylhexyl)phthalate/DEHP)
Santa Clara River Reach 7 (Bouquet Canyon Rd to above Lang Gaging Station)	Pathogens (Coliform Bacteria)
San Jose Creek Reach 2 (Temple to I-10 at White Ave.)	Pathogens (Coliform Bacteria)
San Jose Creek Reach 1 (San Gabriel River Confluence to Temple St.)	Nutrients (Ammonia)
San Gabriel River, East Fork	Trash
San Gabriel River Reach 2 (Firestone Avenue to Whittier Narrows Dam)	Pathogens (Coliform Bacteria)
Rio Hondo Reach 2 (At Spreading Grounds)	Nutrients (Ammonia)
Rio Hondo Reach 1 (Confluence of the Los Angeles River to I-5)	Pathogens (Coliform Bacteria)
Monrovia Canyon Creek	Metals/Metalloids (Lead)
Coyote Creek	Nutrients (Ammonia)
Santa Fe Dam Park Lake	Metals/Metalloids (Copper)
Puddingstone Reservoir	Pesticides (Chlordane)
Peck Road Park Lake	Pesticides (Chlordane)
Legg Lake	Nutrients (Ammonia)
Crystal Lake	Nutrients (Organic Enrichment/Low Dissolved Oxygen)
Source: State Water Quality Control Board, 2006 303(d) impairment status.	

Table 24: Groundwater Basin Water Quality

Groundwater Basin	Pollutants
Coastal Plain of Los Angeles, Central Subbasin	Found in sample wells: Inorganics, radiological, nitrates, volatile organic compounds (VOCs) and semi-volatile organic compound (SVOCs)
San Gabriel Valley	Four areas are considered superfund sites (Whittier Narrows, Puente basin, Baldwin Park, and El Monte areas). Found in sample wells: Inorganics, radiological, nitrates, pesticides, VOCs and SVOCs
Raymond	Found in sample wells: Inorganics, radiological, nitrates, VOCs and SVOCs A Superfund site exists near the Jet Propulsion Laboratories.
Upper Santa Ana Valley, Chino Subbasin	Most serious problems are high concentrations of dissolved solids.
San Fernando Valley	Found in sample wells: Inorganics, radiological, nitrates, pesticides, VOCs and SVOCs
Acton Valley Groundwater Basin	Found in sample wells: nitrates, inorganics
Antelope Valley	Found in sample wells: Inorganics, radiological, nitrates, pesticides, VOCs and SVOCs
Source: California Department of Water Resources 2003	

Public Concerns

WATER RIGHTS AND SUPPLY IMPACTS

The public indicated concern about the potential effects of a new federal designation or overlay on private water rights or the ability of state and local agencies to make decisions regarding water supply and quality. There would be no effect in this regard because all of the alternatives would respect and retain existing water rights (see *Actions Common to All Alternatives*, page 146). Water districts and agencies would continue to manage water supply and discharge. No change would be made to water rights.

However, there could be a beneficial impact on water quality, in each of the action alternatives, from increased interpretation and education, enhanced visitor management and restoration activities. For example, it is anticipated that there would be more law enforcement, better facilities, and increased education and interpretation in high use areas along the San Gabriel River.

It is the stated purpose of any alternative being considered in this study to improve watershed values for the dual purpose of providing quality water-based recreation and to protect or enhance the quality of water supplied to users downstream. These types of beneficial effects are enhanced by increasing allocations of lands into protective status under the various alternatives. The alternatives would also provide new opportunities to restore and improve waterways where possible. This would be done in partnership with water agencies, the Los Angeles County Department of Public Works and the Army Corps of Engineers.

Water rights and uses are expressly protected under any of the action alternatives. Similarly, since the redirection, reapportionment, or redistribution of water sources and supplies are not proposed in any alternative, there would be no impact on other resources or values from such actions. A concern was expressed in regard to the impact of water redistribution specifically on Native American sacred sites, to which it can be said there would be no effect.

NO ACTION ALTERNATIVE

Groundwater basin water quality and surface water pollution would continue to be managed as they are now. Water quality would vary greatly from location to location throughout the study area, depending primarily on the level of development and land uses. Limited funding for restoration, planning, and public education to address water

quality impacts would result in continuing minor to moderate adverse impacts on water resources. The water quality of rivers and creeks in certain areas would continue to be a public health and safety concern.

ALTERNATIVE A

If this alternative was selected, authorizing legislation would reaffirm the original purpose of the ANF to protect watershed resources. Protection of watershed resources would take precedence in determining future uses of the forest. Within the ANF, impairments to waterways are from primarily from trash. Additional resources for visitor education, and more rangers on-site in heavily used recreation areas could reduce pollution caused by recreational use, having a beneficial effect on water resources.

Alternative A would also emphasize restoration, which could improve the overall water quality of rivers and streams within the ANF. Improved water quality would have an indirect beneficial effect on public health and safety.

ALTERNATIVE C

Alternative C would do little immediately to ameliorate the current watershed conditions expressed in the affected environment section. The new emphasis on river-based recreation holds the potential for additional impacts on water resources as described above. However, Alternative C would provide additional resources for visitor education, and more rangers on-site in heavily used recreation areas.

Alternative C would be focused only along the main corridors of the San Gabriel River within the NRA. Over time, restoration opportunities funded by the NRA partnership would also have a beneficial effect on water quality within the San Gabriel River. Water quality improvements would be greatest in those areas where current impairments are a result of recreational use. Improved water quality would have an indirect beneficial effect on public health and safety.

ALTERNATIVE D

Alternative D would do little immediately to ameliorate the conditions within the study area at large as described in the affected environment section. The new emphasis on river-based recreation, and potentially on other recreation uses throughout the expanded NRA, holds the potential for additional impacts on water resources as described above. However, this alternative proposes reaffirmation of the original purpose

for the area, to protect watershed resources. Protection of watershed resources would take precedence in determining future uses. Alternative D would have similar beneficial effects to alternative C for water quality on rivers and creeks that are primarily impacted by recreational use. However, as alternative D would provide restoration opportunities throughout the San Gabriel Mountains and along the San Gabriel River and Puente Hills, the beneficial effects would be greater than in alternative C. Additionally, the NRA would also be able to provide technical assistance for improved recreational planning and restoration opportunities outside of the study area, providing the opportunity to focus on broader restoration efforts. Improved water quality would have an indirect beneficial effect on public health and safety.

CUMULATIVE IMPACTS

Population growth and land use trends in the study area and the surrounding region are likely to continue to adversely impact water use and quality as described in the no action alternative. The study area alternatives seek to ameliorate these conditions to a greater or lesser degree. The total cumulative effect is expected to be more dependent upon local and regional land use over time than on the actions taken as a result of this study. However, restoration and improved public education and recreational facilities proposed in the alternatives would improve conditions to some degree. Alternative D would provide the greatest beneficial effects as it would provide the most resources for restoration, education and recreational improvements. A new emphasis on river-based recreation and trail use over a broad area, where use is expected to increase, has the potential to add to existing impacts within the watershed for a net negative impact downstream. This effect would be negligible in the context of the beneficial effects of watershed improvements that could result from the action alternatives.

Conclusions

Existing threats and impacts to area water resources would continue and the alternatives would not ameliorate the overall conditions within the study area that are expressed in the affected environment section, and in the no action alternative. However, with increased restoration activities, better public recreation, and improved recreational facilities and visitor management, the action alternatives would have a beneficial effect on water resources. The new emphasis on river-based recreation, and potentially on other recreation uses throughout the expanded NRA, holds the potential for additional impacts on water resources downstream. With appropriate applied management and application of best management practices to mitigate nonpoint sources of sediment or other pollutants, adverse impacts would likely be only minor. The abatement of impacts from recreation would be heavily dependent upon monitoring, education, and applied management.

Goals of the Alternatives

The following section compares the potential beneficial and adverse impacts of the action alternatives based on the goals established for all alternatives. The goals were developed by the study team, based on the public input received. They represent values that appeared to be shared by many of the respondents in the various public input opportunities throughout the study process.

Address Current and Future Recreation and Open Space Needs

All three action alternatives (A,C, and D) seek to address recreation and open space needs within the study area. Alternative A would primarily improve the quality of recreation within the San Gabriel Mountains portion of the ANF. However, it would do little to address the needs of nearby urban communities that are currently deficient in parks and open space. Without addressing this need, increasing demands on the ANF to provide local recreational opportunities could diminish the visitor experience over time.

Alternative C would provide more recreation and open space opportunities for communities along the San Gabriel River corridor and would also provide resources to improve the recreational experience in the highly used San Gabriel Canyon area. Alternative D would provide the greatest ability to address current and future recreation and open space needs. A larger area is included in the NRA and technical assistance programs would allow the NRA assist local communities in making connections to NRA resources and in developing more close-to-home recreational opportunities. Alternative D would also provide more resources for regional open space conservation.

Protect or Restore Significant Natural Resources and Important Habitats

Alternative A would provide improved protection of nationally significant resources within the San Gabriel Mountains. Significant native habitat would be improved by greater restoration efforts and improved planning and partnerships with other agencies to protect wildlife corridors. Alternative C would do the least in terms of protecting and restoring significant natural resources and important habitats as it contains the smallest amount of nationally significant resources and native habitat found within the study area. Restoration and protection would occur in the San

Gabriel River upper watershed and along the river corridor to Santa Fe Springs. However, significant resources located in other areas of the San Gabriel Mountains and Puente Hills would not benefit.

Alternative D provides the greatest opportunity to protect and restore natural resources and important habitats on a regional scale. The proposed NRA would contain most of the nationally significant regions identified in the resource analysis. Additionally, the NRA partnership would work regionally to protect and restore wildlife corridors and habitat. Studies have shown that protection of wildlife corridors enhances ecological diversity and provides additional protection from threats from nonnative species, altered fire regimes, and the effects of climate change.

Preserve Historic and Cultural Resources

Most of the nationally significant cultural resources in the study area are located in the San Gabriel Mountains. As such, alternatives A and D provide the most potential for protecting significant cultural resources within the study area. Alternative C would allow for greater preservation of cultural and historical resources associated with the San Gabriel River, including historic mining sites, the site of the original San Gabriel Mission, and the Pio Pico State Historic Park. However, alternative C would preserve cultural resources to a lesser degree than alternatives A and D due to its narrower geographic focus.

Maintain or improve water quality, water conservation and flood protection

All of the alternatives would respect existing management and structures necessary for flood protection. However, each of the action alternatives would have the potential to improve water quality. Alternative D would provide the most opportunities to improve water quality. Improved visitor education, visitor management, and restoration opportunities throughout the San Gabriel Mountains and along the San Gabriel River would provide numerous opportunities to improve water quality.

Alternative A would also provide regional benefits to water quality and conservation. The early conservation of the San Gabriel Mountains was intended for watershed protection and this would be reaffirmed in both Alternatives A and D. Protection of watershed resources and additional restoration throughout the mountains would

improve water quality both in the mountains and downstream. Alternative C would have benefits to the San Gabriel River watershed, through enhanced visitor management and education and restoration opportunities within the NRA. However, it would do nothing to improve the water quality of other watersheds located within the study area, such as the Los Angeles River, the Santa Clara River and rivers that drain into the Antelope Valley.

Environmentally Preferred Alternative

The “environmentally preferred” alternative is the one that best protects, preserves and enhances historic, cultural and natural resources, and that causes the least damage to the biological and physical environment. The environmentally preferred alternative is not the same as an agency’s “preferred” alternative.

The environmentally preferable alternative is determined by applying criteria set forth in NEPA, as guided by direction from the CEQ. The CEQ has stated that the environmentally preferred alternative is the alternative that will promote the national environmental policy as expressed in Sections 101 and 102 of NEPA. This includes alternatives that:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life’s amenities
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

All alternatives except “no action” would achieve the requirements of Sections 101 and 102 of NEPA. By permanently protecting nationally significant resources in the study area, all would (a) fulfill stewardship responsibilities to succeeding

generations, (b) ensure culturally and aesthetically pleasing surroundings, (c) attain a wide range of beneficial uses of the environment without degradation or undesirable consequences, (d) preserve important historic, cultural and natural aspects of our national heritage and maintain an environment that supports diversity and variety of individual choice, and (e) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life’s amenities. However, the alternatives meet these criteria to a significantly different degree.

The NPS has determined that alternative D would be the environmentally preferable alternative because it would protect natural and cultural resources over a significantly larger area, provide greater opportunities for recreation and visitation, provide greater economic benefits, and foster a larger framework for cooperative management as compared to alternatives A and C.

The environmentally preferable alternative should not be viewed as the National Park Service’s preferred alternative. The Director of the National Park Service is required under law and policy to identify which alternative or combination of alternatives would be most effective and efficient in protecting significant resources and providing for visitor enjoyment. The Director will make this finding after the publication of the draft special resource study / environmental assessment, considering public and stakeholder comment. This finding will be included in the study package forwarded to the Secretary of the Interior.

Table 25: Summary of Environmental Consequences

Impact Topics	No Action	Alternative A
<p>Biological Resources - Native Plants</p>	<p>Trends that currently have an adverse impact on native plants, such as invasive species, altered fire regimes, and habitat loss, would continue to have minor to moderate adverse effects on native plant communities.</p>	<p>Protection and awareness of native plants through enhanced interpretation and educational efforts due to the new designation would have beneficial effects on native plant communities.</p> <p>There would be opportunities for increased staff and funding dedicated to the control of nonnative species.</p> <p>The USFS would have additional authorities to work with other land management agencies to protect important wildlife connections to the forest. Protection of habitat corridors enhances species diversity and resilience to threats such as altered fire regimes, invasive species, and climate change.</p>
<p>Biological Resources - Wildlife</p>	<p>Many of the study area native habitat types are severely reduced from their former range.</p> <p>Threats such as habitat loss and fragmentation as a result of development, air pollution, water pollution, and altered fire regimes would continue to have moderate adverse effects on the viability of many species and communities including those that are threatened or endangered.</p>	<p>In alternative A, the proposed designation would bring more resources to the USFS for habitat restoration, conservation, research, and planning for wildlife corridors.</p> <p>Designation would ensure that proposed new or future uses on the national forest would be compatible with the protection of significant resources and watershed values. This would have an overall beneficial effect on protecting wildlife resources within the ANF.</p>
<p>Cultural Resources</p>	<p>Trends that adversely impact cultural resources including, archeological and historical resources within the study area would continue.</p> <p>Within the ANF, cultural resources would continue to be threatened by erosion, fire, flood, vandalism, looting, and land use practices. Additional threats to cultural resources throughout the study area include flooding, water erosion, off-road vehicle use, unauthorized collecting of artifacts, and industrial activities such as mining.</p> <p>Such threats would continue to have minor to moderate adverse effects on cultural resources.</p>	<p>In alternative A, more resources would be available to the USFS for documentation, education, and interpretation of cultural resources within the ANF. The ANF may also be better able to form new partnerships for the protection of cultural resources.</p> <p>Beyond the ANF, existing threats to cultural resources would continue to have minor to moderate adverse effects on cultural resources as a result of natural deterioration of some historic resources due to lack of maintenance and preservation measures and loss of some sites over time.</p> <p>No dedicated federal funds would be available to document and interpret cultural resources in a comprehensive manner outside of the ANF.</p>

Table 25: Summary of Environmental Consequences

Alternative C	Alternative D
<p>Alternative C would provide beneficial effects on native plant protection and education along the San Gabriel River and in the highly visited upper watershed. This would occur through coordinated interpretive efforts, new resources for conservation, and new agency partnerships focused on conservation and restoration of native plant communities.</p> <p>Information centers located throughout the study area could also provide an opportunity for greater awareness with regard to native plant protection.</p> <p>As in alternative A, a component of native plant protection would be to focus on the control of nonnative species.</p>	<p>Alternative D would have the greatest benefit for native plant habitat as it recognizes and promotes protection of habitat in the San Gabriel Mountains, Puente Hills, and along the San Gabriel River corridor. The NPS would provide technical assistance on a voluntary basis to conserve wildlife corridors and native habitats.</p> <p>The larger NRA would also provide coordinated interpretive efforts, new resources for conservation, and new agency partnerships focused on conservation of native plant communities.</p>
<p>In Alternative C, the proposed designation would bring more resources to both the ANF and the San Gabriel River corridor for wildlife protection. Additionally, partnering entities would work to leverage greater funding for conservation along the San Gabriel River.</p> <p>Designation would ensure that proposed new or future uses on the national forest would be compatible with the protection of significant resources and watershed values. This would have an overall beneficial effect on protecting wildlife resources within the ANF.</p> <p>The potential for increased water and land-based recreation opportunities could result in a minor adverse effect on wildlife and wildlife habitat. This would be mitigated through visitor education programs, monitoring, and</p>	<p>Designation would ensure that proposed new or future uses on the national forest would be compatible with the protection of significant resources and watershed values. This would have an overall beneficial effect on protecting wildlife resources within the ANF.</p> <p>Through partnerships, new funding, and technical assistance programs, alternative D would provide the greatest opportunity to protect habitat and connect wildlife corridors important for significant resources.</p> <p>The potential for increased recreation opportunities, in areas where previous use has been light or nonexistent, could result in a minor adverse effect on wildlife and wildlife habitat. This would be mitigated through visitor education programs, monitoring, and restoration efforts.</p>
<p>In alternative C, NPS technical assistance for cultural resource protection would reinforce best management practices for protecting structures, landscapes, archeological resources, and ethnographic resources.</p> <p>Coordinated protection of cultural resources would be enhanced through NRA partnership agreements.</p> <p>Coordinated interpretation and education would have beneficial effects on the protection and understanding of cultural resources.</p> <p>An increase in coordinated land conservation efforts would also likely enhance the protection of cultural and ethnographic resources on lands that are as yet undisturbed.</p>	<p>Alternative D would be fundamentally the same as alternative C, but it would expand the protective boundaries and cover more sites and cultural themes since the area includes the entire San Gabriel Mountains portion of the ANF, the Puente Hills, and the San Gabriel River corridor.</p> <p>Alternative D would provide the most comprehensive and coordinated effort to protect cultural resources throughout the study area through:</p> <ul style="list-style-type: none"> • More NPS technical assistance • More research and documentation of broader areas • More comprehensive interpretation and education of broad cultural themes throughout the NRA. • Expanded partnerships, coordination and consultation with stakeholder groups, including Native Americans.

Table 25: Summary of Environmental Consequences

Impact Topics	No Action	Alternative A
<p>Recreation Use and Visitor and Experience</p>	<p>Higher demands would be placed on existing recreation areas with current trends in population growth.</p> <p>Inequities in recreation opportunities would likely continue.</p> <p>Recreational opportunities would occur only through existing agencies and local governments as funding permits. Lack of resources and personnel for recreation management would continue.</p> <p>Coordinated interpretation for significant resources would not occur.</p> <p>Interpretation and educational programs in the ANF would continue to be greatly limited by current funding and staffing, having a moderate adverse impact on visitor experience.</p>	<p>In alternative A, more USFS staff would be available within the new NRA to manage visitors.</p> <p>Additional funding for improved recreational facilities and more interpretive and educational programming would have a beneficial effect on the visitor experience within the ANF.</p> <p>Alternative A would do little to ameliorate the lack of recreational opportunities available to urban areas that are currently deficient in parks and open space.</p>
<p>Socioeconomics</p>	<p>Current trends in property values, economic activity, income, population, employment, recreation use and distribution, tourism, community relationships (as affected by local federal land use) would continue.</p> <p>Areas identified as experiencing recreational high use would continue to be congested and noisy, with negative impacts on visitor experience and infrastructure.</p>	<p>The NRA designation and improved recreational opportunities would cause small increases in visitation over time.</p> <p>Increased visitation would have modest beneficial effects on surrounding local communities which would provide services to such visitors.</p> <p>Increased investment in the ANF to provide more staffing for visitor services, planning, and restoration could result in additional jobs for the region.</p>
<p>Socioeconomics -Socially and Economically Disadvantaged Populations</p>	<p>The existing lack of open space, lack of effective transportation, lack of culturally advantageous facilities or opportunities, and lack of knowledge about recreation and natural resources would continue to have moderate adverse impact on socially and economically disadvantaged populations.</p>	<p>Alternative A would have a generally beneficial impact on socially and economically disadvantaged populations. However, it would likely represent only a minor improvement for communities that are currently underserved for opportunities to access natural resources and open space.</p>

Table 25: Summary of Environmental Consequences

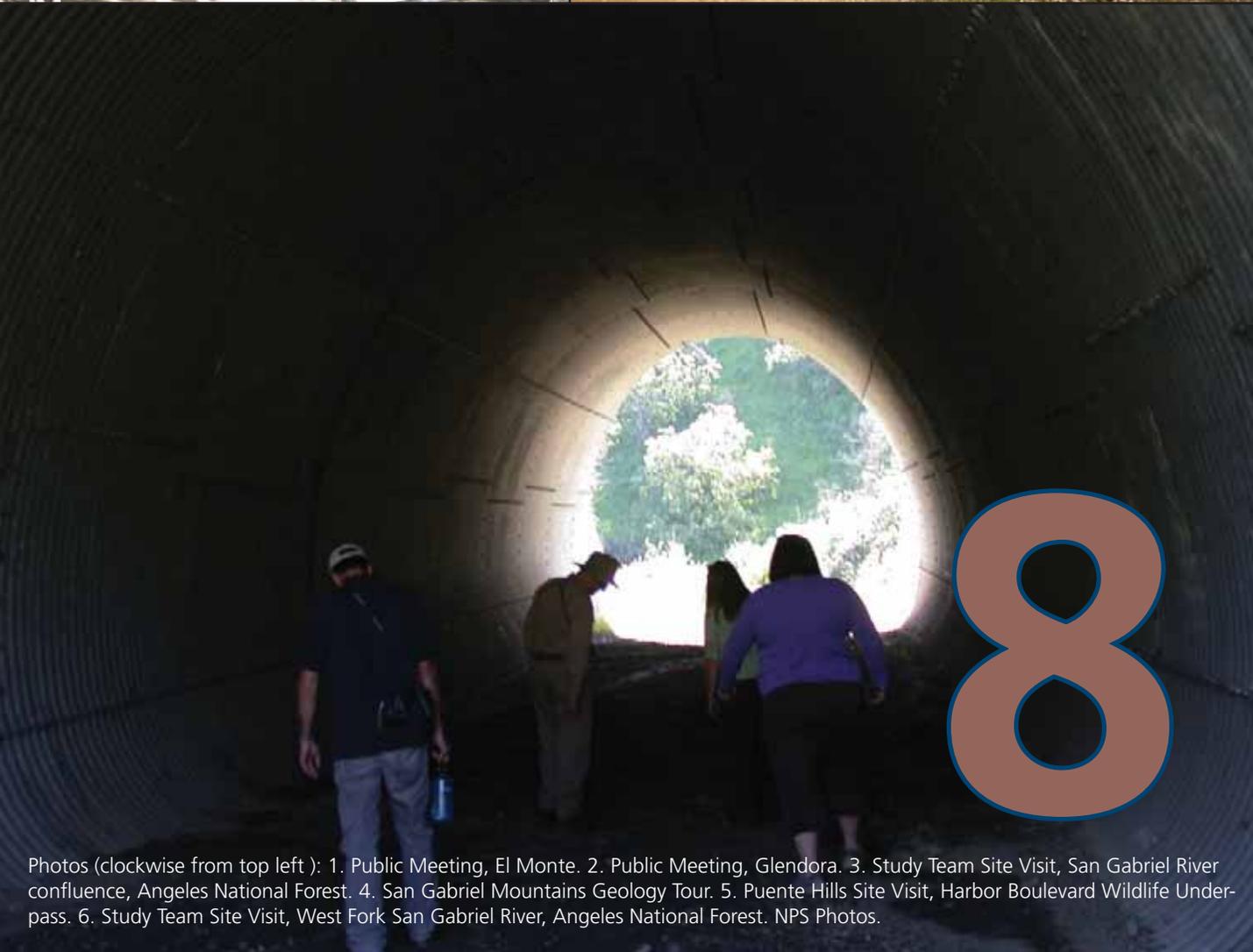
Alternative C	Alternative D
<p>There would be more targeted planning efforts and leveraged funds to create recreational opportunities along the San Gabriel River. More trail connections and new transit options designed to connect communities to the NRA would improve access to recreational areas and open space.</p> <p>Through cooperative agreements, agencies would share staff to assist in visitor management. The NPS would also be able to provide staff assistance and visitor management technical assistance throughout the NRA.</p> <p>The voluntary information network would provide more opportunities to provide interpretive and educational programs about the resources of the San Gabriel River Watershed.</p> <p>Alternative C could also provide public health benefits to those communities near the San Gabriel River corridor.</p>	<p>Alternative D would have the greatest beneficial effect on recreational opportunities and visitor experience. More trail connections and new transit options would improve access to recreational areas and open space.</p> <p>The NPS would provide technical assistance to improve open space and recreation planning in surrounding communities.</p> <p>Through cooperative agreements, agencies would share staff to assist in visitor management. The NPS would also be able to provide staff assistance for visitor management throughout the NRA.</p> <p>The larger NRA and voluntary information network would allow for coordinated interpretive and educational opportunities throughout the study area providing the greatest beneficial effects on the visitor experience.</p> <p>Alternative D would have a greater beneficial effect on public health for communities throughout the region, through providing the most new opportunities for outdoor recreation.</p>
<p>Small increases in visitation to NRA destinations could have modest beneficial effects on surrounding local communities which would provide services to such visitors.</p> <p>The new designation would result in additional jobs to support the NRA. Job training would be incorporated into staffing and volunteer programs. Such effects would be negligible in the regional context.</p>	<p>Small increases in visitation over time could have modest beneficial economic effects on surrounding local communities which would provide services to such visitors.</p> <p>With a larger designation, and a greater emphasis on education and job training, alternative D may provide slightly more benefits than the other alternatives in terms of creating jobs. Such effects would be negligible in the regional context.</p>
<p>Alternative C would have a greater beneficial impact on socially and economically disadvantaged populations, with efforts applied specifically in urban areas close to the San Gabriel River.</p> <p>Alternative C provides job training and opportunities within these communities which has the potential both to improve access for recreation, but also to build programs to provide training and job opportunities.</p> <p>The development of effective and diverse partnerships would also serve to build programs and cooperative agreements with organizations that represent disadvantaged populations.</p>	<p>With regional technical assistance programs, job training, and improved transportation connections to recreation and open space, alternative D presents the most resources and assistance for providing such communities with better access to recreational opportunities.</p> <p>As in C, alternative D provides job training and career opportunities for local communities.</p> <p>As in alternative C, the development of effective and diverse partnerships would also serve to build programs and cooperative agreements with organizations that represent disadvantaged populations.</p>

Table 25: Summary of Environmental Consequences

Impact Topics	No Action	Alternative A
Land Use	<p>Existing efforts to protect and conserve lands would continue at current levels. Regional growth and development, and lack of regional or coordinated planning efforts would continue to challenge local agencies and organizations in their efforts conserve open space.</p> <p>Traffic and congestion would continue to be affected primarily by regional growth and development. However, Localized congestion at heavily used recreation sites would continue to have moderate adverse impacts on traffic patterns in these areas.</p>	<p>Improved recreation opportunities and land conservation within the ANF would have an overall beneficial effect on urban life and the built environment for surrounding communities.</p> <p>Alternative A would have very little effect on traffic patterns throughout the study area. However, with increases in visitation, alternative A could add a negligible adverse impact to local traffic patterns associated with popular recreation areas.</p> <p>Alternative A actions would apply only to national forest lands. There would be no impact on land use managed by existing agencies and local jurisdictions.</p>
Water Resources	<p>Water quality would vary greatly from location to location throughout the study area, depending primarily on the level of development and land uses.</p> <p>Limited funding for restoration, planning, and public education to address water quality impacts would result in continuing minor to moderate adverse impacts on water resources.</p> <p>The water quality of rivers and creeks in certain areas would continue to be a public health and safety concern.</p>	<p>Additional emphasis on restoration and the protection of watershed resources would have a beneficial effect on water resources in the ANF.</p> <p>Additional resources for visitor education and more rangers on-site in heavily used recreation areas could reduce pollution caused by recreational use thus having a beneficial effect on water resources in the ANF.</p> <p>Improved water quality would have an indirect beneficial effect on public health and safety.</p>

Table 25: Summary of Environmental Consequences

Alternative C	Alternative D
<p>Alternative C would have a beneficial impact on the availability of open space along the San Gabriel River corridor, having a beneficial effect on urban quality and the built environment in these areas.</p> <p>When placed in the context of current transportation patterns, which are primarily affected by regional land use, growth and development, alternative C would have very little effect. Transportation improvements to destinations within the NRA, if implemented, could alleviate traffic congestion in high use recreation areas. Such effects would be negligible in the regional context.</p> <p>NPS management policies would apply only to NPS-owned lands. There would be no impact on land use managed by existing agencies and local jurisdictions.</p>	<p>By emphasizing and protecting interconnected ecosystems within and among urban zones, providing more recreational opportunities, and protecting open spaces, alternative D would have the greatest beneficial effect on open space availability, urban quality, and the built environment.</p> <p>With a broader emphasis on connecting people to recreation, providing more close-to-home recreation opportunities for urban communities, and improving transportation to major recreational destinations, alternative D could have beneficial effects on reducing traffic congestion in high use recreation areas. Such effects would be negligible in the regional context.</p> <p>NPS management policies would apply only to NPS-owned lands. There would be no impact on land use managed by existing agencies and local jurisdictions.</p>
<p>Over time, restoration opportunities funded by the NRA partnership would have a beneficial effect on San Gabriel River water quality.</p> <p>Alternative C would provide additional resources for visitor education, and more rangers on-site in heavily used recreation areas along the main corridors of the San Gabriel River. Additional resources for visitor education and more rangers on-site in heavily used recreation areas could reduce pollution caused by recreational use thus having a beneficial effect on water resources where current impairments are a result of recreational use.</p> <p>The increased emphasis on river-based recreation, and potentially on other recreation uses throughout the expanded NRA, holds the potential for additional impacts on water resources. However, this would be mitigated through more visitor education programs and more on-site staff to manage visitation.</p> <p>Improved water quality would have an indirect beneficial effect on public health and safety.</p>	<p>Alternative D would provide more restoration opportunities throughout the San Gabriel Mountains, along the San Gabriel River, and Puente Hills. Over time, these efforts would have greater beneficial effects on water resources than in alternative C.</p> <p>Alternative D would have similar beneficial effects to alternative C for water quality on rivers and creeks that are primarily impacted by recreational use.</p> <p>Additionally, the NRA would provide regional technical assistance for improved recreational planning and restoration opportunities, providing the opportunity to focus on broader watershed restoration efforts.</p> <p>The increased emphasis on river-based recreation, and new recreational opportunities throughout the expanded NRA, holds the potential for additional impacts on water resources. However, this would be mitigated through more visitor education programs and more on-site staff to manage visitation.</p> <p>Improved water quality would have an indirect beneficial effect on public health and safety.</p>



Consultation & Coordination

8

Photos (clockwise from top left): 1. Public Meeting, El Monte. 2. Public Meeting, Glendora. 3. Study Team Site Visit, San Gabriel River confluence, Angeles National Forest. 4. San Gabriel Mountains Geology Tour. 5. Puente Hills Site Visit, Harbor Boulevard Wildlife Underpass. 6. Study Team Site Visit, West Fork San Gabriel River, Angeles National Forest. NPS Photos.

Chapter 8: Consultation and Coordination

Public Involvement

In 2003, Congress directed the National Park Service (NPS) to complete a special resource study of the San Gabriel Watershed and Mountains, and to determine whether the area, or a portion of it, was eligible and suitable to be managed as a unit of the National Park System. The study team made extensive efforts to provide opportunities for the many elected officials, organizations, local governments, and residents of the greater Los Angeles metropolitan region to learn about, and contribute to, the study process. Throughout the special resource study process, the study team gathered input on issues, possible actions and alternatives, through workshops, public meetings, stakeholder meetings, field trips, newsletters, and websites.

Core Agency Partners

As directed in the study legislation, the NPS partnered with the Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy (RMC) in conducting the study. The NPS also partnered with the Angeles National Forest and the Los Angeles County Department of Public Works. These core agency partners served as advisors in project planning, communications, involvement of interested parties, and community engagement. The partners also contributed resource data, expertise, and reviewed draft documents.

Scoping

The NPS initiated the study public scoping in January 2005. The scoping process included meetings with agencies, elected officials and organizations, public meetings and workshops, three newsletters, a web page, and written public comments. These sources were used to identify the issues, significant resources, ideas for alternatives, and impact topics to be considered for environmental analysis.

The NPS study team used a variety of methods to notify the public and stakeholders of the study initiation. On January 19, 2005, a Notice of Scoping was published in the Federal Register, formally initiating the comment period for public scoping. The comment period extended to May 20, 2005. The study team compiled a mailing list of 3,000 from partner agencies and mailed Newsletter 1 to this list. Newsletter 1 described the study process

and announced the dates and locations of public scoping meetings held throughout the study area. Public meetings were held in Rosemead, Claremont, Diamond Bar, Downey, and Acton.

During the public scoping period, the NPS received 65 comment letters and e-mails from individuals, agencies, cities, organizations and elected officials. Input on the scope of the study was also provided by the approximately 175 people who attended public meetings hosted by the NPS. Additional input was gathered through meetings with various individuals, agencies, organizations, cities, and local elected officials. After scoping comments were received, the NPS published a second newsletter summarizing the comments. The majority of scoping comments were related to the study process and scope, opportunities, potential impacts, and important resources to consider.

Following the scoping period, the NPS conducted additional outreach by holding numerous meetings with cities, communities, government councils, and elected officials to refine the study boundary based on both public comments and legislative intent. A third newsletter was published describing changes to the study scope (scope revision).

The following is a list of the agencies, communities, organizations, and elected officials that the study team met with during the public scoping. Formal consultation letters were also sent to agencies and tribal groups.

PUBLIC SCOPING STAKEHOLDER MEETINGS:

- Acton Association of Town Councils
- Amigos de los Rios
- Antelope Valley Rural Town Council
- Army Corps of Engineers
- Assemblymember Judy Chu's Office
- Center for Law in the Public Interest
- Central Basin Water District
- City of Arcadia
- City of Bradbury
- City of Diamond Bar
- City of Duarte
- City of El Monte
- City of Industry
- City of Monrovia
- City of Montebello
- City of Rosemead
- City of Sierra Madre
- Congressman Adam Schiff's Office
- Congressman Brad Sherman's Office
- Congressman Buck McKeon's Office
- Congressman David Dreier's Office
- Congressman Gary Miller's Office
- Congresswoman Grace Napolitano's Office

- Congresswoman Hilda Solis' Office
- Congresswoman Linda Sanchez's Office
- Congresswoman Lucille Royball-Allard's Office
- Emerald Necklace Meeting
- Gateway Cities Council of Governments
- Green Visions, USC
- La Habra Heights City Council
- Latino Urban Forum
- Los Angeles County and San Gabriel River Watersheds Council
- Los Angeles County Department of Parks and Recreation
- Los Angeles County Department of Regional Planning
- Los Angeles County Department of Public Works
- Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy (RMC) Board and staff
- National Environmental Spanish Council
- Orange County Council of Governments
- Puente Hills Habitat Conservation Authority
- San Gabriel Mountains Regional Land Conservancy
- San Gabriel River Master Plan Stakeholders Meeting
- San Gabriel River Water Committee
- San Gabriel Valley Council of Governments
- San Gabriel Valley Water Association
- San Gabriel Valley Water District
- Santa Clara River Group
- Sierra Club
- State Senator Bob Margett's Office
- Tujunga Watershed Association Trails Congress
- Tujunga Watershed Association, Mary Benson
- U.S. Forest Service, Angeles National Forest
- Upper San Gabriel Valley Water District



Public scoping meeting in Rosemead, CA, 2005. NPS photo.

Resource Analysis

Following the scoping phase of the study process, the NPS began analyzing study area resources to determine if there were resources of national significance and if so, whether those resources would be suitable for inclusion in the national park system. The NPS worked with representatives from various agencies and organizations to determine resource significance. A number of methods were employed, including phone interviews, meetings, and field trips. NPS cultural and natural resource professionals were also consulted during this process.

CONTRIBUTIONS AND TECHNICAL REVIEW BY NATIONAL PARK SERVICE PROFESSIONALS

- Kaisa Barthuli, National Park Service, Deputy Program Manager Route 66 Corridor Preservation Program
- Sharon Brown, National Park Service, Outdoor Recreation Planner, National Trails System– Intermountain Region
- Jim Donovan, Rivers, Trails and Conservation Assistance
- Anne Dove, Rivers, Trails and Conservation Assistance
- Keith Dunbar, Chief, Park Planning and Environmental Compliance
- Steve Gibbons, National Natural Landmarks Coordinator
- Elaine Jackson-Retondo, Architectural Historian, PWR Cultural Resources, NHPA Specialist
- Aaron Mahr, National Park Service, Superintendent, National Trails System– Intermountain Region
- Mark Rudo, Archeologist, PWR Cultural Resources
- Rose Rumball Petre, Environmental Compliance Specialist

CONTRIBUTIONS AND TECHNICAL REVIEW BY OTHER AGENCIES, EXPERTS AND SCHOLARS

- Paul Beier, Associate Professor of Wildlife Ecology, School of Forestry, Northern Arizona University
- Bill Brown, Former USFS Biologist for the Angeles National Forest (retired)
- Bruce Carter, Geologist, Pasadena City College
- William Deverell, Professor of History, USC Center for Southern CA History
- Marty Dumpis, USFS, Angeles National Forest, District Ranger
- David Earle, consultant
- Robert Fisher, USGS, Biologist
- Naomi Fraga, Botanist, Rancho Santa Ana Botanical Garden

- Deanna Greco, Geologic Resources Division, NPS
- Anthea Hartig, National Trust for Historic Preservation Western Office, Director
- Mark Herwick, County of Los Angeles, Department of Regional Planning
- Frank C. Lorey III, State and Federal registered Historian
- Michael J. McIntyre, Angeles National Forest District Ranger, Los Angeles River Ranger District, former Heritage Resources, Interpretive Services, and Tribal Relations Program Manager
- Orlando Mistretta, Research Associate, Rancho Santa Ana Botanical Garden
- Janet Nickerman, USFS, Angeles National Forest, Botanist
- Robert Powell, USGS, Project Chief San Gabriel Geologic Resources
- John Robinson, historian, author
- Leslie Welch, USFS, Angeles National Forest, District Wildlife Biologist
- Peter Wohlgemuth, Director, USFS, San Dimas Experimental Forest
- Darrell Vance, Angeles National Forest, Archeologist, Heritage Data Steward
- Anthony Veerkamp, National Trust for Historic Preservation Western Office, Senior Program Officer



USGS Geologist, Robert Powell. NPS photo.

Alternatives Development

The study team released draft alternative concepts in a newsletter for public review in the summer of 2009. The public comment period was open from August to November 2009. The study team distributed over 3,000 newsletters to organizations and individuals on its mailing list, partner agencies, and at public and stakeholder meetings. A limited number of newsletters translated into Spanish were also distributed. The newsletter was also available for comment on the National Park Service's Planning, Environment and Public Comment (PEPC) website.

News releases announcing the availability of the alternatives newsletter and the public meetings schedule were distributed to local media, and several newspaper stories were published. The purposes of the newsletter were to: 1) present preliminary study findings; 2) present preliminary alternatives; and 3) solicit comments on the preliminary findings and alternatives. The newsletter also contained information on the date, time, and locations of public meetings that were held to solicit comments on the preliminary findings. Between August and October 2009, the study team held six public meetings at locations throughout the study area including Diamond Bar, El Monte, Santa Clarita, Glendora, Palmdale, and Tujunga. At each meeting, the study team gave a presentation describing the preliminary findings and alternatives and answered questions. Participants shared comments and suggestions in small groups facilitated by the study team, and Rivers and Mountains Conservancy (RMC) staff, and other volunteers. The facilitators recorded comments on flipcharts during the discussion. All of the meetings were well attended by diverse groups of community members (approximately 450 total) despite the fact that the Station Fire, which significantly affected the Angeles National Forest, was burning during this time. In addition to the public meetings, the NPS study team held meetings with local, state and federal government agencies, organizations, communities, and Congressional offices.

The NPS received approximately 4,800 comments. Most of these comments were submitted via written letters and through e-mail. There were 205 unique letters and 4,600 form letters of 5 different types. The NPS received comments from 36 different agencies and organizations. The remainders were from individuals. The public meeting transcripts are also part of the public comments. A variety of views were expressed, but the majority of comments support combining different aspects of the alternatives and having more NPS involvement

and leadership. Some communities and agencies expressed concerns about loss of local control, or restrictions on their ability to carry out necessary functions. Other commenters expressed concerns about restrictions on recreational activities or impacts on their communities from increased recreational use. Better access to recreation and providing close to home opportunities was an important goal for some commenters. Others expressed interest in furthering opportunities for connecting wildlife habitats and protecting watershed values. Following the comment period, the study team continued to meet with stakeholder groups and agencies to refine the alternatives.

ALTERNATIVES STAKEHOLDER MEETINGS:

- Amigos de los Rios
- Antelope Valley Association of Rural Town Councils
- California Department of Fish and Game
- California State Parks
- City of Diamond Bar
- City of Industry
- Congressman David Dreier's Office
- Congressman Gary Miller's Office
- Congresswoman Grace Napolitano's Office
- Congresswoman Judy Chu's Office
- Congresswoman Sanchez' District Office
- County Sanitation Districts of Los Angeles County
- Friends of Pio Pico State Historical Park
- Friends of the Whittier Narrows Natural Area
- Los Angeles County Department of Parks and Recreation
- Los Angeles County Department of Public Works
- Los Angeles Fish and Game Commission
- Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy (RMC)
- Puente Hills Landfill Native Habitat Preservation Authority
- San Antonio Canyon Town Hall
- San Gabriel Mountains Forever Campaign
- San Gabriel Valley Council of Governments - Open Space Workshop
- San Gabriel Water Association
- Sanitation Districts of Los Angeles County
- Santa Monica Mountains National Recreation Area
- Senator Barbara Boxer's Office
- Senator Bob Huff's Representative
- Senator Dianne Feinstein's Office
- State Senator Gloria Romero's Office
- Trust for Public Land
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. Forest Service, Angeles National Forest

Web Page

A web page for the San Gabriel Watershed and Mountains Special Resource Study (www.nps.gov/pwro/sangabriel/) was developed to provide updates on the study. It contained detailed information about the feasibility study process, background information about the study area, and was updated periodically to include all news releases and newsletters.

Agency and Tribal Consultation

In November 2005, the National Park Service sent out a letter to agencies and tribal organizations announcing the commencement of the study and requested agency input.

Agencies and Elected Officials

- Department of Agriculture, U.S. Forest Service
- Department of the Interior, Bureau of Land Management
- Department of the Interior, U.S. Fish and Wildlife Service
- Department of the Interior, Bureau of Indian Affairs
- Department of the Army, U.S. Army Corps of Engineers
- Congressional Representatives
 - Honorable Barbara Boxer
 - Honorable Dianne Feinstein
 - Congresswoman Hilda L. Solis
 - Congressman Adam B. Schiff
 - Congressman David Dreier
 - Congressman Howard P. "Buck" McKeon
 - Congressman Gary G. Miller
 - Congresswoman Grace F. Napolitano
 - Congresswoman Linda T. Sanchez
 - Congressman Edward R. Royce,
 - Congressman Xavier Becerra
 - Congresswoman Juanita Millender-McDonald
- San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy
- California Department of Fish and Game
- State Historic Preservation Officer

Tribal Organizations

- Alliance of Native Americans
- Cahuilla Band
- California Indian Council Foundation
- Chumash
- Coastal Gabrielino Diegueno
- Costanoan - Rumsen Carmel Tb
- Fernandeno / Tataviam Tribe
- Fontana Native American Indian Center, Inc.
- Gabrieleno/Tongva Tribal Council of San Gabriel
- Gabrielino - Tongva Nation
- Gabrielino - Tongva Springs
- Gabrielino – Tongva Tribe
- Gabrielino - Tongva Youth Council
- Gabrielino Band of Mission Indians of CA
- Ish Panesh United Band of Indians
- Juaneno Band of Mission Indians
- Kawaiisu Tribe
- Kitanemuk & Yowlumne Tejon Indians
- LA City/County Native American Indian Comm
- Los Coyotes Band of Mission Indians
- Owl Clan
- San Luis Rey Mission Band
- San Manuel Band of Serrano Mission Indians
- San Manuel Tribal Administration
- Santa Rosa Band of Mission Indians
- Soboba Band of Mission Indians
- Tehachapi Indian Tribe
- Tejon Indian Tribe
- Ti'At Society
- Tongva
- Tumamait
- Urban Indian Council



Public alternatives meeting in Glendora, CA, 2009. NPS photo.

List of Agencies and Elected Officials to Whom Copies of the Draft Special Resource Study Are Being Sent

The Executive Summary of this report is being sent to the entire study mailing list which includes approximately 1,500 people and organizations. A postcard was sent to the mailing list allowing recipients to request the full report in either printed or CD-ROM version. The full study report is also posted on the Internet, at www.nps.gov/pwro/sangabriel. The following agencies and elected officials are on the study mailing list and are among those that are being sent the draft special resource study and environmental assessment:

Federal Agencies and Elected Officials

FEDERAL AGENCIES

U.S. Department of the Interior

National Park Service

- Craters of the Moon National Monument and Preserve
- Rivers, Trails & Conservation Assistance Program
- Santa Monica Mountains National Recreation Area

U.S. Geological Survey

U.S. Department of Agriculture

Natural Resources Conservation Service

- Mojave Desert Conservation District

United States Fish and Wildlife Service

United States Forest Service

- Angeles National Forest
- Pacific Southwest Research Station, Riverside Forest Fire Laboratory
- San Bernardino National Forest
- Pacific Southwest Region

U.S. Department of Commerce

Office of General Counsel

U.S. Army Corps of Engineers

U.S. Environmental Protection Agency

U.S. SENATORS AND CONGRESSIONAL REPRESENTATIVES

U.S. House of Representatives

Honorable Adam B. Schiff
Honorable Brad Sherman
Honorable Buck McKeon
Honorable Darrell Issa
Honorable David Dreier
Honorable Edward Royce
Honorable Gary G. Miller
Honorable Grace F. Napolitano
Honorable Howard McKeon
Honorable Jerry Lewis
Honorable Judy Chu
Honorable Linda T. Sanchez
Honorable Lucille Roybal-Allard
Honorable Xavier Becerra

U.S. Senate

Honorable Barbara Boxer
Honorable Dianne Feinstein

Senate Committee on Natural Resources & Wildlife

State Agencies and Elected Officials

CALIFORNIA STATE AGENCIES

California Coastal Conservancy
California Resources Agency
Department of Finance
Department of Fish and Game
Department of Forestry & Fire Protection
Department of Parks and Recreation

- Mojave Desert Information Center

Department of Public Health
Department of Transportation
Los Angeles Regional Water Quality Control Board
Native American Heritage Commission
Office of Historic Preservation
San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy
Santa Ana Regional Water Quality Control Board
Santa Monica Mountains Conservancy
South Coast Air Quality Management District
Southern California Wetlands Recovery Project

CALIFORNIA STATE ASSEMBLY

Honorable Anthony Adams
Honorable Anthony Portantino
Honorable Bill Emmerson
Honorable Cameron Smyth
Honorable Charles Calderon
Honorable Curt Hagman

Honorable Ed Hernandez, O.D.
Honorable Hector De La Torre
Honorable Kevin Jeffries
Honorable Michael Duvall
Honorable Mike Eng
Honorable Norma J. Torres
Honorable Steve Knight
Honorable Tony Mendoza

CALIFORNIA STATE SENATE

Honorable Alex Padilla
Honorable Bob Huff
Honorable Carol Liu
Honorable George Runner
Honorable Gloria McLeod
Honorable Gloria Romero
Honorable Ron Calderon

Local Agencies and Jurisdictions

CITIES

Alhambra
Arcadia
Azusa
Baldwin Park
Bell
Bell Gardens
Bellflower
Bradbury
Brea
Buena Park
Cerritos
Chino Hills
Claremont
Commerce
Compton
Corona
Covina
Diamond Bar
Downey
Duarte
El Monte
Fullerton
Glendale
Glendora
Industry
Irwindale
La Habra
La Habra Heights
La Mirada
La Puente
La Verne
Lakewood
Long Beach
Los Alamitos
Los Angeles
Lynwood

Maywood
 Monrovia
 Montebello
 Monterey Park
 Norwalk
 Palmdale
 Paramount
 Pasadena
 Pico Rivera
 Placentia
 Pomona
 Rosemead
 San Dimas
 San Gabriel
 San Marino
 Santa Clarita
 Santa Fe Springs
 Seal Beach
 Sierra Madre
 Signal Hill
 Solana Beach
 South El Monte
 South Gate
 South Pasadena
 Temple
 Walnut
 West Covina
 Whittier

COUNCILS OF GOVERNMENT

Gateway Cities
 San Gabriel Valley
 Kern County
 Orange County

COUNTY GOVERNMENT

Los Angeles

- County Board of Supervisors
- Chief Administrative Office
- Community Standards District
- Department of Agriculture
- Department of Forestry
- Department of Health Services
- Department of Parks and Recreation
 - Santa Fe Dam Recreation Area
 - Vasquez Rocks Natural Area
- Department of Public Works
- Department of Regional Planning
- Department of Transportation
- Fire Department
- Fish and Game Commission
- Sanitation Districts of Los Angeles

Orange

- Watershed and Coastal Resources Division

Santa Barbara

- Department of Planning

San Bernardino

- Board of Supervisors
 - Sherriff's Department
- San Diego
- Board of Supervisors
 - Department of Public Works
 - Planning & Land Use

JOINT POWERS AUTHORITIES (JPAS)

Desert and Mountain Conservation Authority
 Wildlife Corridor Conservation Authority
 Watershed Conservation Authority

TOWN COUNCILS

Acton
 Agua Dulce
 Altadena
 Antelope Acres
 Association of Rural Town Councils
 Rowland Heights Community Coordinating Council
 San Antonio Canyon Town Hall

REGIONAL AGENCIES/PARK DISTRICTS

Greater Los Angeles County Vector Control District
 Puente Hills Landfill Native Habitat Preservation Authority

WATER SUPPLY AGENCIES AND ORGANIZATIONS

Central Basin Municipal Water District
 Main San Gabriel Basin Watermaster
 Municipal Water District of Orange County
 Palmdale Water District
 Rowland Water District
 San Gabriel River Water Committee
 San Gabriel Valley Municipal Water District
 San Gabriel Valley Water Association
 Upper San Gabriel Valley Water District
 Walnut Valley Water District

ORGANIZATIONS

Acora
 Acton/Agua Dulce Trails Council
 Adams' Pack Station
 Altadena Foothills Conservancy
 American Land Rights Association
 American Motorcyclist Association
 Amigos de los Rios
 Antelope Valley Conservancy

Antelope Valley Pacific Crest Trail Association
 Association for Environmental & Outdoor Education
 Association Michoacana
 Azusa Light and Water
 Backcountry Horsemen of California
 Backcountry Horsemen of California
 Barrett Canyon Improvement Association
 Big Santa Anita Canyon Permittees' Association
 Blue Ribbon Coalition
 Boy Scouts of America
 California Cattlemen's Association
 California Native Plant Society
 California Trout, Inc.
 California Wilderness Coalition
 Californians for Alternatives to Toxics
 Center for Biological Diversity
 Claremont Wildlands Conservancy
 Coastal Conservancy
 College of the Canyons
 Community Hiking Club
 Community Hiking Club/SCV Green
 Concerned Off Road Bicyclists Association
 Consejo de Federaciones Mexicanas en Norteamérica
 Desert Marksmen Rifle & Pistol Club
 Equestrian Trail, Inc., COLIA
 Federation of Flyfishers
 Fisheries Resource Volunteer Corps
 Foothills Wildlife Conservancy
 Free Our Forests
 Friends of Coyote Hills
 Friends of Pio Pico, Inc.
 Friends of the Los Angeles River
 Friends of the River
 Friends of Whittier Narrows Natural Area
 Hacienda Heights Improvement Association
 Hills for Everyone
 Hillside Open Space Education Coalition
 Humane Society of the United States
 Hundred Peaks Section/Sierra Club
 International Mountain Biking Association
 La Canada Flintridge Trails Council
 Lake Hughes Cabin Owners Association
 Las Flores Water Company
 Latino Urban Forum
 League of California Cities
 League of Women Voters/Claremont Area
 Los Angeles and San Gabriel Rivers Watershed Council
 Los Angeles Co Beekeepers Association
 Los Angeles Conservation Corps
 Millard Canyon Cabin Owners
 Millard Canyon Improvement Association
 Mount Baldy Home Owners Association
 Mount Wilson Bicycling Association
 Mountain Repeater Association
 Mt. Baldy Fire Safe Council

Mt. Wilson Bike Association
 Mujeres de la Tierra
 Mule Deer Foundation - California
 National Audubon Society
 National Forest Homeowners
 National Hispanic Environmental Council
 National Parks Conservation Association
 National Trust for Historic Preservation
 National Wildlife Federation
 Nelson Big Horn Sheep Stakeholders
 Oldtimers Foundation
 Orange County Buddhist Church
 Outward Bound
 Pacific Bell/Corporate Real Estate
 Pacific Crest Trail Association
 Pacific Mining Association
 Pasadena Casting Club
 Pico Rivera Equestrian Boarders Association
 Placerita Canyon Trail Council
 Progressive Christians Uniting
 Project Amiga
 Public Lands for the People
 Quail Unlimited
 Rancho Santa Ana Botanical Garden
 River Lands Preservation Trust
 RMC Water and Environment
 Rowland Heights Coordinating Council
 San Dimas Canyon Improvement Association
 San Dimas Nature Center
 San Gabriel Canyon Property Owners Association
 San Gabriel Mountains Regional Conservancy
 San Gabriel Mountains Trailbuilders
 San Gabriel Property Owners Association
 San Gabriel Valley Conservation Corps
 Santa Clarita Organization for Planning the Environment
 Santa Clarita Valley Canyons Preservation Committee
 Santa Clarita Valley Trails Advisory Council
 Save Our Canyon
 Sespe Fly Fishing Club
 Sierra Club

- Angeles Chapter
 - Mojave Group
 - Pasadena Group
 - San Gorgonio Chapter

 Sierra Madre Mountain Conservancy
 Sociedad De Obreros
 Southern California Edison
 Southern California Forests Committee
 Southern California Society of American Foresters
 Stallion Meadows Home Owners Association
 Sun City Home Owners Association
 Sylmar Hang Gliding Association
 Sylmar Hills Sportsman's Club
 The California Chaparral Institute
 The City Project

The Trust for Public Land
The Wilderness Society
Tierra Del Sol 4wd Club
Tri-County Conservation League, Inc.
Trinity Lutheran Church
Trust for Public Land
Tujunga Watershed Council and Stakeholders
U.S. Hang Gliding and Paragliding
Voice
Volunteers of the Angeles Nat'l Forest
Washington Native Plant Society
Western Land Exchange Project
Wetlands Recovery Project
Wilderness Cycling
Wilderness Flyfishers

TRIBAL GOVERNMENTS AND ORGANIZATIONS

Agua Dulce/Acton Country Journal
Alliance of Native Americans of Southern California
American Indian Resource Center, Huntington Park
Library
AV Indian Museum
Cahuilla Band
California Indian Basket Weavers Association
Castanoan-Rumsen Carmel Tribe
Coastal Gabrielino Diegueno
DNA Cultural Resources Consultants
Fernandeno / Tataviam San Fernando Mission
Indians
Fernandeno / Tataviam Tribal Government
Fontana Native American Indian Center, Inc.
Gabrielino - Tongva Nation
Gabrielino - Tongva Springs
Gabrielino - Tongva Tribal Council
Haramokngna
IshPanesh United Band of Indians
Island Gabrielino Group
Juaneno Band of Mission Indians
Kawaiisu Tribe
Kern Valley Indian Council
Kitanemuk &YowlumneTejon Indians
LA City/County Native American Indian Community
Los Coyotes Band of Mission Indians
Owl Clan
Redbird
Sacred Sites Committee of AV
San Fernando Band of Mission Indians
San Luis Obispo County Chumash Council
San Luis Rey Mission Band
San Manuel Band of Mission Indians
San Manuel Band of Serrano Mission Indians
San Manuel Tribal Administration
Santa Rosa Band of Mission Indians
Santa Ynez Band of Mission Indians
Sherman Indian Museum
Soboba Band of Mission Indians
Tehachapi Indian Tribe
Tejon Indian Tribe
Tongva
Urban Indian Council
We Um Attassum Pack Station



Appendices

Photos (clockwise): 1. Cycling, San Gabriel River Bike Trail. NPS Photo. 2. Stream in the San Gabriel River. Photo © Randy Okamura. 3. .Glendora orchards, 1931. Photo courtesy of the Los Angeles County Library. 4. San Gabriel Mountains. NPS Photo.

Appendices

Appendix A: Study Legislation

117 STAT. 840 PUBLIC LAW 108–42—JULY 1, 2003

Public Law 108–42
108th Congress

An Act

To authorize the Secretary of the Interior to conduct a study of the San Gabriel River Watershed, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “San Gabriel River Watershed Study Act”.

SEC. 2. STUDY OF SAN GABRIEL RIVER WATERSHED.

(a) IN GENERAL.—The Secretary of the Interior (hereafter in this Act referred to as the “Secretary”) shall conduct a special resource study of the following areas:

- (1) The San Gabriel River and its tributaries north of and including the city of Santa Fe Springs.
- (2) The San Gabriel Mountains within the territory of the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (as defined in section 32603(c)(1)(C) of the State of California Public Resource Code).

(b) STUDY CONDUCT AND COMPLETION.—Section 8(c) of Public Law 91–383 (16 U.S.C. 1a–5(c)) shall apply to the conduct and completion of the study conducted under this section.

(c) CONSULTATION WITH FEDERAL, STATE, AND LOCAL GOVERNMENTS.—In conducting the study under this section, the Secretary shall consult with the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy and other appropriate Federal, State, and local governmental entities.

(d) CONSIDERATIONS.—In conducting the study under this section, the Secretary shall consider regional flood control and drainage needs and publicly owned infrastructure such as wastewater treatment facilities.

SEC. 3. REPORT.

Not later than 3 years after funds are made available for this Act, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Resources of the House of Representatives a report on the findings, conclusions, and recommendations of the study.

Approved July 1, 2003.

Appendix B: Species Tables

Table B1: Federal and State Listed Threatened and Endangered Species

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Plants</i>					
<i>Astragalus brauntonii</i>	Braunton's milk-vetch (endemic)	Closed-cone coniferous chaparral, coastal scrub, valley and foothill grassland	FE	None	Azusa, Mount Wilson
<i>Berberis nevini</i>	Nevin's barberry (endemic)	Chaparral, cismontane woodland, coastal scrub, riparian woodland	FE	CE	Sunland, Glendora, Pasadena, Mint Canyon, San Fernando, Mount Baldy
<i>Brodiaea filifolia</i>	thread-leaved brodiaea (endemic)	Valley and foothill grassland, vernal pools, flood plains, coastal sage scrub	FT	CE	Glendora
<i>Dodecahema leptoceras</i>	slender-horned spineflower (endemic)	Chaparral, cismontane woodland, alluvial fan coastal scrub	FE	CE	Azusa, Mount Wilson, Pasadena, Cajon, Agua Dulce, Mint Canyon, San Fernando, Sunland
<i>Orcuttia californica</i>	California Orcutt grass	Vernal pools, wetlands	FE	CE	Western San Gabriel Mtns., Soledad Basin
<i>Fish</i>					
<i>Catostomus santaanae</i>	Santa Ana sucker	Clear, cool, gravely and rock streams	FT	SSC	Acton, Azusa, Agua Dulce, Condor Peak, Crystal Lake, Glendora, Mount Baldy, Mount San Antonio Sunland, Waterman Mountain, East Fork San Gabriel River, Cattle Canyon, Creek and Bear Creek
<i>Gasterosteus aculeatus williamsoni</i>	Unarmored threespine stickleback	River or creek pools and backwaters with sand or mud bottoms	FE	CE	Acton, Agua Dulce, Mint Canyon
<i>Oncorhynchus mykiss</i>	Southern steelhead	Freshwater streams connecting to the ocean	FE	SSC	(southern ESU - historic)
<i>Amphibians</i>					
<i>Bufo californicus</i>	Arroyo toad	Rivers with shallow gravely pools adjacent to sandy terraces	FE	SSC	Agua Dulce, Chilao Flat, Little Rock Creek
<i>Rana aurora draytonii</i>	California red-legged frog	Dense shrubby riparian vegetation associated with deep, still or slow-moving water	FT	SSC	Sleepy Valley, San Gabriel Mountains

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Rana muscosa</i>	mountain yellow-legged frog	Ponds, tams, lakes, and streams at moderate to high elevations	FT	SSC	Crystal Lake, Mount Baldy, Pacifico Mountain, Valyermo, Glendora, Juniper Hills, Condor Peak, Mount San Antonio, Mount Wilson, Sunland, Chilao Flat, Pasadena, Waterman Mountain, San Gabriel Mountains
Reptiles					
<i>Gopherus agassizi</i>	Desert tortoise	Desert oases, riverbanks, washes, dunes rocky slopes	FT	CT	Northern edge of the San Gabriel Mountains.
Birds					
<i>Buteo swainsoni</i>	Swainson's hawk	Open grasslands, riparian systems	S	CT	Rose Hills
<i>Coccyzus americanus occidentalis</i>	Western yellow-billed cuckoo	Riparian areas	FC	CE	Baldwin Park, El Monte, Ontario, Whittier, Near Cattle Canyon, historic record from San Gabriel River (1951)
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	Riparian areas, willow thickets, mountain meadows	FE	None	Agua Dulce, Pasadena, El Monte, Mount Wilson
<i>Falco peregrinus</i>	American peregrine falcon	Cliff faces, wetlands, woodlands, other forested habitats, cities, agricultural areas	FSS	CE	Pasadena
<i>Gymnogyps californianus</i>	California condor	Foothill and rangeland forest	FE	CE	San Gabriel Mountains
<i>Haliaeetus leucoccephalus</i>	Bald eagle	Woodlands forests, grasslands, wetlands	-	CE	San Gabriel Valley
<i>Polioptila californica californica</i>	Coastal California gnatcatcher	Coastal sage scrub	FT	None	Arcadia, Baldwin Park, Claremont, El Monte, La Habra, Mint Canyon, Mount Wilson, Ontario, Sunland, San Dimas, San Jose Hills, Rancho Santa Ana Botanical Garden Bio Field Station, Puente Hills, Yorba Linda
<i>Vireo bellii pusillus</i>	Least Bell's vireo	Riparian areas	FE	CE	Azusa, El Monte, Fish Canyon, Tassel Canyon, Whittier Narrows, Tonner Canyon, Yorba Linda
Mammals					
<i>Spermophilus mohavensis</i>	Mohave ground squirrel	Low desert with scattered brush, sandy or gravelly soil	FSS	CT	Mescal Creek, Littlerock, Palmdale, Valyermo (areas just north or adjacent to the study area)

Table B2: Rare and Sensitive Plant Species

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
Abrams' alumroot (endemic)	<i>Heuchera abramsii</i>	Upper montane coniferous forest	FW	None	4	Mount San Antonio
alkali mariposa lily	<i>Calochortus striatus</i>	Chaparral, Mojavean desert scrub, chenopod scrub, meadows and seeps	None	None	1B	Waterman Mountain
alpine sulfur-flowered buckwheat (endemic)	<i>Eriogonum umbellatum var. minus</i>	Subalpine coniferous forest, upper montane coniferous forest	FW	None	4	Mount San Antonio
Big Bear Valley woollypod (endemic)	<i>Astragalus leucolobus</i>	Lower montane coniferous forest, Pinyon and juniper woodlands	FSS	None	1B	Mount San Antonio, Telegraph Peak, Mescal Creek
Brand's star phacelia	<i>Phacelia stellaris</i>	Coastal dunes and scrub, upper montane coniferous forest	Candidate	None	1B	El Monte
California muhly (endemic)	<i>Muhlenbergia californica</i>	Chaparral, coastal scrub, meadows and seeps, lower montane coniferous forest	FW	None	4	San Gabriel Mountains: Big Rock Creek, San Antonio Canyon, Devil's Canyon
California walnut	<i>Juglans californica</i>	Southern oak woodland	None	None	4	San Gabriel Mountains, Puente Hills, San Jose Hills
Coulter's goldfields	<i>Lasthenia glabrata ssp. coulteri</i>	Marshes and swamps, playas, vernal pools	None	None	1B	Mount Wilson, Pasadena, La Habra, Whittier
Crested milk-vetch (endemic)	<i>Astragalus bicristatus</i>	Lower and upper montane coniferous forest	FSS	None	4.3	San Gabriel Mountains
Davidson's bush mallow (endemic)	<i>Malacothamnus davidsonii</i>	Chaparral, cismontane woodland, coastal scrub, riparian areas	FW	None	1B	Glendora, Yorba Linda
Davidson's saltscale	<i>Atriplex serenana var. davidsonii</i>	Coastal bluff scrub, coastal scrub (alkaline)	None	None	1B	Mescal Creek, Condor Peak, Sunland
Duran's rush (endemic)	<i>Juncus duranii</i>	Lower and upper montane coniferous forest, meadows and seeps	FW	None	4	San Gabriel Mtns., Dorr Canyon, NW slope of Mt. Burnham. Lodgepole Picnic San Gabriel Mtns., Little Rock Creek, ca 1 mi downstream from Cooper Creek., Angeles Crest Hwy;

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
Engelmann oak	<i>Quercus englemannii</i>	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland	None	None	4	Monrovia, Pasadena, Pomona
Ewan's cinquefoil (endemic)	<i>Potentilla glandulosa ssp. ewanii</i>	Lower montane coniferous forest, near seeps and springs	None	None	1B	Crystal lake
fragrant pitcher sage (endemic)	<i>Lepechinia fragrans</i>	Chaparral	FW	None	4	San Gabriel Mountains: Switzer's Camp, Mount Wilson
fringed grass-of-parnassus	<i>Parnassia cirrata</i>	Lower and upper montane coniferous forest, meadows and seeps	None	None	1B	Glendora, Mount San Antonio, Crystal Lake
gray monardella (endemic)	<i>Monardella cinerea</i>	Lower and upper montane coniferous forest, subalpine coniferous forest	FW	None	4	Mount San Antonio
Greata's aster (endemic)	<i>Symphotrichum greatae</i> (formerly <i>Aster greatae</i>)	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, riparian woodland	None	None	1B	Mount Baldy, Glendora, Azusa, Mount Wilson, Pasadena, Mount San Antonio, Juniper Hills, Waterman Mountain, Crystal Lake, Pacifico Mountain, Acton, Condor Peak, Chilao Flat, Agua Dulce, San Fernando, Sunland
Hall's monardella (endemic)	<i>Monardella macrantha ssp. hallii</i>	Broadleaf upland forest, Chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland	FSS	None	1B	Mount Baldy
hot springs fimbriatylis	<i>Fimbristylis thermalis</i>	Meadows and seeps (alkaline), hot springs	None	None	2	Glendora, Crystal Lake
intermediate mariposa lily (endemic)	<i>Calochortus weedii var. intermedius</i>	Chaparral, coastal scrub, valley and foothill grassland	None	None	1B	La Habra, San Dimas, Yorba Linda, Claremont

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
Jepson's bedstraw (endemic)	<i>Galium jepsonii</i>	Lower and upper montane coniferous forest	FW	None	4	Mt. Waterman, Pacifico Mountain
Johnston's bedstraw (endemic)	<i>Galium johnstonii</i>	Chaparral, lower montane coniferous forest, Pinyon and juniper woodland, riparian woodland	FW	None	4	San Gabriel Mountains: Granite Mountain, Roundtop Mountain, Divide between W Fork Bear Creek and Devils Canyon, horse flats
Johnston's buckwheat (endemic)	<i>Eriogonum microthecum var. johnstonii</i>	Subalpine coniferous forest, upper montane coniferous forest	FSS	None	1B	Mescal Creek, Mount San Antonio
Kern Canyon clarkia (endemic)	<i>Clarkia xantiana ssp. parviflora</i>	Cismontane woodland, Great Basin scrub	None	None	1B	Valyermo
Laguna Mountains jewelflower (endemic)	<i>Streptanthus bernardinus</i>	Chaparral, lower montane coniferous forest,	FSS	None	4	Mt. Baldy, Glendora, Telegraph Peak, Mount San Antonio, Waterman Mountain, Crystal Lake, Pacifico Mountain
lemon lily	<i>Lilium parryi</i>	Lower and upper montane coniferous forest, meadows and seeps, riparian forest,	FSS	None	1B	Pacifico Mountain, San Gabriel Mountains: Little Rock Creek, Prairie Forks, Alder Gulch, Burkhardt trail, Big Cienega spring,
many-stemmed dudleya (endemic)	<i>Dudleya multicaulis</i>	Chaparral, coastal scrub, valley and foothill grassland	FSS	None	1B	Mt. Baldy, Ontario, Claremont, Glendora, Azusa, Baldwin Park, San Dimas, Mount Wilson, Pasadena, El Monte
Mason's neststraw (endemic)	<i>Stylocline masonii</i>	Chenopod scrub, Pinyon and Juniper woodland	None	None	1B	Acton
mesa horkelia (endemic)	<i>Horkelia cuneata ssp. puberula</i>	Chaparral, Coastal sage scrub, cismontane woodland	None	None	1B	Mt. Baldy, Ontario, Glendora, Azusa, Claremont, Baldwin Park, San Dimas, Mount Wilson, Pasadena, El Monte

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
Mojave phacelia (endemic)	<i>Phacelia mohavensis</i>	Cismontane woodland, lower montane coniferous forest, meadows and seeps, Pinyon and juniper woodland	FW	4	4	San Gabriel Mountains: Sulphur Springs, Granite Mountain, Camp Verdugo Pines
mountain oxytrope (endemic)	<i>Oxytropis oreophila</i> var. <i>oreophila</i>	Alpine boulder and rock field, subalpine coniferous forest	None	None	2	Mount San Antonio
Mt. Gleason Indian paintbrush	<i>Castilleja gleasonii</i>	Lower montane coniferous forest, pinyon and juniper woodlands	None	CR	1B	Waterman Mountain, Pacifico Mountain, Chilao Flat, Acton, Condor Peak
ocellated humboldt lily (endemic)	<i>Lilium humboldtii</i> ssp. <i>ocellatum</i>	Chaparral, lower montane coniferous forest, riparian forest, coastal scrub	FW	None	4	Mt. San Antonio, Mt. Baldy, Glendora, Azusa, Crystal Lake, Condor Peak, Chilao Flat
Orcutt's linanthus	<i>Linanthus orcuttii</i>	Chaparral, lower montane coniferous forest, pinyon and juniper woodland	None	None	1B	El Monte, Mount Wilson
Palmer's mariposa lily (endemic)	<i>Calochortus palmeri</i> var. <i>palmeri</i>	Chaparral, lower montane coniferous forest, meadows and seeps	FSS	None	1B	Chilao Flat
Parish's gooseberry (endemic)	<i>Ribes divaricatum</i> var. <i>parishii</i>	Riparian woodland	None	None	1B	Whittier, Pasadena, El Monte
Parry's spineflower (endemic)	<i>Chorizanthe parryi</i> var. <i>parryi</i>	Chaparral, coastal scrub,	None	None	3	Mount Wilson, Claremont, Pasadena, Mount Baldy, Ontario
Peirson's lupine (endemic)	<i>Lupinus peirsonii</i>	Joshua tree woodland, lower and upper montane coniferous forest, pinyon and juniper woodland	None	None	1B	Valyermo, Juniper Hills, Crystal lake, Chilao Flat
Peirson's morning-glory (endemic)	<i>Calystegia peirsonii</i>	Chaparral, chenopod scrub, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grasslands	None	None	4	

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
pine green-gentian (endemic)	<i>Swertia neglecta</i>	Lower and upper montane coniferous forest, pinyon and juniper forest	FSS	None	4	Waterman Mtn, Crystal Lake, Chilao Flat
Plummer's mariposa lily (endemic)	<i>Calochortus plummerae</i>	Granitic, rocky areas in chaparral, cismontane woodland, coastal scrub, lower montane, coniferous forest, valley and foothill grassland	FSS	None	1B	Claremont
rayless ragwort	<i>Senecio aphanactis</i>	Chaparral, Cismontane woodland, Coastal scrub	None	None	2	San Dimas
Robinson's pepper-grass	<i>Lepidium virginicum var. robinsonii</i>	Chaparral, Coastal scrub	None	None	1B	Azusa, Ontario, Mt. Wilson
Rock Creek broomrape (endemic)	<i>Orobanche valida ssp. valida</i>	Chaparral, Pinyon and juniper woodland	None	None	1B	Mount Baldy, Telegraph Peak, Valyermo
rock monardella (endemic)	<i>Monardella viridis ssp. saxicola</i>	Chaparral, Lower montane coniferous forest	FSS	None	4	San Dimas
round-leaved boykinia	<i>Boykinia rotundifolia</i>	Lower montane coniferous forest	W	None	n/a	Mount San Antonio (Day Canyon in San Gabriel Mountains)
Salt Spring checkerbloom	<i>Sidalcea neomexicana</i>	Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, playas/alkaline, mesic	None	None	2	Ontario, Claremont
San Antonio Canyon bedstraw (endemic)	<i>Galium angustifolium ssp. gabrielense</i>	Chaparral, Lower montane coniferous forest	FW	None	4	Mt. Waterman, Mt. Lowe, Mt. San Antonio
San Antonio milk-vetch (endemic)	<i>Astragalus lentiginosus var. antonius</i>	Lower and upper montane coniferous forest	FSS	None	1B	San Antonio, Telegraph Peak, Valyermo
San Bernardino aster (endemic)	<i>Symphotrichum defoliatum</i>	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, meadows and seeps, marshes and swamps, Valley and foothill grassland	None	None	1B	Ontario, San Dimas, Mount San Antonio, Telegraph Peak, Crystal Lake

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
San Gabriel bedstraw (endemic)	<i>Galium grande</i>	Broadleafed upland forest, chaparral, Cismontane woodland, Lower montane coniferous forest	FSS	None	1B	Azusa, Mount Wilson
San Gabriel linanthus (endemic)	<i>Linanthus concinnus</i>	Chaparral, lower and upper montane coniferous forest	None	None	1B	Mount Baldy, Mount Wilson, Pasadena, Mescal Creek, Pacifico Mountain, Mount San Antonio, Telegraph Peak, Valyermo, Waterman Mountain, Crystal Lake, Chilao Flat
San Gabriel Manzanita (endemic)	<i>Arctostaphylos gabrielensis</i>	Chaparral	None	None	1B	Pacifico Mountain
San Gabriel Mountains dudleya (endemic)	<i>Dudleya densiflora</i>	Chaparral, Coastal scrub, Lower montane coniferous forest	None	None	1B	Glendora, Azusa
San Gabriel Mountains sunflower (endemic)	<i>Hulsea vestita</i> ssp. <i>gabrielensis</i>	Lower and upper montane coniferous forest	FW	None	4	Pacifico Mountain, Mount San Antonio, San Gabriel Mtns, Head of Bad Canyon
San Gabriel River dudleya (endemic)	<i>Dudleya cymosa</i> ssp. <i>crebrifolia</i>	Chaparral	FW	None	1B	Azusa
San Jacinto Mountains daisy (endemic)	<i>Erigeron breweri</i> var. <i>jacinteus</i>	Subalpine coniferous, upper montane coniferous forest	FW	None	4	Mt. San Antonio, Crystal Lake
scalloped moonwort	<i>Botrychium crenulatum</i>	Bogs and fens, lower montane coniferous forest, Meadows and seeps, marshes and swamps	None	None	2	Telegraph Peak, Crystal Lake
short-joint beavertail (endemic)	<i>Opuntia basilaris</i> var. <i>brachyclada</i>	Chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland	None	None	1B	Mount San Antonio, Mescal Creek, Telegraph Peak, Valyermo, Juniper Hills, Pacifico Mountain, Mint Canyon, Newhall, Ritter Ridge, Palmdale
short-sepaled lewisia	<i>Lewisia brachycalyx</i>	Lower montane coniferous forest, meadows and seeps	None	None	2	Mount San Antonio

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
slender mariposa lily (endemic)	<i>Calochortus clavatus</i> var. <i>gracilis</i>	Chaparral, coastal scrub, valley and foothill grassland	None	None	1B	Mount Baldy, Glendora, Azusa, Crystal Lake, Agua Dulce,, Mint Canyon
slender silver-moss	<i>Anomobryum julaceum</i>	Broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest	None	None	2	Waterman Mountain
Sonoran maiden fern	<i>Thelypteris puberula</i> var. <i>sonorensis</i>	Meadows and seeps	None	None	2	Azusa, Mount Wilson
southern alpine buckwheat (endemic)	<i>Eriogonum kennedyi</i> var. <i>alpigenum</i>	Alpine boulder and rock field, subalpine coniferous forest	None	None	1B	Mount San Antonio, Crystal Lake
southern jewel-flower	<i>Streptanthus campestris</i>	Chaparral, lower montane coniferous forest, pinyon and juniper woodland	FSS	None	1B	
southern skullcap (endemic)	<i>Scutellaria bolanderi</i> ssp. <i>austromontana</i>	Chaparral, cismontane woodland, lower montane coniferous forest	None	None	1B	El Monte
southern tarplant	<i>Centromadia parryi</i> ssp. <i>australis</i>	Marshes and swamps, valley and foothill grassland, vernal pools	None	None	1B	Yorba Linda, Sunland
Tehachapi ragwort	<i>Packera ionophylla</i>	Lower and upper montane coniferous forest	FW	None	4	Los Angeles County
thread-leaved brodiaea (endemic)	<i>Brodiaea filifolia</i>	Valley and foothill grassland, vernal pools, flood plains, coastal sage scrub	FT	1	1B	Glendora
urn-flowered alumroot	<i>Heuchera elegans</i>	Lower montane coniferous forest, Riparian forest, Upper montane coniferous forest	FW	None	4	Falls Canyon (ANF)
woolly mountain-parsley (endemic)	<i>Oreonana vestita</i>	Lower and upper montane coniferous forest, subalpine coniferous forest	FW	None	1B	Mount San Antonio, Mount Baldy, Telegraph Peak, Waterman Mountain, Crystal Lake

Common Name	Scientific Name	Habitat	Federal Status	State Status	CNPS	Documented Study Area Locations*
<p>*Location names refer to USGS quad names in most cases. Where specific locational information was not available, geographic locations are listed (e.g. San Gabriel Mountains, Puente Hills, San Gabriel River).</p> <p>CNPS=California Native Plant Society. The California Native Plant society has developed an inventory of rare and endangered plants that are native to California.</p> <p>1B= Plants considered rare, threatened, or endangered in California and elsewhere. This includes all plants eligible for state listing and those that must be considered while preparing CEQA documents.</p> <p>2= Plants considered rare in California but more common elsewhere. This includes all plants eligible for state listing and those that must be considered while preparing CEQA documents.</p> <p>3= More information is need for this plant</p> <p>4= Limited distribution (Watch List)</p> <p>CE=State Endangered CT= State Threatened CR= State Listed Rare FE = Federal Endangered FT = Federal Threatened FW= Watch List on federal lands based on USFS Region 5 southern California forests Sensitive Species List FSS = Forest Service Sensitive List</p> <p>N/A = Specific location data not available.</p> <p>Sources: CDFG 2006 and 2010; USFS, 2005, Calflora 2007, CNPS 2007 and 2011</p>						

Table B3: Rare and Sensitive Animal Species

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
Insects					
<i>Callophrys mossii hidakupa</i>	San Gabriel Mountains elfin butterfly	Larval host plant is a sedum spathulifolium	FSS	None	Mount Baldy
<i>Diplectrona californica</i>	California diplectronan caddisfly	Streams, lakes and ponds	FSS	None	Ontario, San Gabriel Mountains
<i>Incisalia mossii hidakupa</i>	San Gabriel Mountains Moss' elfin butterfly	Rocky outcrops, cliffs where stonecrop grows	FSS	None	San Gabriel Mountains
<i>Paleoxenus dohrni</i>	Dorhn's elegant eucnemid beetle	Transition zone forests, higher elevations on incense cedar	FSS	None	San Gabriel Mountains
<i>Plebejus saepiolus aureolus</i>	San Gabriel Mountains blue butterfly	Host plant is sedum saphthufolium. Northern Coastal Scrub, Douglas-Fir Forest, Yellow Pine Forest, Red Fir Forest, Mixed Evergreen Forest, Chaparral	FSS	None	Mescal Creek, Mount San Antonio
<i>Plebulina emigdionis</i>	San Emigdio blue butterfly	Forest openings, at streamsides, in meadows and alpine fell-fields, from cool coastals areas to upper elevations of the California Mountain Ranges	FSS	None	Range includes Bouquet and Mint Canyons/ Los Angeles County
<i>Plejebus saepiolus ssp.</i>	San Gabriel Mountains greenish blue butterfly	Forest openings, at streamsides, in meadows and alpine fell-fields	FSS	None	San Gabriel Mountains
Fish					
<i>Gasterosteus aculeatus microcephalus</i>	partially armored threespine stickleback	Slow water creeks along the California coast	FSS	None	Santa Clara River
<i>Gila orcuttii</i>	Arroyo chub	Pools and runs of headwater creeks and small to medium rivers	FSS	SSC	Agua Dulce, Azusa, Crystal Lake, Mount Baldy, Mount San Antonio, Sunland, Waterman Mountain, Glendora, North East and West Forks of San Gabriel River, Big Mermaids Canyon Creek, Bear Creek
<i>Oncorhynchus mykissi (hatchery stock)</i>	Rainbow Trout	Cold headwaters, creeks, small to large rivers, cool lakes, estuaries	None	None	San Gabriel River upper watershed

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Rhinichthys osculus</i> ssp. 3 (endemic)	Santa Ana speckled dace	Requires permanent flowing streams, shallow cobble and gravel	FSS	SSC	Azusa, Condor Peak, Crystal Lake, Glendora, Sunland, Waterman Mountain
Amphibians					
<i>Aneides lugubris</i>	Arboreal salamander	Valley-foothill hardwood, valley-foothill hardwood conifer, chaparral, mixed conifer, oak and sycamore woodlands	FSS	None	San Gabriel Mountains, Puente-Chino Hills
<i>Batrachoseps gabrieli</i> (endemic)	San Gabriel Mtns slender salamander	Bigcone spruce, pine, white fir, incense cedar, canyon live oak, black oak, and California laurel	FSS	None	Crystal Lake, Mount Baldy, Mount San Antonio
<i>Ensatina eschscholtzii croceata</i>	yellow-blotched ensatina salamander	Coniferous habitats, montane hardwood habitats, mixed chaparral	FSS	SSC	San Gabriel Mountains, Pacifico Mountain
<i>Ensatina eschscholtzii</i>	Monterey ensantina salamander	Ponderosa pine, Douglas fir, mixed conifer, montane hardwood, montane hardwood-conifer	FSS	None	San Gabriel Mountains
<i>Spea hammondi</i>	Western spadefoot toad	Grassland, vernal pools, chaparral, pine-oak woodlands, areas of sandy or gravelly soil in alluvial fans, washes and floodplains	FSC	SSC	La Habra, Mint Canyon, San Gabriel Mountains, Whittier, W Puente Hills
<i>Taricha torosa</i>	Coast Range newt	Moist woodlands	None	SSC	Azusa, Condor Peak, Glendora, Mount Baldy, Pasadena, Waterman Mountain, San Gabriel Mountains, Claremont
Reptiles					
<i>Actinemys marmorata pallida</i>	Southern Pacific pond turtle	Coastal dunes, valley-foothill, chaparral and coastal sage scrub	FSS	None	West Fork of the San Gabriel River
<i>Anniella pulchra</i>	California legless lizard	Coastal dune, valley-foothill, chaparral and coastal scrub habitats	FSS	SSC	Palmdale, Pacifico Mtn., Mount Baldy
<i>Aspidoscelis tigris stejnegeri</i>	coastal western whiptail	Valley-foothill hardwood, valley-foothill hardwood-conifer, juniper, chaparral, valley-foothill riparian, mixed conifer.	FSS	None	Baldwin Park, Condor Peak, Chilao Flat, Mount Wilson, San Dimas, Whittier Narrows
<i>Charina trivirgata</i>	rosy boa	Rocky chaparral-covered hillsides and canyons, desert habitat with good cover	FSS	None	Mount Wilson, Pacifico Mtn

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Charina trivirgata roseofusca</i>	Coast rosy boa	Rocky chaparral-covered hillsides and canyons, desert habitat with good cover	FSS	None	Coastal slopes of the San Gabriel Mountain
<i>Crotalus ruber</i>	red-diamond rattlesnake	Chaparral, woodland and arid desert habitats in rocky areas with dense vegetation	SC	CSC	Chino Hills (near Yorba Linda and Telegraphy Canyon), Puente Hills, Yorba Linda
<i>Diadophis punctatus modestus</i>	San Bernardino ringneck snake	Open, relatively rocky areas with valley-foothill, mixed chaparral, and annual grass habitats	SC	None	Big Dalton Canyon, Glendora Mtn. Road, Puente-Chino Hills
<i>Emys (Clemmys) marmorata pallida</i>	southwestern pond turtle	Ponds, marshes, rivers, streams, irrigation ditches	FSC	SSC	Ritter Ridge, Azusa, Agua Dulce, La Habra, Sleepy Valley, Sunland, Pasadena, Waterman Mountain, El Monte and Glendora quads, San Gabriel River, Browns Gulch, Yorba Linda
<i>Eumeces skiltonianus</i>	Western skink	Grassland, woodlands, pine forests, sagebrush, chaparral	FSC	None	Puente-Chino Hills, San Gabriel Mountains
<i>Lampropeltis zonata (parvirubra)</i>	California mountain kingsnake (San Bernardino population)	Moist woods, coniferous forests, woodland and chaparral	FSC	SSC	Glendora, San Dimas, Little Dalton Canyon, Big Dalton Canyon
<i>Lampropeltis zonata multifasciata</i>	Coast mountain kingsnake	Rocks and boulders near streams	FSS	None	Mount San Antonio
<i>Phrynosoma coronatum (blainvillii population)</i>	Coast (San Diego) horned lizard	Coastal sage scrub, riparian areas, valley-foothill hardwood	S	SSC	Acton, Agua Dulce, Baldwin Park, Crystal Lake, Mescal Creek, Mount Baldy, Palmdale, Pacifico Mountain, Valyermo, Ritter Ridge, Mt. Wilson, Condor Peak, Claremont, El Monte, Sunland, Mint Canyon, Sleepy Valley, Pasadena, Waterman Mountain, Thompson Creek, Eaton Canyon, Heaton Flat, East Fork San Gabriel River, Tonner Canyon/Chino Hills, Bonelli Regional Park, Yorba Linda
<i>Phrynosoma coronatum (frontale population)</i>	Coast (California) horned lizard	Coastal sage scrub, riparian areas, coniferous forest, broad-leaf woodlands	S	SSC	Mescal Creek, San Gabriel River, Sycamore Canyon in the Puente Hills

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Salvadora hexalepis virgultea</i>	Coast patch-nosed snake	Coastal chaparral, desert scrub, washes, sandy flats, and rocky areas, bush desert flats, sagebrush	FSC	SSC	Yorba Linda
<i>Sceloporus graciosus vandenburgianus</i>	Southern sagebrush lizard	Chaparral, pine, and Douglas fir forests	FSS	None	San Gabriel Mountains
<i>Thamnophis hammondi</i>	Two-striped garter snake	Near permanent water or intermittent streams with rock beds	FSC	None	Agua Dulce, Azusa, Glendora, Mint Canyon, Mount Wilson, Ritter Ridge, Pacifico Mountain, Juniper Hills, Sleepy Valley, Little Rock Creek, San Gabriel River
Birds					
<i>Accipiter cooperii</i>	Cooper's hawk	Oak woodlands, riparian areas	None	SSC	Baldwin Park, Palmdale, Puente Hills (Tonner Canyon), Bonelli Regional Park, Whittier Narrows
<i>Accipiter gentilis</i>	Northern goshawk	Oak woodlands, riparian areas	S	SSC	San Gabriel Mountains
<i>Accipiter striatus</i>	Sharp-shinned hawk	Woodlands, riparian areas, chaparral (foraging), scrublands	FSS	SSC	Puente Hills, Bonelli Regional Park
<i>Aegolius acadicus</i>	Northern saw-whet owl	Mature riparian and oak woodlands	FSS	None	San Gabriel Mountains
<i>Agelaius tricolor</i>	tricolored blackbird	Freshwater marshes and riparian areas	None	None	Palmdale, Ritter Ridge, Yorba Linda, Whittier Narrows
<i>Aimophila ruficeps canescens</i>	southern California rufous-crowned sparrow	Steep, rocky areas within coastal sage scrub and chaparral, prefers recently burned areas	FSS	SSC	Mount Baldy, Puente Hills, San Dimas, Bonelli Regional Park
<i>Alectoris chukar</i>	Chukar	Arid, rocky annual grassland and brush/scrub habitat with water available	FSS	None	Mojave desert vegetation associations (range)
<i>Amphispiza belli</i>	Bell's sage sparrow	Dense, dry chamise chaparral with scattered bunches of grass	FSC	SSC	Yorba Linda, western edge of Mojave Desert
<i>Anthus rubescens</i>	American pipit	Annual and perennial grassland, wet meadows, cropland and pasture	FSS	None	Various locations in Los Angeles County
<i>Aquila chrysaetos</i>	Golden eagle	Mountains, desert, and open country, grasslands, deserts and savannas	None	SSC	Big Dalton drainage area, Tonner Canyon/Chino Hills region, Bonelli Regional Park
<i>Asio flammeus</i>	Short-eared owl	Prairies, marshes, dunes, tundra	None	SSC	Bonelli Regional Park

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Asio otus</i>	Long-eared owl	Riparian and live oak woodlands	FSS	SSC	Yorba Linda
<i>Aythya american</i>	Redhead	Open water with freshwater marsh vegetation	None	SSC	Whittier Narrows
<i>Buteo regalis</i>	Ferruginous hawk	Rivers, lakes, and coasts; open tracts of sparse shrubs and grasslands, and agricultural areas during winter	None	SSC	Bonelli Regional Park
<i>Callipepla californica</i>	California quail	Chaparral	FSS	None	Puente-Chino Hills
<i>Campylorhynchus brunneicapillus sandiegensis</i>	coastal (San Diego) cactus wren	Coastal sage scrub, vegetation with thickets of prickly pear or cholla cactus	None	SSC	La Habra, Puente Hills, Yorba Linda
<i>Carduelis lawrencei</i>	Lawrence's goldfinch	Oak woodland, chaparral	FSS	None	Puente-Chino Hills
<i>Cathartes aura</i>	Turkey vulture	Habitat with cliffs or large trees for nesting or roosting	FSS	None	San Gabriel Mountains
<i>Catharus bicknelli</i>	Swainson's thrush	Riparian woodland habitat	FSS	None	San Gabriel Mountain foothill canyons
<i>Catharus guttatus</i>	Hermit thrush	Arid, rocky annual grassland and scrub where water is available	FSS	None	San Gabriel Mountains
<i>Chaetura vauxi</i>	Vaux's swift	Redwood and Douglas fir	FSS	SSC	Big Dalton Canyon
<i>Chordeiles minor</i>	Common nighthawk	Riparian habitat, oak woodland, bigcone Douglas fir, freshwater marsh	FSS	None	San Gabriel Mountains
<i>Cinclus mexicanus</i>	American dipper	Fast-flowing montane rivers and streams	FSS	None	San Gabriel Mountains
<i>Circus cyaneus</i>	Northern harrier	Coastal salt marshes, freshwater marshes, grasslands, agricultural fields, desert and brushland	None	SSC	Puente Hills, Whittier Narrows
<i>Cistothorus palustris clarka</i>	Clark's marsh wren	Freshwater marsh with dense reedbeds	None	SSC	Whittier Narrows
<i>Contopus cooperi</i>	Olive-sided flycatcher	Riparian, oak woodland, bigcone Douglas fir	FSS	None	San Gabriel Mountains
<i>Cypseloides niger</i>	black swift	Steep, rocky, often moist cliffs and crive or caves on sea cliffs, deep canyons	FSS	SSC	Mount Baldy, Mount Wilson, Santa Anita Canyon, Wolfskill Falls
<i>Dendroica petechia brewsteri</i>	Yellow warbler	Riparian woodlands, montane chaparral, mixed conifer habitats	FSS	SSC	Big Dalton Canyon, Whittier Narrows

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Elanus leucurus</i>	White-tailed kite	Grasslands with scattered trees, near marshes along highways	None	SP	San Jose Hills, Tonner Canyon/Chino Hills, Whittier Narrows
<i>Empidonax wrightii</i>	Gray flycatcher	Riparian, oak woodland, bigcone Douglas fir, mixed chaparral	FSS	None	San Gabriel Mountains
<i>Falco mexicanus</i>	prairie falcon	Grassland, savanna, rangeland, agricultural fields, and desert scrub, cliff ledges	FSS	SSC	Valyermo, Acton, Agu Dulce, Tonner Canyon/Chino Hills
<i>Geothlypis trichas</i>	Common yellowthroat	Riparian	None	SSC	San Gabriel Mountains, Puente-Chino Hills, Whittier Narrows
<i>Glaucidium gnoma</i>	Northern pygmy owl	Valley-foothill hardwood, mixed conifer, valley-foothill riparian, montane riparian	FSS	None	San Gabriel Mountains, Eaton Canyon
<i>Icteria virens</i>	Yellow-breasted chat	Riparian areas	FSS	SSC	Baldwin Park, La Habra, Puente Hills, Bonelli Regional park, Whittier Narrows
<i>Ixobrychus exilis</i>	Least Bittern	Dense reeds with permanent wate	None	SSC	Whittier Narrows
<i>Lanius ludovicianus</i>	Loggerhead shrike	Valley-foothill riparian areas, open habitats with scattered shrubs, perches	FSS	SSC	Puente Hills, Bonelli Regional Park, Whittier Narrows
<i>Megascops kennicottii</i>	Western screech owl	Riparian areas, Joshua tree and mesquite groves, open pine and pinyon-juniper forests	FSS	SSC	San Gabriel Mountains
<i>Melospiza lincolnii</i>	Lincoln's sparrow	Riparian areas, bogs, wet meadows	FSS	None	San Gabriel Mountains
<i>Oporornis tolmiei</i>	MacGillivray's warbler	Valley foothill riparian, coastal Douglas-fir, montane riparian, desert riparian	FSS	SSC	San Gabriel Mountains
<i>Oreortyx pictus</i>	Mountain quail	Montane habitats and seasonally in open conifer and deciduous woodlands and forest, chaparral	FSS	None	San Gabriel Mountains
<i>Otus flammeolus</i>	Flammulated owl	Coniferous habitats from ponderosa pine to red fir forests.	FSS	None	San Gabriel Mountains
<i>Pandion haliaetus</i>	Osprey	Rivers, lakes, and coasts, mixed conifer.	FSS	SSC	Bonelli Regional Park
<i>Patagioenas fasciata</i>	Band-tailed pigeon	Oaks and conifer oak woodlands.	FSS	None	San Gabriel Mountains

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Picoides albolarvatus gravirostris</i>	Southern white-headed woodpecker	Lodgepole pine and red-fir habitat	FSS	SSC	San Gabriel Mountains
<i>Piranga rubra</i>	Summer tanager	Desert riparian areas with willows and thickets	FSS	SSC	San Gabriel Mountains
<i>Progne subis</i>	Purple martin	Valley foothill, montane hardwood, montane-hardwood conifer, riparian habitat	FSS	SSC	San Gabriel Mountains
<i>Sphyrapicus thyroideus</i>	Williamson's sapsucker	Lodgepole pine, red fir, Jeffrey pine	FSS	None	San Gabriel Mountains
<i>Stellula calliope</i>	Calliope hummingbird	Ponderosa pine, hardwood-conifer, riparian areas, aspens	FSS	None	San Gabriel Mountains
<i>Strix occidentalis occidentalis</i>	California spotted owl	Oak and conifer habitats	FSS	SSC	San Gabriel Mountains
<i>Tachycineta bicolor</i>	Tree swallow	Open areas, usually near water, including fields, marshes, shorelines, and wooded swamps with standing dead trees	FSS	None	Bonelli Regional Park, San Gabriel Mountains
<i>Toxostoma lecontei</i>	Le Conte's thrasher	Open desert wash, desert scrub, alkali scrub, desert succulent scrub, nests in wash habitat	None	SSC	Mescal Creek, Palmdale, Ritter Ridge
<i>Vermivora ruficapilla</i>	Nashville warbler	Oak woodlands	FSS	None	San Gabriel Mountains
<i>Vermivora virginiae</i>	Virginia's warbler	Arid, shrubby, mixed conifer, pinyon-juniper, mountain chaparral	FSS	SSC	San Gabriel Mountains - Blue Ridge
<i>Vireo gilvus</i>	Warbling vireo	Montane-hardwood, montane-conifer, mixed conifer, ponderosa pine, montane chaparral	FSS	SSC	Whittier Narrows, Puente Hills, San Gabriel Mountains
<i>Vireo plumbeus</i>	Plumbeous vireo	Pinyon-juniper, lodgepole pine, Jeffrey pine	FSS	None	San Gabriel Mountains
<i>Vireo vicinior</i>	Gray vireo	Pinyon-juniper, juniper, chamise-redshank chaparral	FSS	SSC	Little Rock Creek
<i>Wilsonia pusilla</i>	Wilson's warbler	Montane riparian, foothill riparian, aspen, lodgepole pine	FSS	None	San Gabriel Mountains, Whittier Narrows
<i>Zenaida macroura</i>	Mourning dove	Grassland, cropland, pasture, riparian, low-elevation conifer, desert habitats, open chaparral	FSS	None	Puente Hills, San Gabriel Mountains
Mammals					
<i>Antrozous pallidus</i>	Pallid bat	Grasslands, tree cavities, rock crevices, manmade structures	FSS	SSC	Azusa, Acton, Baldwin Park, El Monte, Glendora, Mount Wilson, Ontario, San Dimas

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Bassariscus astutus</i>	Ringtail	Mixture of forest and shrublands in association with riparian areas and rocky areas	FSS	None	Historic to San Dimas and San Gabriel Canyons
<i>Chaetodipus fallax fallax</i>	northwestern San Diego pocket mouse	Sandy herbaceous areas, sagebrush, scrub, annual grassland, chaparral and desert scrubs.	None	SSC	Mount Baldy, Ontario
<i>Chaetodipus fallax pallidus</i>	pallid San Diego pocket mouse	Open brushlands and scrub habitats	None	SSC	Valyermo, Juniper Hills, Mescal Creek
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	Caves, tunnels for roosting and vegetation and mesic edges for feeding, sub-alpine and alpine habitats	S	SSC	San Gabriel Mountains
<i>Erethizon dorsatum</i>	Porcupine	Montane conifer, Douglas-fir, alpine dwarf shrub, wet meadow	FSS	None	San Gabriel Mountains
<i>Euderma maculatum</i>	Spotted bat	Arid deserts, grasslands, mixed conifer	FSS	SSC	San Gabriel Mountains
<i>Eumops perotis</i>	Western mastiff bat	Grasslands, tree cavities, rock crevices, manmade structures	S	SSC	Azusa, Baldwin Park, La Habra, Pasadena, Whittier, El Monte, Glendora, Mount Wilson, Ontario, San Dimas
<i>Lasiurus xanthinus</i>	Western yellow bat	Check status with state and CNDDDB.	None	SSC	Azusa, Baldwin Park, Ontario, Pasadena, San Dimas
<i>Lepus californicus bennettii</i>	San Diego black-tailed jackrabbit	Open brushlands and scrub habitats	FSS	SSC	Baldwin Park, Bonelli Regional Park
<i>Myotis ciliolabrum</i>	Western small-footed myotis	Arid, woody and brushy uplands near water	FSS	None	Mescal Creek
<i>Myotis evotis</i>	Long-eared myotis	Coastal areas	FSS	None	San Gabriel Mountains
<i>Myotis thysanodes</i>	Fringed myotis	Grassland, oak savanna, riparian areas, oak woodland, pinyon-juniper, valley-foothill woodland	FSS	None	Waterman Mountain
<i>Myotis volans</i>	Long-legged myotis	Woodlands, forests, chaparral, coastal scrub	FSS	None	Waterman Mountain
<i>Myotis yumanensis</i>	Yuma myotis	Aric caves, tunnels, buildings, open forests with water	FSS	None	Glendora
<i>Neotamias speciosus speciosus</i>	Lodgepole chipmunk	Closed-canopy forest with sparse undercover including Jeffrey pine, mixed conifer, and red fir	FSS	None	Mount San Antonio, Waterman Mountain

Scientific Name	Common Name	Habitat	Federal Status	State Status	Documented Study Area Locations*
<i>Neotoma lepida intermedia</i>	San Diego desert woodrat	Rock outcrops, chaparral, coastal sage scrub and pinyon-juniper woodland	SC	SSC	San Gabriel Canyon, Azusa, Mount Baldy, Ontario, Claremont
<i>Nyctinomops macrotis</i>	big free -tailed bat	Roosts in cliffs and crevices	None	SSC	Azusa, Baldwin Park, Ontario, San Dimas
<i>Odocoileus hemionus</i>	Mule deer	Pine forest but also contain openings, meadows, and riparian habitats	FSS	None	San Gabriel Mountains
<i>Ovis canadensis nelsoni</i>	Nelson's bighorn sheep	Open areas of low-growing vegetation for feeding, with close proximity to steep, rugged terrain for escape, lambing, and bedding	FSS	SSC	Azusa, Crystal Lake, Glendora, Mount Baldy, Mount San Antonio, Waterman Mountain
<i>Puma concolor</i>	Mountain lion	Foothills and mountains	FSS	None	Puente-Chino Hills, San Gabriel Mountains
<i>Sorex (monticulus?)</i>	San Bernadino dusky shrew	Valley foothill and montane riparian habitat, woodland, chaparral, grassland, and wetland habitats	FSS	None	San Gabriel Mountains
<i>Spilogale gracilis</i>	Western spotted skunk	Canyon streams, rocky cliffs, arid valleys, forest and woodland habitats	FSS	SSC	San Gabriel Mountains
<i>Taxidea taxus</i>	American badger	Grasslands, parklands, farms, forest glades, meadows, marshes, brushy areas, hot deserts, mountain meadows, open chaparral, and riparian zones	FSS	SSC	Baldwin Park, Pasadena, San Dimas
<i>Ursus americanus</i>	Black bear	Mature, dense vegetation, and on sheltered slopes	FSS	None	San Gabriel Mountains

*Location names refer to USGS quad names in most cases. Where specific locational information was not available, geographic locations are listed (e.g. San Gabriel Mountains, Puente Hills, San Gabriel River).

FE = Federally-listed Endangered

FT = Federally-listed Threatened

CE = State-listed Endangered

CT = State-listed Threatened

FSS = Forest Service Sensitive Species List

SC= Species of Concern. Species of concern is an informal designation of the US Fish and Wildlife Service. It refers to those species believed to be in decline or in need of concentrated conservation actions as species of concern.

SSC= Species of Special Concern. The California Department of Fish and Game applies this status to animal species not listed under the Federal and California endangered species acts that are declining at a rate that might require listing or have historically low population counts that are threatened.

N/A = Specific location data not available.

Sources: CDFG 2006 and 2010, USFS 2005, CDFG 2008a

Appendix C: New Area Studies Act

TITLE III—STUDY REGARDING ADDITION OF NEW NATIONAL PARK SYSTEM AREAS

SEC. 301. SHORT TITLE.

This title may be cited as the “National Park System New Areas Studies Act”.

SEC. 302. PURPOSE.

It is the purpose of this title to reform the process by which areas are considered for addition to the National Park System.

SEC. 303. STUDY OF ADDITION OF NEW NATIONAL PARK SYSTEM AREAS.

Section 8 of Public Law 91–383 (commonly known as the National Park System General Authorities Act; 16 U.S.C. 1a–5) is amended as follows:

- (1) By inserting “GENERAL AUTHORITY.—” after “(a)”.
- (2) By striking the second through the sixth sentences of subsection (a).
- (3) By redesignating the last two sentences of subsection (a) as subsection (f) and inserting in the first of such sentences before the words “For the purposes of carrying” the following:
“(f) AUTHORIZATION OF APPROPRIATIONS.—”
- (4) By inserting the following after subsection (a):

“(b) STUDIES OF AREAS FOR POTENTIAL ADDITION.—

(1) At the beginning of each calendar year, along with the annual budget submission, the Secretary shall submit to the Committee on Resources of the House of Representatives and to the Committee on Energy and Natural Resources of the United States Senate a list of areas recommended for study for potential inclusion in the National Park System.

“(2) In developing the list to be submitted under this subsection, the Secretary shall consider—

“(A) those areas that have the greatest potential to meet the established criteria of national significance, suitability, and feasibility;

“(B) themes, sites, and resources not already adequately represented in the National Park System; and

“(C) public petition and Congressional resolutions.

“(3) No study of the potential of an area for inclusion in the National Park System may be initiated after the date of enactment of this subsection, except as provided by specific authorization of an Act of Congress.

“(4) Nothing in this Act shall limit the authority of the National Park Service to conduct preliminary resource assessments, gather data on potential study areas, provide technical and planning assistance, prepare or process nominations for administrative designations, update previous studies, or complete reconnaissance surveys of individual areas requiring a total expenditure of less than \$25,000.

“(5) Nothing in this section shall be construed to apply to or to affect or alter the study of any river segment for potential addition to the national wild and scenic rivers system or to apply to or to affect or alter the study of any trail for potential addition to the national trails system.

“(c) REPORT.—

(1) The Secretary shall complete the study for each area for potential inclusion in the National Park System within 3 complete fiscal years following the date on which funds are first made available for such purposes. Each study under this section shall be prepared with appropriate opportunity for public involvement, including at least one public meeting in the vicinity of the area under study, and after reasonable efforts to notify potentially affected landowners and State and local governments.

“(2) In conducting the study, the Secretary shall consider whether the area under study—

“(A) possesses nationally significant natural or cultural resources and represents one of the most important examples

of a particular resource type in the country; and

“(B) is a suitable and feasible addition to the system. “

(3) Each study—

“(A) shall consider the following factors with regard to the area being studied—

“(i) the rarity and integrity of the resources;

“(ii) the threats to those resources;

“(iii) similar resources are already protected in the National Park System or in other public or private ownership;

“(iv) the public use potential;

"(v) the interpretive and educational potential;
"(vi) costs associated with acquisition, development and operation;
"(vii) the socioeconomic impacts of any designation;
"(viii) the level of local and general public support; and
"(ix) whether the area is of appropriate configuration to ensure long-term resource protection and visitor use;
"(B) shall consider whether direct National Park Service management or alternative protection by other public agencies or the private sector is appropriate for the area;

"(C) shall identify what alternative or combination of alternatives would in the professional judgment of the Director of the National Park Service be most effective and efficient in protecting significant resources and providing for public enjoyment; and

"(D) may include any other information which the Secretary deems to be relevant.

"(4) Each study shall be completed in compliance with the National Environmental Policy Act of 1969.

"(5) The letter transmitting each completed study to Congress shall contain a recommendation regarding the Secretary's preferred management option for the area.

"(d) NEW AREA STUDY OFFICE.—The Secretary shall designate a single office to be assigned to prepare all new area studies and to implement other functions of this section.

"(e) LIST OF AREAS.—At the beginning of each calendar year, along with the annual budget submission, the Secretary shall submit to the Committee on Resources of the House of Representatives and to the Committee on Energy and Natural Resources of the Senate a list of areas which have been previously studied which contain primarily historical resources, and a list of areas which have been previously studied which contain primarily natural resources, in numerical order of priority for addition to the National Park System. In developing the lists, the Secretary should consider threats to resource values, cost escalation factors, and other factors listed in subsection (c) of this section. The Secretary should only include on the lists areas for which the supporting data is current and accurate."

(5) By adding at the end of subsection (f) (as designated by paragraph (3) of this section) the following: "For carrying out subsections (b) through (d) there are authorized to be appropriated \$2,000,000 for each fiscal year."

Appendix D: 2006 NPS Management Policies (Sections 1.2 and 1.3)

1.2 The National Park System

The number and diversity of parks within the national park system grew as a result of a government reorganization in 1933, another following World War II, and yet another during the 1960s. Today there are nearly 400 units in the national park system. These units are variously designated as national parks, monuments, preserves, lakeshores, seashores, wild and scenic rivers, trails, historic sites, military parks, battlefields, historical parks, recreation areas, memorials, and parkways. Regardless of the many names and official designations of the park units that make up the national park system, all represent some nationally significant aspect of our natural or cultural heritage. They are the physical remnants of our past—great scenic and natural places that continue to evolve, repositories of outstanding recreational opportunities, classrooms of our heritage, and the legacy we leave to future generations—and they warrant the highest standard of protection.

It should be noted that, in accordance with provisions of the Wild and Scenic Rivers Act, any component of the National Wild and Scenic Rivers System that is administered by the Park Service is automatically a part of the national park system. Although there is no analogous provision in the National Trails System Act, several national trails managed by the Service have been included in the national park system. These national rivers and trails that are part of the national park system are subject to the policies contained herein, as well as to any other requirements specified in the Wild and Scenic Rivers Act or the National Trails System Act.

1.3 Criteria for Inclusion

Congress declared in the National Park System General Authorities Act of 1970 that areas comprising the national park system are cumulative expressions of a single national heritage. Potential additions to the national park system should therefore contribute in their own special way to a system that fully represents the broad spectrum of natural and cultural resources that characterize our nation. The National Park Service is responsible for conducting professional studies of potential additions to the national park system when specifically authorized by an act of Congress, and for making recommendations to the Secretary of

the Interior, the President, and Congress. Several laws outline criteria for units of the national park system and for additions to the National Wild and Scenic Rivers System and the National Trails System.

To receive a favorable recommendation from the Service, a proposed addition to the national park system must (1) possess nationally significant natural or cultural resources, (2) be a suitable addition to the system, (3) be a feasible addition to the system, and (4) require direct NPS management instead of protection by other public agencies or the private sector. These criteria are designed to ensure that the national park system includes only the most outstanding examples of the nation's natural and cultural resources. These criteria also recognize that there are other management alternatives for preserving the nation's outstanding resources.

1.3.1 National Significance

NPS professionals, in consultation with subject-matter experts, scholars, and scientists, will determine whether a resource is nationally significant. An area will be considered nationally significant if it meets all of the following criteria:

1. It is an outstanding example of a particular type of resource.
2. It possesses exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage.
3. It offers superlative opportunities for public enjoyment or for scientific study.
4. It retains a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource.
5. National significance for cultural resources will be evaluated by applying the National Historic Landmarks criteria contained in 36 CFR Part 65 (*Code of Federal Regulations*).

1.3.2 Suitability

An area is considered suitable for addition to the national park system if it represents a natural or cultural resource type that is not already adequately represented in the national park system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

Adequacy of representation is determined on a case-by-case basis by comparing the potential addition to other comparably managed areas

representing the same resource type, while considering differences or similarities in the character, quality, quantity, or combination of resource values. The comparative analysis also addresses rarity of the resources, interpretive and educational potential, and similar resources already protected in the national park system or in other public or private ownership. The comparison results in a determination of whether the proposed new area would expand, enhance, or duplicate resource protection or visitor use opportunities found in other comparably managed areas.

1.3.3 Feasibility

To be feasible as a new unit of the national park system, an area must be (1) of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment (taking into account current and potential impacts from sources beyond proposed park boundaries), and (2) capable of efficient administration by the Service at a reasonable cost.

In evaluating feasibility, the Service considers a variety of factors for a study area, such as the following:

- size
- boundary configurations
- current and potential uses of the study area and surrounding lands
- landownership patterns
- public enjoyment potential
- costs associated with acquisition, development, restoration, and operation
- access
- current and potential threats to the resources
- existing degradation of resources
- staffing requirements
- local planning and zoning
- the level of local and general public support (including landowners)
- the economic/socioeconomic impacts of designation as a unit of the national park system

The feasibility evaluation also considers the ability of the National Park Service to undertake new management responsibilities in light of current and projected availability of funding and personnel.

An overall evaluation of feasibility will be made after taking into account all of the above factors.

However, evaluations may sometimes identify concerns or conditions, rather than simply reach a yes or no conclusion. For example, some new areas may be feasible additions to the national park system only if landowners are willing to sell, or the boundary encompasses specific areas necessary for visitor access, or state or local governments will provide appropriate assurances that adjacent land uses will remain compatible with the study area's resources and values.

1.3.4 Direct NPS Management

There are many excellent examples of the successful management of important natural and cultural resources by other public agencies, private conservation organizations, and individuals. The National Park Service applauds these accomplishments and actively encourages the expansion of conservation activities by state, local, and private entities and by other federal agencies. Unless direct NPS management of a studied area is identified as the clearly superior alternative, the Service will recommend that one or more of these other entities assume a lead management role, and that the area not receive national park system status.

Studies will evaluate an appropriate range of management alternatives and will identify which alternative or combination of alternatives would, in the professional judgment of the Director, be most effective and efficient in protecting significant resources and providing opportunities for appropriate public enjoyment. Alternatives for NPS management will not be developed for study areas that fail to meet any one of the four criteria for inclusion listed in section 1.3.

In cases where a study area's resources meet criteria for national significance but do not meet other criteria for inclusion in the national park system, the Service may instead recommend an alternative status, such as "affiliated area." To be eligible for affiliated area status, the area's resources must (1) meet the same standards for significance and suitability that apply to units of the national park system; (2) require some special recognition or technical assistance beyond what is available through existing NPS programs; (3) be managed in accordance with the policies and standards that apply to units of the national park system; and (4) be assured of sustained resource protection, as documented in a formal agreement between the Service and the nonfederal management entity. Designation as a "heritage area" is another option that may be recommended. Heritage areas have a nationally important, distinctive assemblage of

resources that is best managed for conservation, recreation, education, and continued use through partnerships among public and private entities at the local or regional level. Either of these two alternatives (and others as well) would recognize an area's importance to the nation without requiring or implying management by the National Park Service.

Appendix E: National Historic Landmark Criteria Sec 65.4

The criteria applied to evaluate properties for possible designation as National Historic Landmarks or possible determination of eligibility for National Historic Landmark designation is listed below. These criteria shall be used by NPS in the preparation, review and evaluation of National Historic Landmark studies. They shall be used by the Advisory Board in reviewing National Historic Landmark studies and preparing recommendations to the Secretary. Properties shall be designated National Historic Landmarks only if they are nationally significant. Although assessments of national significance should reflect both public perceptions and professional judgments, the evaluations of properties being considered for landmark designation are undertaken by professionals, including historians, architectural historians, archeologists and anthropologists familiar with the broad range of the nation's resources and historical themes. The criteria applied by these specialists to potential landmarks do not define significance nor set a rigid standard for quality. Rather, the criteria establish the qualitative framework in which a comparative professional analysis of national significance can occur. The final decision on whether a property possesses national significance is made by the Secretary on the basis of documentation including the comments and recommendations of the public who participate in the designation process.

(a) Specific Criteria of National Significance: The quality of national significance is ascribed to districts, sites, buildings, structures and objects that possess exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archeology, engineering and culture and that possess a high degree of integrity of location, design, setting, materials, workmanship, feeling and association, and:

1. That are associated with events that have made a significant contribution to, and are identified with, or that outstandingly represent, the broad national patterns of United States history and from which an understanding and appreciation of those patterns may be gained; or
2. That are associated importantly with the lives of persons nationally significant in the history of the United States; or
3. That represent some great idea or ideal of the American people; or

4. That embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for a study of a period, style or method of construction, or that represent a significant, distinctive and exceptional entity whose components may lack individual distinction; or
5. That are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic merit to warrant individual recognition but collectively compose an entity of exceptional historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture; or
6. That have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts and ideas to a major degree.

(b) Ordinarily, cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings and properties that have achieved significance within the past 50 years are not eligible for designation. Such properties, however, will qualify if they fall within the following categories:

1. A religious property deriving its primary national significance from architectural or artistic distinction or historical importance; or
2. A building or structure removed from its original location but which is nationally significant primarily for its architectural merit, or for association with persons or events of transcendent importance in the nation's history and the association consequential; or
3. A site of a building or structure no longer standing but the person or event associated with it is of transcendent importance in the nation's history and the association consequential; or
4. A birthplace, grave or burial if it is of a historical figure of transcendent national significance and no other appropriate site,

building or structure directly associated with the productive life of that person exists; or

5. A cemetery that derives its primary national significance from graves of persons of transcendent importance, or from an exceptionally distinctive design or from an exceptionally significant event; or
6. A reconstructed building or ensemble of buildings of extraordinary national significance when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other buildings or structures with the same association have survived; or
7. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own national historical significance; or
8. A property achieving national significance within the past 50 years if it is of extraordinary national importance.

Appendix F: Alternative B: San Gabriel Parks and Open Space Network (Dismissed)

(Excerpt from Newsletter #4, August 2009)

Vision

This alternative concept protects and expands an interconnected system of parks, habitats, and open spaces, connecting urban neighborhoods, mountains, and rivers within a broader ecosystem. Coordinated education and interpretation focuses on connecting people to the special resources and stories of their mountains and watershed. Access to recreational opportunities closer to home is increased.

Description of Concept

Under this alternative concept, a park and open space network would be developed through a partnership of public and private landowners and organizations. The partnership would be comprised of federal, state, and local land management agencies, along with recreation and conservation organizations. A comprehensive plan for a connected system of parks would be created under the partnership, detailing coordinated management strategies to protect and enhance natural resources, cultural resources, recreation, and access. The partnership would coordinate interpretive and educational messaging throughout the network. An information sharing network would be established to organize, consolidate, and distribute scientific information related to the region. An urban satellite office connected to the California Mediterranean Research Learning Center at Santa Monica Mountains National Recreation Area would provide research and educational opportunities to communities and schools. The partnership would serve as a model for future efforts in other areas such as the north slope of the San Gabriel Mountains, the Santa Clara River, and Antelope Valley.

Management Structure

A partnership of land management agencies, conservation organizations and recreation interests would be created. The key roles of the partnership would be to administer the network, share information between partners, and create a comprehensive plan. Lands would continue to be owned and managed by the current owners.

NPS Role

The NPS could provide initial planning and administrative assistance for a specified term. Afterward, the NPS would provide continuing technical assistance to the partnership on a more limited scale, including the development of interpretive and educational materials. The NPS would operate a California Mediterranean Research Learning Center satellite office in the study area. Opportunities for collaboration with the San Dimas Experimental Forest would be explored. The Juan Bautista de Anza National Historic Trail and the Old Spanish National Historic Trail would work under existing authorities to increase interpretation, education, and recreational opportunities.

Funding

The partnership could establish a fundraising organization or be a coordinating body for existing grant programs. The partnership would leverage funds from a variety of sources (e.g. state bonds, Land & Water Conservation Fund) to increase and prioritize funds for new parks, trails, and open spaces within the network. Congressional funding would allow the NPS to provide initial planning assistance to the partnership.

Why this is Important

This alternative concept would increase open space, provide new recreational opportunities in underserved areas, and foster a regional identity based on being part of a broader ecosystem. In addition to expanding parks and recreation areas, the parks and open space network would provide additional habitat connections to significant natural resources in the San Gabriel Mountains, Puente-Chino Hills and the isolated pockets of rare native plant communities located throughout the San Gabriel Valley and Los Angeles coastal plain. Enhanced habitat connections would strengthen regional biodiversity. Additionally, the parks and open space system would provide more opportunities for the public to learn about and enjoy the significant cultural resources of the region such as the Juan Bautista de Anza National Historic Trail and the Old Spanish National Historic Trail. Sites important to interpreting these trails could be incorporated into the network.

Acronyms and Abbreviations

ADA – Americans with Disabilities Act

ANF – Angeles National Forest

ALUC – Airport Land Use Commission

BLM – Bureau of Land Management

CCC – Civilian Conservation Corps

CDC – California Department of Conservation

CDFG – California Department of Fish and Game

CEDD – California Employment Development Department

CEQ – Council of Environmental Quality

CFR – Code of Federal Regulations

CNDDDB – California Natural Diversity Database

CDPR – California Department of Parks and Recreation, also California State Parks

FC – Species identified by the U.S. Fish and Wildlife Service as a candidate for listing under the Endangered Species Act.

FE – (Federally listed endangered species) A species listed as endangered under the Endangered Species Act

FESA – Federal Endangered Species Act

FMMP – Farmland Mapping and Monitoring Program

FR – Federal Register

FT – (Federally listed threatened species) A species listed as threatened under the Endangered Species Act

IBA – International Bird Area

IRWMP – Integrated regional water management plan

JPA – Joint Powers Authority

LA – Los Angeles

LACEDC – Los Angeles County Economic Development Corporation

LADPW – Los Angeles Department of Public Works

LAFCO – Local Agency Formation Commission

LWCF – Land and Water Conservation Fund

MRCA – Mountains Recreation and Conservation Authority

NCCP – Natural Community Conservation Planning Program

NEPA – National Environmental Policy Act

NHL – National Historic Landmark

NF – National Forest

NNL – National Natural Landmark

NM – National Monument

NP – National Park

NPS – National Park Service

NRA – National Recreation Area

NRCS – Natural Resources Conservation Service, United States Department of Agriculture

NRHP – National Register of Historic Places

OHV – Off-highway Vehicles

PCT – Pacific Crest Trail

PEPC – National Park Service Planning, Environment and Public Comment Website

PHLF – Puente Hills Landfill

PL – Public Law

RCD – Resource Conservation District

RCPG – Regional Comprehensive Plan and Guide

RLC – Research Learning Center

RMC – Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy or Rivers and Mountains Conservancy

RWMG – Regional Water Management Group

RNA – Research Natural Area

SCAG – Southern California Association of Governments

SDEF – San Dimas Experimental Forest

SHPO – state historic preservation officer

SP – State Park

SRS – Special Resource Study

USACOE – United States Army Corps of Engineers also U.S. Army Corps of Engineers

UNESCO – United Nations Educational, Scientific and Cultural Organization

USDA – United States Department of Agriculture

USFS – United States Forest Service, U.S. Forest Service, Forest Service

USFWS – United States Fish and Wildlife Service, U.S. Fish and Wildlife Service, or Fish and Wildlife Service

WCA – Watershed Conservation Authority

WPA – Works Progress Administration

WRP – Water Reclamation Plant

Glossary

Alkali: Used in reference to materials that are rich in sodium and/or potassium.

Alluvial fan: A fan-shaped pile of sediment that forms where a rapidly flowing mountain stream enters a relatively flat valley. As water slows down, it deposits sediment (alluvium) that gradually builds a fan.

Alluvium: An unconsolidated accumulation of stream-deposited sediments, including sands, silts, clays or gravels.

Alternatives – A collection of actions assembled to provide reasonable options for solutions to problems.

Anorthosite: a coarse-grained plutonic igneous rock consisting almost entirely of plagioclase feldspar.

Archean Eon: The time interval between 3800-2500 million years ago. The Archean is one of the Precambrian time intervals.

Archeology: The science that focuses on the study of past human cultures.

Arksoic (arkose): A variety of sandstone containing abundant feldspar and quartz, frequently in angular, poorly sorted grains.

Astrophysics: is the application of the principles of physics to astronomical objects beyond the earth; also, the branch of astronomy concerned mainly with the properties and structures of cosmic objects, including the universe as a whole.

Augen: Augen are relatively large, eye-shaped mineral grains in certain types of metamorphic rocks, especially schist and gneiss. (Augen = eyes in German)

Basement rocks: The igneous and metamorphic rocks that exist below the oldest sedimentary cover. In some areas such as shields the basement rocks may be exposed at the surface.

Basin: A circular, syncline-like depression of strata or the site of accumulation of a large thickness of sediments.

Batholith: A very large intrusive igneous rock mass that has been exposed by erosion and with an exposed surface area of over 100 square kilometers. A batholith has no known floor.

Bedrock: Solid rock present beneath any soil, sediment or other surface cover. In some locations it

may be exposed at Earth's surface.

Biotite: A common rock-forming mineral of the mica family. Biotite is a black or dark brown silicate rich in iron, magnesium, potassium, aluminum, and, of course, silica. Like other micas, it forms flat book-like crystals that peel apart into individual sheets on cleavage planes.

Breccia: A clastic sedimentary rock that is composed of large (over two millimeter diameter) angular fragments. The spaces between the large fragments can be filled with a matrix of smaller particles or a mineral cement which binds the rock together

Cenozoic Era: The time span between 66.4 million years ago to the present.

Clastic: A sedimentary rock composed of fragments (clasts) of pre-existing rock or fossils.

Conglomerate: A sedimentary rock made of rounded rock fragments, such as pebbles, cobbles, and boulders, in a finer-grained matrix. To call the rock a conglomerate, some of the constituent pebbles must be at least 2 mm (about 1/13th of an inch) across.

Continental Margin: The interval between the shore and the ocean floor; includes the continental shelf, rise, and slope.

Convergent Plate Boundary: A boundary in which two plates collide. The collision can be between two continents (continental collision), an relatively dense oceanic plate and a more buoyant continental plate (subduction zone) or two oceanic plates (subduction zone).

Craton: The relatively stable nucleus of a continent. Cratons are made up of a shield-like core of Precambrian Rock and a buried extension of the shield.

Critical habitat – habitat designated as critical for a particular species under the Endangered Species Act, including areas on which are found those physical or biological features essential to the conservation of the species.

Crystalline: Being, relating to, or composed of crystal or crystals.

Crust: The rocky, relatively low density, outermost layer of the Earth.

Cultural landscape – a geographic area, including

both the cultural and natural resources, associated with a historic event, activity, or person, or exhibiting cultural or aesthetic values. A way of seeing landscapes that emphasizes the interaction between human beings and nature over time. A traditional ranching area might be part of a cultural landscape.

Cumulative impacts – The incremental effects of an individual project reviewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects in order to ascertain the overall effect on the environment. A cumulative impact assessment is a requirement of NEPA.

Dacite: An igneous, volcanic rock with a high iron content.

Debris flow: A type of landslide made up of a mixture of water-saturated rock debris and soil with a consistency similar to wet cement. Debris flows move rapidly downslope under the influence of gravity. Sometimes referred to as earth flows or mud flows.

Deformation: General term for folding, faulting, and other processes resulting from shear, compression, and extension of rocks.

Deposition: The settling from suspension of transported sediments. Also, the precipitation of chemical sediments from mineral rich waters.

Dike: A sheet-like or tabular-shaped igneous intrusion that cuts across the sedimentary layering, metamorphic foliation, or other texture of a pre-existing rock.

Diorite: Intrusive igneous rock made of plagioclase feldspar and amphibole and/or pyroxene.

Direct impacts (or effects): primary environmental effects that are caused by a project and occur at the same time and place.

Drainage: Any channel that carries water.

Endemic: restricted to or native to a particular area or region.

Eon: The largest time unit on the geologic time scale.

Epoch: A subdivision of geologic time that is longer than an age but shorter than a period. The Tertiary Period is divided into five epochs. From most recent to oldest they are: Pliocene, Miocene, Oligocene, Eocene and Paleocene.

Era: A subdivision of geologic time that is

longer than a period but shorter than an eon. Precambrian, Paleozoic, Mesozoic, and Cenozoic are the eras of the time scale from oldest to youngest.

Erosion: A general term applied to the wearing away and movement of earth materials by gravity, wind, water and ice.

Environmental assessment (EA) – A concise public document that provides evidence and analysis of the potential environmental and socioeconomic impacts of a proposed federal action. An EA provides sufficient information for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). An EA includes brief discussions of the need for the proposal, of alternatives, of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted. Required by the National Environmental Policy Act (NEPA).

Fault: A fracture or fracture zone in rock along which movement has occurred.

Fault System: Two or more fault sets which interconnect.

Fault Zone: A fault expressed as an area of numerous small fractures.

Feldspar (and feldspathic): Family of silicate minerals containing varying amounts of potassium, sodium and calcium along with aluminum, silicon and oxygen. Potassium feldspars contain considerable potassium. Plagioclase feldspars contain considerable sodium and calcium. Feldspar crystals are stubby prisms, generally white, gray, or pink.

Flood Plain: An area of alluvium-covered, relatively level land along the banks of a stream that is covered with water when the stream leaves its channel during a time of high flow. Fluvial

Fluvial: Term used to describe river or stream-related features or processes. **Fluvial deposits** are sediments deposited by the flowing water of a stream.

Formation (geologic): A laterally continuous rock unit with a distinctive set of characteristics that make it possible to recognize and map from one outcrop or well to another.

Fossil: Remains, imprints or traces of an ancient organism that have been preserved in the rock record. Bones, shells, casts, tracks and excrement can all become fossils.

Gabbro: A dark, coarse-grained intrusive igneous rock. Gabbro is made of calcium-rich plagioclase, with amphibole and/or pyroxene, and is chemically equivalent to basalt.

Garnet: Family of silicate minerals containing varying amounts of aluminum, iron, magnesium, and calcium. Schist and gneiss often have tiny, glassy red garnet dodecahedrons.

Geomorphic province: Naturally defined geologic regions that display a distinct landscape or landform. Earth scientists recognize eleven provinces in California. Each region displays unique, defining features based on geology, faults, topographic relief and climate.

Gneiss: A coarse-grained, foliated rock produced by regional metamorphism. The mineral grains within gneiss are elongated due to pressure and the rock has a compositional banding due to chemical activity.

Granitic: A general term for intrusive igneous rocks that look similar to granite but may range in composition from quartz-diorite to granite. All granitic rocks are light colored; feldspar and quartz are visible in hand specimen.

Granodiorite: An intrusive igneous rock similar to granite, but contains more plagioclase than potassium feldspar.

Groundwater: Water that exists below the water table in the zone of saturation. Ground water moves slowly in the same direction that the water table slopes.

Ground Water Recharge Area: A location where surface water or precipitation can infiltrate into the ground and replenish the water supply of an aquifer.

Habitat: The physical location or type of environment in which an organism or biological population lives or occurs; often characterized by a dominant plant form or physical characteristics (i.e., the oak-savanna, wetland, or a coastal habitat).

Holocene: An epoch of the Quaternary Period beginning 10,000 years ago and continuing today.

Hornblende: A rock made up mostly amphibole and plagioclase feldspar. Although the name amphibolite usually refers to a type of metamorphic rock, an igneous rock composed dominantly of amphibole can be called an amphibolite too.

Hydrology: The science of Earth's water, its movement, abundance, chemistry and distribution

on, above and below Earth's surface.

Igneous Rock: A rock formed by the crystallization of magma or lava.

Indirect impacts (or effects): Also referred to as secondary effects, indirect impacts are caused by a project and occur later in time or at some distance from the project; however, they are still reasonably foreseeable.

Infrastructure: A general term describing public and quasi-public utilities and facilities such as roads, bridges, sewers and sewer plants, water lines, storm drainage, power lines, parks and recreation, public libraries, fire stations, sidewalks and streetlights. Can also be considered a permanent installation such as lighting, sidewalks, buildings and water systems.

Inholding: private land located within publicly owned land areas.

Intermittent flow: flow regimes occur irregularly or seasonally

Irreversible impacts: effects that cannot be changed over the long term or are permanent.

Irretrievable impacts: effects to resources that, once gone, cannot be replaced.

Landslide: A downslope movement of rock and soil over a failure surface and under the influence of gravity. Slumps, earthflows, debris flows and debris slides are examples.

Mafic: A term used to describe an igneous rock that has a large percentage of dark-colored minerals such as amphibole, pyroxene and olivine. Mafic rocks are generally rich in iron and magnesium. Basalt and gabbro are examples of mafic rocks.

Mineral: A naturally occurring chemical compound or limited mixture of chemical compounds. Minerals generally form crystals and have specific physical and chemical properties which can be used to identify them.

Mitigation: Mitigation includes: (a) Avoiding an impact altogether by not taking a certain action or parts of an action; (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; (e) compensating for the impact by replacing or

providing substitute resources or environments.

Metamorphic: A rock that has undergone chemical or structural changes produced by increase in heat or pressure, or by replacement of elements by hot, chemically active fluids.

Miocene: An Epoch that includes the time interval of about 23.7 to 5.3 million years ago.

Monzonite: An intermediate igneous intrusive rock composed of approximately equal amounts of sodic to intermediate plagioclase and orthoclase feldspars with minor amounts of hornblende, biotite, and other minerals

Mylonite (mylonitic): A brecciated metamorphic rock frequently found in a fault zone. The fractured texture is thought to form by the crushing actions of fault movement.

National Park System: the sum total of the land and water now or heretofore administered by the Secretary of the Interior through the National Park Service for park, monument, historic, parkway, recreational or other purposes.

North American Plate: The North American Plate is a tectonic plate covering most of North America, Greenland, Cuba, Bahamas, and parts of Siberia, Japan, and Iceland.

Orogeny: A compressive tectonic process that results in intense folding, reverse faulting, crustal thickening, uplift and deep plutonic activity. A mountain-building episode.

Paleomagnetism: The study of Earth's magnetic field over time. When rocks that contain magnetic minerals are deposited, the character (vertical and horizontal orientation) of Earth's magnetic field is locked within the rocks. This information can be used to study changes in Earth's magnetic field as well as the movement of plates over time.

Paleontology: The study of ancient life through fossils.

Paleozoic Era: Includes the time from about 570-245 million years ago.

Pacific Plate: An oceanic tectonic plate beneath the Pacific Ocean.

Plate Tectonics: The theory that the Earth's outer shell is made up of about a dozen lithospheric plates that move about and interact at their boundaries.

Playa: Playas are shallow, short-lived lakes that form where water drains into basins with no

outlet to the sea and quickly evaporates. Playas are common features in arid (desert) regions and are among the flattest landforms in the world.

Pleistocene Epoch: The earliest Epoch of the Quaternary Period, beginning about 1.6 million years ago and ending 10,000 years ago. Commonly known as the '**Ice Age**', a time with episodes of widespread continental glaciation.

Pliocene: The latest Epoch of the Tertiary Period, beginning about 5.3 million years ago and ending 1.6 million years ago.

Pluton: A large body of intrusive igneous rock that solidified within the crust. Batholiths and Stocks are types of plutons.

Porphyry: A variety of igneous rock consisting of large-grained crystals, such as feldspar or quartz, dispersed in a fine-grained feldspathic matrix or groundmass.

Precambrian: The 'unofficial' time period that encompasses all time from the Earth's formation, 4.55 billion years ago to 570 million years ago, the beginning of the Paleozoic Era.

Prime Farmland: land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses.

Proterozoic Eon: The 'Precambrian' time interval from 2.5 billion to 570 million years ago.

Pyroxene: Family of silicate minerals containing iron, magnesium, and calcium in varying amounts. Differ from amphibole family by lack of water in the crystals.

Quaternary: The most recent Period of the Cenozoic Era. This era encompasses the time interval of 1.6 million years ago through today.

Rift Zone: A region of Earth's crust along which divergence is taking place. A linear zone of volcanic activity and faulting usually associated with diverging plates or crustal stretching.

Right-Lateral Fault: A fault with horizontal movement. If you are standing on one side of the fault and look across it, the block on the opposite side of the fault has moved to the right

Riparian (land, area or habitat) – The land and vegetation bordering a natural watercourse such as a river or stream. Riparian habitat provides food, nesting habitat, cover, migration corridors, riverbank protection, erosion control and improved

water quality, and numerous recreational and esthetic values.

Sag pond: A body of water, which forms as water collects in the lowest parts of the depression that forms between two strands of an active strike-slip fault. The relative motion of the two fault strands results in a stretching of the land between them, causing the land between them to sink.

Sediment: A loose, unconsolidated deposit of weathering debris, chemical precipitates or biological debris that accumulates on Earth's surface.

Schist: A metamorphic rock containing abundant particles of mica, characterized by strong foliation, and originating from a metamorphism in which directed pressure plays a significant role.

Siltstone: A clastic sedimentary rock that forms from silt-size (between 1/256 and 1/16 millimeter diameter) weathering debris.

Socioeconomic analysis – The task of assessing the impact of a plan or project on a community's or region's social structure, on a community's fiscal health, on a region's economic basis, and similar socioeconomic considerations.

Special Resource Study: A study conducted by the National Park Service to determine whether an area is appropriate to be managed as a unit of the National Park System. It considers whether: (1) the resources in the area are nationally significant, (2) there are other means of protecting the area's resources, (3) the area's resources are already represented in the National Park System, and (4) if it is feasible for the NPS to protect and manage the resources.

State land conservancy – An independent state agency established to fund or acquire and manage land in order to preserve open space or habitat, provide for low-impact recreational or educational uses, or other similar purposes, with a specific regional focus.

Subduction Zone: An area at a convergent plate boundary where an oceanic plate is being forced down into the mantle beneath another plate. These can be identified by a zone of progressively deeper earthquakes.

Subsidence: A lowering of the land surface in response to subsurface weathering, collapse or slow settlement of underground mines, or the production of subsurface fluids such as ground water or oil.

Surficial materials: Any loose, unconsolidated sedimentary deposit lying on bedrock.

Syenite: A coarse-grained intrusive igneous rock of the same general composition as granite but with the quartz either absent or present in relatively small amounts (<5%).

Tertiary Period: The earliest Period of the Cenozoic Era, beginning about 66.4 million years ago and ending 1.6 million years ago.

Terrane: A rock formation or assemblage of rock formations that share a common geologic history. A geologic terrane is distinguished from neighboring terranes by its different history, either in its formation or in its subsequent deformation and/or metamorphism. Terranes are separated by faults.

Topography: The shape of Earth's surface or the geometry of landforms in a geographic area.

Transform Fault/Transform Plate Boundary: A strike-slip fault that connects offsets in a mid-ocean ridge.

Thrust Fault: A reverse fault that has a dip of less than 45 degrees.

Unconsolidated: A term used when referring to sediment that has not been lithified into a rock.

Uplift: A structurally high area in Earth's crust formed by movements that bend the crust into a structure such as a dome or an arch.

Volcanic rock: Igneous rock that cools and solidifies at or very near the Earth's surface. Volcanoes produce volcanic rock.

Wash: A normally dry stream bed that occasionally fills with water.

Watershed: The geographic area that contributes runoff to a stream. It can be outlined on a topographic map by tracing the points of highest elevation (usually ridge crests) between two adjacent stream valleys. The watershed of a large river usually contains the watersheds of many smaller streams.

Zoning – The division of a city or county into areas, or zones, which specify allowable uses for real property and size restrictions for buildings and lots within these areas. A zoning ordinance is a law that divides land into zones, specifies uses permitted in each zone, and standards required for each use. Typical zoning classifications include different types of agricultural, residential, industrial and commercial zones.

References

- Atchison, Topeka, and Santa Fe Railway
1938 "Citrus Fruits" Chicago, IL: Atchison, Topeka, and Santa Fe Railway Co.
- Audubon Society
2007 *Birds and Science: California Important Bird Areas (IBAs)*. Available on the internet at: [<http://iba.audubon.org/iba/stateIndex.do?state=US-CA>].
- Axelrod, D.I.
1978 "The origin of coastal sage vegetation, Alta and Baja California." In, *American Journal of Botany* 65(10): 1117-1131.
- Bailey, Harry P.
1966 *The climate of southern California*. Berkeley : University of California Press.
- Bean, Lowell John; Smith R. Charles
1978 "Gabrielino; Serrano" In *California*, edited by Robert F. Heizer, Volume 8. *Handbook of North American Indians*, edited by William C. Sturtevant. Washington DC: Smithsonian Institution
- Beck, Warren A. and Ynez D. Haase
1974 *Historical Atlas of California*. Norman: University of Oklahoma Press.
1989 *Historical atlas of the American West*. Norman: University of Oklahoma Press.
- Bigger, Richard
1959 *Flood Control in Metropolitan Los Angeles*. University of California Press.
- Billington, David P., Donald C. Jackson, and Martin V. Melosi.
2005 *The History of Large Federal Dams: Planning, Design, and Construction*. Denver, CO. Prepared for Bureau of Reclamation, U.S. Army Corps of Engineers, and National Park Service
- Blackburn, Thomas C. and Kat Anderson (Editors)
1993 *Before the Wilderness: Environmental Management by Native Californians*. Ballena Press: Menlo Park, Ca.
- [BLM] Bureau of Land Management, U.S. Department of the Interior
2006 *West Mojave Plan*. California Desert District: Moreno Valley, CA.
1994 *South Coast Resource Management Plan*. California Desert District: Palm Springs, CA.
- Burcham, L. T.
1957 *California Range Land: An Historico-Ecological Study of The Range Resource of California*. University of California: Davis, CA.
- California Center for Public Health Advocacy
2006 *Overweight Children in California Counties & Communities, 2004: Los Angeles County*. Available at: http://www.publichealthadvocacy.org/county/Los_Angeles_Fact_Sheet.pdf
- California Coastal Conservancy
2001 *Southern California Wetland Recovery Project Regional Plan*. <http://www.coastalconservancy.ca.gov/scwrp/>
- [CDF] California Department of Finance
2007a *Population Projections for California and Its Counties 2000-2050*, Sacramento, California, July 2007.
2007b *Race/Ethnic Population with Age and Sex Detail, 2000-2050*, Sacramento, California, July 2007.
- [CDFG] California Department of Fish and Game (CDFG)
2008a *CWHR Version 8.2 personal computer program*. California Interagency Wildlife Task Group. Sacramento, California

- 2008b *Natural Community Conservation Planning (NCCP): Status of Current Planning Efforts*. Available on the internet at: <http://www.dfg.ca.gov/habcon/nccp/status.html> (Accessed March 2008).
- 2007 *California Wildlife: Conservation Challenges (Comprehensive Wildlife Conservation Strategy)*. Available on the internet at: <http://www.dfg.ca.gov/habitats/WDP/report.html> (Accessed March 2007).
- 2006 *California Natural Diversity Database*. Accessed October 2006. Available on the internet at [<http://www.dfg.ca.gov/bdb/html/cnddb.html>].
- 2003 *Atlas of the Biodiversity of California*. Sacramento: California Department of Fish and Game.
- 2000 The Status of Rare, Threatened, and Endangered Animals and Plants of California. CDFG: Sacramento, CA. [http://www.dfg.ca.gov/hcpb/species/search_species.shtml]
- 1993 *Southern California Coastal Sage Scrub NCCP Conservation Guidelines*. Sacramento: California Department of Fish and Game.

California Department of Parks and Recreation

- 2002 *California Recreation Trails Plan, Phase 1*. Department of Parks and Recreation Planning Division, Statewide Trails Office: Sacramento, CA.

California Department of Water Resources

- 2003 *Bulletin 118: Basins and Subbasins of the South Coast Hydrologic Region*. Available on the internet at: http://www.water.ca.gov/groundwater/bulletin118/south_coast.cfm

California Geological Survey

- 2004 *Significant California Earthquakes*. Compiled from: T. Topozada and others, 2000, Epicenters of and areas damaged by $M \geq 5$ California earthquakes, 1800-1999 (CDMG Map Sheet 49); Updated (3/2004) with data from: Topozada, T. R. and D. Branum (2002) California $M \geq 5.5$ earthquakes, history and areas damaged, in Lee, W. H., Kanamori, H. and Jennings, P., International Handbook of Earthquake and Engineering Seismology, International Association of Seismology and Physics of the Earth's Interior; National Earthquake Information Center (<http://neic.usgs.gov/>); Nevada Bureau of Mines and Geology (<http://www.seismo.unr.edu/ftp/pub/updates/louie/graphics/brochure.html>); and loss information from C. Stover and J. Coffman, 1993, Seismicity of the United States (USGS Professional Paper 1527). Available on the internet at: http://www.conservation.ca.gov/CGS/rghm/quakes/Pages/eq_chron.aspx

California Native Plant Society

- 2011 *Inventory of Rare and Endangered Plants (online edition, v8-01a)*. California Native Plant Society. Sacramento, CA.
- 2006 *Inventory of Rare and Endangered Plants (online edition, v7-11mar)*. California Native Plant Society. Sacramento, CA. Available on the internet at: <http://www.cnps.org/inventory>

California Regional Water Quality Control Board – Los Angeles Region

- 2000 *State of the Watershed – Report on Surface Water Quality: The San Gabriel River Watershed*. Available on the internet at: http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/regional_program/wmi/water_report/SanGabrielRiverState.shtml

Carter, Bruce A.

- 1982a "Geology of the San Gabriel Anorthosite-Syenite Body, Los Angeles County, California." In Fife, D. L., and Brown, A. R., (Editors). *Geology and mineral wealth of the California Transverse Ranges: South Coast Geological Society, Mason Hill Volume, Annual Symposium and Guidebook Number 10*. Santa Ana, CA: South Coast Geological Society.
- 1982b "Early Geologic Studies of the Transverse Ranges, California." In Fife, D. L., and Brown, A. R., (Editors). *Geology and mineral wealth of the California Transverse Ranges: South Coast Geological Society, Mason Hill Volume, Annual Symposium and Guidebook Number 10*. Santa Ana, CA: South Coast Geological Society.

- Cassity, Michael, Ph.D.
2004 *Route 66 Corridor National Historic Context Study*. Broken Arrow, Oklahoma. Prepared for the National Park Service.
- [CEDD] California Employment Development Department
2010 *Local Area Profiles*. <http://www.labormarketinfo.edd.ca.gov>. Accessed 12/17/2010.
- Centers for Disease Control and Prevention
2001 *Increasing Physical Activity: A Report on Recommendations of the Task Force on Community Preventive Services ("Increasing Physical Activity")*, available on the internet at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5018a1.htm].
- [CEQ] Council on Environmental Quality, Executive Office of the President
1978 "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act." *Federal Register* 43: 55978–56007.
- Chavez, D., and N. Knap
2004 *Management problems of and strategies for off-highway vehicle management: National Forests in California*. Unpublished Report. U.S. Department of Agriculture, Forest Service.
- Chester, Tom
2004 San Gabriel Mountains: The Waterfalls. Available on the internet at: <http://tchester.org/sgm/lists/waterfalls.html>.
- The City Project
2007 *Healthy Parks, Schools and Communities: Mapping Green Access and Equity*. Available on the internet at: <http://www.cityprojectca.org/ourwork/mappinggreenaccess/index.html>.
- Clark, William B.
1998 *Gold districts of California*. Sacramento, Calif.: Dept of Conservation, Division of Mines and Geology.
- Cleland, Robert Glass and Glenn S. Dumke
1966 *Wilderness to Empire: A History of California*. Edited by Glenn S. Dumke. New York: Knopf.
- Cleland, Robert Glass
1941 *The Cattle on a Thousand Hills, Southern California 1850-1870*. San Marino: Huntington Library.
- Conkling, Steven W. and Brad Sturm
1997 *Final Report, National Register of Historic Places: Evaluation for the Proposed Mount San Antonio Historic Mining District, Angeles National Forest*. LSA Associates, Inc. Prepared for the Angeles National Forest.
- Cook, Sherburne F.
1978 "Historical Demography" In *California*, edited by Robert F. Heizer, Volume 8. *Handbook of North American Indians*, edited by William C. Sturtevant, Washington DC: Smithsonian Institution
- County of Los Angeles Libraries
2006 *Frequently Asked Questions, Antelope Valley*. Available on the internet at: <http://www.colapublib.org/history/antelopevalley/faq.html> Accessed July 31, 2006.
- Cranz, Galen
2000, June. "Changing Roles of Urban Parks: From Pleasure Garden to Open Space." *Landscape* 22:3 (Summer 1978) pp.9-18
- Crespi, Juan, trans. Alan K. Brown
2001 *A Description of Distant Roads: Original Journals of the First Spanish Expedition into California, 1769-1770*. San Diego, CA : San Diego State University Press, 2001.
- Crump, Spencer
1962 *Ride the Big Red Cars: How Trolleys Helped Build Southern California*. Los Angeles, CA: Crest Publications.

- Davis, F.W., Peter A. Stine and David M. Stoms
 1994 "Applications of Remote Sensing and Geographic Information Systems for the Distribution and Conservation Status of Coastal Sage Scrub in Southwestern California." In *Journal of Vegetative Science*, 5(5): 743-756.
- Davis, F.W., D.M. Stoms, A.D. Hollander, K.A. Thomas, P.A. Stine, D. Odionn, M.I. Borchert, J.H. Thorne, M.V. Gray, R.E. Walker, K. Warnter, and J. Graae
 1998 *The California Gap Analysis Project – Final Report*. Santa Barbara, CA: University of California. Available on the internet at [<http://gis.ucsc.edu/Projects/VWP/report.pdf>]
- Deinstadt, J.M., E.J. Pert, F.G. Hoover, and S. Sasaki
 1990 *Survey of fish populations in six southern California streams: 1987*. Calif. Fish and Game, Inland Fisheries Division, Admin. Rep. 90-1.56 p.
- Dibblee, Thomas W.
 1982 "Geology of the San Gabriel Mountains, Southern California." In Fife, D.L., and Minch, J.A., eds., *Geology and mineral wealth of the California Transverse Ranges*. Santa Ana, CA: South Coast Geological Society Annual Symposium and Guidebook, no. 10.
- Dumke
 1944 *The Boom of the Eighties in Southern California*. San Marino, CA: Huntington Library
- Ehlig, Perry L.
 1982 "The Vincent Thrust: Its Nature, Paleogeographic Reconstruction Across the San Andreas Fault and Bearing on the Evolution of the Transverse Ranges, San Gabriel Mountains." In Fife, D. L., and Brown, A. R., (Editors). *Geology and mineral wealth of the California Transverse Ranges: South Coast Geological Society, Mason Hill Volume, Annual Symposium and Guidebook Number 10*. Santa Ana, CA: South Coast Geological Society.
- Engelhardt, Fr. Zephyrin, O.F.M
 1908 *The Missions and Missionaries of California*. San Francisco, CA: James H. Barry Co.
- Fages, Pedro
 1919 *An historical, political, and natural description of California*; translated by Herbert I. Priestley. Catholic Historical Review. Vol. 4, no. 4 (Jan. 1919); v. 5, no. 1 (Apr. 1919).
- Farnsworth, R.W.C.
 1883 *A Southern California paradise (in the suburbs of Los Angeles), being a historic and descriptive account of Pasadena, San Gabriel, Sierra Madre, and La Cañada*; with important reference to Los Angeles and all Southern California, and containing map and illustrations. Pasadena: R.W.C. Farnsworth.
- Fischler, Stanley I.
 1979 *Moving Millions: An Inside Look at Mass Transit*. New York, New York: Harper & Row.
- Fisher, Robert, United States Geological Survey
 2007 Personal communication with Barbara Butler, National Park Service, Pacific West Region, January 2007.
- [FMMP] Farmland Mapping and Monitoring Program, California Department of Conservation Division of Land Resource Protection
 2008 *California Farmland Conversion Report 2006-2008*. Available on the internet at: http://redirect.conservation.ca.gov/DLRP/fmmp/county_info_results.asp
 2002 *California Farmland Conversion Report 2000-2002*. http://redirect.conservation.ca.gov/DLRP/fmmp/county_info_results.asp

Friends of Pio Pico State Historic Park

2011 E-mail message from Carolyn Schoff, to Barbara Butler, NPS landscape architect, February 16, 2011, regarding visitation to Pio Pico State Historic Park.

Garcia, Matt

2001 *A World of its Own: Race, Labor, and Citrus in the Making of Greater Los Angeles, 1900-1970.* Chapel Hill, NC: University of North Carolina Press.

Gumprecht, Blake

1999 *The Los Angeles River: Its Life, Death and Possible Rebirth.* Baltimore: Johns Hopkins University Press.

Hafen, Le Roy Reuben, Armijo, Antonio

1954 *Old Spanish Trail: Santa Fe to Los Angeles, Far West and the Rockies historical series, 1820-1875, v.1,* Glendale, CA: A. H. Clark Co.

Hall, William H.

1888. *Report of the state engineer of California on irrigation and the irrigation question.* State Office: Sacramento: 1886-88.

Halsey, Richard W.

2008 *Fire, Chaparral, and Survival in Southern California: Revised and Updated.* Sunbelt Publications: San Diego, CA.

Hanes, T. L., R.D. Friesen, and K. Keane.

1989 "Alluvial scrub vegetation in coastal southern California." In Abell, Dana (Tech. Coordinator) *Proceedings of the California Riparian Systems Conference: protection, Management, and Restoration for the 1990; September 22-24, 1988; Davis, California.* Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture.

Hayhoe, Katherine, Daniel Cayan, Christopher B. Field, Peter C. Frumhoff, Edwin P. Maurer, Norman L. Miller, Susanne C. Moser, Stephen H. Schneider, Kimberly Nicholas Cahill, Elsa E. Cleland, Larry Dale, Ray Drapek, R. Michael Hanemann, Laurence S. Kalksteinl, James Lenihan, Claire K. Lunch, Ronald P. Neilson, Scott C. Sheridan, and Julia H. Verville.

2004 "Emissions pathways, climate change, and impacts on California." *Proceedings of the National Academy of Sciences, USA.* August 24, 2004, vol. 101, no. 34, 12422-12427.

Hilton, George W. and John F. Due

1960 *The Electric Interurban Railways in America.* Stanford, CA: Stanford University Press.

Institute for Astronomy, University of Hawaii

Available on the internet at: <http://www.ifa.hawaii.edu/mko>

Johnston, Bernice Eastman

1962 *California's Gabrielino Indians.* Los Angeles: Southwest Museum.

Jones and Stokes

2004 *Final Inventory and Evaluation Report for the San Dimas Experimental Forest, Los Angeles, California.* Prepared for the United States Department of Agriculture Forest Service, Angeles National Forest. Arcadia, California.

Joseph, Stephen E., Criscione, Joseph J., Davis, Terry E. and Perry L. Ehlig.

1982 "The Lowe Igneous Pluton." In Fife, D.L., and Minch, J.A., eds., *Geology and mineral wealth of the California Transverse Ranges.* Santa Ana, CA: South Coast Geological Society Annual Symposium and Guidebook, no. 10.

Joslin, Les

1995 *Uncle Sam's Cabins: A Visitor's Guide to Historic U.S. Forest Service Ranger Stations of the West.* Bend, OR: Wilderness Associates

- Keating, Michael T., M.A.
2006 *Black Gold in the Golden State*. Claremont Graduate University
- Keeley, Jon E.
2005 *Alien Plant Invasion Following Fire in California Shrublands*. Western Ecological Research Center. Publication Brief for Managers. Three Rivers, CA. Available on the internet at: <http://www.werc.usgs.gov/pubbriefs/index.html>
- King, William F.
1990 *The San Gabriel Valley: Chronicle of an Abundant Land*. Chatsworth, CA: Windsor Publications.
1975 *The Vintage Years, Our Valley Before 1945*. Walnut, California: Mt. San Antonio College Community Services.
- Kroeber, Alfred L.
1976 *Handbook of the Indians of California*. New York: Dover Publications
- [LACEDC] Los Angeles County Economic Development Corporation
2010 *2010-2011 Mid-Year Update Economic Forecast and Industry Outlook, July 2010*. Available on the internet at: <http://laedc.org/reports/>
- [LADPW] Los Angeles County Department of Public Works
2006a *San Gabriel River Corridor Master Plan*. Available on the internet at: <http://dpw.lacounty.gov/wmd/watershed/sg/mp/mp.cfm>.
2006b *Greater Los Angeles County Region Integrated Resource Water Management Plan*. Available on the internet at: <http://www.ladpw.org/wmd/irwmp/>.
2006c *Hydrology Manual*. Water Resources Division: Alhambra, California. Available on the internet at: <http://dpw.lacounty.gov/wrd/publication/>
2004 *San Gabriel River and Montebello Forebay Water Conservation System*. Available on the internet at: <http://dpw.lacounty.gov/wrd/publication/system/montebello.cfm>
2005 *Santa Clara River Enhancement and Management Plan*. Prepared By: AMEC Earth & Environmental.
- Leadabrand, Russ
1966 *A Guidebook to the Mojave Desert of California, including Death Valley, Joshua Tree National Monument, and the Antelope Valley*. Los Angeles, CA: W. Ritchie Press.
- Lillie, Robert J.
2005 *Parks and Plates: The Geology of our National Parks, Monuments and Seashores*. New York: W.W. Norton and Company.
- Los Angeles Almanac
2005 *Headline History: Los Angeles County Pre-history to 1799-A.D.* Available on the internet at: <http://www.laalmanac.com/history/hi01a.htm>. Accessed July 29, 2005
- Los Angeles County
2009 *The County of Los Angeles Annual Report 2009-2010*. Public Affairs, Chief Executive Office, Los Angeles, California
- Los Angeles County Department of Public Health
2009 *Key Indicators of Health by Service Planning Area; June 2009*. Los Angeles County Department of Public Health, Office of Health Assessment and Epidemiology. Available on the internet at: <http://www.publichealth.lacounty.gov/docs/keyindicators.pdf>
- Los Angeles County Department of Regional Planning
2010a E-mail message from Joan Rupert, to Barbara Butler, NPS landscape architect, December 9, 2010, regarding visitation to county parks.

- 2010b *Revised Draft Santa Clarita Valley Area Plan: One Valley One Vision*. Los Angeles County Department of Regional Planning, Los Angeles, California
- 2008 *Draft General Plan*. Available on the internet at: <http://planning.lacounty.gov/generalplan>
- Los Angeles County Libraries
- 2006 Antelope Valley Community History. Available on the internet at: <http://www.colapublib.org/history/antelopevalley/>
- Major, J. and D.W. Taylor
- 1977 "Alpine." In *Terrestrial vegetation of California (new expanded edition)*. Barbour, M.G and J. Major., eds. Sacramento, CA: California Native Plant Society; 601-675.
- Matti, Jonathan C., Morton, Douglas M. and Brett F. Cox.
- 1992 *The San Andreas Fault System in the Vicinity of the Central Transverse Range sProvince, Southern California*. Open-File Report 92-354. Department of the Interior, U.S. Geological Survey.
- Mattison, M. Elise and Allan G. Barrows.
- 2003 *Seismic Hazard Zone for the Ritter Ridge Quadrangle, Los Angeles County, California*. California Department of Conservation, California Geological Survey. Sacramento, California.
- Mayer, Kenneth E. and William F. Laudenslayer, Jr., editors
- 1988 *A Guide to Wildlife Habitats of California*. State of California: Sacramento.
- McCulloh, Thane H., Beyer, Larry A. and Ronald W. Morin
- 2001 *Mountain Meadows Dacite: Oligocene intrusive complex hat welds together the Los Angeles Basin, northwestern Peninsular Ranges, and Central Transverse Ranges, California*. Washington, DC: USGS Information Services.
- McPhee, John
- 1989 *The Control of Nature*. New York: Farrar, Straus, Giroux.
- [Metro] Los Angeles County Department of Transportation
- 2006 Los Angeles County Metropolitan Transportation Authority (Metro) Bicycle Transportation Strategic Plan. Available on the internet at: http://www.metro.net/board/Items/2006/02_February/20060215P&Item6%20Atta.pdf
- Miller, Crane S. and Richard S. Hyslop
1983. *California: The Geography of Diversity*. Mayfield Publishing Company: Palo Alto, CA.
- Mistretta, Orlando
- 2007 Personal communication with Barbara Butler, National Park Service, Pacific West Region April 2007.
- Morton, Douglas M. and Fred K. Miller
- 2003 *Preliminary geologic map of the San Bernardino 30'x60' quadrangle, California: Detailed description of Map Units, version 1.0*. Open-File Report 03-293. Department of Interior, U.S. Geological Survey.
- Morton, Paul K.
- 1982 "Mineral deposits of the Transverse Ranges." In *Geology and Mineral Wealth of the Transverse Ranges*. South Coast Geological Society: Santa Ana, CA
- Mount, Jack D.
- 1971 "A Late Miocene Flora from the Solemint Area, Los Angeles County, California." *Bulletin of the Southern California Paleontological Society*, vol. 3, no. 3, pp. 1-4 & 8.
- Mount Wilson Observatory
- 2007 Information extracted from Mount Wilson Observatory web site: <http://www.mtwilson.edu/>. Accessed in 2007.
- Muir, John
- 1894 *The Mountains of California*. The Century Company: New York.

- Murphy, Roy and Julia Murphy
 1985 *The San Gabriel Mountains*. Arcadia, CA: Big Santa Anita Historical Society.
- [NPS] National Park Service
 2010 *A Socioeconomic Atlas for National Park Units in California*. Prepared by Jean McKendry, College of Natural Resources, University of Idaho, Moscow, Idaho.
- 2009 *National Park Visitor Spending and Payroll Impacts 2008*. Prepared by Daniel J. Stynes, Department of Community, Agriculture, Recreation and Resource Studies Michigan State University, East Lansing, Michigan.
- 2008a *National Natural Landmarks: NNL Guide*. Available on the internet at: [<http://www.nature.nps.gov/nnl/index.cfm>]
- 2008b NPS Rustic Architecture in the West (<http://www.nps.gov/history/hdp/exhibits/parkitect/>)
- 2006 *Management Policies*.
- 2000 *History in the National Park Service: Themes and Concepts (updated)*. Also 1987 *Thematic Framework*. Available on the internet at [http://www.cr.nps.gov/history/online_books/thematic87/theme1-16.htm]
- 1998 *Padua Hills Theater National Register of Historic Places Nomination Form*. Available on the internet at: <http://www.cr.nps.gov/nr/feature/Hispanic/2000/padua.HTM>
- 1996 *Juan Bautista de Anza National Historic Trail Comprehensive Management Plan*.
- 1995 Route 66 Special Resource Study.
- 1991 Mount Lowe Railway National Register of Historic Places Nomination Form. Prepared by Charles G, Seims.
- 1990 *Natural History in the National Park System and on the National Registry of Natural Landmarks*. Natural Resources Report, NPS NR NRTR-90/03. Washington, D.C.: National Park Service.
- 1989 National Historic Landmark Astronomy Theme Study. Available on the internet at: http://www.nps.gov/history/history/online_books/butowsky5/astro0.htm
- 1986 *Architecture in the Parks*, National Historic Landmark Theme Study, Laura Soullière Harrison
- 1979 *A Survey of Potential Natural Landmarks, Biotic Themes, of the Mojave-Sonoran Desert Region*. Prepared for the Heritage Conservation Recreation Service, United States Department of the Interior by Paul S. Martin. Tucson: University of Arizona.
- 1977 *Rustic Architecture: 1916 – 1942*, William C. Tweed, Historian; Laura E. Soulliere, Architectural Historian; Henry G. Law, Architect
- 1976 *The Mojave-Sonoran Natural Region Study*. Prepared for the National Park Service by Wachter, Bruce G., Bull, William B. and Stephen J. Reynolds. Tucson: University of Arizona, Department of Geosciences.
- 1974 *Geological Resources of the South Pacific Border Region*. Prepared for the National Park Service by John H. Lipps, James R. Correa, and Gary Zumwalt. Davis: University of California.
- 2010 *Santa Monica Mountains National Recreation Area Historic Resources Study and Environmental History*, Prepared by Timothy Babalis, Environmental Historian. On-file at Santa Monica Mountains National Recreation Area.

- 1973 "A Survey of the Natural History of the South Pacific Border Region, California: Biotic Themes" G. Prepared by Ledyard Stebbins and Dean William Taylor, Institute of Ecology, University of California, Davis for the National Park Service. On file at the Pacific West Regional Office, Oakland, California.
- Nelson, Howard J.
1983 *The Los Angeles Metropolis*. Dubuque, Iowa: Kendall/Hunt Publishing Company.
- [NOAA] National Oceanic Atmospheric Administration
2002 "Endangered and Threatened Species: Range Extension for Endangered Steelhead in Southern California." *Federal Register* 67: 21586–21598.
- 1999 309 State Enhancement Grant Assessments and Strategies: Public Access, 1992-1996. Department of Commerce. NOS, OCRM, CPD, 99-04.
- Norris and Webb
1990 *Geology of California*. John Wiley & Sons: New York.
- Noss, Reed, Beier, Paul and Shaw, William
1997 *Evaluation of The Coal Canyon Biological Corridor*. Unpublished Report.
- Nourse, Jonathan A. Oakeshott, Gordon B.
2002 *Middle Miocene reconstruction of the central and eastern San Gabriel Mountains, southern California with implications for evolution of the San Gabriel fault and Los Angeles Basin*. Geological Society of America, Special Paper 365
- 1971 *California's Changing Landscape: A Guide to the Geology of the State*. McGraw-Hill Book Company: New York.
- Orsi, Jared
2004 *Hazardous Metropolis: Flooding and Urban Ecology in Los Angeles*. Berkeley, CA: University of California Press.
- PCR Services Corporation
2006 *Significant Ecological Area Update*. Prepared for the Los Angeles County Department of Regional Planning, November 2000.
- 2000a Biological Resources Assessment of the Proposed Antelope Valley Significant Ecological Area, prepared for Los Angeles County Department of Regional Planning, November 2000.
- 2000b Biological Resources Assessment of the Proposed Puente Hills Significant Ecological Area, prepared for Los Angeles County Department of Regional Planning, November 2000.
- 2000c Biological Resources Assessment of the Proposed San Gabriel Canyon Significant Ecological Area, prepared for Los Angeles County Department of Regional Planning, November 2000.
- 2000d Biological Resources Assessment of the Proposed E. San Gabriel Valley Significant Ecological Area, prepared for Los Angeles County Department of Regional Planning, November 2000.
- Peck, Sedley
1938 "Colorful Old Days on the Upper San Gabriel," *Trails Magazine*. Will H. Thrall, Editor and Business Manager. p. 7, Vol. 5, No. 3, Summer. The Mountain League of Southern California.
- Pomeroy, Elizabeth
2000 *Lost and Found: Historic and Natural Landmarks of the San Gabriel Valley*. Pasadena, CA: Many Books Press
- 2002 *Lost and Found II: More Historic and Natural Landmarks under Southern California Skies*. Pasadena, CA: Many Books Press

- Powell, Robert E., United States Geological Survey
- 2007a Personal communication with Barbara Butler, National Park Service, Pacific West Region, January 2007.
- 2007b Personal communication with Barbara Butler, National Park Service, Pacific West Region, September 2007.
- 1993 "Balanced palinspastic reconstruction of pre-late Cenozoic paleogeology, southern California: Geologic and kinematic constraints on evolution of the San Andreas fault system" in Powell, R.E., Weldon R.J., and Matti, J.C. eds., *The San Andreas Fault System: Displacement, Palinspastic Reconstruction, and Geologic Evolution*. Boulder, Colorado, Geological Society of America Memoir 178, pp.1-106.
- Puente Hills Landfill Native Habitat Preservation Authority
- 2007 *Final Resource Management Plan*. Prepared by LSA Associates, Inc. for the Puente Hills Landfill Native Habitat Preservation Authority. Whittier, CA
- Quinn, Ronald D.
- 2009 Personal communication with Barbara Butler, National Park Service, Pacific West Region, November 2009.
- 1990 *The status of walnut forests and woodlands (Juglanscalifornica) in southern California*. In: Schoenherr, Allan A., ed. Endangered plant communities of southern California: Proceedings, 15th annual symposium; 1989 October 28; Fullerton, CA. Special Publication No. 3. Southern California Botanists: Claremont, CA.
- Raab, Mark
- 2005 *Land of sunshine: an environmental history of metropolitan Los Angeles*. Deverell, William and Greg Hise (editors). Pittsburgh: University of Pittsburgh Press.
- Richardson, Robert B.
- 2009 *Recreation Use in National Forests, Urban Population Growth, and Demographic Change: The Case of the San Gabriel Mountains*. Michigan State University. Prepared for the Sierra Club
- The River Project
- 2006 *The State of the Tujunga: An Assessment of the Tujunga/Pacoima Watershed*. Available on the internet at < <http://www.theriverproject.org/tujunga/plan.html>>. Robinson, John W.
- Robinson, W. John
- 2007 Personal communication with Jean Boscacci, National Park Service, Pacific West Region, March 2007.
- 1991 *The San Gabriels: The Mountain Country from Soledad Canyon to Lytle Creek*. Big Santa Anita Historical Society: Arcadia, California
- 1985 *The San Dimas Experimental Forest and the Dalton Watershed: 50th Anniversary*. Pacific Southwest Forest and Range Experiment Station: Berkeley, CA.
- 1973 *Mines of the San Gabriels*. Glendale, California La Siesta Press.
- Robinson, W. W.
- 1946 *The Forest and the People: The Story of the Angeles National Forest*. Title Insurance and Trust Company: Los Angeles.
- Rowland, Lenore
- 1948 *Romance of La Puente Rancho, including excerpts from "La Puente Valley, past and present" by Janet and Dan N. Powell (W.P.A. Writers Project)*. Covina, CA: Neilson Press

- [RWMG] Regional Water Management Group
 2007 *Antelope Valley Integrated Regional Water Management Plan*. Available on the internet at: <http://www.avwaterplan.org/>
- San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy
 2001 *Common Ground, from the Mountains to the Sea*. Available on the internet at: [http://www.rmc.ca.gov/plans/common_ground.html].
- [SCAG] Southern California Association of Governments
 2008, January *Draft 2008 Regional Transportation Plan (RTP) Update, Program Environmental Impact Report*. Available on the internet at: <http://www.scag.ca.gov/RTPpeir2008/draft/index.htm>
- Schiffman
 2005 *Land of sunshine: an environmental history of metropolitan Los Angeles*. Deverell, William and Greg Hise (editors). Pittsburgh: University of Pittsburgh Press.
- Schoenherr, Allan A
 1992 *A Natural History of California*. University of California Press: Berkeley, CA.
- Scott, T.A. and D.S. Cooper
 1999 *Summary of Avian Resources of the Puente- Chino Hills Corridor*. Publisher: Location.
- Sharp, Robert P.
 1975 *Southern California: K/H Geology Field Guide Series*. Kendall/Hunt Publishing Company
- Sister, C., Wilson, J.P., and Wolch, J.
 2008 *Green Visions Plan for 21st Century Southern California*. 17. *Access to Parks and Park Facilities in the Green Visions Plan Region*. University of Southern California GIS Research Laboratory and Center for Sustainable Cities, Los Angeles, California.
- Smith, Cornelius
 1936 "The Old San Gabriel and Some of Those who Made its History," *Trails Magazine*. Will H. Thrall, Editor and Business Manager. p. 7, Vol. 3, No. 3, Summer. The Mountain League of Southern California
- Stanton, Robert J.
 1966, January. *Megafauna of the upper Miocene Castaic Formation, Los Angeles County, California*. *Journal of Paleontology*, v.40, no.1, pp. 21-40.
- Stein, Bruce A, Lynn S. Kutner, and Jonathan S. Adams editors.
 2000 *Precious Heritage: The Status of Biodiversity in the United States*. Oxford University Press: United States.
- Stein, Eric D., Shawna Dark, Travis Longcore, Nicholas Hall, Michael Beland, Robin Grossinger, Jason Casanova, and Martha Sutula.
 2007 *Historical Ecology and Landscape Change of the San Gabriel River and Floodplain*. Southern California Coastal Water Research Project Technical Report #499.
- Steiner, Frederick
 1933 *Americans at Play*. McGraw-Hill Book Company: New York and London.
- Stein, William
 1960 "Recollections of a pioneer oil driller." *The Ventura County Historical Society* 3:1-20.
- Stephenson, John R. and Gena M. Calcarone.
 1999 *Southern California Mountains and Foothill Assessment*. United States Department of Agriculture, Forest Service, GTR: PSW-GTR-172.
- Sugranes, Eugene Joseph
 1909 *The Old San Gabriel Mission: Historical Notes Taken from Old Manuscripts and Records*. San Gabriel, CA.

- Swift, C. C., T. R. Haglund, M. Ruiz, and R. N. Fisher.
1993 "The status and distribution of the freshwater fishes of southern California." *Bulletin of the Southern California Academy of Science* 92(3):101-167.
- Teague, Charles Collins
1944 *Fifty years a rancher: the recollections of half a century devoted to the citrus and walnut industries of California and to furthering the cooperative movement in agriculture*. Los Angeles: Printed by Anderson & Ritchie: Ward Ritchie Press.
- Thomas, David Hurst, editor
1989 *Columbian Consequences*. Washington and London: Smithsonian Institution Press
- Thorne, R.F.
1988. "Montane and subalpine forests of the Transverse and Peninsular Ranges." In: Barbour, M. Gand J. Major, eds. *Terrestrial vegetation of California (new expanded edition)*. Sacramento, CA: California Native Plant Society; 537-557.
- Thrall, Will H.
1937 "Mount Wilson – The Observatory and The Toll Road Company," *Trails Magazine*. Will H. Thrall, Editor and Business Manager.vol. 4, summer 1937, no. 3, pp. 8-9 The Mountain League of Southern California
1935 "The Days of Gold," *Trails Magazine*. Will H. Thrall, Editor and Business Manager.p. 16, Vol. 2, No. 3.Summer.The Mountain League of Southern California
1934 "Angeles Forest – Our Greatest Mountain Playground," *Trails Magazine*. Will H. Thrall, Editor and Business Manager. p. 12, Vol. 1, No. 3, Summer. The Mountain League of Southern California
- The Trust for Public Land
2005 *Healthy Parks, Healthy Communities: Park Inequities and Health Disparities in California Fact Sheet*.
2004 *No Place to Play: A Comparative Analysis of Park Access in Seven Major Cities*. Available on the internet at [http://www.tpl.org/tier3_cd.cfm?content_item_id=14565&folder_id=266]
- U.S. Census Bureau
2005 *American Community Survey*. Available on the internet at: <http://www.census.gov/acs/www/>
2000 *Summary File 1 (SF1), P1*. Total Population: 2000.
- [USFWS] United States Fish and Wildlife Service, United States Department of the Interior
2010 "Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-Legged Frog; Final Rule." *Federal Register* 75: 12815– 12959.
2008 "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Berberis nevinii* (*Nevin's barberry*)." *Federal Register* 73: 8411– 8440.
2007 "Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Poliioptila californica californica*); Final Rule." *Federal Register* 72: 72009– 72213.
2006a "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southern California Distinct Population Segment of the Mountain Yellow-Legged Frog (*Ranamuscosa*)" *Federal Register* 70: 54344– 54386.
2006b "Designation of Critical Habitat for *Astragalus brauntonii* and *Pentachaeta lyonii*." *Federal Register* 71: 66373– 66423.
2005a ETWP; Final Designation of Critical Habitat for the Arroyo Toad (*Bufo californicus*); Final Rule." *Federal Register* 70: 19561– 19633.
2005b Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Southern California Distinct Vertebrate Population Segment of the Mountain Yellow-Legged Frog (*Rana muscosa*)." *Federal Register* 70: 54106– 54143.

- 2005c Designation of Critical Habitat for *Brodiaea filifolia* (*thread-leaved brodiaea*); Final Rule." *Federal Register* 70: 73819– 73963.
- 2004 Endangered and Threatened Wildlife and Plants; Final Rule To Designate Critical Habitat for the Santa Ana Sucker (*Catostomus antaanae*). " *Federal Register* 69: 8839– 8861.
- 1998 *Vernal Pools of Southern California Recovery Plan*. Fish and Wildlife Service Region One, Portland, Oregon.
- 1995 "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). " *Federal Register* 70: 60885-61009.
- 1994 "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Least Bell's Vireo." *Federal Register* 59: 4845-4867.
- 1990 *Natural History in the National Park System and on the National Registry of Natural Landmarks*. Natural Resources Report, NPS NR NRTR-90/03. Washington, D.C.: National Park Service.
- 1980 "Proposed Designation of Critical Habitat for Endangered Unarmored Threespine Stickleback." *Federal Register* 45: 76012– 76015.
- [USFS] United States Forest Service, United States Department of Agriculture.
- 2011 *Angeles National Forest website: Special Places*. Available on the internet at: <http://fs.usda.gov/angeles>
- 2010 *Station Fire BAER Revisit*. United States Department of Agriculture, Forest Service. Pacific Southwest Region, Angeles National Forest.
- 2009 *National Visitor Use Monitoring Results: Angeles National Forest*. Last updated 23rd March 2009. National Visitor Use Monitoring Program. Available on the internet at: http://www.fs.fed.us/recreation/programs/nvum/2009/Angeles_FY2006.doc
- 2007 *Recreation Facility Analysis: Five-Year Proposed Program of Work and Programmatic Effects of Implementation*. Available on the internet at: < <http://www.fs.fed.us/recreation/programs/rfa/index.shtml> >
- 2005 *Southern California National Forests Plan: Land Management Plan, Angeles National Forest Strategy*. R5-MB-075 Available on the internet at: <http://www.fs.fed.us/r5/scfpr/projects/lmp/>
- 2003a *Business Plan for the Angeles National Forest*. Pacific Southwest Region. R5-MB-020.
- 2003b *Comprehensive River Management Plan Sespe Creek, Los Padres National Forest*. Pacific Southwest Region, R5-MB-038.
- 2003c *Comprehensive River Management Plan Sisquoc River, Los Padres National Forest*. Pacific Southwest Region, R5-MB-039.
- 2003d *Comprehensive River Management Plan Big Sur River, Los Padres National Forest*. Pacific Southwest Region, R5-MB-027.
- 1999a San Dimas Experimental Forest Facilities Plan; <http://fireimaging.com/sdef/plan/index.html>
- 1986 *Cultural Resource Overview for the Angeles National Forest*, prepared by McIntyre, Michael
- [USGS] United States Geological Survey
- 2006 *Geologic History of the San Andreas Fault System*. Available on the internet at: http://geomaps.wr.usgs.gov/social/geology/geologic_history/san_andreas_history.html. Accessed, July 2006.
- University of California, Berkeley
- 2008 "Climate Change Could Severely Impact California's Unique Native Plants." *ScienceDaily*. Retrieved January 11, 2008, from <http://www.sciencedaily.com/releases/2008/06/080625073809.htm>

- UCLA (University of California, Los Angeles) Landscape Architecture Program
2006 *Saving the San Gabriel River*. Los Angeles, CA.
- Vance, Darrell (USFS, Angeles National Forest)
2007 Personal communication with Jean Boscacci, National Park Service, Pacific West Region.
- Vandergast, Amy G., Andrew J. Bohonak, Stacie A. Hathaway, Joshua Boysb, and Robert N. Fisher
2008 "Are hotspots of evolutionary potential adequately protected in southern California?" *Biological Conservation*. Vol 141, pp. 1648 – 1664
- Vandergast, Amy G., Andrew J. Bohonak, David B. Weissman, and Robert N. Fisher
2007 "Understanding the genetic effects of recent habitat fragmentation in the context of evolutionary history: phylogeography and landscape genetics of a southern California endemic Jerusalem cricket (Orthoptera: Stenopelmatidae: Stenopelmatius)." *Molecular Ecology*. Vol. 16, pp.977-992.
- Weber, Msgr. Francis J., editor
1979 *The Pride of the Missions*. Hong Kong: Libra Press Limited.
- Weigand, Peter W.
1982. *Middle Cenozoic Volcanism of the Western Transverse Ranges in Fife, D.L., and Minch, J.A., eds., Geology and mineral wealth of the California Transverse Ranges*. Santa Ana, Calif., South Coast Geological Society Annual Symposium and Guidebook, no. 10.
- Weiler, Stephan
2005, December "A Park by Any Other Name: National Park Designation as a National Experiment in Signaling." *The Federal Reserve Bank of Kansas City Economic Research Department, Research Working Paper*. RWP 05-09.
- Welles, Annette
1972 *The Los Angeles Guidebook*. Sherbourne Press.
- Wells, A.W., J.S. Diana, and C.C. Swift
1975 *Survey of the freshwater fishes and their habitats in the coastal drainages of southern California*. Final Report, Calif. Fish and Game, Inland Fisheries Branch, Sacramento.
- Western Oil and Gas Association
1965 *Highlights of California's Petroleum History*. Los Angeles: The Association.
- Whitley, David S., Ph.D.
2002 *National Register nomination form: Rock Art Sites of the Transverse Range Province, Southern California*. Prepared for the U.S. Forest Service, Angeles National Forest
- Wilson, Rick I. and Wayne Haydon
1998 *Seismic Hazard Zone Report for the Mint Canyon Quadrangle: Earthquake-Induced Landslide Zones in the Mint Canyon 7.5-Minute Quadrangle, Los Angeles County, California*. California Department of Conservation Division of Mines and Geology. Available on the internet at: ftp://ftp.consrv.ca.gov/pub/dmg/shezp/eval_rpts/mintc_eval.pdf
- Wilson, Rick I. and Janis L. Hernandez
2003 *Seismic Hazard Zone Report for the Acton Quadrangle: Earthquake-Induced Landslide Zones in the Acton 7.5-Minute Quadrangle, Los Angeles County, California*. California Department of Conservation Division of Mines and Geology. Available on the internet at: http://gmw.consrv.ca.gov/shmp/download/evalrpt/act_eval.pdf Woodburne, M.O.
- 1975 *Cenozoic stratigraphy of the Transverse Ranges and adjacent areas, southern California: Geological Society of America Special Paper 162*, 95 p.
- Workers of Writers Program of the Work Projects Administration
1941 *Los Angeles: A Guide to the City and its Environments*. Hasting House Publishers: New York.

- Wright, Lauren A. and Bennie W. Troxel
2002 *Levi Noble: Geologist: His Life and Contributions to Understanding the Geology of Death Valley, the Grand Canyon, and the San Andreas Fault*. USGS Open-File Report 02-422. United States Geological Survey, United States Department of the Interior.
- Yerkes, R.F., McCulloh, T.H., Schoellhamer, J.E. and J.G. Vedder.
1965 *Geology of the Eastern Los Angeles Basin, Southern California*. Geological Survey Professional Paper 420-A. United States Government Printing Office: Washington, DC.

Preparers

CORE STUDY TEAM

The core study team was based in the National Park Service's Pacific West Regional Office in Oakland, California. Core study team members were responsible for public involvement and outreach materials, research, writing and analysis related to study area resources, development of the alternatives, environmental compliance, and production of the draft study report.

Jean Boscacci, Outdoor Recreation Planner

Barbara Butler, Landscape Architect

Mamie Choy, Landscape Architect

Martha Crusius, Senior Planner, Project Manager

Brad Phillips, Outdoor Recreation Planner

EXTENDED STUDY TEAM

The extended study team included NPS Pacific West Regional Office staff that provided assistance and expertise for specific aspects of the study.

Jim Donovan, Rivers, Trails, and Conservation Assistance Program, Los Angeles. Participated in alternatives development, technical review of resource significance, public meeting facilitation.

Anne Dove, Rivers, Trails, and Conservation Assistance Program, Los Angeles. Contributed research and writing related to recreational resources, technical review of resource significance, participated in alternatives development, public meeting facilitation.

Peg Henderson, Rivers, Trails, and Conservation Assistance Program, Oakland. Contributed research and writing related to recreational resources and partnership opportunities.

Elaine Jackson-Retondo, Historian, National Register & National Historic Landmarks Program. Technical review of cultural resource significance.

Mark Rudo, Archeologist. Contributed analysis and writing related to archeological chronology and resources, technical review of cultural resource significance.

Robert Rossman, Environmental Compliance Specialist. Primary author of the environmental consequences.

Rose Rumball-Petre, Environmental Compliance Specialist. Technical review of resource significance.

Michael Sawlin, Geologist, National Natural Landmarks Coordinator. Provided guidance on geologic research and potential significance.

CONTRIBUTIONS FROM PARTNER AGENCIES

Agency partners assisted the study process by providing general advice and guidance, resource information, meeting facilitation, technical reviews, mailing lists, meeting sponsorship, etc.

Lower Los Angeles and San Gabriel Rivers and Mountains Conservancy

Jane Beesley, Deputy Executive Officer, Watershed Conservation Authority

Belinda Faustinos, Former Executive Officer

Valorie Shatynski, Deputy Executive Officer

Frank Simpson, Consultant

Luz Torres, Staff Biologist

Marybeth Vergara, Project Manager

U.S. Forest Service:

Marty Dumpis, Recreation, Heritage Resources, Special Uses, and Lands Staff Officer

Mike McIntyre, Los Angeles River District Ranger

Jody Noiron, Former Forest Supervisor

Darrel Vance, Forest Archaeologist/ Heritage Program Manager

L'Tanga Watson, San Gabriel River District Ranger

Sherry Rollman, Public Affairs Officer