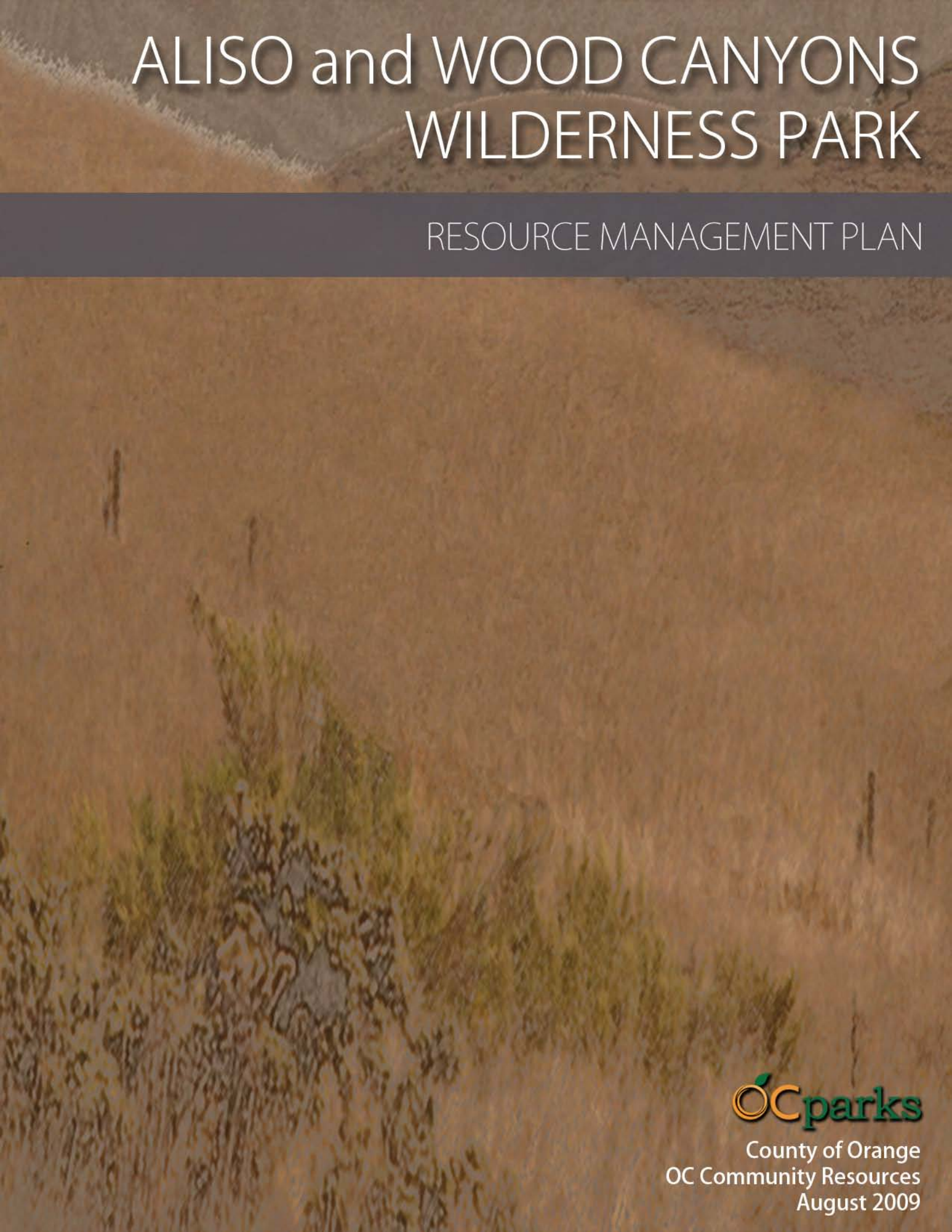
ALISO and WOOD CANYONS WILDERNESS PARK

RESOURCE MANAGEMENT PLAN



OCparks

County of Orange
OC Community Resources
August 2009

ALISO AND WOOD CANYONS WILDERNESS PARK

RESOURCE MANAGEMENT PLAN

AUGUST 2009

OCparks

ORANGE COUNTY BOARD OF SUPERVISORS

Minute Order: August 4, 2009

Approved Mitigated Negative Declaration IP 08-2009 and Final Draft Aliso and Wood Canyons Wilderness Park Resource Management Plan for guidance of OC Parks on future policy, land use, and resource management decisions for the park.

ALISO AND WOOD CANYONS WILDERNESS PARK

RESOURCE MANAGEMENT PLAN

AUGUST 2009

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ALISO AND WOOD CANYONS WILDERNESS PARK

RESOURCE MANAGEMENT PLAN

AUGUST 2009

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1.1 INTRODUCTION

The Aliso and Wood Canyons Wilderness Park (AWCWP) covers 3,873[1] acres including the hills, canyons, and floodplain surrounding Aliso and Wood Canyons and portions of Laguna Canyon. The landscape ranges from lush, oak woodlands to broad expanses of grassland and coastal sage scrub. The diverse landscape and topography provides spectacular views and opportunities for a variety of visitor experiences.

Orange County Parks (OC Parks) owns and operates AWCWP. Conservation efforts by the County and others have helped to ensure that the open space remains undeveloped and its natural resources remain intact. The park is designated as a wilderness park. As defined by the Orange County General Plan Recreation Element, a regional wilderness park is:

> A regional park in which the land retains its primeval character with minimal improvements and which is managed and protected to preserve natural processes. The park (1) generally appears to have been affected primarily by forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) is of sufficient size to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic or historical value. In essence, park uses envisioned will result in minimal impact to existing park resources and are compatible with a wilderness experience.
>
> - Orange County General Plan Recreation Element

1.2 REGIONAL CONTEXT

AWCWP is located within the Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) central and coastal subregion reserve known as the Nature Reserve of Orange County (NROC); therefore, it is subject to provisions of the NCCP/HCP implementation agreement. This nature reserve forms a large island of habitat almost entirely surrounded by urban development. Despite its long history of use and proximity to urban development, the nature reserve supports many of the typical and unique landscapes of California – coastal sage scrub, chaparral, native grassland, and oak woodland – and sustains important habitat for a number of native animal species including California gnatcatcher, coastal cactus wren, mule deer, bobcat, and southwestern pond turtle. The connectivity between these areas within the nature reserve provides a rare opportunity to preserve a functional wildland habitat.

[1] Total acres = 3,355 Fee, 256 Easements, and 262 IOD (Irrevocable Offer of Deed Dedication).

1.3 RESOURCE MANAGEMENT PLAN

As required by the NCCP/HCP, programs for implementing NCCP/HCP policies and adaptive management plans for fire, restoration/enhancement, and recreation will be defined in a Resource Management Plan (RMP) for each County park within the proposed habitat reserve system. The AWCWP RMP elements will include policies for managing and monitoring the park; research; habitat restoration and enhancement; fire management; public access and recreation; and infrastructure. The RMP will be submitted for review to the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and the NROC.

Proposed management of the AWCWP will remain consistent with the County's definition of a wilderness park. As such, the County will protect and preserve the native habitat in the park for the benefit of its natural resources. The County will continue to provide outdoor education and low-impact recreation consistent with resource protection goals.

The RMP provides a comprehensive, long-term management plan for AWCWP. The RMP will serve as a clear and realistic blueprint for how the wilderness park will be managed for the next several decades, and will guide the County on future policy, land use, and resource management decisions relating to the park. The RMP is designed to be flexible enough to allow changes and refinements to management approaches as more is learned about the park's ecosystems and the responses of these ecosystems to both natural and human forces. This flexibility is a prime component of adaptive management, which involves the gradual modification of management techniques based on the results of ongoing management, research, and monitoring activities.

The fundamental objective for the RMP is to identify the best way to manage, protect and enhance the natural resource values of AWCWP while balancing the needs of the local community for safe recreational and educational opportunities. The major plan objectives are to enhance wildlife habitats, develop vegetation management practices, and provide recreational opportunities and public access that have minimal impacts on resources.

The main elements of the Resource Management Plan are summarized below.

Chapter 3: Public Involvement
As part of the process for developing a RMP for the AWCWP, a series of public workshops /meetings provided a means for local communities and interest groups to share their thoughts and to shape the RMP. The workshops were intended as forums to engage members of the community regarding key discussion points pertaining to the AWCWP.

The Open House/Information Fair initiated the public input part of the process with the exchange of information about the park. The next step was a Field Day Workshop, in which participants experienced the wilderness park to see specific points of concern and/or opportunities for change. The third workshop allowed participants to explore various strategies and solutions for achieving park goals within the framework of a wilderness park. A fourth public meeting was held to present and receive public input on the First Draft RMP. In June 2008, the Second Draft RMP was released to the public along with the CEQA Initial

Study/Mitigated Negative Declaration (IS/MND) for a 30-day public review period during which the public could provide comments on both the RMP and the IS/MND. On May 21, 2009, the Coastal Greenbelt Authority reviewed the Final Draft RMP and recommended approval of the document to the Orange County Board of Supervisors.

Chapter 4: Description of Wilderness Park
AWCWP has significant resource values that need to be protected, preserved, and managed. More detail about the park's resources is included in the Existing Conditions Report (Appendix C).

- *Recreation.* AWCWP, with its varied topography, stunning vistas, and 30-mile network of trails weaving through 3,300 acres of open space, provides an abundance of recreational and educational opportunities for a variety of users.
- *Adjacent Land Uses.* AWCWP is almost completely surrounded by urban development associated with the communities of Aliso Viejo, Laguna Niguel, Laguna Hills, Laguna Woods, and Laguna Beach.
- *Visual Resources.* AWCWP represents a significant visual and scenic resource within the region. The length and configuration of the park's perimeter, coupled with the hilly topography provide significant variety in both viewpoint orientation and available viewsheds, creating a wealth of viewing conditions and opportunities.
- *Topography.* The northeastern boundary of the park abuts the tip of a broad alluvial plain. From there, the park continues south along a narrow floodplain bordered on the west by steep hills. Both Aliso and Wood Canyons are characterized by steep canyon walls and a narrow valley floor bisected by Aliso Creek.
- *Geology.* AWCWP is underlain by geologic units ranging in age from the Oligocene Epoch (35 million years ago) to the present day.
- *Hydrology.* AWCWP includes the confluence of two main creeks and the canyon slopes surrounding these creeks: Aliso Creek and Wood Creek.
- *Fire.* Portions of AWCWP are designated high fire. Areas most susceptible have 1) thirty percent slopes or greater; 2) medium to heavy fuel loading, predominantly coastal sage scrub; and 3) frequent critical fire hazard weather conditions.
- *Biologic Resources.* Natural communities include coastal scrub, chaparral, riparian woodland, native and annual grassland, vernal pools, and rock and cliff faces. The vegetation provides habitat for a unique assemblage of plants and animals.
- *Biologic Significance.* The NCCP/HCP Habitat Reserve preserves a microcosm of the California Floristic Province, an identified biodiversity hot spot in North America and a genetic reserve for the continent. The Reserve is regionally and nationally significant as a prime example of this unique habitat web.
- *Wildlife Corridors.* Aliso and Wood Canyons provide wildlife corridors and habitat for medium (e.g., opossum, gray fox) and large-sized (e.g., coyote, bobcat) mammal species. AWCWP unifies locally established open space and wilderness areas, including the Laguna Coast Wilderness Park (LCWP) and James Dilley Greenbelt Reserve to the northwest and north, and Laguna Niguel Regional Park to the northeast.

- *Paleontological Resources*. Six geological formations and four nonformational units are exposed within AWCWP. All formations and nonformational units except for the Holocene alluvium/colluvium have produced fossils.
- *Cultural Resources.* Sites include components of several recognized Coastal Southern California traditions including Milling Stone, Intermediate, and Late Periods. Occupation is dated to as early as AD 150 to as recent as AD 1800. Only a few of the sites have been thoroughly excavated. Historic resources include historic structures associated with the ranching, a set of wagon tracks worn into sandstone, rock graffiti from the 1850s and numerous unevaluated vehicular crash sites.

Chapter 5: Issues, Threats, and Potential Impacts
Identifying key issues, threats and potential impacts clarifies the needed focus for the RMP. Key management challenges for AWCWP stem from the proximity to residential development and increased park use. Other issues, such as invasive plant infestations, stem from historical land uses and are exacerbated by current environmental conditions. Based on the information collected at public meetings and from preparing the Existing Conditions Report (Appendix C), the project team identified key park-wide issues.

Habitat fragmentation, invasive plant species, existing fuels and fire hazard conditions, the urban edge effect, public use, and erosion constitute the main threats. The RMP is designed to address these issues and threats and to minimize impacts while supporting the intent of a County wilderness park. Management guidelines and strategies that address these issues are provided.

Chapter 6: Goals and Strategies
Goals and strategies outline a management framework to protect the resources of AWCWP. This section outlines resource management intentions and provides general guidance to support the natural, cultural, scenic, and recreation resources. The following goals provide the framework for the RMP:

Biological Resources
- Protect, restore, preserve and enhance the natural resources of the park.
- Maintain a park that is compatible with the entire San Joaquin Hills ecosystem and the Aliso Creek watershed.

Water Quality
- Improve the quality of streamwater that flows through the park.

Cultural Resources
- Protect and preserve the important cultural/historical resources of the park.

Interpretation/Education
- Provide an appropriate interpretive program that increases the public's understanding and appreciation of the significant natural and cultural resources of the site.

Visual Resources
- Protect and enhance significant views

Public Use and Access
- Achieve compatibility between protection of the site's natural and cultural resources and human use demands.
- Allow for passive recreational uses that contribute to enjoyment of the natural resources and promote healthy lifestyles (recognizing that park uses must have minimal impact on park resources and be compatible with a wilderness experience).

Stewardship
- Provide effective stewardship of the park

Chapter 7: Public Access and Recreation
AWCWP will continue to draw visitors from throughout Southern California. Stewardship of the natural and cultural resources is a core OC Parks responsibility. OC Parks must balance natural and cultural resource protection with appropriate public access and recreation especially as the population grows. Consistent with this purpose, the County will improve the current network of authorized trails, evaluate the potential for new trail routes, and implement management actions to minimize road and trail impacts to the natural and cultural resources of the site.

Recommendations for new trails respond to recognized destinations, prominent view locations and desirable off-site destinations. The existing trail network does not always provide sufficient opportunities for loop trails. In response, recommendations to formalize existing unauthorized trails include:

1. Reroute Corridor Trail
2. Aliso Beach Park Class 1 Bikeway
3. Car Wreck
4. Nestall Trail (aka Birthday)
5. East Ridge Trail (Five Oaks Link)
6. Aliso Creek (East)
7. Aliso Summit Trail to Aliso Creek East
8. Moulton Meadows Linkage Trail

The RMP recommends that most unauthorized trails be closed and actively restored to native habitat. To assure that impacts are lessened and a balance exists between restored habitat (closed trails) and new recreation (re-opening existing unauthorized trails) the RMP recommends that none of the unauthorized trails slated to be authorized (opened) can be opened until habitat restoration is successfully initiated for the unauthorized trails within that management zone or area. Unauthorized trails to be restored include:

1. Ibis
2. Paradise

3. Dog Park
4. Smoothies
5. Alpine
6. Schoolyard
7. Red Rider
8. No Way Out
9. JT's

AWCWP needs a clear sense of entry such that visitors immediately recognize that they have entered a County Wilderness Park. At the public meetings, people expressed a need to better define the entries to the park and to create an overall identity for the park: visitors should know that they are in a special place – possibly with an entry monument(s). Communication of this identity begins with creating a clear hierarchy of entries with the design for each entry and continues in evaluating the content of displays, handouts and programs.

Chapter 8: Biological Resources Management

Biological resource management ranges from a "hands off" approach to relatively intensive, active habitat manipulation. Much of the vegetation is composed of natural plant communities that are naturally adapted to recovery from disturbances such as fires or landslides. Where natural or even artificial disturbances have occurred, quick recovery or somewhat slower natural succession will lead to restored natural plant communities without benefit of active management. In other situations, excessive management adversely affects the health of natural plant communities. At times the only means to restore a native plant community is intensive manipulation and management especially where damage has been severe or where introduced exotic plants, out-compete the native plants.

The most abundant dominant exotic species occurring within grassland areas of AWCWP are exotic annual grasses, black mustard, poison hemlock, artichoke thistle, milk thistle, Italian thistle, and bristly ox-tongue. Within the drainages and other areas, giant reed, tree tobacco, poison hemlock, castor bean, and pampas grass are of concern. Nonnative grasses, black mustard, thistle species, and giant reed are the major obstacles to restoration in both distribution and density.

In order to improve biological productivity and diversity, habitat areas need to be evaluated for their conservation value and then prioritized for restoration and enhancement. NCCP/HCP criteria for high conservation values and low conservation values will be used in conjunction with professional judgment to evaluate habitats for their conservation value. Primary habitat enhancement and restoration activities include:

1. Close/Restore Unauthorized Trails
2. Eradicate Invasive Weeds
3. Re-Establish Native Habitat by Replanting

Habitat restoration and enhancement must be site specific, with prescriptions developed based on the site's conditions. The feasibility of restoration/enhancement and the type of habitat most appropriate to be restored on a given site are determined by physical

characteristics (e.g., soil type, hydrology, topography) and biotic characteristics (e.g., vegetation types and proximity of native communities). Other key factors include access for equipment used in restoration and suitability of terrain for restoration.

Pest species have the potential to reduce the conservation value of AWCWP by directly affecting one or more NCCP/HCP target and identified species. This group of pests includes the brown-headed cowbird (*Molothrus ater*), a group of medium-sized mammalian predators known as "meso-predators" [including feral dogs and cats, opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), striped skunk, and nonnative red fox (*Vulpes fidva*)], red-eared sliders (*Trachemys scripta elegans*), the American Bullfrog, African clawed frogs (*Xenopus laevis*), and Argentine ants (*Iridomyrmex humilis*). Pest animal control activities shall be coordinated with NROC, USFWS, CDFG, and animal control officers.

The NCCP/HCP requires that all resource management activities be monitored directly to assess their effectiveness in meeting the goals set by the NROC to 1) promote biodiversity, 2) increase habitat for target species, and 3) increase habitat values. The data collected through the monitoring program, as described in the Monitoring and Adaptive Management Program, must be analyzed and used as the basis for evaluating and guiding park management. Analysis will compare current and previous data, with greater emphasis on identifying long-term trends rather than short-term phenomena.

Chapter 9: Hydrology and Water Quality Management

AWCWP is located within the Aliso Creek watershed, encompassing a drainage area of approximately 36 square miles. The terrain in the Aliso Creek watershed varies dramatically along the course of the creek. While much of the upper and lower watershed is surrounded by reserved parkland, the middle reaches of the watershed are highly developed. Increasing urban development within the watershed has impacts on the creeks that flow into the park.

Aliso Creek and its tributary drainages are critical resources for wildlife. For this reason, the integrity of these drainages is a focus of resource management within the park. However, the majority of the Aliso Creek watershed lies outside the park boundary and thus, outside the direct control of park staff. Educational programs such as those offered through a Good Neighbor Program can help to diminish problems associated with potential contaminated urban runoff entering the wildlife habitat of the park's watercourses. Park staff should be alert to signs of potential contamination of park water resources resulting from activities within the park, as well as, urban runoff from outside park boundaries.

This section is supplemented with a Water Quality Technical Report (Appendix J) prepared for the park, which includes:

- Background Research on existing surface water, storm water, dry weather flow and water quality regulations;
- List of Constituents to be used to evaluate potential options including specific surface and groundwater quality objectives, re-use criteria, and/or compliance with local and state regulations; and

- Conceptual Programmatic Approach for water quality preservation and/or improvement that identifies potential opportunities that are compatible with RMP objectives, have a recognized and expected effect on site conditions, can be integrated within the existing drainage system and addresses constituents of concern.

Chapter 10: Cultural Resources Management
Some of the cultural resources within AWCWP have been or are in danger of being destroyed by human or natural disturbances. As a result, all archaeological/cultural sites within the AWCWP are considered highly significant, with site preservation as a priority. Whenever possible, the preservation of archaeological sites is an objective of the AWCWP by maintaining park resources in an undisturbed condition. The locations of cultural resources are a major factor in the placement of both park facilities and their improvements. For cultural resources the specific fundamental objective is the identification of the best way to manage, protect, and enhance park resources while still providing educational opportunities to the public, as well as a safe recreational environment.

Chapter 11: Paleontological Resources Management
With the exception of rock units considered too young to contain fossils, all geological units within AWCWP have the potential to yield important, significant fossils. These nonrenewable resources provide evidence of past environments, climate, and lifeways as well as providing a window into the development of species. A paleontological management system should be established that incorporates previously recorded localities within the AWCWP, in addition to localities that will be discovered in the future. A major goal in dealing with paleontological resources is to provide educational opportunities to the public.

Chapter 12: Public Outreach and Education
A comprehensive interpretative program will convey information about AWCWP. Trail use lends itself to an active recreational experience that can be enhanced by educating trail users on the local environment and history. Interpretation provides the means to deepen an appreciation and encourage the protection of AWCWP. Interpretation provides lasting benefits to individuals and the local communities. Interpretive services can introduce visitors to the intrinsic values of the park and educate about the appropriate management of natural and cultural resources.

The education of park visitors may well be the most important element of the resource management program. The location of the park in the midst of an urban environment renders it subject to profound influences of human activities. Outreach should include:

- Interface with Schools and Youth Groups
- Academic Research or Internships
- Docent Training
- Volunteer Stewardship Program
- Good Neighbor Program
- Arts Community Outreach
- Interpretive and Educational Programs

Park signs are required to convey directions, regulations, interpretation, and identification. Signs must be related to specific park management objectives. These objectives should be accomplished with the fewest number of signs to prevent "sign clutter." Maps and informational brochures can be used in place of signs.

Chapter 13: Fire Management Plan

Droughts coupled with high temperatures, and often human influence, have caused frequent wildfires in Orange County. Although regular fires are an essential component of the ecology of certain AWCWP habitats, such as CSS and chaparral, an excess of plant fuel may increase the severity of a wildfire and threaten native habitat and neighboring development.

Existing fuel modification areas and zones are located on the edges of AWCWP where they meet residential developments. The current maintenance procedures for the fuel modification zones require the residential developments to mow, disc, weed whip, and hand-thin/clear these areas according to the fuel management plans for individual developments.

Excessive fuel management practices increase the "edge effect" and allow nonnative invasive weeds, rather than natives, to become easily established within the fuel modification zones and adjacent natural areas. Existing fuel management and long and short term fire management practices appear to be severe (erosion, denuded slopes) along some of the areas between residential development and AWCWP. Proper management of these areas is important for erosion and weed control, and wildlife management.

In response to the 1993 Laguna Fire, a required component of the NCCP/HCP is preparation of a Fire Management Plan. The purpose of the Fire Management Plan is to address the role of fire in the NROC and to provide appropriate short and long term fire management policies that are sensitive to species conservation and protect adjacent urban development from fire. Following adoption of the fire management plan for the entire NCCP/HCP Reserve, a specific fire management plan should be prepared for AWCWP.

Chapter 14: Park Maintenance

Operations and maintenance efforts strive to keep the park safe, functional and attractive for residents and visitors. A top priority is responsible stewardship of park resources for both present and future generations. On-going maintenance promotes successful implementation of management activities. The County will maintain facilities in the park to ensure that resource values are preserved and that management activities are supported. Routine patrol of public use ensures compliance with the rules and regulations and allows staff to assess level of use by area of the park. County staff will continue to enforce park policies to promote safety for park visitors and to protect park resources.

In order to protect park resources and public safety, the County will enforce park boundaries by maintaining property fencing and access points and signing park property.

The County will evaluate the potential for new trail routes, but focus on improving the current network of trails and implementing management actions to minimize road and trail impacts. At present the County uses trail guidelines as detailed in the Regional Riding and Hiking Trails Design Manual (September 13, 1991). The RMP includes best management practices

(BMPs), design standards, maintenance, and management strategies that the County should implement for roads and trails.

The County will protect and enhance views and distinctive landscape features that contribute to the setting, character, and visitor experience.

Resource management can preserve wildlife corridors particularly along the interface between natural and developed areas. Corridor function is influenced by fire management, exotic species encroachment, recreational use and roads.

Erosion control is critical for to maintain natural drainage patterns, water and soil quality, healthy aquatic ecosystems, and safe trail conditions. The County will maintain trails and roads to prevent erosion.

Chapter 15: Monitoring and Adaptive Management Program
Adaptive management is defined as a flexible, iterative approach to long-term management of biotic resources that is directed over time by the results of ongoing monitoring activities and other information. Biological management techniques and specific objectives are regularly evaluated in light of monitoring results and other new information. These periodic evaluations are used to adapt both the management objectives and techniques to better achieve overall management goals. This approach involves managing CSS and adjacent habitats in a manner designed to support a broad range of “CSS Species” over the long term, with particular emphasis on the "target and identified" species.

Monitoring and targeted studies shall be designed to assist management decision-making. Under this model, management moves forward in a scientifically-based way that involves monitoring, conducting targeted studies, and applying management activities as experimental treatments. The results feed back into decision-making, reducing uncertainty and improving the effectiveness of the program.

The data collected through the monitoring program must be analyzed and used as the basis for evaluating and guiding park management. A key responsibility of the supervising park ranger will be compilation and analysis of monitoring data, coupled with regular assessments of park management based on the analyzed data.

The County will provide opportunities for university-level research especially in cases where research would help to answer fundamental management questions or contribute to the conceptual models of species of interest and habitats.

Chapter 16: Park Administration, Management, and Operations
OC Parks will continue to manage and operate AWCWP. OC Parks is responsible for the entire parkland within the current border excluding in holdings such as the Coastal Treatment Plant and easements.

Park headquarters will continue in a park office at the Main Entry. The park office may be incorporated into the site plan and architectural plans for a renovated interpretive center at the main entry. This office will be the center of control for all park operations and resource

management operations. Maintenance operations will continue from the maintenance yard at the park's main entry.

The RMP programs for natural and cultural resource protection will require additional staffing. Improved connections to adjacent corridors will present new issues related to enforcement: how to make sure that park users visit the park during operating hours. Recommendations to restrict access to and restore many of the unauthorized trails will require planning, work effort, and diligent enforcement. The RMP recommends the addition of a Park Ranger II and a Resource Specialist/Resource Coordinator.

Volunteers play an increasing role in assisting with a variety of public services, including park and recreation services. Volunteers contribute to a constituency for the park that increases community involvement and provides political support. Management and supervision of volunteers is critical to their effectiveness.

1.4 RECOMMENDATIONS

Each chapter in the RMP concludes with a list of recommendations or action items to be implemented by the County in order to achieve the goals described above. Table A compiles these recommendations and organizes them into a matrix. Recommendation measures are listed according to the relevant goal and strategy, as described in Chapter 6. The second column identifies the action. Included with each action is a timeframe for completion. Anticipated costs for each action will be completed at a later date.

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
PUBLIC USE AND ACCESS ***Goals:*** • **Achieve compatibility between protection of the park's natural and cultural resources and human use demands.** • **Allow for passive recreational uses that contribute to enjoyment of natural resources and promote healthy lifestyles (recognizing that park uses must have minimal impact on park resources and be compatible with a wilderness experience).**			
USE-1 USE-2 USE-3	Implement an education program to promote awareness of trail safety and etiquette as a means of reducing trail conflicts.	General	O
	Provide additional park ranger staffing to increase enforcement of park rules and regulations.	General	O
	Explore the potential for adopting a trail rating system to alert trail users to the level of difficulty of various trails. Post Trail Rating Markers at the top and bottom of each trail.	General	O
	Conduct routine monitoring and management of park trails to prevent construction of unauthorized trails.	General	O
	Reclassify and improve the following existing unauthorized trails to an authorized trail status or create a new trail to provide access to key destination points, viewing locations, and off-site destinations and to provide needed loops and connections: 1. Reroute Corridor Trail 2. Aliso Beach Park Class I Bikeway 3. Car Wreck 4. Nestall (aka Birthday) 5. East Ridge Trail (Five Oaks Link) 6. Aliso Creek East 7. Aliso Summit Trail to Aliso Creek East 8. Moulton Meadows Linkage Trail	Five Years	O
USE-4 USE-5	Actively restore to native habitat the following unauthorized trails consistent with the programs outlined in this RMP: 1. Ibis 2. Paradise 3. Dog Park 4. Smoothies 5. Alpine 6. Schoolyard 7. Red Rider 8. No Way Out 9. JTs	Five Years	O
USE-6	Develop public access facilities and improvements that blend in and are compatible with the surroundings and in keeping with a wilderness park.	General	D
	Incorporate the guiding principles as outlined in this RMP for managing existing trails and creating new trails.	As-Needed	O
	Continue ongoing maintenance of existing trails.	As-Needed	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Monitor visitor use to determine trail traffic volumes. On an annual basis, inspect park trails and make appropriate repairs.	Annually	O
USE-7	Create a comprehensive and consistent park-wide image for use in all park signs, promotional materials, park amenities	General	D
	Implement the following minor improvements to enhance the main entry and parking area: 1. Place monument park signage on Alicia Parkway to announce the park. 2. Enhance the entry and entry road with native plants and trees typical to the park. 3. Reconfigure the parking area to accentuate the sense of arrival.	Five Years	D
	Implement the following major improvements to enhance the main park entry: 1. Create a forecourt of pre-entry to serve as a transition zone from the parking lot to the center as well as a gathering place for visitors. 2. Create a paseo feature, a centralized access route to the park linking the forecourt, park ranger's station, interpretive center, outdoor classrooms, and picnic and staging areas.	Ten Years	D
BIOLOGICAL RESOURCES ***Goals:*** • **Protect, restore, preserve, and enhance the natural resources of the park.** • **Maintain a park that is compatible with the entire San Joaquin Hills ecosystem and the Aliso Creek watershed.**			
BIO-1	Protect and maintain existing population of native plants and wildlife using active and passive techniques.	General	O
	Develop a park-wide, long-term invasive management plan to control exotic plant species that includes both natural and disturbed areas in the park for both the Reserve and non-Reserve lands.	General	O
	Develop a park-wide, long-term management plan to control vertebrate pest species for the purpose of protecting park resources and public health in Reserve and non-Reserve lands.	General	O
	Allow for wildlife movement. Adopt the measures contained in Section 14.5.2 of this RMP to protect and enhance wildlife corridors.	General	O
BIO-2	Control pest plants particularly within the known 293 mapped polygons (approximately 1,000 acres), fuel modification zones, and other disturbed priority areas. Follow the management plan (NREP) for NCCP/HCP Reserve lands and any other approved long-term management plan to locate, monitor, and eradicate exotic plant species. Removal methods may include flail mowing, discing, soil solarization, control burning, chemical application, cut and paint and/or wicking chemical application. Eradicate according to an established (maybe species specific) schedule.	As-Needed	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Control pest animal species using a long-term management plan. All pest animal control activities shall be coordinated between the supervising park ranger and the Resource Specialist or Resource Coordinator with, as needed, consultation with NROC, USFWS, CDFG, and animal control officers.	As-Needed	O
	Monitor brown-headed cowbirds and other pest vertebrate species to determine if control efforts are needed to protect sensitive native species. Known vertebrate pests include the brown-headed cowbird, feral dogs and cats, opossum, raccoon, striped skunk, red fox, red-eared sliders, African clawed frogs, and Argentine ants.	As-Needed	O
	Restore native habitat actively using approved site specific seeding and planting techniques. Fencing and signage, weed management, and erosion control may be necessary to protect areas during plant establishment. Exotic species prevention measures (e.g., weeds, Argentine ants) should be implemented.	As-Needed	O
	Close all selected unauthorized trails by covering the trails with leaf litter and blocking them with physical barriers or signage and issue citations as necessary. Restore the areas actively or passively to improve habitat.	As-Needed	O
	Control pest plants particularly within the known 293 mapped polygons (approximately 1,000 acres), fuel modification zones, and other disturbed priority areas. Follow the management plan (NREP) for NCCP/HCP Reserve lands and other approved long-term management plan to locate, monitor, and eradicate exotic plant species. Update the NROC database once every five years, at a minimum.	Five Years	O
BIO-3 STEW-5	Monitor species and habitat enhancement and restoration activities as part of the adaptive management program to evaluate effectiveness and progress. Through monitoring, seek to identify new enhancement and restoration opportunities and priorities within the park (see Section 15.0 Adaptive Management and Monitoring).	General	O
	Develop an electronic data management system to incorporate baseline data collected for the preparation of this RMP and that allows for new information to be added. 1. Maintain a general record of management and monitoring activities, as needed. 2. Incorporate monitoring data collected to track the responses of resources to management actions. Data from "active" species inventories will be compiled in filed and a GIS database. Data from "passive" management/monitoring will be compiled into report format for use in guiding future management. Incorporate data when available. 3. Coordinate with managers in other parts of the NCCP/HCP to compare monitoring and management results, as needed. 4. Incorporate data from NROC studies (*e.g.,* wildlife movement, target species, habitat restoration activities) into the park database and use to adapt management	General	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	practices.		
	Monitor key ecological processes, such as perturbation events either actively or passively, which ever is more appropriate, as determined by the Resource Specialist and other concerned parties to interpret biological change and responses to management measures.	As-Needed	O
	Record monitoring data for all resource management activities, as described in the NROC Monitoring and Adaptive Management Program. Data from species inventories will be compiled in files and a GIS database. Monitoring frequency may vary and should be evaluated by the supervising park ranger, the Resource Specialist or Resource Coordinator, NROC, and resource agencies (e.g., CDFG, USFWS). Produce report and photographic documentation for each site.	Annually	PM
	Conduct annual inspections of the fuel modification zones and park boundaries to monitor fuel modification zone limits, erosion, exotic plant and animal species, including, feral domestic animals.	Annually	O
	Actively monitor noxious weed eradication using semi-permanent line or point-intercept transects or plots, depending on the area characteristics, to collect quantitative data both before eradication, to collect baseline data, and after eradication in years one, three, and five.	One, Three, and Five Years	O
	Actively monitor accidental burns and prescribed vegetation clearing areas for floral and faunal characteristics. Methods shall include plot and transect techniques and other suitable techniques.	One, Three, and Five Years	O
	Map habitat enhancement and restoration activities and update the Habitat Enhancement and Restoration Map (HERM; at NROC) to show the existing and future restoration and enhancement areas.	Bi-annually	PM
	Actively monitor the populations of the "targeted and identified species," general bird species, plant community composition, and other sensitive resources, including CSS vegetation and their responses to management actions. Methods shall include plot and transect sampling techniques.	Bi-annually	O
	Actively monitor fuel modification areas collecting qualitative and quantitative data every two years.	Bi-annually	O
	Update treatment data for vertebrate pest management (e.g., brown-headed cowbird, feral animals).	Bi-annually	O
	Monitor locally uncommon, sensitive, federally-threatened or endangered species and other sensitive resources to track the populations, identify threats, develop management recommendations, and determine the effectiveness of management actions. Monitoring frequency should be evaluated by the supervising park ranger, the Resource Specialist or Resource Coordinator, NROC, and resource agencies (e.g., CDFG, USFWS). Once every five years, recommended.	Five Years	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Establish photopoints and collect survey data along the creeks. Utilize baseline data for lower Aliso Creek collected as part of the Aliso Creek SOCWA Bridge to Aliso and Wood Canyons Park Project (Project 056056WS400009). Collect similar survey data and photos for Wood Creek and upper Aliso Creek. Collect data every five years to track changes along these drainages.	Five Years	O
	To assess coastal sage scrub and riparian habitat quality, survey for the following species: the threatened coastal California gnatcatcher and endangered southwestern willow flycatcher and least Bell's vireo, and the sensitive yellow-breasted chat and yellow warbler.	Five Years	O
	Evaluate the suitability of the data management system for management purposes and refine the system, as necessary.	Five Years	PM
	Suitable sensitive plant habitat surveys shall be conducted in areas not known to have sensitive plant habitat. Survey every five years during the spring.	Five Years	O
	Create a habitat map using the County's habitat classification system (Gray and Bramlet 1992, Jones and Stokes Associated, Inc. 1993) to track changes in habitat distribution, with emphasis on detecting conversion to ruderal habitats. Displacement causes will be investigated. Remedial action will be implemented as appropriate, but natural succession will be allowed.	Ten Years	O/PM
	Research opportunities for university-level research and data contributions by interested parties should be encouraged. Project development and proposals would be evaluated by the supervising park ranger and the Resource Specialist. Data submission should be facilitated either through an internal website or other secure methods.	Ten Years	O
BIO-4	Incorporate applicable provisions of the NCCP/NROC Fire Management Plan, when completed, into the RMP. That plan, through the NROC, is currently in preparation.	General	O
	Continue existing fire control methods required by the City of Laguna Beach and OCFA within the designated zones at the urban-wildland interface. Areas that have been disturbed outside of the fuel modification zone within the park boundaries will be revegetated with plants that are compatible with adjacent native vegetation. Adopt fire control methods that cause the least damage to natural resources while still providing effective fire control.	General	O
	Develop one fuel modification plan for the park in cooperation with the applicable agencies. Encourage the HOAs to adopt a section of the park in a "good neighbor" program.	General	O
	Develop and implement a program to educate local jurisdictions, park neighbors, and the public about wildfire management. Include the natural role of fire in native vegetation communities, fire safe practices in designing and building structures in interfaces areas and in landscaping.	General	PM
	Collaborate with the OCFA, local fire agencies, fire safety councils, neighborhood groups, and others in the implementation of the Fire Management Plan.	General	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Precisely locate and permanently mark fuel modification areas in the field.	General	O
	Document the location and dates of wildfire occurrences.	As-Needed	O
	Locate park facilities away from fire hazard areas	As-Needed	O/D
	Evaluate soil, slope and vegetation of burned areas in the aftermath of a wildfire in the park. Employ temporary soil/slope stabilization measures if area is subject to soil or slope erosion or failure before vegetation can recover.	As-Needed	O/D
	Monitor fuel modification areas required for adjacent properties to ensure that no park areas are being adversely impacted by fuel modification zone maintenance practices being conducted by other parties.	Annually	O
	Develop a program in which the park ranger will consult with the Orange County Fire Authority (OCFA) once every five years to determine if fuel loads within the park reach dangerous levels.	Five Years	O
WATER QUALITY ***Goal:*** • **Improve the quality of streamwater that flows through the park.**			
WQ-1 WQ-2	Continue to actively participate in watershed planning efforts.	General	O/D/PM
	Assess projects and recommendations resulting from watershed planning efforts for their potential impacts to park resources.	General	O/D
	Incorporate water quality education and BMPs into public outreach efforts. Most of the objectives of the WMP are to promote and encourage practices and behavior that supports development of a healthy environment for the watershed. Education is therefore a major component of a watershed management program, as well as enhanced public outreach to promote a more complete understanding of the environmental problems and the ecological value of the Aliso Creek watershed.	General	PM
	Conduct water quality monitoring within the park at appropriate intervals for the presence of manmade debris, nutrients, and other non-point source pollutants.	General	W
	Recognize efforts of on-going regulatory programs to address water quality in Aliso Creek. Ensure that park activities do not exacerbate existing water quality conditions.	General	O
CULTURAL RESOURCES ***Goal:*** • **Protect and preserve the important cultural/historical resources of the park.**			
CULT-1	Establish a cultural resources records management system. 1. Create a relational database system to record pertinent site information using the Model Curation Program, CSUF, as a template. 2. Digitize known park resources into a controlled-access GIS format to produce a base map of AWCWP.	General	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Implement a formal procedure for care of existing collections with AWCWP through the OC Parks Historical and Cultural Programs office. Use standards provided in Part IV of the CSUF Proposed Policy and Procedural Guidelines (Eisentraut and Cooper 2002) and relevant County P&Ps.	General	O
	Create a site inventory checklist for inventorying all archaeological sites within AWCWP. A major feature of the checklist should be a section that details threats to the site. Digital photographs of the site conditions, and GPS location data should be incorporated.	General	O
	Conduct a search of the Native American Heritage Commission (NAHC) Sacred Lands Files in order to identify Traditional Cultural Areas within the park. Native American groups should be appropriately consulted by park management personnel in identifying sacred sites and natural resources procurement areas; and to help develop management programs for these resources.	General	O
	When site-specific plans are created that detail future park improvements, they can be compared with the AWCWP resource constraints map to identify known significant cultural resource sites in the vicinity of disturbance. In addition, focused pedestrian surveys consistent with the County SCA A01 should be conducted for all future park improvements.	As-Needed	O
	For any cultural resource work conducted within the Park, an Orange County certified archaeologist should prepare a Research Design that identifies research strategies to be implemented during the research program. A review team of cultural resource professionals should establish research priorities for the park, and cultural resource work within the park should be designed to address these priorities.	As-Needed	O
	Routinely patrol culturally sensitive areas in order to help evaluate ongoing impacts to known archaeological sites. Sites should be evaluated in terms of the potential effects on the resources by natural weathering and erosion of site and the impacts of park visitors.	As-Needed	O
	When sites and/or isolates are located, they should be recorded on California Department of Parks and Recreation (DPR) 523 series forms. Location data should be recorded using a handheld GPS unit. Site updates, including photos and maps, should be completed for previously documented sites that are reevaluated. Surface collection is recommended for any materials encountered if the site appears to be threatened by natural or human factors. Forms should comply with both the CSUF Model Curation Program format, and the California Historical Resources Information System (CHRIS) Format. Updates and new forms should be submitted to the South Central Coastal Information Center of the CHRIS.	As-Needed	O
	If a known significant site will undergo direct impacts, an Orange County certified archaeologist should be consulted to both recommend and implement appropriate mitigation measures. Mitigation Measures should follow the County Standard Conditions of Approval (SCA) A01 – A04.	As-Needed	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	When the significance of a site is unknown, an Orange County certified archaeologist should conduct test excavations at those sites to determine if they are eligible for listing on the National Register of Historic Places and/or the California Register of Historical Resources. The archaeologist shall provide recommendations for further action based on the findings of test level excavations.	As-Needed	O
	Monitoring of any project that involves earth disturbing activities in culturally rich soils should be conducted by a trained archaeologist under the supervision of an Orange County Certified Archaeologist. Artifacts that are unearthed during this construction should be collected with provenience information when available. Monitoring should comply with County SCA A04.	As-Needed	O
	Implement an emergency response plan for sites that have been exposed by erosion. When cultural resources, including artifacts or features, are encountered, either during a planned patrol or in another unexpected manner, an Orange County certified archaeologist should be consulted. The certified archaeologist will both recommend and, with OC Parks' approval, implement mitigation measures that are appropriate for the impacts to the sites.	As-Needed	O
	Presence/Absence archaeological surveys are considered to have a limited lifetime. The park has not been surveyed for cultural resources in over 5 years. A park-wide systematic reconnaissance survey should be conducted every 10 years under the direction of an Orange County certified archaeologist. To help staff with this endeavor, qualified volunteer groups could be utilized to assist in the survey of the AWCWP. Update the park-wide survey every ten years, particularly in high visitation, and high erosion areas.	Ten Years	O
	In association with a qualified archaeologist, establish a volunteer program to help complete necessary artifact analysis and inventory. Create a training manual for working with archaeological collections. Volunteers should be organized through the County's Adopt-a-Park program.	General	PM
CULT-2	Create a cultural resources interpretive display or hub to help disseminate information from the park to both the public and the scientific communities.	As-Needed	D
	Make a concerted effort to develop a Native American stewardship program. Native Americans can implement an evaluation of sacred sites or resources that they have deemed important to ensure the protection of the resource in perpetuity.	As-Needed	O
	Establish a paleontological resources records management system. 1. Create a relational database system to record pertinent site information using the Modal Curation Program, CSUF as a template. Once in place, this database should be continually updated to include new information about previously recorded localities, as well as document newly discovered localities.	General	PM

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	2. Digitize known park fossil resources into a access-controlled GIS format to produce a base map of AWCWP.		
CULT-3	Implement a formal procedure for care of existing collections with AWCWP. Collections are managed through the OC Parks Historical and Cultural Programs office using standards provided in Part IV of the CSUF Proposed Policy and Procedural Guidelines (Eisentraut and Cooper 2002) and relevant County P&Ps.	General	O
	Place paleontological resource collections from AWCWP in a suitable repository within Orange County.	General	O
	Conduct a park-wide systematic reconnaissance survey under the direction of an Orange County certified paleontologist. Survey work should be completed to a level that will satisfy Orange County Standard Condition of Approval A05.	General	O
	Create a site inventory checklist for inventorying all paleontological sites within AWCWP. A major feature of the checklist should be a section that details threats to the locality.	General	O
	Schedule routine patrols in paleontologically sensitive areas to help evaluate known and as yet undiscovered paleontological localities. Localities should be evaluated in terms of the potential effects on the resources by the natural weathering and erosion of the locality and the impacts of park visitors.	General	O
	When fossil localities are identified, they should be recorded on fossil locality sheets that will document important information about the find such as a temporary field number, tentative identification of the find(s), description of the sediments, formation name, location of the find within the AWCWP, elevation and GPS locational information. Every effort should be made to preserve the site in situ for future generations. Collection is recommended for any materials encountered if the fossil appears to be threatened by natural or human factors.	As-Needed	O
	Prior to any proposed ground disturbing activities within AWCWP, conduct a paleontological assessment survey under the direction of a County-certified paleontologist to identify both the rock types present in the area and the potential for significant fossil resources to be discovered. The survey should comply with SCA A05.	As-Needed	O
	If significant fossils are identified, they should be scientifically salvaged prior to initiation of construction activities. A County-certified paleontologist should develop a paleontological resources impact mitigation program (PRIMP) consistent with guidelines developed by the Society of Vertebrate Paleontologists (SVP 1995) to direct resource monitoring of excavations in order to collect and properly curate any fossils that may be discovered during the ground-disturbing activities. Salvage activities should comply with County SCA A06.	As-Needed	O

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Implement an emergency response plan for sites that have been exposed by erosion or planned AWCWP maintenance. When paleontological resources are encountered, an Orange County certified paleontologist should be consulted. The certified paleontologist will recommend mitigation measures that are appropriate for the impacts to the locality.	As-Needed	O
	In association with a qualified paleontologist, establish a volunteer program to help complete necessary fossil analysis and inventory. Create a training manual for working with paleontological collections.	General	PM
CULT-4	Develop research objectives to direct scientific investigations in the park.	General	O
	Create paleontological resource information exhibits that would help to disseminate information about AWCWP to both the public and scientific communities.	General	D
	Develop an interpretive facility in the Pecten Reef area with impacts to resources mitigated below a level of California Environmental Quality Act (CEQA) significance.	General	D
	Coordinate paleontological interpretive and visitor education programs with other interpretation and education efforts throughout the park.	General	O
	Recognize opportunities to pursue academic research for cultural and historical resources in the park.	General	O
CULT-5	If human remains are encountered during survey and/or ground disturbing activities, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code §5097.98.	As-Needed	O
INTERPRETATION/EDUCATION ***Goal:*** • **Provide an appropriate interpretive program that increases the public's understanding and appreciation of the significant natural and cultural resources of the park.**			
INT-1 INT-3	Offer a diverse educational program to include primary and secondary schools, academic institutions, neighbors, volunteers, local artists and other agencies and non-profit groups.	General	O
	Develop a well-designed, coherent signage system.	General	D
	Coordinate with the Orange Coast Watershed and Environmental Center (OCWEC) and other partners and non-profit groups to provide interpretive opportunities for the public.	General	PM
	Prepare a signage guidebook specific to AWCWP, to include detailed specifications for the design of all signs.	Five Years	D
INT-2	Adopt interpretive themes that establish the overall interpretive direction and tone for AWCWP.	General	O/D
	Develop a comprehensive Interpretive Plan for AWCWP that includes recommendations for interpretive trails and displays; enhancement of existing facilities and displays; interpretive programming; and interpretive methods, such as live programs, tours, brochures, maps, and school programs.	General	O/D

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Update the Interpretive Plan every five years.	Five Years	O/D
VISUAL RESOURCES ***Goal:*** • **Protect and enhance significant views.**			
VIS-1	Work with local jurisdictions in the land use planning and development process to protect key views in AWCWP from continued visual intrusion by surrounding development. This coordination will include appropriate general plan land use designations, zoning to regulate building height and setbacks, ridgeline protection ordinances and development review and enforcement.	General	PM
	Work with local jurisdictions in the land use planning and development process to protect the AWCWP from existing and future ambient light sources in nearby developments.	General	PM
	Coordinate protection and enhancement of visual resources in AWCWP with efforts to enhance County holdings through land acquisition. Priority areas for protection and enhancement include focal public use areas and main recreational facilities within AWCWP to prevent visual intrusion from adjacent development.	General	PM
	Use native plantings to visually buffer developed areas, enhance visual quality and integrate with the surrounding native landscape.	As-Needed	O
	Site structures (e.g. Restrooms, Interpretive Kiosks) to be sensitive to scenic views from and into the AWCWP.	As-Needed	D
	Expand recreation and interpretive opportunities associated with the visual and scenic resources of the park. Opportunities include view-oriented day-use facilities and interpretive programming in key locations.	Five Years	D
STEWARDSHIP ***Goal:*** • **Provide effective stewardship of the park.**			
STEW-1	Perform routine operation and maintenance activities consistent with the NCCP/HCP.	General	O
	Establish property signs along the park boundary and at each access point, identifying the area as a wilderness park and providing directions for access and contact information.	General	O
	Use volunteer trail crews to assist with trail maintenance. Conduct workshop training to discourage the use of unauthorized trails by placing logs, brush, and other obstructions across the head of the trails.	General	O
	Recruit volunteers to assist with the implementation of restoration techniques.	General	O/PM
	Remove litter, trash, and debris that may attract nonnative wildlife and reduces the aesthetic values of the park.	As-Needed	O
	Establish responsibilities for removing trash and for regular collection at specific locations.	As-Needed	O
	Enlist the help of volunteers for clean-up events at the park.	As-Needed	O/PM

Table A: Recommendations

Strategy (code ref. - see Chapter 6.0)	Action	Timeframe	Lead Agency[a]
	Maintain facilities, including trailheads, gates, roads, and infrastructure to retain the integrity and value of the park.	Annually	O
STEW-2	Identify portions of the park where fencing may be needed. Fencing should be installed or reinforced in areas adjacent to residential lots, roads, and other level areas where accessibility impacts to sensitive park resources are problematic. Fencing should be maintained as needed and monitored annually.	Annually	O
STEW-3	Implement the appropriate design guidelines, as detailed in Section 14.3, when constructing new trails or re-routing existing trails or roads in order to minimize environmental impacts.	As-Needed	O
	Restrict or prohibit trail users from areas where erosion has created a public hazard.	As-Needed	O
	Correct erosion problems especially where adjacent to sensitive plant populations. Identify areas that have the potential to impact these populations. Install repairs that reduce or eliminate erosion problems.	As-Needed	O
	Install swales across dirt roads and trails. Soil swales made of local native soils is the preferred method to control erosion. Identify locations where erosion problems can be minimized by maintaining trails and roads and installing water bars.	As-Needed	O
	Implement the erosion control guidelines as detailed in Section 14.6, as appropriate, to repair and prevent erosion within the park.	As-Needed	O
	Monitor visitor use to determine trail traffic volumes. On an annual basis, inspect park trails and make appropriate repairs.	Annually	O
STEW-4	Provide sufficient park ranger staff to adequately manage and monitor the park.	General	PM
	Add an additional Park Ranger II position to assist in the operation and maintenance of AWCWP.	General	PM
	Upgrade the existing Groundskeeper position to Parks Maintenance Worker.	General	PM
	Create a new position, Resource Specialist, to implement the overall resource management and interpretive program.	General	PM
	Issue citations to persons that violate park regulations. Fines levied for abuse of park facilities resulting in harm to cultural and paleontological resources, wildlife, or sensitive habitat should be sufficient to discourage repeat occurrences.	General	O
	Form a group of volunteers to patrol the park on weekends, evenings, and high-use times to answer visitors' questions, inform visitors about park rules, and immediately report violations.	General	O/PM

[a] W = OCPW Watershed & Coastal Resources
O = OC Parks Operations
PM = OC Parks Program Management
D = OC Parks Design

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2.0 Introduction

2.0 INTRODUCTION

2.1 PLAN OVERVIEW

The Aliso and Wood Canyons Wilderness Park (AWCWP) encompasses approximately 3,873[2] acres of open space that includes the hills, canyons, and floodplain surrounding Aliso and Wood Canyons and portions of the Laguna Canyon/El Toro Cliffs area. The park's landscape ranges from lush, oak woodlands to broad expanses of grassland and coastal sage scrub. The diversity of the landscape and topography provides spectacular views and opportunities for a variety of visitor experiences.

Orange County Parks owns and operates AWCWP. Conservation efforts by the County and others have helped to ensure that the open space remains undeveloped and its natural resources remain intact. The park is designated as a wilderness park. According to the Orange County General Plan (Orange County 2004), a wilderness park is a "regional park in which the land retains its primeval character with minimal improvements and which is managed and protected to preserve natural processes." As such, the Resource Management Plan (RMP) focuses on preserving and protecting the unique resources of the site while integrating passive recreation uses, as appropriate.

The park is located within the Cities of Laguna Niguel, Laguna Hills, Aliso Viejo, Laguna Beach, and Dana Point, Orange County, California within the Natural Communities Conservation Plan and Habitat Conservation Plan (NCCP/HCP) central and coastal subregion reserve known as the Nature Reserve of Orange County (NROC). The NCCP/HCP Implementation Agreement requires preparation of a RMP for AWCWP. The RMP will provide a comprehensive, long-term management plan for AWCWP. The fundamental objective for the RMP is to identify the best way to manage, protect and enhance the natural resource values of the park while providing safe recreational and educational opportunities to the public.

2.2 PARK OVERVIEW

2.2.1 Location

AWCWP is located in Southern Orange County, west of Interstate 5 and off South Coast Highway (Figure 1: Regional Location and Figure 2: Project Location). The park stretches from El Toro Road and Laguna Canyon Road on the west to Moulton Parkway and Alicia Parkway on the east. Because of its size and its "Y" shaped configuration, the park has a lengthy perimeter that borders several different communities. The main entrance into the park is located in Laguna Niguel off of Alicia Parkway. Perimeter cities include Laguna Woods, Laguna Hills, and Aliso Viejo (north), Laguna Niguel (east), Dana Point (south), and Laguna Beach (west).

[2] Total acres = 3,355 Fee, 256 Easements, and 262 IOD (Irrevocable Offer of Deed Dedication).

2.2.2 Regional Significance

AWCWP is part of a larger 17,000-acre regional coastal canyon ecosystem comprised of Laguna Coast Wilderness Park, Crystal Cove State Park, and City of Irvine Open Space and is a significant component of the NROC (Figure 3: Nature Reserve of Orange County). This nature reserve forms a large island of habitat almost entirely surrounded by urban development. Despite its long history of use and proximity to urban development, the nature reserve supports many of the typical and unique landscapes of California – coastal sage scrub, chaparral, native grassland, and oak woodland – and sustains important habitat for a number of native animal species including California gnatcatcher, coastal cactus wren, mule deer, bobcat and southwestern pond turtle. The connectivity between these areas within the nature reserve provides a rare opportunity to preserve a functional wildland habitat.

AWCWP is located at the lower reaches of the Aliso Creek Watershed which covers approximately 36 square miles and includes portions of the cities of Aliso Viejo, Dana Point, Laguna Niguel, Laguna Woods, Laguna Hills, Laguna Beach, and Lake Forest. Its main tributary, Aliso Creek, originates in the Santa Ana Mountains within the boundaries of Cleveland National Forest and flows through AWCWP. The Aliso Creek watershed, like other watersheds in Orange County, has been significantly affected by development. The park is located within a heavily urbanized region at the bottom of a watershed. The watershed is subject to a variety of management decisions that impact resources within AWCWP. As such, this RMP provides management guidance that considers outside factors affecting AWCWP.

2.3 PURPOSE OF RMP

As required by the NCCP/HCP Implementation Agreement, programs for implementing NCCP/HCP policies and adaptive management plans for fire, restoration/enhancement, and recreation will be defined in a RMP for each County park within the proposed habitat reserve system. The AWCWP RMP elements will include policies for managing and monitoring the park; research; habitat restoration and enhancement; fire management; public access and recreation; and infrastructure. Per the NCCP/HCP Implementation Agreement, the Draft RMP has been reviewed by the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and the NROC.

The RMP provides a comprehensive, long-term management plan for AWCWP. The RMP will serve as a clear and realistic blueprint for how the wilderness park will be managed for the next several decades, and will guide the County on future policy, land use, and resource management decisions relating to the park. The RMP is designed to be flexible enough to allow changes and refinements to management approaches as more is learned about the park's ecosystems and the responses of these ecosystems to both natural and human forces. Every five to seven years, the RMP should be reviewed to assess the success of these management strategies and should be amended, as needed. This flexibility is a prime component of adaptive management, which involves the gradual modification of management techniques based on the results of ongoing management, research, and monitoring activities. Active management of resources, as opposed to simply fencing off

Riverside County
Santa Ana
Tustin
Irvine
Lake Forest
Rancho Santa Margarita
Newport Beach
Laguna Woods
Mission Viejo
Laguna Hills
Aliso Viejo
Orange County
LAGUNA CANYON RD
MOULTON PKWY
ALICIA PKWY
Aliso and Wood Canyons Wilderness Park
Laguna Beach
Laguna Niguel
San Juan Capistrano
Dana Point
San Clemente
San Diego County
5
55
73
133
241
261
405

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- LSA Graphic Provided
- Geomatics Land Information Systems Division

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 1: Regional Location

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Aliso and Wood Canyons Wilderness Park

Pacific Ocean

Aliso and Wood Canyons Wilderness Park Resource Management Plan Figure 2: Project Location

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division

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DATE: June 3, 2008

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LEGEND

Existing Aliso and Wood Canyons Wilderness Park

CENTRAL & COASTAL NCCP - HCCP CLASSIFICATIONS

Existing Use

Reserve

Special Linkage

Non-Reserve Open Space

Conservation Easement

Crystal Cove State Park

Irvine Open Space Preserve South

Laguna Coast Wilderness Park

Pacific Ocean

0 1 2 3 4 Miles

DESIGNED AND PRODUCED BY:

OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:

- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown April 2004

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 3: Nature Reserve of Orange County

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Back of Figure 3

habitat and leaving it untended, is integral to maintaining the integrity and sustainability of resources over the long term.

The fundamental objective for this RMP is to identify the best way to manage, protect and enhance the natural resource values of AWCWP while balancing the needs of the local community for safe recreational and educational opportunities. The RMP considers all of the natural and cultural resources present within AWCWP. The major plan objectives are to enhance wildlife habitats, develop vegetation management practices, and provide recreational opportunities and public access that have minimal impacts on resources within the park.

2.4 RELATIONSHIP TO OTHER PLANS

Several policy documents and major planning efforts include AWCWP and shape management decisions within the park. The summaries below provide an overview of the most relevant projects. Implementation of the AWCWP RMP will occur concurrently with these projects.

2.4.1 Orange County Central and Coastal Subregion Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP)

The County of Orange (County), the Transportation Corridor Agencies (TCA), USFWS, and CDFG, in cooperation with several large private landowners, developed the NCCP/HCP for coastal sage scrub (CSS) conservation and four other covered habitats (i.e., oak woodlands, Tecate cypress, cliff and rock, and chaparral within the coastal subarea). The County was the local Lead Agency with involvement from cities in Orange County, public and private organizations, and participating resource agencies (e.g., CDFG, USFWS). The NCCP Act enacted by the California Legislature in 1991 resulted in the NCCP/HCP program. The NCCP/HCP for the Central/Coastal Subregion, approved by the participating agencies in July 1996, addresses multiple habitats and species, and, in particular, subregional habitat needs of the coastal California gnatcatcher (CAGN).

The NCCP/HCP provides "take"3 authorization or conditional take authorization for certain species and habitats for participants in the NCCP/HCP program. In general, the program is a habitat-based, multiple-species management and conservation strategy that focuses on conserving natural vegetation communities, such as CSS, cliff and rock, coastal chaparral, and oak woodlands. In addition to habitat types, the program focuses on a few identified or target plant and animal species that are indicators of ecosystem health. Nine identified plant species and 30 identified animal species occur in various habitat types. Of the 30 identified animals, 3 of the species are also target species. The 3 target species that have special survey requirements described in the NCCP/HCP are the orange-throated whiptail, coastal cactus wren, and coastal CAGN. Additional information on the Central/Coastal NCCP/HCP,

[3] The presence of federally listed species under the Endangered Species Act and/or designated critical habitat must be considered during the planning of any project, particularly if the project would result in "take" of the species or its habitat. According to USFWS, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct. Harm, in this sense, can include any disturbance to habitat used by the species during any part of its life history.

including the target and species covered, is included in the Existing Conditions Report (Appendix C).

2.4.2 Nature Reserve of Orange County (NROC)

A key component of the NCCP/HCP is the creation of the 38,738-acre NROC. Most of AWCWP is within the Central/Coastal NCCP/HCP designated NROC. The NROC protects more than 18,800 acres of CSS. CSS is a naturally fragmented habitat interspersed within a mosaic of non-CSS vegetation communities including chaparral, grasslands, riparian woodlands, and oak woodlands. Including significant portions of these non-CSS habitats and their resident species within the reserve system increases its biodiversity value and results in a multiple-species, multiple-habitat reserve. Therefore, in addition to 18,000 acres of CSS, the reserve includes: 7,300 acres of chaparral; 6,100 acres of grassland; 1,800 acres of riparian; 950 acres of woodland; 200 acres of forest habitat; and significant portions of six other habitats that currently exist in the subregion.

The NROC is owned and managed by a combination of private landowners and public agencies and administered by a Non-Profit Management Corporation that coordinates activities within the reserve system, receives and disburses funds to reserve owners/managers, hires staff and biologists to conduct adaptive management activities, and prepares annual reports for public review. Additional information on the NROC is included in the Existing Conditions Report (Appendix C).

2.4.3 Aliso Creek Watershed Management Plan

Aliso Creek is the primary drainage source for the Aliso Creek Watershed, which encompasses a drainage area of approximately 36 square miles. The watershed extends 19 miles from the foothills of the Santa Ana Mountains to the Pacific Ocean south of Laguna Beach, and includes the tributaries of Wood Creek, Sulphur Creek, Aliso Hills Channel, Dairy Fork, Munger Creek, and English Canyon. Over the last two decades, a number of water-related issues in the Aliso Creek Watershed have been independently addressed by various public and private entities. Many of the smaller, routine problems have been addressed by piecemeal projects implemented by local agencies. Implementation of effective solutions for some of the larger problems has been constrained by local funding limitations and conflicting agency jurisdictions and mission statements.

To address some of these larger problems, a comprehensive study approach was proposed for the Aliso Creek Watershed, pursued through a partnership with various local public agencies, utility districts and the U.S. Army Corps of Engineers (Corps). The Los Angeles District of the Corps became the lead agency for the Aliso Creek Watershed Study that was initiated in 1995. Since 1995, approximately 23 documents addressing various aspects of the Aliso Creek watershed have been published by the County and the Corps. At present, rather than continue to conduct more studies of watershed problems, the County is focused on the immediate implementation of projects.

The Aliso Creek Watershed Management Plan (WMP) is a collection of recommendations that have been developed with the advice and participation of community representatives; Federal, State, and local agency representatives; private citizens; and local citizen interest groups. Specific practices are listed that may be adopted by landowners and managers throughout the watershed. These practices also include many alternatives from which to choose, dependent on specific site conditions and personal preferences. The WMP is designed to be flexible and will be updated by local entities as new information and techniques become available.

The WMP is designed to address numerous water and land related problems in the Aliso Creek Watershed. The objectives of the WMP include:

- Promote stream stabilization
- Reduce soil erosion
- Increase biological diversity
- Encourage land stewardship
- Improve aquatic and riparian habitat
- Reduce invasive species
- Improve water quality

2.4.4 South Orange County Integrated Regional Water Management Plan

The South Orange County Integrated Regional Water Management Plan (IRWMP) includes the Aliso Creek Watershed. The IRWMP is a result of a collaborative effort of local and regional agencies – 12 cities, seven water and wastewater agencies, and the County of Orange – to achieve total watershed efficiency in the southern Orange County area. The purpose of the IRWMP is to identify potential projects intended to improve water quality and supply in order to investigate their feasibility, engage in long range water planning, to establish priorities among the proposal of the member entities, and to obtain potential funding. The IRWMP focuses primarily on the projects and plans of the member agencies, with an emphasis on water supply and water quality. The principal challenges facing South Orange County are reflected in each of the individual member agencies, with a focus on the following:

- Water Reliability
- Watershed Management
- Seasonal Storage
- Environmental Protection
- Water Quality
- Grant/Agency Funding
- Water Recycling

The projects identified in the IRWMP for the Aliso Creek Watershed rely on the Aliso Creek Watershed Management Plan described above. Current activities to improve water quality within the Aliso Creek Watershed include:

- Aliso Creek Water Quality SUPER (Stabilization, Utility, Protection, and Environmental Restoration) Project
- Sulphur Creek Ecosystem Restoration Project
- Sulphur Solution Restoration Project
- Development of plans for English Canyon Ecosystem Restoration Project, Wood Canyon Emergent Wetland Project, and Aliso Creek Mainstream Ecosystem Restoration Project
- Continued monitoring and benefits from the Wetland Capture and Treatment Network constructed, multi-purpose wetlands
- Aliso Beach Park Clean Beach Initiative Project
- Munger Storm Drain Pilot Sand Filter Project
- Giant Reed Removal

2.4.5 Aliso Creek Concept Plan

The Aliso Creek Concept Plan, also known as the Aliso Creek Water Quality SUPER (Stabilization, Utility Protection and Environmental Restoration) Project, started out as three separate projects. During the South Orange County IRWMP planning process, it became clear that several projects had a direct link to one another and should be combined. These projects included:

- The Aliso Creek Mainstem Ecosystem Restoration Project
- The Aliso Creek Emergency Sewer Relocation Project
- Water Harvesting on Aliso Creek

The County, South Orange County Wastewater Authority (SOCWA), Moulton Niguel Water District (MNWD), and South Coast Water District (SCWD) propose to provide water quality benefits, stream bank stabilization, utility infrastructure protection, and ecosystem restoration in the Aliso Creek for the reach beginning at the AWMA Road park entrance and ending downstream at the Pacific Ocean. More information on the Aliso Creek Concept Plan is provided in Chapter 9.0 Hydrology and Water Quality Management.

3.0 Public Involvement

3.0 PUBLIC INVOLVEMENT

As part of the process for creating a RMP for the Aliso and Wood Canyons Wilderness Park, a series of workshops provided a means for communities and interests surrounding the resource area to share their thoughts and to shape the management plan and park. The workshops were intended as forums to engage members of the community regarding key discussion points pertaining to the AWCWP. The planning team compiled prior studies and mapped, assessed, and analyzed the resource area, including contextual factors, management needs, and existing public use patterns. Public input assisted in determining the optimum balance between all the different planning considerations. The workshop process enabled various members of the community to be involved, express their concerns, identify issues and opportunities, evaluate plan alternatives and shape the final preferred alternative.

The Open House/Information Fair initiated the planning process with the exchange of information about the park. The next step was the Field Day Workshop, in which participants experienced the wilderness park and saw first hand specific points of concern and/or opportunities for change. The third workshop allowed participants to explore various strategies and solutions for achieving park goals within the framework of a wilderness park. Subsequently, the public will be asked to provide input on the Draft Resource Management Plan.

Key issues, concerns and opportunities identified during these public workshops are summarized in Appendix C. Summaries of the workshops are provided below.

3.1 PUBLIC WORKSHOP #1 SUMMARY

The first public workshop, the Open House and Information Fair, was held on February 21, 2006 to generate public understanding and enthusiasm for the AWCWP RMP. The workshop provided a forum for the community to share their thoughts regarding the issues, concerns, and opportunities associated with the RMP. Various organizations and interest groups brought displays and pertinent background information pertaining to their areas of interest in order to add to the open forum of discussion. Support materials for this public workshop are located in Appendix D.

The project team presented a brief overview of the RMP's purpose and goals, thumbnail sketch of park resources and existing recreational uses, known stakeholders involved in past planning efforts, and tentative schedule. The discussion focused on three principal areas: 1) Questions regarding the process and intent of the RMP, 2) Issues and/or areas of concern, and 3) Areas or topics of opportunity.

Questions and Observations. In general, participants questioned the scope of the RMP and whether implementation measures would be included in the plan document. Other

questions included how to best notify potential participants and increase dialogue throughout the planning process. Many participants expressed concern about the necessity of balancing the recreational needs of the entire community rather than just certain special interest groups. Other questions pertained to whether the planning process would be able to successfully balance the recreational needs of the public with the need to manage natural resources in the park. There was a range of opinions on such issues as amount of signage and number of trails within the park, among other things, some of which contradicted each other.

Key Issues and Concerns. The majority of issues related to trail use and safety, unauthorized or historic versus authorized trails, public access, conflicts between different user types, and signage. General management issues and concerns included soil and creek erosion; invasive species; fire management practices; and the protection of biological, historical, cultural, and paleontological resources. In some cases, workshop participants provided contradictory comments (e.g., too much signage for a wilderness park vs. too little signage, too many trails vs. not enough trails).

Opportunities. The discussion of opportunities revolved around the general management suggestions provided by the workshop participants. Ideas included "you are here" maps, a trail rating system to reduce the number of injuries, and the creation of intensive use trails as a means of protecting sensitive resources. Many participants believed that there should be more of an emphasis on interpretive programs highlighting AWCWP's unique resources.

The workshop concluded with a discussion of the logistics for the subsequent field day workshop.

3.2 PUBLIC WORKSHOP #2 SUMMARY

The Field Day Workshop was planned and organized to review the issues and ideas raised at the first public workshop and to bring participants into contact with the resource area. On March 25, 2006, participants met at AWCWP to tour the specific areas of the park that best demonstrate the issues and management opportunities. Participants provided feedback and observations in workbook journals prepared by the project team.

Three separate groups completed four tours: Main Entrance and Staging Area Tour, Aliso Canyon Tour, Wood Canyon Tour, and the West Ridge Tour. The first session, the Main Entrance Tour, was held collectively with all three groups participating together. The tours included various stops to highlight specific features of the park and inform discussions and observations. The workbooks provided a means for people to write about the experience and to reflect on constraints and opportunities. Field Trip issues/responses are summarized below according to the four tour activities. For a more detailed summary of responses, see Appendix D.

Main Entry Area

- Entry area needs to be accentuated as the primary park entry – "the Gateway"

- People are satisfied with the honor system for parking but suggest adding controls such as higher staff visibility on weekends and posted "No Parking" outside the park
- Entry signage is sufficient but needs better organization, clarity and placement
- Theme for archaeological and paleontological resources should be "teach, inform, and protect"
- Major expansion of the Orange County Natural History Museum (OCNHM) was not universally supported. People commented that the OCNHM is a poor gateway to the park and that it does not reflect the character and resources of the park.

Aliso Canyon 1

- A trail linkage to the coast is supported acknowledging "logistical challenges."
- A canyon alignment is the most practical for a linkage to the coast.
- Key issues include: high habitat sensitivity, safety for trail users through the golf course, and the additional burden of patrol at the south entry.

Aliso Canyon 2: ACWHEP Facility

- Structure was viewed as offering limited benefit to the park in terms of function and appearance.

Wood Canyon 1 Confluence

- Amenities are appropriate but require clarity for trail options and more interpretive information.
- Remote archeological/paleontological resources are problematic and require protection strategies for public access.

Wood Canyon 2 Creek Erosion

- Regarding priorities for trail maintenance versus erosion control versus habitat protection, habitat protection was considered first priority and better inventory of resource sensitivity was expressed as important.
- People suggested a more holistic approach to watershed management.

Wood Canyon 3 Creek Realignment

- Realigning the creek could be beneficial to enhance habitat conditions or to better handle flood capacities.

Wood Canyon 4 Sycamore Grove

- Sycamore grove amenities are appropriate to balance a wilderness experience and accommodate public use.
- Amenities should remain "rustic" with more directional and interpretive information provided.

Wood Canyon 5 Hunwut Trail Access

- Neighborhood access is generally accepted (helping to diffuse traffic at main entry) however opinion regarding the treatment of such an entry varied widely – orientation and interpretive trailhead type features were suggested.

Wood Canyon 6 Soka University

- Rather than exclusive access by the University, community access and University access was suggested through Gate #5 by majority of participants.

West Ridge 1 Top of the World Staging Point

- Important to convey gateway idea with directional, rules and interpretive information here. A "you are here map" could identify vista points.
- A parking facility was generally considered unnecessary.

West Ridge 2 Mathis Canyon Trailhead

- Another opportunity for directional, explanatory and interpretive information.
- Wildlife corridor access should be a priority to public use and access.

West Ridge 3 Rockit Trail

- Bike uses and their controls were discussed: Ratings for difficulty was suggested along with better trail maintenance, more patrols and better education and equipment.

West Ridge 4 Stairstep Trail

- Wildlife and trail linkage with adjoining park was considered very important but many expressed that the biggest impediment was offsite with the major road crossings.
- Consistency in rules and management between the two parks (AWCWP and LCWP) was considered important.
- Trail should be designed as a multiuse trail but steep slopes between the two parks are problematic for a multiuse trail.

3.3 PUBLIC WORKSHOP #3 SUMMARY

On May 24, 2006 OC Parks hosted the third public workshop at Soka University to gather feedback on the alternative management strategies prepared in response to public input and the results of the technical work conducted by the project team. Support materials for this public meeting are located in Appendix E. A brief summary of the third public workshop is included below.

The participants generally agreed with the County's definition of Wilderness Park, as described in the County of Orange General Plan Recreation Element. The County's definition of wilderness park provides the basis for management decisions (i.e., resources, improvements, and facilities), guides the discussion of goals and strategies to manage the Park, and provides the framework within which alternative strategies for providing public

access are developed. Proposed management of the AWCWP will remain consistent with the County's definition of a wilderness park. As such, the County will protect and preserve the native habitat in the park for the benefit of its natural resources. The County will continue to provide opportunities for outdoor education and low-impact recreation consistent with resource protection goals.

The project team introduced goals and strategies to consider different means of protecting and preserving the land as a wilderness park (Section 6.0). The goals and strategies outline a management framework to protect the Park's resources, to perpetuate the Park's important resource values, and to respond to threats to those values, consistent with the definition of wilderness park. The goals and strategies are divided into Biological Resources, Cultural Resources, Interpretation and Education, Public Use and Access, and Stewardship Elements. A goal is a statement of intended outcome for management activities. A strategy is a management action to achieve the goal. All participants expressed the need to protect and restore the natural and cultural resources of the park. This RMP recommends management programs that support these goals and strategies.

The group then considered three alternatives for continuing or introducing public access. Alternatives consider the key opportunities and constraints associated with implementing various management strategies. The three alternatives developed by the project team provide for varying intensities of recreation use and are consistent with the County's definition of a wilderness park (Appendix E). The alternatives primarily address public access (trails and entries) because these are the areas where there may be a difference of opinion on how to manage AWCWP. Opinions differed about how to protect the Park and allow public access.

The alternatives provide opportunities for recreation in so far as they are consistent with the overriding goal of protecting Park resources. The management alternatives are:

Alternative A: Preservation - Increased Resource Protection
Alternative B: Conservation - Limited Facility Improvement
Alternative C: Recreation - Maximize Recreation Opportunities

Management zones focus the discussion of alternative management strategies. AWCWP is divided into four management zones based on geographic relationships, resource values, ecological parameters, management issues, goals and objectives, types and intensities of land use, and visitor use and experiences (Section 6.3).

- Upper Aliso Creek
- Lower Aliso Creek
- Upper Wood Canyon
- Lower Wood Canyon

Workshop participants were asked to rank the alternative for each zone that best met their goals in order to provide input to the Preferred Plan. The summary of alternatives ranking is included in Appendix E. Participants agreed that more background information would assist

in developing the Preferred Alternative. They also made constructive suggestions about how the information could be presented more effectively in presenting the Preferred Plan. These suggestions were considered in the development of the RMP. Notes from the workshop are included in Appendix E.

3.4 COASTAL GREENBELT AUTHORITY - NOVEMBER 16, 2006

On November 16, 2006, OC Parks hosted the fourth public meeting to present and receive public input on the Draft Resource Management Plan (RMP). The meeting was held at the Council Chambers for the City of Laguna Woods in conjunction with the Coastal Greenbelt Authority (CGA). The presentation highlighted the major features of the Draft Resource Management Plan and provided an update on intent to provide further technical information on water quality. A brief summary of this fourth public meeting is included below.

Staff and the consultant team highlighted the primary features of the RMP with a powerpoint presentation including an outline of the primary issues for managing resources within AWCWP, the goals of the RMP and the primary recommendations for public use and access, protection of biologic and cultural resources, the need for ongoing monitoring and fire management, the role of AWCWP within a larger watershed, interpretation, and park maintenance. Comments from CGA and the public included the following:

- Concern about trails proposed for closure with habitat restoration
- Need for continuous access to the beach
- Need for access for the elderly and children to central areas of AWCWP
- Role of hydrology and water quality at AWCWP
- Need for emergency access within AWCWP
- Massive erosion problems at AWCWP
- Some trails for hiking only should be changed to multi-use
- Safety and health of migratory birds
- Problems with unauthorized trails and habitat protection
- Concern for pavement in proximity to creeks
- Gateways for Aliso Canyon Community Park
- Need for community outreach and education
- Suggest only signs on authorized trails with direction to stay on trails
- Need refuge areas for wildlife within AWCWP

At the conclusion of the meeting, staff provided an anticipated schedule for upcoming RMP tasks related to a technical report on water quality, the environmental documentation and a revised RMP for agency and public review.

4.0 Existing Conditions

4.0 DESCRIPTION OF WILDERNESS PARK

AWCWP has significant resource values that need to be protected, preserved, and managed. Natural communities within the park include coastal scrub, four types of chaparral, riparian woodland, native grassland, vernal pools, and rock and cliff faces. Cultural resources include historic settlement sites as well as archaeological sites. The following is a summary of the key physical, visual, natural, and cultural resources found within the park. A more detailed description of the park's resources is included in the Existing Conditions Report (Appendix C).

4.1 LAND USE

4.1.1 History of Use

AWCWP contains a wide array of archaeological features that reveal a complex pattern of prehistoric land use and settlement. Prehistoric cultural resources include villages, campsites, open air shell middens, rock shelters, and stone tool manufacturing and re-sharpening sites. The varied and abundant archaeological resources represent a valuable source of information about the prehistoric land use of the region over a long period of time, as well as a source of anthropological information about cultural ecology, adaptation, and interaction.

The lands within the park boundaries were historically part of the Rancho Niguel, granted to Juan Avila in 1842. Since that time, the park lands have been used for cattle and sheep grazing, and cultivation of barley and oats. The rise in population, floods, droughts, heat spells, freezes, plant disease, the 1933 earthquake, and the Great Depression created difficulties for area farmers and the subdivision of Rancho Niguel soon followed. Sites related to these historic land uses and events located within the park include: Moulton Cement Plant, the old corral, Bacon House site, the Mormon trading post site, and Tischler's Rock. In addition, at least two pieces of old farm equipment have been identified in the park. These artifacts have historic value as remnants of the historic agricultural operation of Moulton Ranch and also have interpretive value, as they may be used to help portray the history of the ranch.

More information on the history of the site and its cultural resources is provided in Section 4.6.

4.1.2 Existing Land Uses

AWCWP, with its varied topography, stunning vistas, and 30-mile network of trails weaving through 3,873 acres of preserved open space, provides an abundance of recreational and educational opportunities for a variety of users. The Park accommodates hiking, mountain biking, and equestrian uses, as well as passive recreational activities like birding,

photography, and nature viewing. Wood Canyon Trail connects the majority of AWCWP's trails and provides easy access to multiple geological and biological interpretive sites. Park rangers conduct free half-hour nature walks through the Park at 12 noon on the second and fourth Saturday of every month. Interpretive displays at the Old Corral, Dripping Cave, and Pecten Reef Trail provide an insight into the dense cultural and geological history of the park. The Top of the World vista point, one of many in AWCWP, places the park within a regional context with its breathtaking views of the Pacific Ocean, Aliso and Wood Canyons, and the San Gabriel and San Bernardino Mountains beyond.

4.1.3 Adjacent Land Uses

AWCWP is almost completely surrounded by urban development associated with the communities of Aliso Viejo, Laguna Niguel, Laguna Hills, Laguna Woods, and Laguna Beach (Figure 4: Adjacent Land Uses). These surrounding communities provide existing and potential connections to AWCWP. Public open space located adjacent to or near the park includes: Moulton Meadows Park and the City of Laguna Beach Open Space, Laguna Niguel Regional Park, Laguna Coast Wilderness Park, Crystal Cove State Park, and Indian Hills community park. At its southern end, the park borders Aliso Creek Golf Course. Soka University, a small private college, occupies a prominent location in the viewshed of the park along the eastern ridge of Wood Canyon.

Property to the north between Aliso and Wood Canyons is within Aliso Viejo. Planned uses for this community include medium and high density residential, light industrial, and community commercial. The area north of the Aliso Viejo community is occupied by Rossmoor Leisure World. Leisure World is a retirement community that includes single and multi-family residences plus commercial uses and private parks and open space (Ed Almanza and Associates 1992).

The Chet Holifield federal building and parking lot lies near the northeastern extension of the park, along Upper Aliso Creek. Other existing land uses near that portion of the park include commercial and residential development. Residential areas border the west side of the park in the Temple Hill/Top of the World (TOW) vicinity of Laguna Beach and the east side of the park along Highlands Avenue and Alicia Parkway in Laguna Niguel.

4.2 VISUAL RESOURCES

AWCWP represents a significant visual and scenic resource within the region. The length and configuration of the park's perimeter, coupled with the hilly topography provide significant variety in both viewpoint orientation and available viewsheds, creating a wealth of viewing conditions and opportunities. These resources include a combination of panoramic views in which the canyons form the dominant foreground element and the surrounding hills form the background, as well as distinctive landscape features and built features (Figure 5: Visual Resources).

4.2.1 Scenic Resources

Numerous scenic resources, such as vista points/panoramic views, landscape features, and built features contribute to an existing positive visual experience for park users.

Vista Points/Panoramic Views. Due to the varied topography within the park, several points provide a vantage from which to enjoy the area's scenic resources. "Top of the World," which lies just outside the park, is one of the best-known vista points. From this vista point, one is presented with dramatic and high quality panoramic views of the Pacific Ocean, Santa Catalina Island, and the community of Laguna Beach to the west; the San Gabriel and San Bernardino Mountains to the northeast; and Wood Canyon and surrounding urban development to the south and east. Moulton Peak – the highest point in the park at 890 feet - provides sweeping views of the canyons, ridgelines, and hillsides of the park. Other viewing areas that provide vistas of the park and the surrounding landscape occur at other high points in the park, such as along the West Ridge, Alwut, Aswut, Aliso Summit, and Aliso Peak trails.

Landscape Features. The aesthetic resources of the park are largely due to the native plant associations found there. The park's landscape consists of rugged topography characterized by steep hillsides surrounding deep canyons. Views within the park range from intimate, secluded spaces to grand vistas. In the upper reaches of the two canyons, canyon walls and trees create enclosed spaces where views can focus on details such as rock formations, plants, and animals. Canyon walls also block views of surrounding development atop the ridgelines. In the wider, lower reaches of the canyons, views consist of broad expanses of grassland and grassy meadows, coastal sage scrub and the surrounding hillsides. The diversity of the landscape and topography provides opportunities for a variety of visitor experiences.

Distinctive Features. Other visually distinctive features reflect the unique geology and history of the park. Such features include: Dripping Cave, Cave Rock, and the Old Corral. These features are described more fully in the Existing Conditions Report (Appendix C).

4.2.2 Elements Detracting from Scenic Quality

A number of visual features or characteristics in the park and vicinity detract from the quality of the views and scenic character. Some of these features include: urban and rural development immediately adjacent to the park boundary; unauthorized trails created by park users; and infrastructure such as water tanks and utility lines.

Visual Intrusion of Urban Development. Urban and rural development immediately adjacent to the park boundary is visually intrusive from several locations within AWCWP. As Orange County continues to urbanize, homes are being built on the ridgelines overlooking the park. In fact, views of the park are a key selling point for selling such real estate. This development has an adverse effect on views from the park and the overall scenic quality. Because of these hillside and ridgeline locations, the homes tend to be silhouetted against the sky, significantly altering the skyline and the perception of the park area as a rural, natural area. This problem is most evident along Lower Aliso Canyon, lower Wood Canyon,

and around the Aliso and Wood Canyons Confluence, where residential development hugs the park boundary on bluffs above the park. In addition, inappropriate management of fuel modification zones (*i.e.,* goat grazing, non-compliance with approved landscape palettes) along the urban interface has denuded the hillsides, degrading views from within the park.

Built Features Within the Park. In several locations throughout the park, built features or human intervention detract from the overall visual quality and ultimately the visitor experience. These features include unauthorized trails, utility corridors, and other infrastructure (i.e., poorly constructed road dip crossings, concrete poured over rocks).

In certain areas of Wood Canyon, views are marred by unauthorized trails created by mountain cyclists and other park users. These scars on the hillsides mar the natural landscape and ultimately diminish its scenic value.

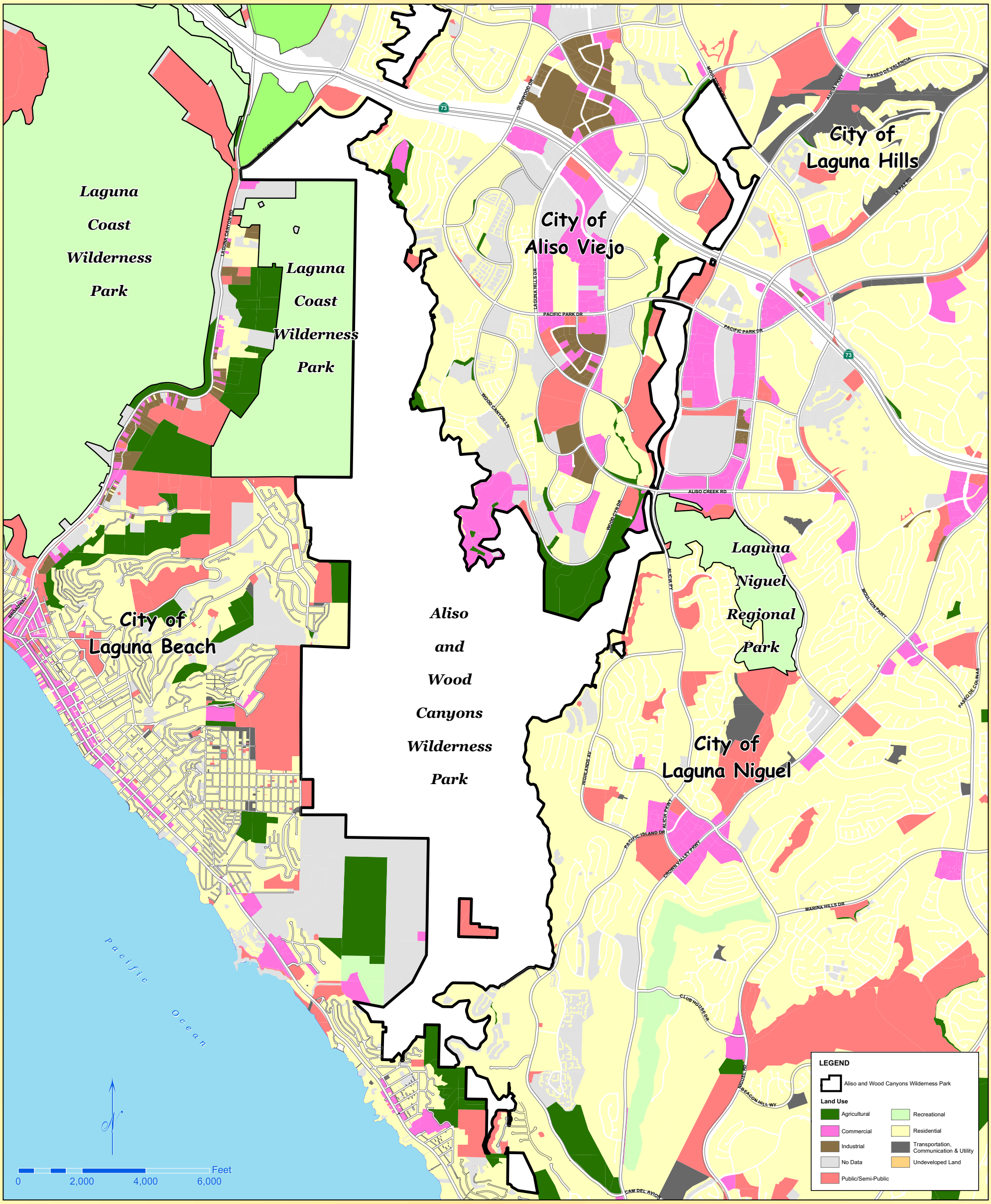
At several locations within AWCWP where infrastructure such as utility lines and water tanks interrupt the scenic landscape and reduce the quality of views from significant vista points. A high-tension electrical transmission line crosses the park from Moulton Peak to a point just west of the West Ridge Trail. Clearly visible from several vantage points within the park, the towers and overhead lines are significant foreground features when viewed from several park trails, including the Rock-It, Five Oaks, and West Ridge trails. Two water tanks are located within the park boundaries. These tanks are owned and operated by the Moulton Niguel Water District and are placed at two of the highest points in the park, at Moulton Peak and along the West Ridge Trail. Due to their elevation, the tanks are highly visible from many vantage points within the park.

4.3 PHYSICAL RESOURCES

4.3.1 Topography

Elevations in the park range from 20 feet above sea level at the mouth of lower Aliso Canyon to an elevation of 891 feet at Moulton Meadows and Niguel Hill (Figure 6: Topography). The northeastern boundary of the park abuts the tip of a broad alluvial plain. From there, the park continues south along a narrow floodplain bordered on the west by steep hills. Both Aliso and Wood Canyons are characterized by steep canyon walls and a narrow valley floor bisected by Aliso Creek. Notable sandstone rock outcroppings occur along a ridge forming the east side of Wood Canyon and the west side of the upper Aliso Canyon near the confluence of Wood Canyon and El Toro (Rattlesnake) Canyon.

High above the steep canyon walls, bordering the City of Laguna Beach, Moulton Meadows Park, a plateau, overlooks lower Aliso Canyon. From here, broad panoramic views of the Pacific Ocean and inland views continuing all the way to the mouth of upper Aliso Canyon and beyond are available. El Toro Ridge, which forms the northern end of Wood Canyon, is comprised of near vertical sandstone cliffs and rock outcroppings that taper to a narrow valley floor bordering El Toro Road and ending at Laguna Canyon Road.



DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 04/2004

DATE: December 11, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 4: Adjacent Land Uses

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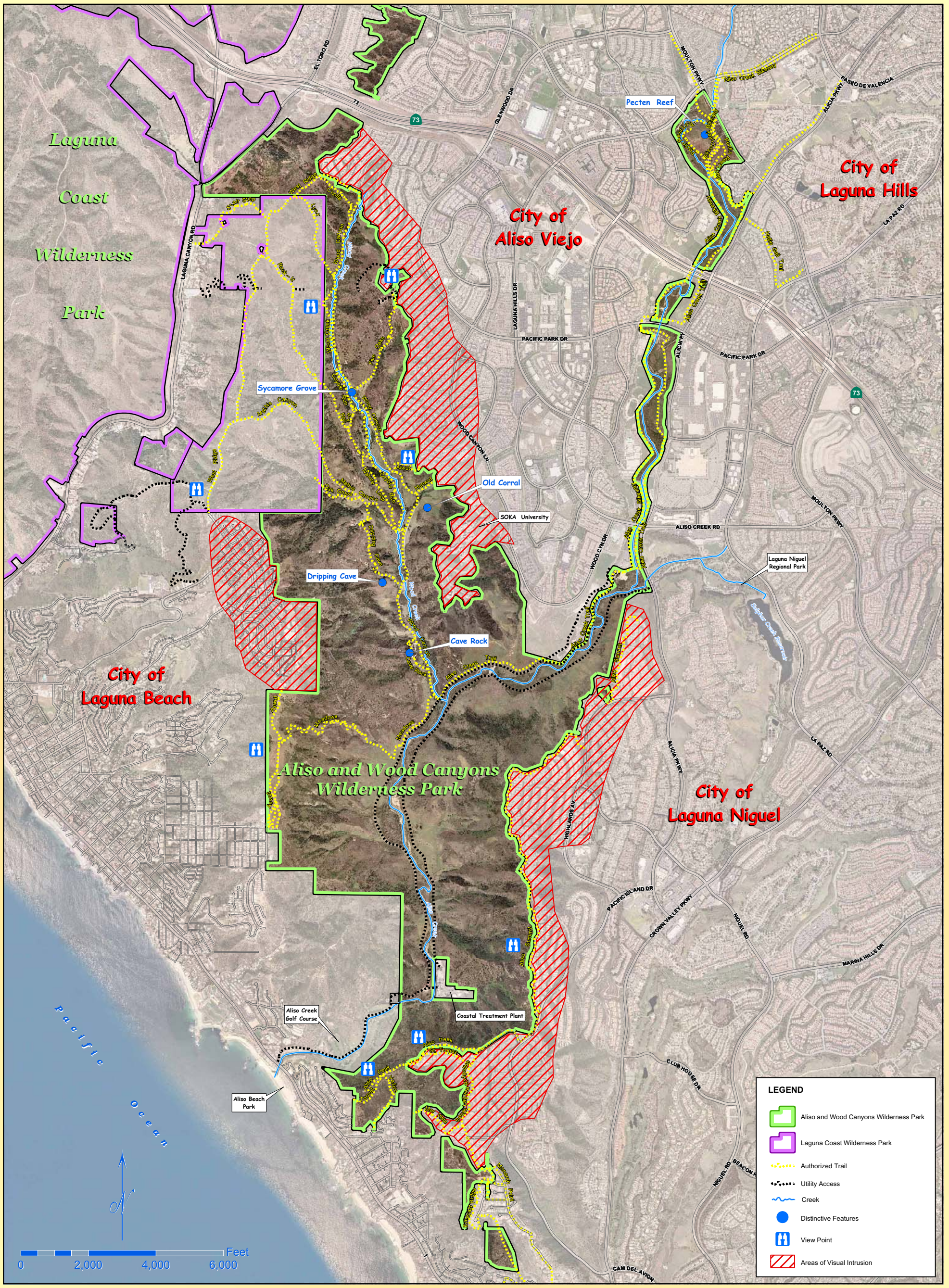

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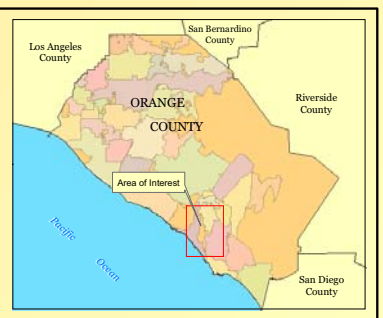
Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 5: Visual Resources



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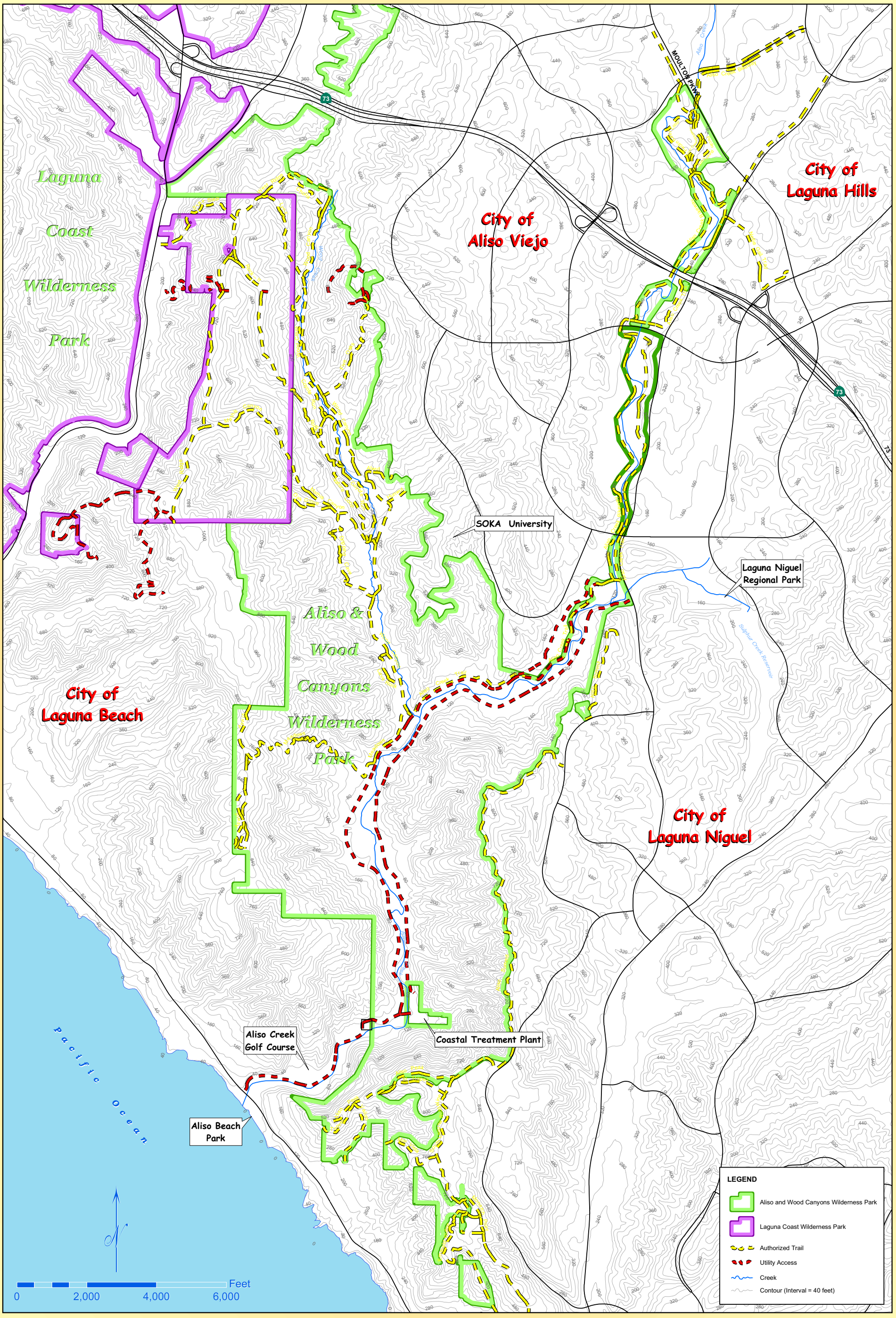
Back of Figure 5



DESIGNED AND PRODUCED BY:

OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:

- Geomatics Land Information Systems Division
- USGS 10 meter DEM 1999

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 6: Topography

F:\PROJECTS\Brian\Requests\LSA Maps\RMP Final Revisions\Figure6_Slope.mxd

Back of Figure 6

4.3.2 Geology and Soils

Geology. The park is underlain by geologic units ranging in age from the Oligocene Epoch (35 million years ago) to the present day (Figure 7: Geology). Formations present (listed in order of oldest to youngest) include:

- Sespe/Vaqueros Undifferentiated Formation (Ts, Tv, Tsv)
- San Onofre Breccia (Tsob)
- Topanga Formation (Tt)
- Monterey Formation (Tm)
- Capistrano Formation (Tcs)
- Niguel Formation (Tn)
- Marine Terrace Deposits (Qvop)
- Younger Alluvium/Colluvium

The Existing Conditions Report (Appendix C) provides a more detailed analysis of the geologic units present in AWCWP.

Soils. Soils along Aliso Creek in the northeastern arm of the park are generally clay and sandy loams. The soil types east of the creek in lower AWCWP are predominantly loam and clay loams at the base of Aliso Canyon, transitioning to rock outcrop at higher elevations toward Laguna Niguel. Silty clay loam soils dominate the western half of AWCWP, with free-draining sandy loam soils prevalent around Wood Creek. Figure 8, Soils, illustrates the variety of soil types found within the park boundaries. Soil information was obtained from the U.S. Department of Agriculture and the Soils Conservation Service and was also supplied by the County GIS (geographic information system) mapping efforts. The Existing Conditions Report (Appendix C) provides more detailed information on the soil types in AWCWP.

Landslides. Approximately 12 major bedrock landslides occurred on the upper canyon slopes of the Topanga Formation south of Sheep Hills in lower Aliso Canyon (Figure 9: Landslides). Geology and engineering investigations indicate that these slides are unmanageable (Ed Almanza and Associates, 1992). Several additional verified and suspected slides are located in upper Wood Canyon. Several other slides are found in lower Wood Canyon and on both sides of upper Aliso Canyon within AWCWP boundaries.

4.3.3 Hydrology

AWCWP includes the confluence of two main creeks and the canyon slopes surrounding these two creeks: Aliso Creek and Wood Creek. Aliso Creek Watershed encompasses a drainage area of approximately 36 square miles and includes portions of the cities of Aliso Viejo, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, and Mission Viejo (Figure 10: Watershed Map). The watershed extends approximately 19 miles

from the foothills of the Santa Ana Mountains to the Pacific Ocean south of Laguna Beach, and includes the tributaries of Wood Creek, Sulphur Creek, Aliso Hills Channel, Dairy Fork, Munger Creek, and English Canyon. Residential developments within the watershed include portions of Lake Forest, Laguna Beach, Foothill Ranch, Portola Hills, Mission Viejo, Laguna Hills, Aliso Viejo, and Laguna Niguel (California Coastal Conservancy 2001).

Aliso Creek flows approximately 19 miles (30 kilometers) from its headwaters in the Cleveland National Forest south past the confluence with Wood Creek and into the ocean at Aliso Beach Park in the City of Laguna Beach. The AWCWP portion of Aliso Creek encompasses the drainage section south of Moulton Parkway and Aliso Canyon through which Aliso Creek flows before entering the ocean. AWCWP also includes the Wood Creek watershed which extends northwesterly from its confluence with Aliso Canyon and includes Mathis Canyon and its tributaries. Wood Creek is approximately 3 miles (4.8 kilometers) long from its headwaters at a detention basin to its confluence with Aliso Creek at an elevation of approximately 90 feet (27 meters) (Figure 11: AWCWP Hydrology).

The Aliso Creek watershed, like other watersheds in Orange County, has been significantly affected by development. Aliso Creek, once an intermittent stream before the region became heavily urbanized, now flows year-round through the eastern and southern sections of AWCWP, augmented in recent years by significant increases in upstream urban runoff. Specific watershed concerns include channelization, poor surface water quality from discharge of non-point sources, loss of habitat in the floodplain, loss of riparian habitat, paving of the flood plain, decline of water supply and flows, biodiversity loss, invasive plant and animal species, surface erosion, and over use of existing resources (California Coastal Conservancy 2001).

AWCWP also includes Wood Creek which extends northwesterly from its confluence with Aliso Creek and includes Mathis Canyon and its tributaries. Wood Creek is approximately 3 miles (4.8 kilometers) long from its origins at a detention basin collecting storm water and nuisance runoff in the City of Aliso Viejo to its confluence with Aliso Creek at an elevation of approximately 90 feet (27 meters). This creek is less affected by development than its neighbor Aliso Creek, but still has many of the same concerns.

River geomorphology conditions within AWCWP have been degrading for several decades. Degradation within AWCWP is caused by several factors including past cattle grazing, current goat grazing and dry farming, urbanization of the upper watershed, improper fuel zone management, natural and artificial fluctuations of the water levels in the channel, and human activities such as impeding the channel at trail, spillway, and road crossings.

Additional information on hydrology and water quality within AWCWP is included in Section 9.0.

4.3.4 Climate

AWCWP is located within the South Coast Air Basin (SCAB), bound by the Pacific Ocean on the west and the San Gabriel, San Bernardino, and San Jacinto mountains on the north and east. The regional climate in the SCAB is classified as Mediterranean, characterized by

0 2,600 5,200 FEET

Legend

- Aliso and Wood Canyons
- Contact, Approx. Located
- Contact, Certain
- Fault, Certain
- Fault, Concealed
- Fault, Inferred

Strike and Dip of Beds

70 Inclined

Geology

- Qya_a - Young Axial Channel Deposits
- Qyls - Young Landslide Deposits
- Qvop - Very Old Peralic Deposits
- Tn - Niguel Formation
- Tcs - Capistrano Formation Siltstone Facies
- Tn - Monterey Formation
- Tsob - San Onofre Breccia
- Tt - Topanga Formation
- Tv - Vaqueros Formation
- Ts - Sespe Formation

SOURCE: LSA (2006), Morton et al (2004), USGS 7.5' QUAD - DANA POINT ('75), LAGUNA BEACH ('81), SAN JUAN CAPISTRANO ('81), CALIF

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- LSA (2006); Morton et al (2004), USGS 7.5' Quad - Dana Point ('75); Laguna Beach ('81), San Juan Capistrano ('81), Calif.

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 7: Geology

F:\PROJECTS\Brian\Requests\LSA Maps\RMP Final Revisions\Figure7_Geology.mxd

Back of Figure 7

Laguna Coast Wilderness Park

City of Aliso Viejo

City of Laguna Hills

City of Laguna Beach

Aliso and Wood Canyons Wilderness Park

City of Laguna Niguel

SOKA University

Laguna Niguel Regional Park

Aliso Creek Golf Course

Coastal Treatment Plant

Aliso Beach Park

Pacific Ocean

EL TORO RD
LAGUNA CANYON RD
GLENWOOD DR
LAGUNA HILLS DR
PACIFIC PARK DR
ALICIA PKWY
MOULTON PKWY
PASEO DE VALENCIA
LA PAZ RD
WOOD CANYON LN
WOOD CYN DR
ALISO CREEK RD
HIGHLANDS AV
PACIFIC ISLAND DR
CROWN VALLEY PKWY
NIGUEL RD
MARINA HILLS DR
CLUB HOUSE DR
CAMINO DEL AVION
73

LEGEND

Aliso and Wood Canyons Wilderness Park

Soils

- Beaches
- Clay
- Clay Loam
- Cobbly Loamy Sand
- Cobbly Sandy Loam
- Complex
- Gravelly Loam
- Gravelly Loamy Sand
- Gravelly Sandy Loam
- Loam
- Loamy
- Loamy Sand
- Riverwash
- Rock Outcrop
- Sandy Loam
- Silty Clay Loam
- Tidal Flats
- Variant Clay
- Water

0 1,000 2,000 3,000 4,000 5,000 Feet

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 04/2004
- USDA Soil Data, 2006

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 8: Soils

F:\PROJECTS\Brian\Requests\LSA Maps\RMP Final Revisions\Figure8_Soil_Associations.mxd

Back of Figure 8

Laguna Coast Wilderness Park

City of Aliso Viejo

City of Laguna Hills

City of Laguna Beach

Aliso and Wood Canyons Wilderness Park

Laguna Niguel Regional Park

City of Laguna Niguel

Aliso Creek Golf Course

Coastal Treatment Plant

Aliso Beach Park

Pacific Ocean

EL TORO RD
LAGUNA CANYON RD
GLENWOOD DR
MOULTON PKWY
ALICIA PKWY
PASEO DE VALENCIA
LA PAZ RD
LAGUNA HILLS DR
ALISO CREEK RD
PACIFIC PARK DR
CROWN VALLEY PKWY
PACIFIC ISLAND DR
MARINA HILLS DR
NIGUEL RD
CAMINO DEL AVION
73

N W E S

0 1,000 2,000 3,000 4,000 5,000 Feet

LEGEND

- Existing Park
- Proposed Park
- Creek
- Bedrock landslide
- Soil flow
- Probable landslide

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

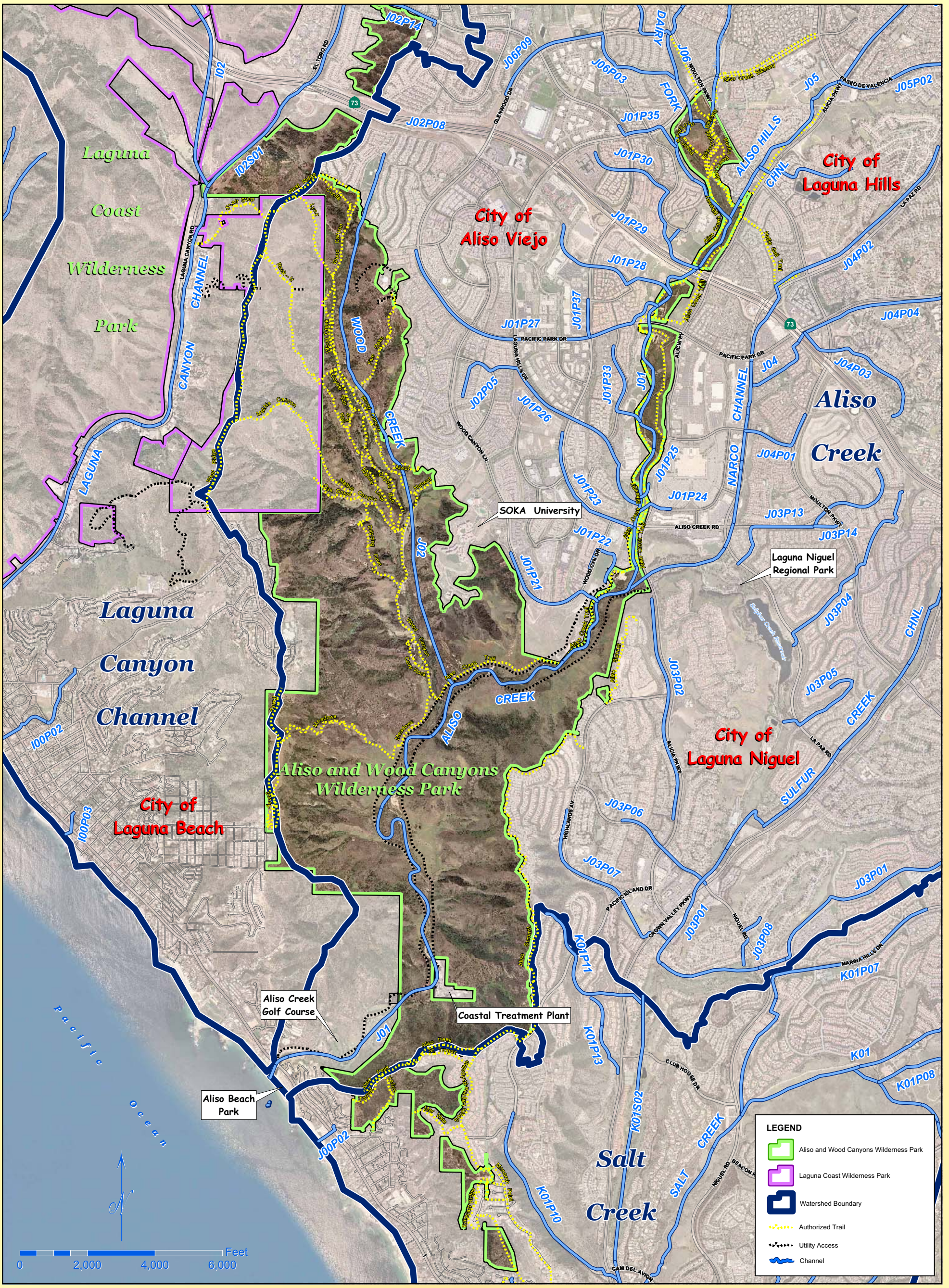
DATA SOURCE:
- Geomatics Land Information Systems Division
- NOAA 3 meter DEM 2002
- Eagle Aerial Image 1 foot resolution, flown April 2004
- California Division of Mines and Geology Special Report 112/1974-Geology of the San Juan Quadrangle, O. C., CA and Special Report 127/1976-Geology of the Laguna Beach Quadrangle, O.C., CA.

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 9: Landslides

F:\PROJECTS\Brian\Requests\LSA Maps\RMP Final Revisions\Figure9_Landslides.mxd

Back of Figure 9

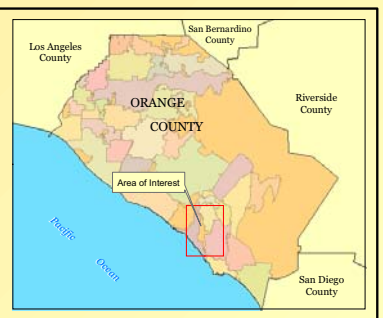


DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 04/2004

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 10: Watersheds



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Back of Figure 10

Laguna Coast Wilderness Park

City of Aliso Viejo

City of Laguna Hills

City of Laguna Beach

Aliso and Wood Canyons Wilderness Park

City of Laguna Niguel

Laguna Canyon
Wood Creek
Aliso Creek
Canyon Acres
Rim Rock Canyon
Bluebird Canyon
Hobb Canyon
Narco
Sulphur Creek
Salt Creek
San Juan Canyon
Arroyo Salada
Pacific Ocean

73

0 2,000 4,000 6,000 Feet

LEGEND

- Aliso and Wood Canyons Wilderness Park
- Laguna Coast Wilderness Park
- Creek

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 04/2004

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 11: Hydrology

F:\PROJECTS\Brian\Requests\LSA Maps\RMP Final Revisions\Figure11_AWCWP_Hydrology.mxd

Back of Figure 11

warm, dry summers and mild, moist winters. The warmest month of the year is July, and the coldest is January. Average daily temperatures range from a minimum of 35 - 48 degrees Fahrenheit to a maximum of 80 - 84 degrees Fahrenheit. Although the climate is considered semi-arid, the marine layer keeps the air near the land surface moist on most days. Annual average relative humidity is 71 percent along the coast and 59 percent inland.

More than 90 percent of rainfall in the SCAB occurs from November through April. The majority of precipitation is in the form of rain. Monthly and yearly precipitation is extremely variable. Average annual rainfall along the San Gabriel River corridor varies from approximately 28 inches in the San Gabriel Mountains, to 18 inches in the San Gabriel Valley, to approximately 14 inches on the coastal plain. Average annual precipitation in the San Joaquin Hills usually ranges from 14 to 18 inches. Due to the location and climate of the San Joaquin Hills, streams that can be found in the region during the cooler months go dry during the warm summer months.

The flora and fauna of AWCWP are uniquely adapted to the specific climatic conditions of the region. Annual and bulbiferous plants, many of which are considered rare by the California Native Plant Society (CNPS), take advantage of late winter and early spring rains to complete their growth cycle. Perennial plants exhibit most of their growth during this same period and many adapt to the dry summers by going dormant in the summer, reducing water loss by having dark green leaves with waxy cuticles, and/or by having deep roots that capture ground water or deep soil moisture. Differences in these strategies can be observed on south facing slopes (hot and dry), north facing (cooler and moister), and canyon bottoms (where perennial groundwater is present) Animals, such as the western spadefoot toad are also adapted to completing breeding activities during the relatively brief rainy season, while withstanding the hot, dry season, for example by burrowing into the ground. Other animals, such as the federally-listed (under the Endangered Species Act) California gnatcatcher are uniquely adapted to the various habitat types present, such as coastal sage scrub, with its insect fauna.

4.3.5 Fire History

Southern California's Mediterranean climate presents the ideal conditions for fire. The wet, mild winters and dry, hot summers provide a long growing season that produces an abundance of plant fuel. Fire suppression, heavy rains, and seasonal or prolonged drought all result in excessive plant fuel accumulation and the potential for catastrophic wildfire.

Throughout history, the San Joaquin Hills have been subjected to repeat burning. The most recent firestorms occurred in October and November of 1993, in which more than 1,000 structures were destroyed or damaged in three major fires: the Stagecoach fire (October 26, 1993), the Laguna Canyon fire (October 27, 1993), and the El Toro fire (November 2, 1993). The Laguna Canyon fire burned more than 16,500 acres and 366 structures (Firewise 2005). The fire burned over 10,000 acres of open space, including 90 percent of the Laguna Coast Wilderness Park (County of Orange Environmental Management Agency 1996). (No portion of AWCWP burned at that time). Figure 12, Fire History, shows historic fires in the vicinity of AWCWP.

Major portions of AWCWP have been designated as high fire classification areas in the Orange County General Plan and Aliso Creek Corridor Specific Plan. Areas most susceptible to fire have three common characteristics: 1) thirty percent slopes or greater; 2) medium to heavy fuel loading, predominantly coastal sage scrub; and 3) frequent critical fire hazard weather conditions. Canyon slopes meeting these three criteria appear on east facing Laguna Canyon slopes, both sides of lower Aliso Canyon, upper Wood Canyon, portions of Sheep Hills and Upper Aliso Canyon. The greatest potential for fire damage exists at the interface between AWCWP and adjacent residential development.

4.4 NATURAL RESOURCES

4.4.1 Vegetation Communities

The distribution of vegetation types and subtypes within AWCWP is influenced by a variety of abiotic factors, including soils, slope steepness and aspect, elevation, and microclimate. These, in turn, are influenced significantly by the combination of the geology of the region and local climatic influences (e.g., coastal fog). AWCWP is in a region that represents a transition between two coastal sage scrub habitat types, Venturan and Diegan, as classified state-wide by Holland (1986). When combined with other habitat types in the park, such as chaparral and oak/sycamore woodland, the vegetation provides habitat for a unique assemblage of plants and animals. Biologically, the NCCP/HCP Habitat Reserve preserves a microcosm of the California Floristic Province, an identified biodiversity hot spot in North America and a genetic reserve for the continent. The Reserve, of which AWCWP is a part, is therefore regionally and nationally significant as a prime example of this unique habitat web, yet it occurs in an area that nearly surrounded by existing development, with the attendant human influences.

AWCWP contains seven unique habitat types: coastal scrub; chaparral; grassland; vernal pools, seeps, and meadow habitats; marsh; riparian; and woodland habitats (Figure 13: Vegetation Communities). Rock and cliff habitat also comprises a limited portion of the park, and disturbed habitat – characterized by non-native plant species – is also present in areas. The approximate acreages of each habitat type are shown in Table B.

Table B: Habitat Types within AWCWP

Habitat Type	Acreage
Coastal Scrub	1825
Chaparral	725
Grassland	886
Vernal Pools, Seeps, and Meadow	7
Marsh	(no acreage value reported)
Riparian	247
Woodland	133
Rock and Cliff	2
Disturbed	41

FIRE HISTORY & NCCP RESERVE

SAN BERNARDINO COUNTY

LOS ANGELES COUNTY

RIVERSIDE COUNTY

SAN DIEGO COUNTY

Pacific Ocean

NCCP Reserve
SIERRA FIRE
Fire History
UNKNOWN 2
73 FIRE
ANTONIO
ASSIST #108 (MATEO)
AVERY
BAKER
BEDFORD 1
BEDFORD 2
BLACKSTAR
BLIND
BLUE GUM
BOAT (LAGUNA)
BREA
BREA CANYON
CARBON CANYON
CARBON CANYON (WAGON)
CLEMENTE
COAL CANYON
CORNWELL
COTO
EL MORO
EL TORO
EMERALD CANYON 1
EVENING
FIRE BREAKS
FIRESTONE
FUEL BREAK (HISTORICAL)
FUEL BREAK (HISTORICAL-PARTIAL)
GREEN
GREEN RIVER
GREEN RIVER FIRE
GRUNDY
GYPSUM
HARVESTER
HOLY JIM
HWY 91
INDIAN
INDIAN POTRERO
IRVINE
IRVINE LAKE
JAMESON
JONES RANCH
KELLY
LA PATA
LA VIDA
LAGUNA
LAGUNA (LEWLEWIN)
LAGUNA (LUMBER)
LAGUNA CANYON
LAGUNA FIRE
LIVE OAK
LUNA HUXOL
MINE
MODJESKA
MONARCH
NELLIE GAIL 1
NELLIE GAIL 2
NELSON
NIGER
NIGUEL
NOHL
ORTEGA
OUTSIDE ORIGIN #2
OUTSIDE ORIGIN #6
OVERHILL
OWL
PACIFIC ISLAND
PASEO
PASEO GRANDE
PENDELTON
PETERS CANYON
PICO
PRESCRIBED FIRE
RACETRACK
RANCHO MISSION 4
RANCHO MISSION 1A
RIDGE LINE
SANTIAGO
SANTIAGO CANYON
SHADY CANYON
SHELL
SHOESTRING
SILVERADO
SOQUEL
STAGECOACH
STEWARD
TALEGA
TONNER
TORO
TRAFALGAR
TRW
UNKNOWN
WAGON WHEEL
WHITING
WIEGAND
WILLIAMS CANYON
YORBA
YORBA LINDA

0 7,000 14,000 Feet

PGIS\GIS\Fire History 5-16-2006.mxd

Orange County, California
BRYAN G. SPEEGLE, DIRECTOR
RESOURCES & DEVELOPMENT MANAGEMENT DEPARTMENT (RDMD)
TIMOTHY A. SEELY, DIRECTOR
PLANNING & DEVELOPMENT SERVICES (PDS)
PLANNING SERVICES SECTION

NATURE RESERVE of ORANGE COUNTY

DESIGNED AND PRODUCED BY:

Planning and Development Services
Planning GIS Section
Albert Lucero

DATA SOURCE:
- Planning and Development Services
- Nature Reserve of Orange County

DATE: November 16, 2006

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 12: Fire History

F:\PROJECTS\Brian\Requests\LSA Maps\RMP Final Revisions\Figure12_Fire_History.mxd

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Laguna Coast Wilderness Park

Aliso and Wood Canyons Wilderness Park

Pacific Ocean

Coastal Treatment Plant

EL TORO RD
I-5
73
GLENWOOD DR
MOULTON PKWY
Aliso Creek
PASEO DE VALENCIA
LAGUNA CANYON RD
Wood Canyon Creek
PACIFIC PARK DR
LAGUNA HILLS DR
ALICIA PKWY
WOOD RANYON LN
LA PAZ RD
ALISO CREEK RD
WOOD CYN DR
Sulphur Creek Reservoir
HIGHLANDS AV
CROWN VALLEY PKWY
PACIFIC ISLAND DR
NIGUEL RD
MARINA HILLS DR

N

0 2,000 4,000 6,000 8,000 Feet

LEGEND

- Contour Interval 40ft
- Authorized Trail
- Existing Aliso and Wood Canyons Wilderness Park
- Proposed Aliso and Wood Canyons Wilderness Park

VEGETATION TYPES

- Scrub
- Chaparral
- Maritime chaparral-Sagebrush
- Maritime chaparral-Sage scrub
- Southern maritime chaparral
- Grassland
- Vernal Pools, Seeps, and Meadows
- Marsh
- Riparian herb
- Southern willow scrub
- Mulefat scrub
- Southern sycamore riparian woodland
- Southern coast live oak riparian forest
- Southern arroyo willow forest
- Southern black willow forest
- Southern cottonwood-Willow riparian forest
- Canyon live oak ravine forest
- White alder riparian forest
- Woodland
- Cliff and Rock
- Marine and Coastal
- Lakes and Reservoirs
- Watercourses

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 meter resolution, flown June 2001
- The vegetation was identified using the Orange County Habitat Classification System (developed by Dames & Moore and David Bramlet) and partially rectified true-color aerial images flown in 1991 where 1" = 500'.

DATE: May 27, 2009

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 13: Vegetation Communities

F:\PROJECTS\Phil\AWCWP RMP Revisions\Figure13_Vegetation Classification.mxd

Back of Figure 13

Coastal Scrub Habitats. Coastal scrub habitats account for the largest plant community in AWCWP. Coastal scrub habitat generally describes a mosaic of native plant communities that occur on hillside slopes and lowland bluffs from Southern Oregon to northwestern Baja California, including offshore islands from the Channel Islands to Cedros Island. The coastal scrub vegetation type found in AWCWP consists of sparsely to densely spaced, low-growing, aromatic, drought deciduous shrubs. Coastal scrub habitats grow primarily on slopes and ridges below approximately 3,300 feet (1,000 meters) in elevation where rainfall, drainage, soil type, and exposure to sun provide suitable growing conditions.

Vegetation growing on north-facing slopes is different than vegetation growing on south-facing slopes. On south-facing slopes, the vegetation is typically Coastal Sage Scrub (CSS), including California sagebrush *(Artemisia californica)*, California encelia *(Encelia californica)*, white *(Salvia apiana)*, purple *(S. leucophylla)*, and black *(S. mellifera)* sages, California buckwheat *(Eriogonum fasciculatum)*, coyote bush *(Baccharis pilularis)*, coastal goldenbush *(Isocoma menziesii* var*. vernonioides)*, and golden yarrow *(Eriophyllum confertifolorum* var*. confertiflorum)*. On north-facing slopes, lemonade berry *(Rhus integrifolia)* and other large shrubs such as toyon *(Heteromeles arbutifolia)* and laurel sumac *(Malosma laurina)* intermingle with drought-tolerant chaparral.

Large CSS patches grow on the upper slopes within Wood Canyon, around the confluence of Aliso and Wood Canyons, and continue south into lower Aliso Canyon. Drier slopes often contain black sage scrub, mixed sage scrub, buckwheat scrub, and cactus scrub. On the whole, CSS occurs in extensive patches throughout AWCWP, but is not well represented north of Aliso Creek Road. This increasingly rare plant community, with high biological value, is thought to be one of the most endangered vegetation types in California (Atwood 1993). A total of five associations of CSS are known to occur in the AWCWP: southern coastal bluff scrub, Venturan-Diegan transitional CSS, southern cactus scrub, chenopod scrub, and sage scrub-grassland ecotone. Up to eight subassociations of the Venturan-Diegan transitional CSS may exist within AWCWP: California sagebrush/California buckwheat scrub, California sagebrush/orangebush monkey flower scrub, black sage scrub, sagebrush scrub, buckwheat scrub, coyote bush scrub, mixed sage scrub, and California sagebrush/coyote bush scrub.

Chaparral Habitats. Chaparral is the second most extensive vegetation community in the AWCWP. Chaparral is made up of woody shrubs with small, leathery, evergreen leaves (i.e., sclerophyllous) that are adapted to prevent wilting during dry periods. Like CSS, chaparral is both drought- and fire-adapted. Fire is a healthy and necessary component of its life cycle. Shrubs respond to recurrent fires in several ways; they resprout from both crown and roots, and produce seeds that are both fire resistant and dependent on fire for germination and growth. Fire helps create a healthy plant mosaic of different ages and species and as a result increases the diversity of habitats (Horton et al. 1955).

Chaparral is found on north- and west-facing shaded slopes where soil moisture persists and shrubs grow about 5 to 10 feet tall and form dense, woody stands with a canopy that shades a nearly bare understory. Chaparral is the dominant community in the southernmost portion of the park, and is most prominent within Wood Canyon, near the confluence of Aliso and Wood Creeks; it continues, in dense patches mixed with sage scrub, south toward the

Pacific Ocean. Chaparral is not considered as sensitive as CSS, since it is more widespread in Southern California and does not support as many sensitive species. Of the twelve chaparral associations identified as occurring in the County, four have been known to occur in AWCWP: maritime chaparral-sagebrush, southern mixed chaparral, southern maritime chaparral, and toyon-sumac chaparral. Not only do many of the chaparral communities contain several sensitive plant species (i.e., summer holly *[Comerostaphylis diversifolia* ssp*. diversifolia]*, Nuttall's scrub oak *[Quercus dumosa]*), but maritime chaparral is itself a rare habitat community.

Grassland Habitats. Grasslands are found extensively throughout AWCWP, particularly along Aliso Creek, north of its confluence with Wood Creek. This habitat is characterized by low herbaceous vegetation dominated by annual and perennial grasses and forbs, which typically occur on deep, fine-textured, usually clayey soils from flat plains to gently rolling hills. The assemblage of species within the grasslands are influenced by several environmental, climatic, and edaphic factors including soil structure, texture, parent material, chemistry, slope aspect, slope angle, and level of disturbance (Jones and Stokes 1993). Portions of AWCWP were grazed by cattle until the latter part of the 20th century, which reduced the native grasses and favored the exotic annual species that are more tolerant of trampling and grazing. Currently, nonnative annual grassland habitats occupy what was once native vegetation. Native grasslands likely consisted of climax stands of perennial needle grass and melic grass species on wetter sites, with annual species existing as climax communities on drier alluvial plains (Webster 1981). Native grass cover within AWCWP has improved since grazing and farming have ceased.

Annual grasses will germinate with the first fall rains that exceed 0.5 inch (15 mm), growing slowly during winter and more rapidly in spring (Heady 1977). Most annuals mature between April and June (Heady 1977), although some species, such as fascicled tarweed *(Deinandra fasciculata)* and doveweed *(Croton setigerus)*, continue to grow into summer. Fall rains that encourage germination, followed by an extended dry period, favor the growth of deep-rooted forbs (Duncan and Woodmansee 1975). Annual grasslands are found along all reaches of Aliso Creek just north of the confluence with Wood Creek and in stretches along the western border of AWCWP.

Concentrations of native grasses occur within many of the annual grasslands, often forming an ecotone with CSS on slopes. One native and two nonnative associations of grassland habitat have been known to occur in AWCWP: annual grassland, southern coastal needlegrass grassland, and ruderal grassland.

Vernal Pools, Seeps, and Meadow Habitats. Vernal pools, seeps, and meadow habitats account for a very small portion of AWCWP. These habitats are seasonal or perennial wetlands found in some of the low-lying slopes and canyon bottoms. Wetland vegetation takes several forms depending on substrate, water regime, disturbance, and other biotic and abiotic factors. These areas contain herbaceous-dominated communities when inundated with water. These types of habitats are very limited in distribution in Southern California because of their dependence on surface or near-surface water during most of the year. In addition, past flood control and other development projects have resulted in a relatively massive loss of this habitat and a drastic reduction in the species that depend on it. Meadow

communities at all elevations generally have a simple structure consisting of a layer of herbaceous plants. Shrub or tree layers are usually absent or very sparse; however, they may be an important feature of the wetland edge. Some species reach heights of less than 1 inch, while others may grow 3 feet tall or more (greater than 1 meter). Vernal pools, seeps, and meadow habitats occur with a great variety of plant species; therefore, it is not possible to generalize species composition. Species may differ, but several genera are common to these wetland habitats such as: bentgrasses, sedges (*Carex* sp.), rushes (*Juncus* sp.), willows (*Salix* sp.), and cat-tails (*Typha* sp.). Invasive species such as giant reed *(Arundo donax)* and pampas grass *(Cortaderia selloana)* dominate the vegetation in some locations, particularly along Aliso Creek. There is one association that has been known to occur within AWCWP: freshwater seep.

Marsh Habitats. Marsh habitats are extremely limited and account for a remnant amount in AWCWP. Brackish and freshwater marshes are flooded for a majority of the year and are characterized by perennial, emergent species including: umbrella sedges (*Cyperus* sp.), Olney's bulrush *(S. americanus)*, California bulrush *(Scirpus californicus)*, alkali bulrush *(S. maritimus),* and narrow-leaved cat-tail *(Typha angustifolia)*. Marsh habitats are associated with Aliso Creek, El Toro Creek, and some portions of Wood Creek. Mallard Marsh has historically provided some open water habitat and still supports some emergent wetland species. However, currently no surface water is evident, and the plant species are dominated by coastal goldenbush and a variety of weedy forms. One association of marsh habitat is known to occur in AWCWP: coastal freshwater marsh.

Riparian Habitats. Riparian communities account for the third largest vegetation type within AWCWP. Riparian habitats are associated with stream channels, lakes, or ponds or are dependent upon the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage. In AWCWP, riparian habitats are associated with the perennial streams and floodplains of Aliso Creek and Wood Creek and range from herbaceous plants to multilayered tree species. Riparian communities are dominated by one or several species of anemophilous (wind-pollinated), winter-deciduous trees adapted to periodic or continuous soil saturation during all or part of the growing season. Riparian vegetation is found along the length of Aliso Creek and in the lower portions of Wood and Mathis Canyons. The majority of this habitat is composed of mulefat *(Baccharis salicifolia)*, willow, and giant reed. A good portion of Aliso Creek is inundated with large patches of giant reed *(Arundo donax),* a highly invasive nonnative plant. Giant reed forms impenetrable stands of highly flammable vegetation that crowds out native plant species and reduces habitat for wildlife. The California Invasive Plant Council (Cal-IPC) includes giant reed on its "Exotic Pest Plants of Greatest Ecological Concern in California" list (www.cal-ipc.org).

The overall riparian community in AWCWP contains as many as eight associations: riparian herb, southern willow scrub, mulefat scrub, southern sycamore riparian woodland, southern coast live oak riparian forest, southern arroyo willow forest, southern black willow forest, and bramble thicket.

Woodland Habitats. Woodland habitats comprise a considerable amount of the northwest portion of AWCWP. Coastal oak woodlands are extremely variable multi-layered vegetation communities dominated by trees with an open, mosaic canopy. Woodlands typically occur

on or near the base of north-facing slopes and in moist ravines. The overstory consists of deciduous and evergreen hardwoods that are dense and form a closed canopy. The understory is equally variable. In some instances, it is composed of shrubs from adjacent chaparral or CSS that form a dense, almost impenetrable understory, while in other instances, the understory vegetation is poorly developed and dominated by grasses and forbs. Oak woodland is a prominent feature in Wood Canyon, where it intermingles with maturing southern willow scrub and southern sycamore riparian forest. However, in upper Wood Canyon, oak woodland is mixed with scattered oak trees, chaparral, and sage scrub. AWCWP has been known to contain two woodland habitat associations: coast live oak woodland and Mexican elderberry woodland.

Rock and Cliff Habitats. Rock and cliff habitats occur regularly within AWCWP. Rocks and cliffs are more common in canyons with steep, clay, or sandy slopes and/or erosion-prone soil types. These elements provide a variety of microhabitats for a number of plant and animal species in the area, including rare plants such as Laguna Beach dudleya *(Dudleya stolonifera)*. These microhabitats include geographic features such as limestone outcrops, cliffs, crevices, and small caves. The rock and cliff community in AWCWP is represented by two associations: cliff faces and rock outcrops.

Disturbed Habitat. This community accounts for any type of disruption from past grazing and agriculture to current urban impacts such as roadsides, trails, or clearing for fuel management zones. These communities are dominated by introduced weedy species, especially forbs and grasses.

Exotic Plant Species. California has become the adopted home of over 1,000 plant species from other parts of the world. Most of these originated in the Mediterranean region, where the climate is similar to Southern California's. Most of California's exotic species are fast-growing annuals that prefer disturbed habitats and are prodigious seed producers (Barbour et al. 1993). Exotic or nonnative plant species often change the landscape and the natural relationships between native plant cover, soil, hydrology, and wildlife by outcompeting native plants. Not all nonnative species are invasive and harmful, but many (e.g., giant reed, nonnative grasses) can completely take over and change entire established ecosystems. The consequences of the invasion, including alteration of habitat and disruption of natural ecosystem processes, can be catastrophic for native species.

The most abundant dominant exotic species occurring within grassland areas of AWCWP are exotic annual grasses, black mustard *(Brassica nigra)*, poison hemlock *(Conium maculatum)*, artichoke thistle *(Cynara cardunculus)*, milk thistle *(Silybum marianum)*, Italian thistle *(Carduus pycnocephalus)*, and bristly ox-tongue *(Picris echioides)*. Within the drainages and other areas, giant reed, tree tobacco *(Nicotiana glauca)*, poison hemlock, and pampas grass are of concern (LSA 2003). Eucalyptus (*Eucalyptus* sp.) and other ornamental shrubs and groundcover are planted at the Coastal Treatment Plant, and the eucalyptus continues downstream to the 9-hole Aliso Creek Golf Club just outside of AWCWP. Many of the ornamental plants are not invasive in southern California. Clearly, nonnative grasses, thistles, and giant reed are the major obstacles to restoration in both distribution and density.

4.4.2 Sensitive Habitats and Special Status Plant Species

Sensitive Habitats. Habitats are considered to be sensitive biological resources based on (1) federal, State, or local laws (e.g., NCCP/HCP) regulating their development; (2) limited distributions; and/or (3) the habitat requirements of sensitive plants or animals occurring on site. There have been 19 identified primary plant communities considered sensitive by State and/or local agencies. In addition, both wetlands and waters of the United States are considered sensitive by federal and State agencies.

The sensitive habitats identified in the project boundary include all of the associations and subassociations of CSS and chaparral in the coastal subarea, coastal freshwater marsh, southern willow scrub, mulefat scrub, southern arroyo willow forest, southern black willow forest, oak woodlands, and cliff and rock outcrops. All of the sensitive habitats are described in detail in the Existing Conditions Report (Appendix C).

Special Status Plant Species. The NCCP/HCP identified federally listed (under the Endangered Species Act – ESA), State listed (under the California Endangered Species Act – CESA), and proposed endangered or threatened plant species that have been observed in AWCWP based on researched literature records. Listed plant species that were identified in the literature review as potentially occurring on site or in the study area are listed in the Existing Conditions Report (Appendix C) and shown on Figure 14: Sensitive Plant Species. The listing status, plant community, and habitat characteristics concerning these and other special interest plant species are provided in the Existing Conditions Report (Appendix C).

4.4.3 General Wildlife

AWCWP is known to have high species diversity and numbers of wildlife due to the quality native habitat associated with the undisturbed slopes and canyons, diverse habitat types (such as sage scrub, chaparral, and woodland habitats, including areas with water, such as riparian and pond habitat). In addition, the connectivity and continuity of habitat with adjacent native lands (i.e., LCWP, Laguna Niguel Regional Park, Laguna Laurel Ecological Reserve, Coastal Reserve, City of Laguna Beach Open Space, City of Irvine Open Space) (VST 1991; Almanza 1992; County 1998; County map 2002) promotes, protects, and enhances the survival of a variety of wildlife species.

Invertebrates. Native plant communities within AWCWP provide habitat and food for many invertebrate species. Common species that would be expected in lowlands and on hilltops include anise swallowtail, checkered and cabbage white, gray hairstreak, Acmon blue, Mormon metalmark, mourning cloak, painted and west coast ladies, red admiral, common buckeye, and funereal duskywing (Almanza 1992, LSA review). Riverside fairy shrimp, a federally listed endangered invertebrate and a NCCP/HCP Conditionally Covered Species, are known to occur within the Aliso Creek watershed (Nowak 1999). The Quino checkerspot butterfly *(Euphydryas editha quino)*, a federally listed endangered butterfly and a NCCP/HCP Conditionally Covered Species, has not been recently documented within AWCWP; this species is no longer likely to occur, but habitat does exist within AWCWP for this species.

Fish and Other Aquatic Species. Currently, waters within AWCWP are expected to have low fish diversity due to predatory aquatic and bird species, degradation of water quality and natural hydrologic conditions, and geomorphic changes to the creek channels. Fish species known to occur in the AWCWP in recent history include native species such as tidewater goby *(Eucyclogobius newberryi)* and steelhead *(Oncorhynchus mykiss)*, as well as nonnative species such as mosquito fish *(Gambusia affinis)*, largemouth bass *(Micropterus salmoides)*, minnow species, and common carp *(Cyprinus carpio)*(LSA observation 2006). Tidewater goby *(Eucyclogobius newberryi)*, a State and federally listed endangered fish, is known to occur at the mouth of Aliso Creek. Tidewater gobies have been observed in recent years, but are not currently expected, in Aliso Creek from the mouth to 1.5 miles upstream.

Amphibians and Reptiles. Many native amphibian and reptile species have been observed on or adjacent to AWCWP. Most of these species occur in more than one habitat type or are associated with the ecotones between habitats. Several species are considered rare according to the NCCP/HCP and are known or expected to occur within AWCWP; these species are the arboreal salamander *(Aneides lugubris)*, garden slender salamander *(Batrachoseps major)*, western spadefoot (toad) *(Spea hammondii)*, southwestern pond turtle *(Actinemys marmorata)*, San Diego horned lizard *(Phrynosoma coronatum blainvillei)*, orange-throated whiptail *(Aspidoscelis hyperythra beldingi)*, coastal western whiptail *(A. tigris multiscutatus)*, coastal rosy boa *(Charina trivirgata rosafusca)*, San Bernardino ringneck snake *(Diadophis punctatus modestus)*, two-striped garter snake *(Thamnophis hammondii)*, and red-diamond rattlesnake *(Crotalus ruber)*. Several non-native species occur in this area including the African clawed frog, American bullfrog, and red-eared slider.

Raptors and Other Birds. Raptors are the most conspicuous wildlife in AWCWP. Raptors observed within the biological study area include turkey vulture *(Cathartes aura)*, white-tailed kite *(Elanus leucurus)*, northern harrier *(Circus cyaneus)*, sharp-shinned hawk *(Accipiter striatus)*, Cooper's hawk *(A. cooperii)*, red-shouldered hawk *(Buteo lineatus)*, red-tailed hawk *(B. jamaicensis)*, American kestrel *(Falco sparverius)*, merlin *(F. columbiarius)*, barn owl *(Tyto alba)*, and great horned owl *(Bubo virginianus)*(Dore and Dougan 1989; VST 1991; Bloom; Hamilton). In terms of habitats, grassland, and other open habitats are most important to foraging raptors, as well as, CSS and chaparral, especially in the more open areas. Although few of them nest there, all of the known and expected species forage in grasslands and other open habitats. Within AWCWP, the white-tailed kite, northern harrier, and burrowing owl (rare occurrences) are not expected to be found regularly in any other habitat except grassland.

Many carnivorous bird species also inhabit the extensive oak woodland and stands of sycamores in both Aliso Canyon and Wood Canyon. The large woodland trees are essential sites for roosting and nesting raptors. The snags and cavities that characteristically develop in these trees are also used by a variety of cavity nesting species such as flickers and woodpeckers. The western screech-owl *(Megascops kennicottii)* as well as the sharp-shinned, Cooper's, and red-shouldered hawks primarily forage in the woodland habitats. The following breeding raptors have been confirmed nesting in Aliso and/or Wood Canyons: turkey vulture, Cooper's hawk, red-tailed hawk, northern harrier, and barn owl. White-tailed kites had unconfirmed nests in both canyons as well (VST 1991; Bloom).

Laguna Coast Wilderness Park

Aliso and Wood Canyons Wilderness Park

EL TORO RD
LAGUNA CANYON RD
GLENWOOD DR
LAGUNA HILLS DR
PACIFIC PARK DR
ALICIA PKWY
MOULTON PKWY
PASEO DE VALENCIA
LA PAZ RD
ALISO CREEK RD
WOOD CYN DR
CROWN VALLEY PKWY
HIGHLANDS AV
PACIFIC ISLAND DR
WOOD CANYON LN

Aliso Creek
Wood Creek
Sulphur Creek Reservoir

Coastal Treatment Plant
Aliso Creek Golfcourse

Pacific Ocean

0 2,300 4,600 6,900 9,200 Feet

LEGEND

- Aliso and Wood Canyons Wilderness Park
- Contour Interval 40ft
- Authorized Trail
- Utility Access
- Proposed Trail
- Unauthorized Trail

CENTRAL & COASTAL NCCP - HCP CLASSIFICATIONS

- Existing Use
- Non-Reserve Open Space
- Reserve
- Conservation Easement

SENSITIVE PLANT SPECIES

- Laguna Beach Dudleya
- Catalina Mariposa Lily
- Intermediate Mariposa Lily
- Many - Stemmed Dudleya
- Palmer's Grappling - Hook
- Small - Flowered Microseris
- Summer Holly / Big - Leaved Crown - Beard
- Bushrue
- San Diego Tarweed
- Ocean Spray
- Vernal Barley
- Western Dichondra
- Summer Holly
- Pomona Locoweed
- Turkish Rugging
- Thread - Leaved Brodiaea
- Small - Flowered Morning Glory
- Hummingbird Sage
- Nuttall's Scrub Oak
- Summer Holly / Big - Leaved Crown - Beard
- Turkish Rugging
- Neiblas Lichen Species
- Big - Leaved Crown - Beard
- Thread - Leaved Brodiaea

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- NOAA 3 meter DEM 2002
- Eagle Aerial Image 1 foot resolution, flown April 2004
- Draft Aliso and Wood Canyons Wilderness Park Resource Management Plan Dated July 1991
- California Natural Diversity Data Base, April 12, 1999
- Field Surveys conducted by Harmsworth and Associates between March and July, 1998
- Supervising Park Ranger Tom Maloney, February 10, 2006

DATE: June 3, 2006

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 14: Sensitive Plant Species

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Back of Figure 14

AWCWP is unique due to the local geography with two distinct canyons that provide quality habitat for many bird species. Upland native plant communities form a mosaic throughout AWCWP, which creates high bird diversity within limited areas. Throughout the year and during the spring and summer breeding seasons, common resident and migrant bird species in these grassland, scrub, chaparral, woodland, and forest areas include California quail *(Callipepla californica)*, mourning dove *(Zeniada macroura)*, greater roadrunner *(Geococcyx californianus)*, white-throated swift *(Aeronautes saxatilis)*, black-chinned *(Archilochus alexandri)* and Anna's *(Calypte anna)* hummingbirds, downy woodpecker *(Picoides pubescens)*, northern flicker *(Colaptes auratus)*, black phoebe *(Sayornis nigricans),* ash-throated flycatcher *(Myiarchus cinerascens),* Cassin's *(Tyrannus vociferans)* and western *(T. verticalis)* kingbirds, western scrub-jay *(Aphelocoma californica)*, American crow *(Corvus brachyrhynchos)*, common raven *(C. corax)*, northern rough-winged *(Stelgidopteryx serripennis)* and cliff *(Petrochelidon pyrrhonota)* swallows, bushtit *(Psaltriparus minimus)*, canyon wren *(Catherpes mexicanus)*, Bewick's wren *(Thryomanes bewickii),*, ruby-crowned kinglet *(Regulus calendula)*, wrentit *(Chamaea fasciata)*, northern mockingbird *(Mimus polyglottos),* phainopepla *(Phainopepla nitens)*, yellow-rumped warbler *(Dendroica coronata)*, California towhee *(Pipilo crissalis)*, western meadowlark *(Sturnella neglecta)*, and lesser goldfinch *(Carduelis psaltria)*. In addition, upland habitats provide important foraging and nesting habitat for special-interest species such as coastal cactus wren *(Campylorhynchos brunneicapillus)*, coastal California gnatcatcher *(Polioptila californica californica)*, California thrasher *(Toxostoma redivivum)*, grasshopper sparrow *(Ammodramus savannarum)*, and Southern California rufous-crowned sparrow *(Aimophila ruficeps canescens)*. All of these bird species are known from AWCWP (Dore and Dougan 1989; VST 1991; Almanza 1992; LSA 2003; Corps 2003; DeSante; Hamilton).

Many land birds are closely tied to the riparian vegetation and perennial nature of the water in Aliso and Wood Canyons. These drainages provide suitable habitat for a number of water-dependent and aquatic bird species. Throughout the year and during the spring and summer breeding seasons, common resident and migrant bird species in these marsh, shrub, creek, and ponded areas include mallard *(Anas platyrhynchos)*, great blue heron *(Ardea herodias)*, great egret *(A. alba)*, snowy egret *(Egretta thula)*, green heron *(Butorides striatus)*, black-crowned night heron *(Nycticorax nycticorax)*, American coot *(Fulica americana)*, belted kingfisher *(Ceryle alcyon)*, Anna's hummingbird, warbling vireo *(Vireo gilvus)*, marsh wren *(Cistothorus palustris)*, orange-crowned warbler *(Vermivora celata)*, common yellowthroat *(Geothlypis trichas)*, song sparrow *(Melospiza melodia)*, black-headed grosbeak *(Pheucticus melanocephalus)*, blue grosbeak *(Passerina caerulea)*, red-winged blackbird *(Agelaius phoeniceus)*,, hooded *(Icterus cucullatus)* and Bullock's *(I. bullockii)* orioles, and lesser goldfinches. In addition, riparian habitat provides foraging and important (potential) nesting habitat for special-interest species such as yellow warbler *(Dendroica petechia)*, yellow-breasted chat *(Icteria virens)*, and endangered least Bell's vireo *(Vireo bellii pusillus)*. All of these bird species are known from AWCWP (Dore and Dougan 1989; VST 1991; Almanza 1992; LSA 2003; County map; Harmsworth 2002; Corps 2003).

The brown-headed cowbird *(Molothrus ater)* is a parasitic bird species that takes advantage of many of the above-mentioned species of passerines (songbirds). This species is known from AWCWP (Dore and Dougan 1989) in limited numbers due to the lack of agricultural

fields and equestrian areas adjacent to the study area. Trapping efforts in the past at AWCWP have removed large numbers of this species.

Mammals. Mammal species diversity is relatively high within AWCWP. Coyote, grey fox, raccoon, striped skunk, bobcat, and mule deer can be detected in AWCWP (Crooks et al. 1999). Mountain lions *(Puma concolor)* have not been detected in the coastal subregion study area (*i.e.,* San Joaquin Hills North and South and Aliso and Wood Canyons), although they could occur, at least occasionally, in AWCWP.

The riparian and woodland communities as well as the bridge structures, palms, rock outcrops, and natural caves provide foraging and roosting opportunities for bats. Several species of bat are known or expected to use the area. Most of the bats that could potentially occur in the survey area are less active during the winter and most either hibernate or migrate, depending on the species.

Exotic Animal Species. Exotic organisms with the potential to do serious ecological harm observed within AWCWP include crayfish (Family Astacidae), African clawed frog *(Xenopus laevis)*, and American bullfrog *(Rana catesbeiana)*. In addition, several nonnative fish have been documented in Aliso Creek. The presence of nonnative species often reduces the potential for viable populations of native and sensitive species that could be present, due to competition for resources and because many exotic animal species directly prey upon native species or reduce breeding success (*e.g.*, American bullfrog, brown-headed cowbird).

4.4.4 Special Status Wildlife Species

Listed Species. Several California Endangered Species Act (CESA) and federal Endangered Species Act (ESA) listed animal species are known to occur in AWCWP: the State listed endangered willow flycatcher *(Empidonax traillii)*(during migration; breeding not confirmed for the federally endangered southwestern willow flycatcher *[E. t. extimus]*), least Bell's vireo, and the federally listed threatened coastal California gnatcatcher. The willow flycatcher occurs throughout most of California during its migrations between wintering and breeding grounds. The breeding subspecies in southwestern California (*E.t. extimus*) is federally listed as endangered and nests in numbers in riparian (e.g., willow riparian forest) vegetation at the Prado Basin in southern San Bernardino County. The endangered least Bell's vireo is a migratory bird that also nests in riparian vegetation communities along the creeks in AWCWP. The coastal California gnatcatcher is the species most closely associated with conservation efforts in Southern California's CSS community and was the focus of the local NCCP/HCP. California gnatcatchers are most often found in sagebrush-dominated habitat and occur throughout AWCWP in suitable habitat.

Nonlisted Species. A number of the nonlisted sensitive species[4] of AWCWP are found in a range of habitats. Amphibians and reptiles such as the western spadefoot, southwestern pond turtle, San Diego horned lizard, coastal western whiptail, San Bernardino ringneck

[4] The NCCP/HCP has a list of identified species that are notable for their rarity or as indicator species of the health of the vegetation community in which they occur. These species are managed for in the NCCP/HCP and are addressed as if they were listed as endangered species under the FESA and CESA. These species are described under nonlisted species in this report and associated appendices.

snake, and northern red-diamond rattlesnake are most common in chaparral and CSS but also range into grassland and woodland. Raptors and other birds known from AWCWP include the white-tailed kite, Cooper's hawk, coastal cactus wren, oak titmouse *(Baeolophus inoratus)*, loggerhead shrike *(Lanius ludovicianus)*(at least historically), and yellow-breasted chat. A number of sensitive bat species potentially occur in AWCWP; most are confined to woodlands, cliffs, or structures for roosting but range more widely when foraging. Larger, nonlisted sensitive mammals also occur within AWCWP, including the coyote *(Canis latrans)*, gray fox *(Urocyon cinereoargenteus),* and mule deer *(Odocoileus hemionus)*.

The Existing Conditions Report (Appendix C) identifies the sensitive animal species known or potentially occurring within AWCWP. Species provided in this table are listed alphabetically by scientific name, with their common names following. Additional specific information with references to focused monitoring and research studies for many of these species is provided in the Existing Conditions Report (Appendix C).

4.4.5 Wildlife Movement Corridors

Large areas of continuous habitat or narrower linkages between expanses of open space provide movement corridors for wildlife and dispersal corridors for plants. A wildlife corridor is typically a linear habitat feature that connects large patches of natural open space and/or provides avenues for frequent movement, dispersal, or migration of animals and any associated plant material. Corridors, particularly those of significant size, can be used for transit by both large (e.g., coyote, bobcat *[Felis rufus],*) and small (e.g., insects, birds) species. Corridors may be less regularly used by sedentary species that occur in localized habitat; however, many of these species still benefit when offspring use corridors for dispersal to other open space patches. Aliso and Wood Canyons are known to provide wildlife corridors and habitat for medium (e.g., Virginia opossum [*Didelphia viginiana;* a nonnative species], gray fox) and large-sized (e.g., coyote, bobcat) mammal species, including domestic animals (Crooks 1999).

The NCCP/HCP identifies several important linkage functions for the AWCWP that unify locally established open space and wilderness areas, including the Laguna Coast Wilderness Park (LCWP) and James Dilley Greenbelt Reserve to the northwest and north, respectively; Laguna Niguel Regional Park to the northeast; and Salt Creek Corridor Regional Park to the east (Figure 15: Wildlife Corridors). The northwestern portion of the AWCWP is contiguous with natural habitat in the LCWP lands while the southern part of AWCWP terminates near the southern end of the City of Laguna Beach near South Coast Highway (State Highway 1) and the Pacific Ocean.

Overall the largest wildlife corridor connects AWCWP to the open space areas to the north and west across El Toro Road and Laguna Canyon Road. While these relatively busy roads compromise the function of the corridors, the species that utilize these areas are generally quite mobile and the native habitat that is contiguous throughout these corridors provides significant benefit to wildlife movement. Movement to the north and east of the northeastern arm of AWCWP is more constrained by busy roadways and surrounding development, but in these areas highly mobile species, such as birds, coyotes, and bobcats, can utilize the drainage corridors that either lead to other open space areas or act as "stepping stones."

Several narrow wildlife corridors still exist immediately west and east of lower AWCWP, although they have been significantly reduced in width and continuity due to dense residential developments. The value of wildlife corridors has also been diminished due to habitat degradation associated with mis-management of fuel modification zones.

4.5 PALEONTOLOGICAL RESOURCES

Paleontological resources represent a significant feature of AWCWP. Six geological formations and four nonformational units are exposed within AWCWP (see Figure 7, Geology). All formations and nonformational units except for the Holocene alluvium/colluvium have produced fossils. Table C lists the paleontological sensitivity of each formation/unit (listed from oldest to youngest) (Eisentraut and Cooper 2002).

Table C: Paleontological Sensitivity of the Geologic Units within AWCWP

Geologic Unit	Sensitivity
Undifferentiated Sespe/Vaqueros	Very high
San Onofre Breccia	Low
Topanga Formation	Very high
Monterey Formation	Very high
Capistrano Formation	Very high
Niguel Formation	Moderate
Marine Terrace Deposits (Older Alluvium)	High
Landslide Deposits	Dependent on source of slide material
Recent Colluvium	None
Recent Alluvium	None

The rating system employed by Eisentraut and Cooper (2002) is as follows:

Very high: Scientifically very significant fossils and fossils from critical geological time periods; very important for scientific study. Within AWCWP four Formation are listed as having “very high” sensitivity. These are, from oldest to youngest, the Undifferentiated Sespe/Vaqueros, Topanga, Monterey, and Capistrano Formations. The Undifferentiated Sespe/Vaqueros represents both terrestrial and marine facies tracing the landscape evolution of southern California prior to the activation of the San Andreas Fault system. The Formation is time-transgressive, spanning from the Late Eocene to the Earliest Miocene. Fossils of important marine and terrestrial vertebrates are found within these sediments. The Topanga, Monterey and Capistrano Formations are all Miocene Marine deposits. Fossils of important invertebrates and vertebrates are common in these Formations and often are found as articulated individuals or bone beds of mixed species. The Niguel Formation, a Pliocene unit, is not well exposed within the County and has not produced extensive fossil assemblages. Rocks of this age are important in Orange County because they help illustrate the flora and fauna present during this period of time.

High: Quality preservation and scientifically significant fossils; important for research and/or very important for public display. There is one unit, Marine Terrace Deposits (Older Alluvium) that is classified as having a “high” paleontological significance. Marine Terrace

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 15: Wildlife Corridors

Laguna Coast Wilderness Park

Aliso and Wood Canyons Wilderness Park

A
A
A
B
C
D
D
D
D
E
F
G
G
G

Aliso Creek
Wood Creek
Sulphur Creek Reservoir
Coastal Treatment Plant
Aliso Creek Golfcourse
Pacific Ocean

LAGUNA CANYON RD
EL TORO RD
73
GLENWOOD DR
MOULTON PKWY
PASEO DE VALENCIA
ALICIA PKWY
LAGUNA HILLS DR
ALISO CREEK RD
PACIFIC PARK DR
WOOD CANYON LN
LA PAZ RD
WOOD CYN DR
CROWN VALLEY PKWY
HIGHLANDS AV
PACIFIC ISLAND DR
MARINA HILLS DR
CLUB HOUSE DR
CAM DEL AVION
BROADWAY

N

0 1,000 2,000 3,000 4,000 5,000 Feet

LEGEND

- Aliso and Wood Canyons Wilderness Park
- Contour Interval 40ft
- Authorized Trail
- Utility Access
- Proposed Trail
- Unauthorized Trail
- Corridor Linkage

CENTRAL & COASTAL NCCP - HCP CLASSIFICATIONS

- Existing Use
- Non-Reserve Open Space
- Reserve
- A-G Capital Letter Designations as Discussed in Existing Conditions Report

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
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DATA SOURCE:
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- Eagle Aerial Image 1 foot resolution, flown 04/2004
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- California Natural Diversity Data Base, April 12, 1999
- Field Surveys conducted by Harmsworth and Associates between March and July, 1998

The degree of accuracy of these data sets may differ. In addition, the source of the data, as well as its intended use may also influence the precision. Therefore, Geomatics/LIS/GIS disclaims any responsibility for the accuracy of the data

DATE: June 3, 2008

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Back of Figure 15

Deposits are Pleistocene to earliest Holocene in age. Both marine and terrestrial invertebrates, vertebrates and plants are abundant in these sediments. These sediments also have the potential to produce evidence of early human habitation in the County (if such evidence exists).

Moderate: Abundant fossils of good quality; important for education and public display. The Niguel Formation, a Pliocene unit, is not well exposed within the County and has not produced extensive fossil assemblages. Rocks of this age are important in Orange County because they help illustrate the flora and fauna present during this period of time.

Low: Poorly preserved fossils; only useful for educational purposes.

None: Contains no fossils; either too young or nondepositional rock units. Although landslide deposits are generally too young to contain fossils, the underlying bedrock unit from which the landslide deposit originated often does contain fossils, and often landslide deposits are shallow and the underling bedrock will have fossils. Therefore, the sensitivity of landslide deposits is dependent on the underlying strata.

AWCWP contains one of the world's best paleontological resources spanning approximately 37 million years of the history of the earth. With the exception of rock units considered too young to contain fossils, all geological units within AWCWP have the potential to yield important, significant fossils. These nonrenewable resources provide evidence of past environments, climate, and lifeways as well as providing a window into the development of species.

4.6 CULTURAL RESOURCES

4.6.1 Ethnography

AWCWP spans the border of Gabrielino, and Juaneño territories as described by Kroeber (1925). The Juaneño are considered to be a linguistically related subgroup of the Luiseño and occupy the area near San Juan Capistrano. Juaneño words were used to name several of the parks trails.

The name "Gabrielino" describes those native groups living in what is now the Los Angeles and Orange County areas and was given due to the affiliation of these groups with Mission San Gabriel Arcángel. Gabrielino villages generally contained populations of 50–100 inhabitants, although larger communities may have existed. The name Luiseño has been applied to those native people living within the "ecclesiastical jurisdiction of Mission San Luis Rey" (Oxendine 1983:8). The term Juaneño describes those native people who were missionized into Mission San Juan Capistrano and who inhabited the northernmost portion of Camp Pendleton. Luiseño and Juaneño villages are thought to have numbered approximately 200 individuals, while as many as 250 individuals may have inhabited some large Luiseño villages (White 1963:104, 117–119).

The Gabrielino, Luiseño, and Juaneño were hunters and gatherers who used both inland and coastal food resources. They hunted and collected seasonally available food resources

and led a semisedentary lifestyle, often living in permanent communities along watercourses and near coastal estuaries. The presence of water, a stable food supply, and some measure of protection from flooding were the most important factors relating to the location of habitation sites. Gabrielino and Luiseño communities located in the interior regions maintained permanent geographical territories or use areas that averaged 30 square miles, although it is likely that coastal settlements occupied less acreage, where food resources may have been more plentiful and more easily available throughout the entire year (White 1963:117, 119; Oxendine 1983:44).

In addition to permanent settlements, native groups occupied temporary campsites used seasonally for hunting, fishing, and gathering plant foods and shellfish (White 1963:120–124; McCawley 1996:25). Rabbit and deer were the most commonly hunted animals, while acorns, buckwheat, chía, berries, and fruits were some of the more commonly collected plant foods. Acorns were the staple food of most indigenous Californians (Kroeber 1925:84) and were the most characteristic feature of the domestic economy of native California (Gifford 1936:87). The economy of coastal groups is thought to have focused on marine rather than land resources (White 1963:119).

4.6.2 Prehistory

Researchers have divided regional prehistory into a four-stage chronology describing changing artifact assemblages and evolving ecological adaptations. The principal chronology proposed by Wallace (1955) divides the area prehistory by major cultural changes within general prehistoric time periods. Wallace defined four cultural horizons, or periods, for Southern California. These include the Early Period, the Millingstone Period, the Intermediate Period, and the Late Prehistoric Period, which are discussed briefly below.

Early Period. The Early Period covers a period between approximately 10,000 and approximately 5,500 BC. Artifacts and cultural activities from this time period represent a predominantly hunting culture (Wallace 1955), including atlatl, dart, and an array of specialized cobble, core, flake and blade implements. Early Period artifacts have seldom been identified in Orange County.

Millingstone Period. The Early Period is followed in time by the Millingstone Period. Sites from the Millingstone Period (post-5500 BC) typically contain groundstone artifacts such as manos, metates, and cogged stones, as well as soapstone objects. Several Millingstone Period sites have been identified in Orange County. The best known is ORA-64, which dates to ca. 6000 BC (Erlandson 1994:219-221). Drover et al. (1983) suggest that early Millingstone Period sites represent refuse from mobile hunters and gatherers who utilized coastal resources during the winter and inland resources throughout the remainder of the year. By the late portion of the Millingstone Period, faunal remains suggest relatively permanent settlements in the Newport Bay area.

Intermediate Period. By 3000 BC, coastal populations began greater reliance on marine resources. In coastal areas, there was an increased use of the mortar and pestle, which marked a technological change in the manner in which seeds were processed and indicated a diversification in seed collection. The use of the mortar and pestle marks Wallace's

Intermediate Period. Additional artifacts found predominantly within the Intermediate Period include discoidals and crescentics (crescentically shaped flaked stone artifacts). Orange County researchers have had difficulty identifying the Intermediate Period, since tool categories, even the mortar and pestle, occur in both earlier and later periods. As a result, few Orange County sites have been placed in this Period.

Late Prehistoric Period. The Late Prehistoric Period begins approximately AD 500 (Bean and Smith 1978). During this period, artifact changes and new cultural practices occur. Smaller projectile points, representing bow and arrow hunting, appear on Late Period sites. This period is also marked by steatite effigies and by cremation as an interment practice. By AD 1000, smoking pipes and ceramic pottery occur, although ceramic smoking pipes may occur somewhat earlier, within the later portion of the Intermediate Period. Sites within the Orange County region occasionally contain the vitreous lithic (glassy stone) called Grimes Canyon fused shale, which originates from Ventura County (Demcak 1981; Hall 1988).

McKinney and Knight (1979:17-24) discuss a rock art area within El Toro Canyon. The site (CA-ORA-13) was first reported by Romero in 1935, and was designated as CA-ORA-13 in 1941. According to Meadows (1966) there was also an adobe in this area that was occupied in 1861 by Hyman Tischler. The site was relocated in 2007 and has been heavily impacted by erosion, fires, and human contact.

4.6.3 History

The lands within the park boundaries were historically part of the Rancho Niguel, granted to Juan Avila in 1842. Rancho Niguel spanned an area totaling 13,361 acres, covering an area three miles east of San Juan Capistrano and north to El Camino Real and west toward Rancho San Joaquin, encompassing most of Laguna Niguel, Aliso Viejo, and Laguna Beach and portions of Laguna Hills. Although Avila continued to reside in San Juan Capistrano, he built an adobe house near Aliso Creek and El Camino Real that served as an administration building and a place to host many parties. Avila was well known and liked throughout the region; his hospitality earned him the nickname “El Rico” the rich one (Decker and Decker 2004).

The early settlers used these large land grants for herding cattle as grazing land was abundant. The trade of hides and tallow began in the early 1800s and by the 1840s livestock ranching was the primary economic resource of California (Cleland 1975). The cattle boom continued throughout the 1840s and 1850s, largely due to the tremendous immigration that accompanied the Gold Rush. However, this demand began to decline as early as 1855, due largely to the importation of sheep from New Mexico and cattle from the Mississippi and Missouri Valleys and the development of stock breeding farms (Cleland 1941: 108). A series of disastrous floods and severe droughts sealed the fate of the early cattle ranchers.

As cattle ranching declined, sheep raising grew in importance. The industry reached its greatest prosperity during the Civil War, when the disruption of the national cotton trade created a huge demand for wool (Cleland 1941: 139-141). Southern California’s economic transition continued through the 1870s. During this time, many of the large landholdings

were subdivided and a diversified agriculture centered on citrus fruits, grapes, and grains appeared.

In 1884 Lewis Fenno Moulton leased Rancho Niguel for the purpose of sheep and cattle raising. In 1895, after leasing the land for 11 years, Moulton eventually purchased the entire Rancho Niguel and entered into partnership with Jean Pierre Daguerre. Collectively, their business was known as the "Lewis F. Moulton (Moulton) and Company Ranch" (Decker and Decker 2005). Under the direction of Moulton and Daguerre, the ranch developed a diversified economy based on cattle ranching, agriculture (including dry farming) and tenant farming. Following the deaths of Daguerre (1911) and Moulton (1938), maintenance of the ranch passed on to their wives and children, who continued to successfully raise cattle and farm the land until the 1950s (Decker and Decker 2005).

Following World War II, pressure for urbanization came from the rapid Orange County housing expansion that was occurring in nearby cities. The Moulton-Daguerre partnership was dissolved in 1951. The Moulton family received the northern portion of the ranch, comprised of what eventually developed into Aliso Viejo, Laguna Woods, and Laguna Hills. The Daguerre family received the southern ranch lands, comprised of most of the original Rancho Niguel, in what developed into the community of Laguna Niguel (Decker and Decker 2005). The close proximity of the El Toro Marine Corps Air Base (ETMCAB) (now closed) resulted in two aircraft crashlanding within the park's boundaries.

4.6.4 Cultural Resource Sensitivity

The records search of the South Central Coastal Information Center (SCCIC) records for documented historic and prehistoric resources within AWCWP identified 51 resources. These can be grouped into four broad categories as shown in Table D below.

Table D: Documented Historic and Prehistoric Resources within AWCWP

Category	# of Sites
Habitation Site (includes rockshelters and midden sites)	33
Native American Heritage Value Site (includes rock art, rock alignments and burials)	4
Lithic/Artifact Scatters	6
Historic Sites (includes structures associated with ranching the lands, now AWCWP)	8
TOTAL SITES	**51**

In addition, based on the geology and geomorphology of the area, it is likely that undiscovered archaeological sites may exist within portions of the AWCWP. Sites may be buried beneath alluvial sediments within the stream drainages or beneath colluvium below hill and ridge landforms. It is also possible that some sites have been destroyed or adversely impacted over the years through the process of erosion in many of the river valleys. Due to the steep terrain of portions of the park, some areas of AWCWP may not have been adequately surveyed. However, it is likely that landforms exhibiting steep slopes would not have been favorable for occupation by Native Americans.

The entire area of AWCWP was previously surveyed during planning of the Aliso Viejo residential and commercial development. In addition, focused surveys of specific areas planned for trails or other improvements, and surveys of adjacent land have occurred. However, these surveys were conducted more than 20 years ago. Continuing use and erosion within AWCWP has likely exposed new resources, and some known resources may no longer exist. The entire park area should be resurveyed on a systematic basis to document sites within the park and to develop site specific management plans for those resources.

AWCWP preserves a relatively complete cross section of the human history of settlement and use of the San Joaquin Hills. Sites within the Park are considered highly significant and have contributed greatly to research into the prehistory of Orange County. Some of the sites within the park are unique in that they are relatively undisturbed and deeply buried. Additional background information on the cultural resources within AWCWP is located in the Existing Conditions Report (Appendix C) and Section 9.0 of the RMP.

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5.0 Issues, Threats and Potential Impacts

5.0 ISSUES, THREATS AND POTENTIAL IMPACTS

Identifying key issues, or established threats and potential impacts clarifies the needed focus for the RMP. Key management challenges for AWCWP stem from the proximity to residential development and increased park use. Other issues, such as invasive plant infestations, stem from historical land uses and are exacerbated by current environmental conditions. Based on the information collected at public meetings and from preparing the Existing Conditions Report (Appendix C), the project team identified key park-wide issues.

5.1 ISSUES

Biological Resources

- Need habitat restoration especially in areas with high resource value
- Failure of past passive resource management: loss of CSS habitat and rare plants due to goat grazing, weed invasions, unauthorized trail use, improper fuel management practices, and over-use of the park
- Lack quality of fish habitat in park creeks
- Heavy infestation of a variety of invasive exotic weed species (i.e., giant reed, thistles, palms, castor bean)
- Spread of invasive exotic weeds from adjacent development
- Presence of nuisance wildlife species (i.e., African clawed frog, bullfrog, cowbird) that are pervasive throughout Southern California
- Lack of wildlife corridor connectivity between adjacent open space lands
- Need additional monitoring/surveys for some sensitive species
- Lack management of existing wildlife corridors
- Potential impacts on aquatic species from infrastructure and creek stabilization projects
- Loss of CSS habitat
- Loss of rare plants
- Impacts on biological resources from over-use of park

Water Quality

- Increased runoff and nuisance flows from surrounding urban development impacts water quality and causes erosion
- Improper management of adjacent fuel modification areas impacts water quality

Fire Management

- Biomass buildup increases fire hazards
- Poor management of adjacent fuel modification areas impacts park resources (*e.g.*, erosion, exotic species, visual impact) and affects operations and maintenance
- Damaged and disturbed park land (*e.g.*, loss of habitat, fencing scars, weed invasions, lack of management and monitoring)

Cultural and Paleontological Resources

- Potential effects on cultural resources by park development such as construction of trails and interpretive facilities
- Potential effects on cultural resources by park maintenance such as restoration activities, and weed removal
- Potential impact on cultural resources from existing utilities, infrastructure maintenance, improvements, realignment, SOCWA access road, and SOCWA and MNWD pipelines
- Potential impact from creek erosion and creek stabilization projects
- Potential effects on cultural resources by park visitors such as unauthorized collection and removal of artifacts or fossils, vandalism, and creation of illegal trails.
- Potential effects on cultural resources by fire management practices such as development and maintenance of fire breaks and damage or destruction of burnable cultural materials during controlled burning
- Need to implement recommended system for cultural resources records management as adopted by the County
- Need to identify Traditional Cultural Areas (burial sites) within the park, including ceremonial and/or procurement sites
- Need to systematically and routinely inventory and document cultural resources
- Need to integrate park management of cultural and paleontological resources with other agencies such as Orange County Natural History Association, Orange County Archaeological/Paleontological Curation Program, and Pacific Coast Archaeological Society
- Need to ensure formal procedure for care of collections within the park or given to the park is implemented
- Need to control access to paleontological resources

Interpretation/Education

- Enhance education program to promote understanding of appropriate park uses (*e.g.* stay on trails) and park resources (sensitive species, urban edge effects)
- Upgrade/renovate interpretive center to provide a more dynamic learning experience and to improve the appearance of the park's main entry
- Create an information/education hub at creek confluence or at Soka University
- Lack signage, particularly directional and safety information

- Signage clutter – too much signage
- Need park interpretive plan that staff can use to guide interpretion, education, and outreach activities
- Need "Good Neighbor" program to educate residents about living along the wildland interface (i.e., invasive plants, low fire hazard natives, use of herbicides near natural areas)

Visual Resources

- Visual intrusion of urban development along the ridges of both Aliso and Wood Canyons
- Lack of screening of urban development and utility infrastructure (i.e., water tanks, power lines, structures)
- Interruption of scenic landscape by utility lines, illegal trails, and structures
- Landscape scars from goat fencing and grazing
- Denuded slopes resulting from inappropriate fuel medication activities and failure to follow approved landscape plans
- Exposed and collapsing pipe adjacent to creek
- Sea of giant reed along Aliso Creek

Public Use and Access

- Impacts of public use on park resources
- Need access to the coast
- Need better access in lower Aliso Canyon; no trail on the east side of Aliso Creek
- Conflicts between trail users
- Encroachment of adjacent property owners into park
- Underutilized hiking trails
- Creation and ongoing use of unauthorized trails destroys and fragments habitat and causes erosion
- Need education program to improve trail safety and reduce conflicts between users
- Moderate interest to expand existing trail system
- Safety concerns related to steep trails and the frequency of accidents
- Informal end-of-street access points makes enforcement of regulations difficult and facilitates creation of unauthorized trails
- Lack of parking/access, *e.g.,* from Soka University
- Need connection between AWCWP and Laguna Coast Wilderness Park across Laguna Canyon Road
- Need consistent and creative design for park entries and signs to inform and engage the public

- Traffic congestion caused by on-street parking as a result of people trying to avoid park fees
- Improve design at park entries and along trail routes to decrease clutter of signs
- Need trail connection to regional trail from better access to park and trail connectivity to outlying destinations

Operations, Maintenance and Management

- Coordination of management efforts between jurisdictions. Need to build relationships with cities, HOAs, OCFA.
- Need to integrate park resource management practices with NROC programs
- Difficult to close trails and ensure compliance with trail closures
- Need for consistency in enforcement of dog regulations
- Need boundary fences at problem areas.
- Problem with illegal homeless camping (*e.g.*, heavy littering, bike theft, habitat destruction, safety, water quality)
- Enforcement of park hours/potential effects of 24-hour use
- Problems with litter and illegal dumping
- Limited staff resources available to enforce park regulations and manage park resources

5.2 THREATS AND POTENTIAL IMPACTS

Table E identifies the most significant threats for AWCWP and lists the potential impacts that are likely to result from these threats. Habitat fragmentation, invasive plant species, existing fuels and fire hazard conditions, the urban edge effect, public use, and erosion constitute the main threats. The RMP is designed to address these issues and threats and to minimize impacts while supporting the intent of a County wilderness park. Management guidelines and strategies that address these issues are provided in the sections that follow.

5.2.1 Public Use

Human use has the potential to cause extensive degradation of the natural and cultural resource values of open space areas. Overuse and inappropriate uses of the extensive trail network can have negative environmental effects by altering natural drainage patterns, eroding and depositing of soil, introducing exotic vegetation, and increasing human-wildlife conflicts. Degraded trails also diminish the quality of the visitor experience by creating difficult or unsafe trail conditions, promoting trail use conflicts, and impacting the scenic quality of the landscape.

Table E: Analysis of Threats and Potential Impacts for the AWCWP

THREATS	POTENTIAL IMPACTS
5.2.1 PUBLIC USE	
The existing trail network is heavily used by hikers, runners, and mountain cyclists. Off-trail use has facilitated the development of unauthorized trails and shortcuts.	• Overuse and inappropriate uses of trails causes erosion, alters natural drainage patterns, introduces exotic vegetation, degrades native vegetation, and increases human-wildlife conflicts. • Degraded trails create difficult or unsafe trail conditions for visitors. • Conflicts/safety problems between the highly active (cyclist) trail users and the passive (bird watching, painting, photography)
5.2.2 URBAN EDGE EFFECT	
AWCWP is surrounded by urban area along most of its boundaries. Because of its size and "Y-shaped" configuration, the park has a lengthy perimeter (approximately 42 miles) that borders several different communities.	• Exotic plant and animal species are introduced and degrade the natural environment. • Prevents native wildlife from using habitat along the periphery of the park or puts them at risk for predation by feral or domesticated animals when they do move out into this region. • Contributes to an increase in frequency and severity of wildfires. • Visual intrusion degrades scenic quality of the park. • Unauthorized access from adjacent development contributes to habitat fragmentation. • Ambient lighting, including night lighting from Soka University and sports field, and noise can disturb wildlife and ecosystem functioning. • Inappropriate management of fuel modification zones contribute to soil erosion, poor water quality, degradation of habitat, and landscape blight. • Lack of permanent markers to delineate fuel modification boundaries facilitates infringement (*i.e.,* goat grazing) on park property. • Variety of landscape plans creates

THREATS	POTENTIAL IMPACTS
	confusion and difficulties for enforcement and management.
5.2.3 INVASIVE PLANT AND ANIMAL SPECIES	
Invasive plant and animal species are outcompeting native species in areas of the AWCWP. Invasive species are spreading into the AWCWP from adjacent development.	• Invasive species degrade existing native habitat and reduce biodiversity. • Invasive species compete with native plants for resources and habitat, and prevent seedling establishment. • Invasive species may displace native wildlife.
5.2.4 WATER QUALITY	
Land use practices and natural processes throughout the watershed adversely affect water quality within the park. Many of these practices occur outside the purview of park managers. Some threats to water quality within the park boundaries can be controlled by park managers (*e.g.,* invasive vegetation).	• Increased runoff causes flooding and erosion damage to habitat, open space, large wastewater lines, and other infrastructure. • Water quality that does not meet public health regulatory requirements. • Degradation of aquatic and terrestrial habitat. • Loss of recreational opportunities.
5.2.5 HABITAT FRAGMENTATION	
Biocorridors become increasingly important for plants and wildlife as human development encroaches upon natural areas, yet even the biocorridors within the AWCWP are threatened by human development.	• Movement of wildlife and genetic material is hindered, resulting in the loss of species in the isolated patches. • Habitat fragmentation contributes to the "urban edge effect."
5.2.6 EXISTING FUELS AND FIRE HAZARD CONDITIONS	
Excess fuel loads within AWCWP (*e.g.* near homes) increase the risk of wildfire.	• Eroded hillsides become invaded by nonnative vegetation and native vegetation is diminished. • Neighboring homes and businesses are at risk when wildfires become unmanageable. • AWCWP is at risk from fires at the urban interface
5.2.7 EROSION	
Steep slopes, historic land use practices, and the construction of unauthorized trails have resulted in erosion. Areas without vegetation on steep slopes are the most	• Increases sedimentation in streams and watercourses. • Degrades water quality (increased turbidity).

THREATS	POTENTIAL IMPACTS
susceptible to erosion.	• Lose habitat value in riparian and wetland ecosystems from siltation and type conversion. • Creates hazardous trail conditions from rills and gullies for hikers, bikers, and equestrians. • Reduces soil productivity and water-holding capacity. • Alters natural drainage patterns. • Increases velocity and amount of stormwater runoff. • Barren areas reduce scenic value.

A long history of use, prior to the establishment of AWCWP, has facilitated the development of visitor-created unauthorized trails and shortcuts. Steep trails without adequate ground cover are heavily eroded with cutting and compaction along their edges. In some areas, trails act as drainage ditches carrying water during storm events. In addition, off-trail use tramples native vegetation, degrades habitat, disturbs wildlife, and promotes invasive exotic species.

5.2.2 Urban Edge Effect

Urban areas in proximity to the park may cause negative effects. Some of these effects are urban runoff, light pollution, exotic pests, feral pets, exotic plants, diseases, fire, and pollution. Some are more easily controlled than others. These effects can deter animals from using the habitat along the edge of the park, which in turn reduces the overall usable acreage of the park. Conflicts may occur along the urban edge from animals in AWCWP moving into the urban area to roam and forage.

AWCWP has urban area along most of its boundaries. One of the obvious effects of the urban edge is the fuel modification required along these areas. Most of the fuel modification zones associated with adjacent development lie outside the park boundaries; there are only a few areas for fuel modification within AWCWP. Mismanagement of these fuel modification zones has the potential to adversely affect AWCWP. Over zealous vegetation removal and failure to revegetate with fire-resistant, native plant species contribute to soil erosion, poor water quality and degradation of native habitat. Inappropriate/unauthorized chemical control further degrades water quality and riparian ecosystems. In addition, the large number of fuel modification/landscape plans governing the fuel modification zones and inconsistency in management approaches between the different Homeowners Associations (HOAs) make it difficult for park managers to ensure appropriate management.

Ornamental plants planted in the urban areas may move into AWCWP and if not monitored can become established. Domestic/feral pets enter AWCWP to roam and forage for food. These animals may compete with native animals for food or prey upon the native animals themselves, and may also introduce disease to native populations. The best way to reduce these and other urban edge effects is to educate the public who live adjacent to AWCWP and to explain the ways they can reduce impacts to AWCWP and why they should be concerned. Park staff should work with HOAs, cities, Orange County Fire Authority (OCFA) and others to enforce compliance of approved fuel modification landscape plans and promote revegetation of denuded areas with low fire hazard native plants.

5.2.3 Invasive Plant Species

Invasive plants are a threat to open space because they colonize disturbed areas and degrade existing native habitat. The invasive plants are more aggressive than most native plants, will out compete the natives, and prevent certain native species from germinating. The nonnative invasive plants take hold, and since they are colonizers, they are very difficult to get rid of once they have become established. It is much easier to fight invasive weeds in the early stages.

Historic land uses, from cattle and sheep grazing and cultivation to recreation use, has allowed nonnative invasive plants to take hold within the park. In some of these areas the weeds have caused significant damage and are not allowing the disturbed areas to recover and fill in with native vegetation. The management of the invasive plants will be an important component of the continued health and vitality of the habitat at AWCWP.

5.2.4 Water Quality

The proximity of AWCWP to urban development renders it susceptible to water quality problems including urban runoff, non-point source pollution, increased sedimentation, and streambank erosion. The entire Aliso Creek watershed suffers from a number of problems related to water resources. These problems are a result of natural processes as well as human actions and land uses that exacerbate natural conditions such as variation in rainfall, changes in sediment and other occurrences. Problems within the watershed fall into four general categories: creek instability, water quality, loss of fish and wildlife habitat, and flooding damage. Creek instability results in channel degradation, erosion damage, loss of habitat, expansion of invasive species and devalued recreation experience.

Many of these problems are a result of processes and practices occurring beyond park boundaries and outside of the purview of park managers. Participation in public outreach and watershed-wide management efforts will be the most effective method for addressing water quality problems within AWCWP.

5.2.5 Habitat Fragmentation

Habitat fragmentation may occur on either a local or regional level. Local fragmentation of habitat can be caused by activities within the area that damage the functionality of the

habitat. Examples of these are trails, roads, invasion by exotic weeds, goat fencing, habitat removal from goat grazing, and development. Regional fragmentation is when large tracts of open space are isolated from other large stretches of land. If corridors are not kept between these lands, then they become isolated and the movement of wildlife and genetic material (seed, spores, and pollen) of plants will be diminished. This in time will reduce the viability and health of the smaller patches of isolated habitat.

Trails that cut across AWCWP, as well as scars from installation of goat fencing, and invasive weeds are decreasing the quality and functionality of the habitat. Other areas of the habitat are doing well but they are fragmented and isolated. Keeping certain areas closed to public use and restoring habitat on the unauthorized trails can preserve areas of intact habitat.

5.2.6 Existing Fuels and Fire Hazard Conditions

The Mediterranean climate of Southern California—characterized by wet, mild winters and dry, hot summers—is conducive to producing an abundance of fire fuel because of the long growing season. Fire suppression, heavy rains, and seasonal or prolonged drought all result in excessive fuel accumulation. When excess fuel loads are not managed properly and fire is suppressed in plant communities (e.g., chaparral) that have fire-based regeneration requirements, wildfires pose a threat to the surrounding homes and communities and the native vegetation itself. Major wildfires adversely impact native habitat because of the increased chance of erosion and subsequent invasion of exotic plant species (Kent 2005).

The southern California fire season typically starts in the fall when the Santa Ana winds bring hot and dry air from the east (Kent 2005). Within AWCWP, the risk of fire is significant in areas where fire has been suppressed, allowing a dense understory to accumulate in areas where vegetation might normally be thin. Hillsides with southern exposure, steep slopes that allow fires to spread rapidly, and unmanaged growth along the residential areas at the periphery of AWCWP are especially fire prone.

In response to the potential threat of fire along the urban edge, the City of Laguna Beach has been conducting fuel management by goat grazing for the past 18 years. In grazed areas fuel is reduced so that fires burning into it can be more readily extinguished. Five of the fuel modification zones (1, 2, 5, 6, and 7) are adjacent to AWCWP.

5.2.7 Erosion

Erosion, the process by which soil particles are displaced and transported by wind or water, occurs naturally from weather or runoff. Human land use practices such as unrestricted construction, agriculture, removal of vegetation or mulch, paving or heavy repeated trampling can cause accelerated erosion beyond natural levels. Erosion reduces soil quality and water-holding capacity by removing the nutrient-rich upper layers of the soil. Erosion can increase sedimentation in wetlands, streams (including riparian habitats) and watercourses, degrade water quality, increase flood hazards and reduce water storage capacity. The extent of erosion depends on a combination of factors including the amount

and intensity of rainfall, soil type, slope length and steepness, and ground cover (vegetation, litter/mulch, rocks). Soil erodibility is a function of texture, organic matter content, structure and permeability. In general, areas with erosive soils on long steep slopes with little or no vegetative cover will be most susceptible to erosion.

The creation of unauthorized trails, particularly downhill, mountain biking trails in steep hillside areas exacerbate conditions that are conducive to erosion because they compact soils, remove ground cover and concentrate runoff flows.

6.0 Goals and Strategies

6.0 GOALS AND STRATEGIES

6.1 DEFINITION

Aliso and Wood Canyons Wilderness Park (AWCWP) is a regional wilderness park. As defined by the Orange County General Plan Recreation Element, a regional wilderness park is:

> A regional park in which the land retains its primeval character with minimal improvements and which is managed and protected to preserve natural processes. The park (1) generally appears to have been affected primarily by forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) is of sufficient size to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic or historical value. In essence, park uses envisioned will result in minimal impact to existing park resources and are compatible with a wilderness experience.
>
> - Orange County General Plan Recreation Element

Proposed management of the AWCWP will remain consistent with the County's definition of a wilderness park. As such, the County will protect and preserve the native habitat in the park for the benefit of its natural resources. In addition, the County will continue to provide opportunities for outdoor education and low-impact recreation consistent with resource protection goals.

The park is located within the Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) central and coastal subregion reserve known as the Nature Reserve of Orange County (NROC); therefore, subject to provisions of the NCCP/HCP Implementation Agreement. Proposed management strategies within the RMP will comply with the requirements of the NCCP/HCP. Per the requirements of the NCCP/HCP Implementation Agreement, the RMP has been reviewed by CDFG, USWS and the NROC.

6.2 PARKWIDE GOALS AND STRATEGIES

In response to the Issues, listed in Section 5.1, the following goals and strategies outline a management framework to protect the resources of AWCWP. Goals and guidelines are necessary to perpetuate the park's important resource values and to respond to threats to those values. This section states resource management intentions and provides general guidance that support the natural, cultural, scenic, and recreation resources. Subsequent sections (e.g., Biological Resources Management) detail objectives and management programs to support these strategies.

The goals and strategies are divided into Biological Resources, Cultural Resources, Interpretation and Education, Public Use and Access, and Stewardship. A goal is a statement of intended outcome for management activities. A strategy is a management action for achieving the goals. All goals and strategies are offered for consideration based on the availability of County resources such as personnel and funding to achieve them.

PUBLIC USE AND ACCESS (USE)

Goals

- **Achieve compatibility between protection of the site's natural and cultural resources and human use demands.**
- **Allow for passive recreational uses that contribute to enjoyment of the natural resources and promote healthy lifestyles (recognizing that park uses must have minimal impact on park resources and be compatible with a wilderness experience).**

Strategies

USE-1: Provide public use facilities and associated services within the park as needed to facilitate public enjoyment of the natural setting.

USE-2: Provide a trail system that provides a broad public benefit by accommodating diverse trail uses and abilities.

USE-3: Provide a comprehensive trail system that promotes linkages within the park to the Pacific Ocean and to adjacent communities and to other regional trails and destinations outside the park.

USE-4: Provide a trail system that balances recreation demand with the primary purpose to protect the natural and cultural resources within the park.

USE-5: Provide sufficient access to the park trail system to adequately serve the public and to discourage the creation of unauthorized and individual access points by adjacent neighbors.

USE-6: Accommodate trail amenities that maintain the natural character of the land, enhance resource protection and contribute to the enjoyment of open space.

USE-7: Provide a trail system that promotes and enhances public enjoyment and appreciation of the natural, cultural, and scenic resources.

USE-8: Identify appropriate passive uses of the park and prohibit inappropriate recreational uses.

BIOLOGICAL RESOURCES (BIO)

Goals

- **Protect, restore preserve and enhance the natural resources of the park.**
- **Maintain a park that is compatible with the entire San Joaquin Hills ecosystem and the Aliso Creek watershed.**

Strategies

BIO-1: Protect and maintain populations of native plant and wildlife with an emphasis on managing NCCP/HCP covered species.

BIO-2: Improve biological productivity and diversity through protection, enhancement, and restoration activities consistent with the adaptive management strategy of the NCCP/HCP.

BIO-3: Monitor enhancement and restoration activities as part of the adaptive management program to evaluate effectiveness and progress. Through monitoring, seek to identify new enhancement and restoration opportunities and priorities within the park.

BIO-4: Implement and coordinate with other adjacent landowners fire management methods that cause the least damage to park resources while providing effective fire control to protect human life and property.

WATER QUALITY (WQ)

Goal

- **Improve the quality of streamwater that flows through the park.**

Strategies

WQ-1: Protect water quality within the park. Identify water quality problems and work with regulatory agencies and property owners to correct water quality problems from storm water runoff and other causes in the watershed.

WQ-2: Develop and implement a water quality management plan.

CULTURAL RESOURCES (CULT)

Goal

- **Protect and preserve the important cultural/historical resources of the park.**

Strategies

CULT-1: Identify and implement a formal procedure for preserving known cultural resources within the park.

CULT-2: Maintain a cultural resources interpretive program in coordination with Local Tribal Leaders and the Archeological community.

CULT-3: Protect and preserve paleontological resources within the park.

CULT-4: Develop a paleontology interpretive program.

CULT-5: Follow established protocol if human remains are encountered during ground-disturbing activities in the park.

INTERPRETATION/EDUCATION (INT)

Goal

- **Provide an appropriate interpretive program that increases the public's understanding and appreciation of the significant natural and cultural resources of the park.**

Strategies

INT-1: Establish facilities and programs to enhance the public's understanding of park resources and to encourage research about park resources.

INT-2: Develop and implement an interpretive master plan.

INT-3: Provide high quality interpretive facilities and programs.

VISUAL RESOURCES (VISUAL)

Goal

- **Protect and enhance significant views.**

Strategies

VISUAL-1: Protect and enhance views and distinctive landscape features that contribute to the setting, character, and visitor experience of the park.

STEWARDSHIP (STEW)

Goal

- **Provide effective stewardship of the park.**

Strategies

STEW-1: Maintain park facilities (*i.e.,* trails, kiosks, gates, picnic areas) in the park to ensure that resource values are protected and management activities (*i.e.,* habitat restoration, closure of unauthorized trails) are supported.

STEW -2: Enforce boundaries by establishing site fencing and patrolling park access points.

STEW-3: Maintain trails and roads to prevent erosion.

STEW-4: Patrol public use of the park to ensure compliance with the rules and regulations and to assess level of use by area of the park.

STEW-5: Develop a data management system to incorporate baseline data collected for the preparation of this management plan.

6.3 MANAGEMENT ZONES

Management zones are delineated on a map showing the entire park (Figure 16: Management Zones). These zones are an attempt to define spatially the management scheme for the park. Management zones allow for describing management goals by area or showing relationships between one area and another in terms of land use and management strategies. These areas are based on geographic relationships, resource values, ecological parameters, management issues, goals, or objectives, types and intensities of land use; or visitor use and experiences. Four (4) management areas have been created:

- Upper Aliso Canyon
- Lower Aliso Canyon
- Upper Wood Canyon
- Lower Wood Canyon

The management zones reflect consideration of a number of factors, including existing and potential resource values, type and intensity of recreation use, and the practicalities of

everyday management and operations. The zones generally represent areas of the park that share common physical and use characteristics and should be managed as identifiable components or subareas. The resource management zones will allow for common referencing of geographic locations for all resource management activities (i.e., scientific surveys, exotic plant control, monitoring). The discussion below provides management goals and strategies for the four management areas.

6.3.1 Upper Aliso Canyon (UALISO)

This zone constitutes the northeastern arm of the park and includes a segment of Aliso Creek as well as the paleontological rock outcropping known as the Pecten Reef formation in this northernmost extent of Aliso Canyon. The Pecten Reef formation contains a dense assemblage of fossils and, therefore, possesses extremely high value for paleontological resources. Due to its remote location from the park rangers' office, it has a high threat for illegal collection of resources. This narrow section of the park acts primarily as a transportation corridor connecting people to destinations north, south, and west. Numerous entry points from the many community parks and schools along the Aliso Creek Bikeway in this zone access the park. This area contains significant biological resource value associated with the riparian corridor along Aliso Creek. However, Aliso Creek is also heavily infested with Giant Reed, an invasive exotic weed species. Invasive species will need to be controlled in order to protect the riparian habitat.

Goals

- **Protect and interpret paleontological resources.**
- **Maintain a natural and scenic link for trail users.**
- **Enhance riparian habitat.**

Strategies

UALISO-1: Interpret the paleontological resources of Pecten Reef. Interpretation should focus on preserving paleontological resources in situ and notifying park rangers.

UALISO-2: Make Pecten Reef a primary park entry. It provides a prime location for displaying/distributing general information about the park.

UALISO-3: Create distinctive entries along Aliso Creek that signify the visitor is entering a wilderness park. Improve communication and connections with local communities and schools.

UALISO-4: Protect and restore riparian habitat along Aliso Creek through habitat restoration efforts and control of invasive exotic species.

UALISO-5: Continue to participate in and support Aliso Creek watershed planning efforts. Implement recommended strategies, as appropriate, to improve water quality.

Laguna Coast Wilderness Park

Aliso and Wood Canyons Wilderness Park

City of Aliso Viejo

City of Laguna Hills

City of Laguna Beach

City of Laguna Niguel

SOKA University

Laguna Niguel Regional Park

Aliso Creek Golf Course

Coastal Treatment Plant

Aliso Beach Park

Pacific Ocean

Feet
0 2,000 4,000 6,000

LEGEND

- Aliso and Wood Canyons Wilderness Park
- Laguna Coast Wilderness Park
- Multi-Use Trail
- Proposed Multi-Use Trail
- Hiking Trail
- Bikeway
- Bikeway / Utility Access
- Utility Access
- Proposed Multi-Use Trail / Utility Access Road
- Creek

Management Zones

- Upper Wood Canyon
- Lower Wood Canyon
- Upper Aliso Canyon
- Lower Aliso Canyon

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 04/2004

DATE: May 11, 2009

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 16: Management Zones

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6.3.2 Lower Aliso Canyon (LALISO)

This area encompasses the main park entry as well as the lower reach of Aliso Creek down to the southernmost extent of the park. The Main Park Entry is the busiest gateway into the park and includes the widest range of developed facilities that currently include a picnic area, parking, park ranger station, park maintenance/operation yard, and portable restrooms. Important cultural sites exist in this area of the park. The lower reach of Aliso Canyon on the east side of Aliso Creek is currently closed to the public. The Coastal Treatment Plant and its access road are located within this area. At the southern end of the park, several disparate parcels are connected by trails. Along the trail is a small vista park named Badlands Park located off of Isla Vista Road. This section of the park may be relatively unknown to all but local users, despite the fact that its steep hillsides offer dramatic and high quality views of the Pacific Ocean.

Goals

- **Provide access into park to communities at southernmost segment of Lower Aliso Canyon.**
- **Enhance recreation use.**
- **Improve riparian habitat and water quality in Aliso Creek.**

Strategies

LALISO-1: Improve the main park entry to provide better directional information for access to parking and trails, and park amenities; improved restroom facilities; improved park ranger station and interpretive center.

LALISO-2: Provide bikeway to Aliso Beach Park consistent with the regional bikeway plan (OCTA Strategic Bikeways Plan).

LALISO-3: Provide a trail on the east side of Aliso Creek from Alicia Parkway to the Coastal Treatment Plant.

LALISO-4: Provide trail to overlook at southernmost park boundary.

LALISO-5: Provide a rest stop at the southernmost park boundary to include restrooms, picnic area and interpretive displays.

LALISO-6: Emphasize the ACWHEP structure as a destination point. Explore the potential for providing a trail connection between the ACWHEP structure and the Aliso Summit Trail.

LALISO-7: Enhance Willow Hut as a destination point by providing ADA access and interpretive information.

LALISO-8: Protect and restore riparian habitat along Aliso Creek through habitat restoration efforts and control of invasive exotic species.

LALISO-9: Continue to participate in and support Aliso Creek Watershed planning efforts. Implement recommended strategies, as appropriate, to improve water quality.

LALISO-10: Develop checks and balances criteria for OC Parks to review all future watershed practices within AWCWP.

6.3.3 Upper Wood Canyon (UWOOD)

This area represents the northwestern part of the park and is the primary entry into the park from "Top of the World." Part of this area consists of land that is owned by the City of Laguna Beach and leased to the County of Orange, as such, it represents a unique joint use and management area. This area contains many of the park's most popular and heavily used trails. Facilities and improvements in this area will focus on trails and interpretive opportunities.

Goals

- **Maintain and enhance recreation resources.**
- **Protect natural resources.**

Strategies

UWOOD-1: Explore the opportunity to connect the north end of AWCWP to the Laguna Coast Wilderness Park as part of a regional hiking trail. A feasibility study will be required to evaluate alternative alignments.

UWOOD-2: Provide connection between the northern end of Five Oaks Trail at Moulton Peak to Wood Canyon Trail

UWOOD-3: Change status of "Car Wreck" Trail to "Authorized Trail" to provide a connection between Oak Grove Trail and Mathis Canyon Trail. Implement trail improvements for safety.

UWOOD-4: Provide trail connection between Dripping Cave Trail and the ridgeline to enhance trail recreation with a loop and to provide park operations with an improved route to patrol remote park locations. An environmental assessment will be required to evaluate potential biological impacts associated with trail implementation.

UWOOD-5: Formalize the Hunwut entry to provide access from eastern neighborhoods and Soka University.

UWOOD-6: Protect and manage native habitat, including coastal scrub, oak woodlands, chaparral, and native grasslands.

UWOOD-7: Provide a composting toilet at Sycamore Grove.

6.3.4 Lower Wood Canyon (LWOOD)

This area encompasses lower Wood Canyon below Mathis Canyon Trail, including Moulton Meadows. Lower Wood Canyon contains many of the park's unique natural and geologic resources, including sensitive plant, bird and wildlife species, as well as Dripping Cave and Cave Rock. Important cultural sites are also located in lower Wood Canyon. It also contains many of the park's unauthorized trails which come down from the ridge separating Wood and Laguna Canyons. A formal trailhead is provided for the Meadows Trail leading down to the Aliso and Wood Canyons confluence and for the Aswut Trail along the ridge to the west. The management intent for this zone is to maintain and protect park resources and improve wildlife corridors while continuing to provide trail access. Expanded opportunities for interpretation and education may also be pursued.

Goals

- **Protect, enhance and interpret biological resources.**
- **Continue to provide trail access.**

Strategies

LWOOD-1: Protect and manage coastal scrub habitat, especially areas that are known habitat for sensitive plant species.

LWOOD-2: Provide loop trail connection from AWMA Road/Aliso Creek trail extension up to Aswut Trail/Moulton Meadows Park.

LWOOD-3: Provide interpretive signage and exhibits to educate park users of the park's valuable resources.

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7.0 Public Access and Recreation

7.0 PUBLIC ACCESS AND RECREATION MANAGEMENT

7.1 INTRODUCTION

The location of AWCWP within a growing metropolitan area with good highway access and opportunities for use year-round have made it an extremely popular recreation destination for local residents and regional, national, and international visitors alike. The park offers many opportunities for recreation use, including hiking, running, mountain cycling, equestrian use, nature viewing, birding, painting, photography, and wilderness education with an extensive network of trails. Hitching rails located at the park entrance, Wood Canyon at Mathis Trail, and at the Old Sycamore Grove accommodate equestrian uses, and a rest area located under the Sycamore Trees provides for small gatherings in the park.

Among the permitted uses in the park, mountain cycling is the most popular. In fact, mountain cycling had been a common use in Aliso and Wood Canyons prior to the establishment of the AWCWP. Mountain cycling activities, both past and present, are indicative of the high public demands for open natural terrain in the county. The fact that the park site borders on so many different communities has resulted in increased demands on the site as a valuable open space resource. These demands can be expected to increase in future decades as the population in Orange County continues to grow and open space areas continue to diminish.

Given the definition of Wilderness Park, public access and recreation are considered secondary to the primary goal of protecting and restoring the natural and cultural resources of the park. This section provides an overview of existing park uses and summarizes the detailed trail assessment prepared for the Existing Conditions Report (Appendix C).

7.2 EXISTING PUBLIC ACCESS

Visitors enjoy the rugged topography, steep hillsides, and deep canyons accessed through the park's 30-mile network of trails. The Wood Canyon Trail acts as the spine of the trail system with a combination of improved and unimproved trails creating the overall network. Currently, there are 2.0 miles of hiker-only trails, 28.0 miles of multi-use trails, and 3.5 miles of paved bikeway. A complete assessment of existing trails is provided in the Existing Conditions Report in Appendix C.

All trails within the park fall into one of four trail classifications (Figure 17: Existing Trails). The four classifications, authorized, restored, utility access, and unauthorized, represent the County's current policies regarding public access and recreational use as well as physical characteristics identified in the field. The four trail classifications can be described as follows:

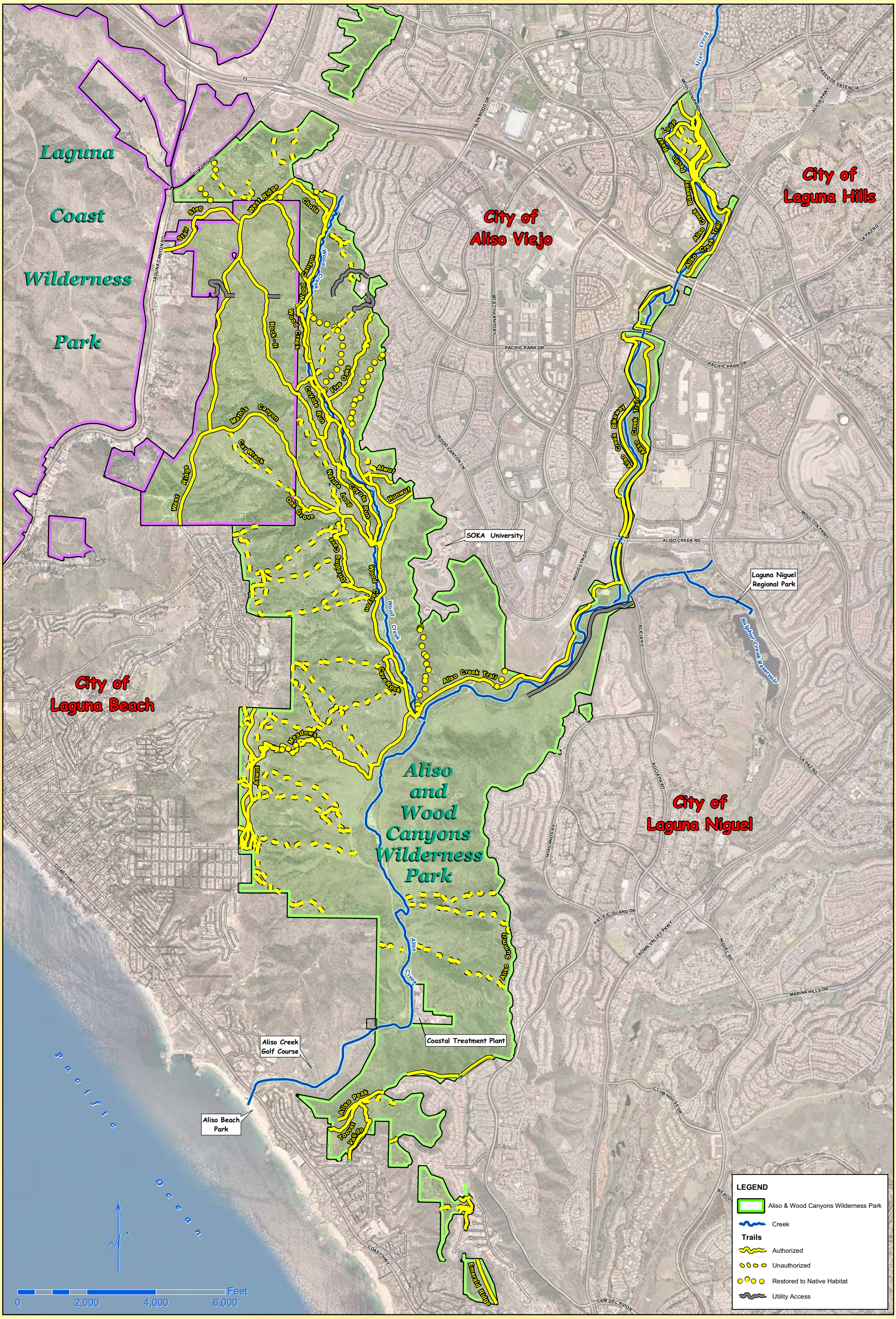
- **Authorized Trails:** The Park's existing practice is to allow pedestrian, equestrian, and bicycle access to most trails. A few trails are designated for pedestrian use only. This category includes trails maintained by OC Parks.
- **Restored Trails (trails restored to natural condition):** This category includes trails and roads that have been closed by the park rangers due to safety concerns and/or to protect park resources. Many of these trails have been revegetated with native species and posted to prevent unwanted access. These trails were identified primarily in discussion with park rangers.
- **Utility Access Roads:** Multiple utility access roads are located in the park; these roads are not maintained by park staff. The SOCWA service road and easement provide access to the Coastal Treatment Plant and pipelines located in lower Aliso Canyon. The Moulton Niguel Water District manages the service roads around the water tanks on Moulton Peak.
- **Unauthorized Trails:** Uncontrolled access and increased recreational use has facilitated the development of visitor-created trails that are potentially damaging to site resources. This category includes these visitor-created or unauthorized trails.

7.2.1 Existing Trails

The Existing Conditions Report (Appendix C) includes an assessment of existing recreation resources, including trails. The trails assessment summarized below is based on the Orange County Regional Parks Unpaved Trail Assessment prepared in 1995 and is supplemented with information from an onsite trail assessment conducted in February and March 2006. Table F describes the relevant detail regarding the individual trails. For clarity, the trails assessment is organized according to four geographic areas that consist of Upper Aliso Canyon, Aliso and Wood Canyons Confluence, Lower Aliso Canyon, and Wood Canyon.

Upper Aliso Canyon. This area forms the northeast arm of the park from Moulton Parkway to the main park entrance that provides the primary access to this area. The parking lot accommodates 48 cars including two spaces for disabled visitors. The Orange Coast Watershed and Environmental Center is establishing offices and programs for interpretation and education at this location. A small picnic area, trash cans and portable restrooms are also located at the main park entrance. Kiosks provide information regarding the rules, regulations, and resources of the park with trail maps. Visitors can also enter this section of the park from the north along Moulton Parkway or from access points along the Aliso Creek Bikeway.

> ***Aliso Creek Trail:*** The Aliso Creek Trail begins at the base of the Pecten Loop Trail where the Aliso Creek Bikeway crosses Aliso Creek. The Aliso Creek Trail parallels Alicia Parkway and the eastern bank of Aliso Creek. The trail remains distinct from the Aliso Creek Bikeway with the exception of the junction at Pacific Park Drive. Here the trail crosses Aliso Creek north and south of the road before shifting back toward Alicia Parkway. The trail terminates at the junction of the AWMA Road and bikeway just north of the main park entrance.



DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- USGS 10 meter DEM 1999
- Eagle Aerial Image 1.5 foot resolution, flown July 2003

DATE: May 12, 2009

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 17: Existing Trails

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Table F: Trails Assessment

Management Zone and Trail	Trail Classification*	Length	Width	Grade*	Surface*	Condition	Setting	User Group*	Use*	Service Access*	Notes
Upper Aliso Canyon											
Aliso Creek Trail	A, Dual	3 miles	3 feet	Easy	DG	Maintained	Riparian, Landscaped	H, E, MB	L	Yes	
Aliso Creek Bikeway	A, Dual	3 miles	10 feet	Easy	P	Maintained	Riparian, Landscaped	H, MB	H	Yes	
Pecten Reef Loop Trail	A, Single	0.5 miles	3 feet	Easy	C/S	Maintained	Grassland	H, E, MB	M	No	
Aliso and Wood Canyons Confluence											
Aliso Canyon Trail (Lower Aliso Creek Trail)	A, Single	1.5 miles	3-5 feet	Easy	C/S	Minimal rutting and bike shortcuts	Coastal Sage Scrub, Grassland, Riparian	H, E, MB	H	Yes	Heavily traveled
Aliso Summit Trail	A, Single	3.5 miles	5 feet	Easy	D/G	Maintained	Coastal Sage Scrub, Grassland, Riparian	H	M	No	Discontinuous trail
SOCWA Service Road	Utility Access	XX	XX	Easy	P	Maintained	Coastal Sage Scrub, Grassland, Riparian	Closed to Public	N/A	Yes	Road closed to public
SOCWA Easement	Utility Access	XX	XX	Easy	CS	Maintained	Coastal Sage Scrub, Grassland, Riparian	Closed to Public	N/A	Yes	Easement closed to public
Aswut Trail	A, Dual	XX	8-10 feet	Easy	P	Maintained	Hillside	H, MB, D	H	Yes	Evidence of goat grazing
The Meadows Trail	A, Single	1.5 miles	2-5 feet	Difficult	C	Maintained	Coastal Sage Scrub, Grassland, Hillside	H, E, MB	M	No	Provides access to Wood Canyon
Lower Aliso Canyon											
Valido Trail	A, Single	1.0 mile	3 feet	Moderate	C/SS	Maintained	Coastal Sage Scrub, Hillside	H	M	No	
Aliso Peak Trail	A, Dual	XX	XX	Moderate	C/SS	Maintained	Coastal Sage Scrub, Hillside	H	M	No	
Toovet Trail	A, Dual	XX	XX	Moderate	C/SS	Maintained	Coastal Sage Scrub, Hillside	H	M	No	
Wood Canyon											
Wood Canyon Trail	A, Dual	3.1 miles	8-12 feet	Easy	L	Creek crossings via planks set on concrete	Coastal Sage Scrub, Grassland, Oak Woodland, Riparian	H, E, MB	H	Yes	Most heavily used trail. Cleared by OC Fire Authority
Cave Rock Trail	A, Single	0.25 mile	4-8 feet	Moderate	C/S	Heavily rutted in places	Coastal Sage Scrub, Grassland, Oak Woodland	H	H	No	
Dripping Cave Trail	A, Single	2 miles	4-5 feet	Moderate	C/S	Maintained	Coastal Sage Scrub, Grassland, Oak Woodland	H, MB	H	No	
Mathis Canyon Trail	A, Single	2 miles	3-10 feet	Difficult	S/L	Heavy erosion and rutting toward top of hill	Coastal Sage Scrub, Grassland, Hillside	H, E, MB	M	Yes	
Oak Grove Trail	A, Single	1.5 miles	3 feet	Moderate	C/S	Maintained	Coastal Sage Scrub, Grassland, Riparian	H, E, MB	M	No	No connection to other trails
Hunwut Trail	A, Single	XX	4-5 feet	Moderate	CS	XX	Coastal Sage Scrub, Grassland, Hillside	H, E, MB	L	Yes	Locked gate prevents entry
Alwut Trail	A, Single	XX	4-5 feet	Moderate	CS	Maintained	Coastal Sage Scrub, Grassland, Hillside	H, E, MB	L	Yes	
Coyote Run Trail	A, Single	2.5 miles	3 feet	Moderate	C/L	Rutting and bike shortcuts present	Coastal Sage Scrub, Grassland, Oak Woodland, Riparian	H, MB	M	No	
Five Oaks Trail	A, Single	1.25 miles	3-6 feet	Difficult	C/SS	Heavy erosion and rutting in places	Coastal Sage Scrub, Oak Woodland, Hillside	H, E, MB	M	No	Lacks loop trail
Wood Creek Trail	A, Single	0.5 mile	4-8 feet	Easy	L/O	Maintained	Oak Woodland, Riparian	H	M	No	
Rock-it Trail	A, Single	1 mile	2-8 feet	Difficult	C/SS	Heavy erosion and rutting in places	Coastal Sage Scrub, Hillside, Ridgeline	H, MB	M	No	Trail with most injuries
West Ridge Trail	A, Dual	XX	8-15 feet	Moderate	S/G	Erosion and rutting along trail edges & many unauth. trails present	Coastal Sage Scrub, Ridgeline, Hillside	H, E, MB, D	H	Yes	Unauthorized trails very visible
Nature Loop Trail	A, Single	0.5 mile	2-3 feet	Difficult	C/SS	Heavy rutting at trail base	Coastal Sage Scrub, Ridgeline, Hillside	H	M	No	Cleared by OC Fire Authority
Lynx Trail	A, Single	1.5 miles	3-4 feet	Difficult	C/SS	Maintained	Coastal Sage Scrub, Ridgeline, Hillside	H, E, MB	M	No	
Cholla Trail	A, Single	1 mile	4 feet	Difficult	C/SS	Maintained	Coastal Sage Scrub, Ridgeline	H, E, MB	M	No	Unauthorized trail to El Toro Road
Stairstep Trail	A, Single	0.7 mile	XX	Difficult	XX	Some erosion and rutting	Coastal Sage Scrub, Ridgeline	H, E, MB	L	No	Steep, challenging trail

*Trail Classification
A, Single: Authorized, Single Track Trail
A, Dual: Authorized, Double Track Trail

*Grade
Easy: <5% sustained slope
Moderate: 5% - 10% slope
Difficult: > 10% slope

*Trail Surfaces

DG:	Decomposed Granite
P:	Pavement
C/S:	Clay/Sand
D/G:	Dirt/Gravel
CS:	Compact Soil
C:	Clay
C/SS:	Clay/Sandstone
L:	Loam
S/L:	Sand/Loam
C/L:	Clay/Loam
L/O:	Loam/Oak Duff
S/G:	Sand/Gravel

* User Group
H: Hiker
E: Equestrian
MB: Mountain Biker
D: Leashed Dogs

* Use Level
L: Lightly Used
M: Moderately Used
H: Heavily Used

*Service Access
These trails are accessible to Fire Department/Emergency vehicles and Park Ranger/Maintenance vehicles.

Aliso Creek Bikeway: The Aliso Creek Bikeway is an Orange County master-planned regional bike path intended to stretch from the mountain foothills to the Pacific Ocean. The three mile section of the bikeway within AWCWP is accessed at Sheep Hills Park in Laguna Niguel from Laguna Hills Drive. Visitors can also access the bikeway from several access points along the route. The dual-lane path follows Aliso Creek south through a narrow green corridor directly adjacent to suburban communities and schoolyards on the west. The bikeway crosses the creek via a bridge south of the Pecten Loop trail and travels underneath Highway 73, Pacific Park Drive, and Aliso Creek Road. It ends at the junction of the creek and AWMA Road just north of the main park entrance.

The Aliso Creek bikeway connects visitors north to many city parks along the way, to Limestone-Whiting Ranch Wilderness Park 12 miles north and to Cleveland National Forest trails in the Santa Ana Mountains.

Pecten Reef Loop Trail: This easy, half-mile interpretive trail loops around Pecten Reef Hill in the northernmost section of the park's eastern arm. The Pecten Reef trail connects with the Aliso Creek Bikeway near Moulton Parkway, and again at the southern end of the loop near the Aliso Creek Bikeway creek crossing. It is suggested that this be expanded to a full loop on both sides of the paved bikeway.

Aliso and Wood Canyons Confluence. This area forms the heart of the park; it extends east-west from the main park entrance to Moulton Meadows. The main park entrance provides the primary access to this area. A trailhead/staging area is also located at the confluence between the two canyons. The trailhead provides a horse watering trough, portable restroom, picnic table, and information kiosk. A gate prevents park visitors from continuing on the AWMA Road to the Coastal Treatment Plant during business hours (i.e., Monday through Friday). Visitors can also enter the park from the west at the City of Laguna Beach Moulton Meadows Park via Nyes Place and/or Blue Bird Canyon Roads in the City of Laguna Beach.

Aliso Canyon Trail (Lower Aliso Creek Trail): Originating from the main park entrance at Alicia Parkway, Aliso Canyon Trail parallels Aliso Creek and the paved AWMA Road. The trail provides the only means of accessing Wood and Mathis Canyons from the eastern portions of the park and the main entrance. The trail has an "open" feel and affords views of vast expanses of grassland, coastal sage scrub, and the riparian habitat along Aliso Creek south of the trail. Aliso Canyon Trail comes to an end at the junction with Meadows and Wood Canyon Trails.

Discovery Trail: Also originating from the main park entrance at Alicia Parkway, the 0.25 mile Discovery Trail is located immediately adjacent to the Orange Coast Watershed and Environmental Center and the park ranger station. From the trail, visitors can view evidence of past human habitation, including sheep/cattle grazing on the slope and part of a corral that dates back to the late 1800's. The 1940's International Harvester or "Windrower" was used to collect barley, oats, and rye and is a connection to past agricultural work in the area. The trail passes through primarily riparian habitat with many native plants in close proximity to the trail. The

Discovery Trail is a combined loop and provides access to a scenic overlook of Aliso Creek.

Aliso Summit Trail: The Aliso Summit Trail follows the eastern ridge of Aliso Canyon in Laguna Niguel and borders residential communities. The northern half-mile portion is accessed in the Hillcrest Estates neighborhood via Lilly Shapell Park on Drakes Bay. The trail breaks at the northern intersection of Highland Ave. and Ridgeview Drive. The second leg picks up again where Ridgeview Drive loops back to Highland Ave. The trail provides expansive views of Aliso and Wood Canyons and the Pacific Ocean along its entire route. Aliso Summit Trail connects with Seaview Park at Talavera Drive and continues to the Aliso Peak Trail overlooking Laguna Beach and the ocean.

AWMA Road: The AWMA Road originates at the main park entrance and parallels Aliso Creek through Aliso Canyon to the Coastal Treatment Plant. The road provides access to the Coastal Treatment Plant located in lower Aliso Canyon above the Aliso Creek Golf Course. This private road is intended for Coastal Treatment Plant personnel and official County vehicular use only. An easement with the County and the Coastal Treatment Plant provides for public access from the park's main entry to Wood Canyon during weekends and holidays only.

Coastal Treatment Plant Easement: Along the east side of Aliso Creek, an on-grade dirt maintenance road runs through Aliso Canyon from Alicia Parkway to the Coastal Treatment Plant. The dirt road provides utility access to the treatment plant pipelines along the east side of Aliso Creek and is presently closed to the public. Several unauthorized trails come down the hillside from the Aliso Summit Trail and connect to this maintenance road.

Aswut Trail (native language trail name): The Aswut Trail is accessed via Moulton Meadows Park at Del Mar and Balboa Avenues in Laguna Beach. This paved, dual track trail follows a level grade north toward Meadows Trail at an elevation of approximately 800 feet. Views abound on either side of the trail: to the west lies the city of Laguna Beach and the Pacific Ocean and on the east sprawls the lower half of AWCWP, dense development east of the park, and the barely discernible San Gabriel and San Bernardino Mountain ranges. Past the juncture with Meadows Trail, Aswut terminates at a locked gate within a private residential community at Alta Laguna Boulevard.

The Meadows Trail: Accessed by Moulton Meadows Park (City of Laguna Beach) and Aswut Trail, the Meadows Trail provides direct access to Wood Canyon from Laguna Beach. The trail descends at a steep incline down the hill through grassland and scattered coastal sage scrub habitat with unobstructed views. At the floor of Aliso Canyon the trail veers north through an open meadow toward the beginning of the Wood Canyon Trail.

Lower Aliso Canyon. This area forms the southern boundary of the park from the Aliso and Wood Canyons confluence to the Aliso Creek Golf Course. Several trails are open to the

public, including the Valido, Aliso Peak, and Toovet trails connecting to the Aliso Summit Trail. These trails are accessed via West Street from Laguna Beach.

> ***Valido Trail:*** Valido Trail (hikers only) is accessed by West Street from the Pacific Coast Highway in Laguna Beach. Users climb stairs, sandstone outcroppings, and check dams to the headland overlook located at the top of Aliso Peak Trail. At 683 feet, the views of the Orange County Coast, Aliso Beach Park, and lower Aliso Canyon are spectacular. Valido Trail connects with Toovet Trail where an additional overlook is available at its terminus.
>
> ***Aliso Peak Trail:*** The Aliso Peak Trail (hikers only) connects with the Valido Trail and Seaview Park in Laguna Niguel. Seaview Park is accessed by Talavera Drive. A steep and sometimes slippery hike up the bluff to Aliso Peak reveals a solitary bench positioned to take in views of the Pacific Ocean, Aliso Beach Park, City of Laguna Beach, and Aliso Creek Golf Course.
>
> ***Toovet Trail (native language trail name):*** The Toovet Trail (hikers only) is accessed by either the Valido or Aliso Peak trails but does not make a through connection to Laguna Beach. A short hike through coastal sage scrub concludes at a bluff overlook to the Pacific Ocean and Laguna Beach.

Wood Canyon. This area forms the northwest arm of AWCWP from El Toro Road to the Aliso and Wood Canyon confluence. Wood Canyon contains the majority of the park's 30-miles of trails along with the majority of the park's unauthorized trails. Primary access to this area is from the Aliso and Wood Canyons confluence via the main park entrance. Another primary access point to Wood Canyon is from the "Top of the World" (TOW) via City of Laguna Beach Open Space. The TOW trailhead provides parking, restrooms, water, telephone, informational kiosks and interpretive panels. Secondary access points into the park occur along the West Ridge Trail (City of Laguna Beach) at its junctions with Mathis Canyon, Rock-it, Lynx, and Cholla Trails.

> ***Wood Canyon Trail:*** Wood Canyon Trail serves as the backbone to the 30-mile trail system, providing access points and opportunities for loop trail excursions. The varied vegetation along its length on the canyon floor, easy access to multiple geological and biological interpretive sites, and fairly level grade allow for enjoyment by a diverse group of recreationists. The Cave Rock and Dripping Cave Trails stem from the trail in lower Wood Canyon with the historic Old Corral site past the connection with Mathis Canyon Trail.
>
> The canyon narrows and becomes more densely wooded in the upper reaches. Old Sycamore Grove provides a pleasant shaded spot for a quick lunch or rest. Past Five Oaks Trail the trail tapers, the canyon narrows, and dense riparian, oak woodland, chaparral, and coastal sage scrub provide welcome shade. A second creek crossing just before Lynx Trail (the first was at Dripping Cave) and the trail ends at an elevation of approximately 500 feet at Cholla Trail.

Cave Rock Trail: Cave Rock Trail is a short single-track trail that forms a loop with Wood Canyon Trail in lower Wood Canyon. Only hikers are permitted on this trail. Settled amongst coast live oak trees, Cave Rock is a domed sandstone rock outcropping that features a cavity that was likely created by water erosion resulting from prehistoric ocean wave action. As it circles back toward Wood Canyon, the trail descends and ascends a dry ravine via wooden steps under oak woodland canopy and through grassland and coastal sage scrub vegetation.

Dripping Cave Trail: A distance from the Wood Canyon Trail, Dripping Cave is a popular natural interest point in the park. From the Dripping Cave, the trail leads northwest, crossing the western ridge of Wood Canyon before dropping down to the grassland at the floor of Mathis Canyon. Dripping Cave Trail connects with Mathis Canyon Trail at its base.

Mathis Canyon Trail: At its start at Wood Canyon Trail, Mathis Canyon Trail begins a gentle grade into Mathis Canyon through grassland with scattered elderberry shrubs, sycamores and oak trees. At its junction with Oak Grove Trail the trail begins a challenging ascent up Mathis Canyon. Ascending the trail offers panoramic views of Wood Canyon, Moulton Peak, and the Rock-it Trail snaking down the ridge to the north. Mathis Canyon Trail terminates at West Ridge Trail at an elevation of approximately 700 feet.

Oak Grove Trail: Oak Grove Trail begins at Mathis Canyon Trail just as it is starting the steep ascent up to the West Ridge Trail. The trail trends west along Mathis Canyon crosses Mathis Creek and terminates nearly halfway up Mathis Canyon at an elevation of 300 feet. Users must back-track down the trail as it offers no official connections with other routes.

Hunwut Trail ("Black Bear" in Juaneno): The County has an opening in the fence that allows passage into the park at the end of the Hunwut Trail at the County property line. This access point is a "step over" rail road tie entrance on the south side of the vehicle pipe gate. A concrete utility road, leads from this pipe gate (park access) at the end of the Hunwut Trail to the City (Aliso Viejo) gate at the City street within a gated residential neighborhood. This concrete road is used for emergency access for Fire Dept. and other official vehicles. The concrete road is within the fenced off (CLF) landscape hillside owned by the community HOA.

The City gate is locked and posted with a No Trespassing sign facing the foot traffic coming from AWCWP into the City's community development. This City gate is bordered by a fence and water service tank to the North, and a short 20-foot long chain link fence up the hill to the South, towards Soka University. Currently, people enter this area by walking uphill and around the chain link fence, and go into and out of the park. Park rangers support this gate as a legitimate access point into the park, and recommend it be included in the RMP as an access point to be negotiated with the City of Aliso Viejo.

Alwut Trail (native language trail name): Accessed midway along Wood Canyon Trail, the Alwut Trail is a short hike up a moderate incline to a locked gate at the ridgeline. The trail provides no connections with other trails, but offers great viewing opportunities. The top of the Alwut Trail is recognized as a scenic overlook, providing impressive views of Corral, Mathis, and Wood Canyons.

Coyote Run Trail: Coyote Run Trail parallels Wood Creek on the west side and connects the Wood Creek hiking trail and the popular Wood Canyon multi-use trail. This trail provides a more scenic and varied alternative to the Wood Canyon Trail because it skirts the lower portion of Wood Canyon's west ridge rather than following the canyon floor. At its northern end, just past the Old Sycamore Grove, the trail crosses Wood Creek and connects with Wood Canyon Trail.

Five Oaks Trail: Five Oaks Trail is the only trail that extends up the eastern ridge of Wood Canyon. Beginning at the junction of Wood Canyon Trail and the Old Sycamore Grove, Five Oaks is an increasingly steep climb through oak woodland at the trail base and coastal sage scrub habitat to an elevation of 890 feet at Moulton Peak. A utility access road serves the water towers located at the peak and public access is prohibited. Lack of a loop trail in this location is a common complaint among trail users.

Wood Creek Trail: This "hikers only" trail follows Wood Creek as it flows south through the park. Accessed by Lynx and Wood Canyon Trails at its northern end, the trail begins a gentle descent to a viewing point at approximately 400 feet. This vantage point provides beautiful views of the canyon, the ridgeline, and the Wood Canyon and Five Oaks Trails. As the trail continues south and rejoins with Wood Creek, oak woodland canopies and chaparral create dense shade. Wood Creek Trail connects with Wood Canyon and Coyote Run Trails just north of the Old Sycamore Grove.

Rock-It Trail: The Rock-It Trail is a highly technical trail that is popular with mountain cyclists. Named for its passage over sandstone rock outcroppings that begin about a third of the way down, the trail originates from the top of Wood Canyon at the West Ridge Trail. A popular loop opportunity commonly utilized by cyclists entering at the main entrance includes a ride north up the Wood Canyon and Cholla Trails, a short ride along the West Ridge Trail, and the steep downhill thrill provided by Rock-It. Rock-It allows for access from the City of Laguna Beach via the Alta Laguna Community Park and the Top of the World trailhead from West Ridge Trail. Rock-It joins with Coyote Run Trail near the base of Wood Canyon.

West Ridge Trail: The West Ridge Trail is a graded fire road that provides access from the Alta Laguna Community Park (City of Laguna Beach) and the Top of the World area. Beginning at an elevation of approximately 1000 feet, the trail traverses the ridge between Wood Canyon and Laguna Canyon. The trail continues north and connects first with Mathis Canyon Trail, then Rock-it Trail at the water tank on El Toro Ridge, followed by Stairstep Trail, and finally Lynx and Cholla Trails. Numerous

unauthorized trails drop down to Laguna Canyon Road from the West Ridge Trail. West Ridge Trail terminates at the Cholla Trail in upper Wood Canyon.

Nature Loop Trail: The Nature Loop Trail connects Wood Canyon and Coyote Run Trail to provide a 0.5 mile "hikers only" loop around the west ridge of Wood Canyon and the east ridge of Mathis Canyon. At its juncture with Coyote Run Trail, the habitat transitions from coastal sage scrub to lush oak woodland and riparian vegetation. Coyote Run Trail parallels Wood Creek and returns the hiker back to the beginning of the Nature Loop just off of Wood Canyon Trail.

Lynx Trail: At its northern end, the Lynx Trail connects with the West Ridge Trail at El Toro Ridge and joins with the Wood Creek Trail at its base. Lynx Trail allows for access from the City of Laguna Beach via the Alta Laguna Community Park or the adjacent Laguna Coast Wilderness Park via the Stairstep Trail as an alternative means of accessing Wood Canyon. In the upper reach of Wood Canyon at about 700 feet, Lynx meanders down at a moderately steep grade through coastal sage scrub habitat. The connection with Wood Creek and West Ridge Trails creates several trail loop opportunities in upper Wood Canyon.

Cholla Trail: The Cholla Trail is a one mile connector trail that links the West Ridge and Wood Canyon Trails in the northernmost region of the park. The Cholla Trail provides users with a steep and winding passage through dense coastal sage scrub and chaparral with magnificent views of Wood Canyon. From the Cholla Trail, several unauthorized trails connect to El Toro Road.

Stairstep Trail: Located in the upper section of Wood Canyon and accessed by West Ridge Trail, the 0.7-mile Stairstep Trail was previously an unauthorized trail that now provides the only authorized route from the park to Laguna Canyon Road and the neighboring Laguna Coast Wilderness Park. The steep descent down this trail is challenging, weaving through dense woody chaparral and coastal sage scrub vegetation. Stairstep Trail is most commonly used by mountain bikers.

7.2.2 Existing Entries

At present, approximately 36 entry sites provide access into AWCWP with 24 gated entry points meaning that they can be closed, as needed, to prevent unwanted access. The majority of these gates are open during park operating hours. Other access points do not have gates to control access. These entries are shown on Figure 18, Existing Public Access.

- Main Entrance (Gate #1)
- Wood Canyon Trailhead (Gate #2)
- AWMA Road Gate at the Wood Canyon Trailhead (Gate #3)
- Halfway down the Mathis Trail (Gate #4)
- Top of Hunwut Trail (Gate #5)

- Top of Alwut Trail (Gate #6)
- Junction of Canyon View Park and Top of Wood Canyon Trail (Gate #7)
- Access to West Ridge Trail at Hollyleaf (Gate #8)
- Access to Cholla Trail and West Ridge Trails (Gate #9)
- Access Alta Laguna and West Ridge Trails (Gate #10)
- Top of the World and Aswut Trail (Private Gate – Gate #11)
- Moulton Meadows Park and Aswut Trail (Gate #12)
- Aliso Creek Golf Course and bottom of AWMA Road (Gate #13)
- Coastal Treatment Plant and bottom of Aliso Canyon Trail (Gate #14)
- Coastal Treatment Plant access gate (Gate #15)
- South end of Aliso Summit Trail (Gate #16)
- North end of Aliso Creek (east side) off Alicia Parkway (Gate #17)
- South end of Aliso Creek Bikeway (Gate #18)
- South end of Aliso Creek Trail, south of Avila (Gate #19)
- Aliso Creek Trail, north of Avila (Gate #20)
- Aliso Creek Trail, south of Pacific Park (Gate #21)
- South end of Pecten Reef Loop Trail (Gate #22)
- East end of Pecten Reef Loop Trail (Gate #23)
- North end of Pecten Reef Loop Trail at Laguna Hills Drive (Gate #24)

Other access points do not have gates to control access. Open access points include:

- Access via Hummingbird Park at El Toro and Aliso Creek Roads (Access #1)
- (Access #2)
- Access to Five Oaks Trail via the water tank access road (Access #3)
- Top of the World end of street access (Access #4)
- Top of the World and Aswut Trail – Bypass of private gate (Access #5)
- Aliso Beach Park and Aliso Creek Golf Course via Village Lane (Access #6)
- Toovet Trail (Access #7)
- Valido Trail (Access #8)
- Mar Vista Trail (Access #9)
- Aliso Summit Trail, Laguna Niguel (Access #10)
- Aliso Summit Trail, Laguna Niguel (Acess #11)
- SOCWA Road entrance (Access #12)

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- NOAA 3 meter DEM 2002
- Eagle Aerial Image 1 foot resolution, flown April 2004

DATE: June 3, 2006

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 18: Existing Public Access

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Back of Figure 18

Numerous unofficial entry points from community parks and schools along the Aliso Creek Bikeway and from adjacent residential neighborhoods access AWCWP. Some of these entry points are unauthorized, "end of street" points used to gain access to unauthorized trails; others are informal entries meaning there are no developed trailheads at these locations.

7.3 PROPOSED PUBLIC ACCESS

AWCWP will continue to draw visitors from throughout Southern California. Stewardship of the natural and cultural resources is a core responsibility of OC Parks. OC Parks must balance natural and cultural resource protection with appropriate public access and recreation, especially as the population grows. Consistent with this purpose, the County will improve the current network of authorized trails, evaluate the potential for new trail routes, and implement management actions to minimize road and trail impacts to the natural and cultural resources of the site (Figure 19: Public Access and Recreation).

7.3.1 Guiding Principles for Trails Within a Wilderness Park

- Prioritize resource protection.
- Relocate or decommission trails if impacts on native habitat or other resources are discovered.
- Re-align trails away from sensitive habitat areas.
- Minimize riparian crossings to decrease disturbance of sensitive natural areas.
- Eliminate duplication of trails.
- Reconstruct existing trails rather than rerouting the trail to minimize ground disturbance.
- Provide diverse and interesting trail experiences to minimize volunteer trails.
- Use best management practices in the design, construction, and maintenance of trails.
- Implement trails in partnership with other public agencies and non-governmental organizations.
- Consider the possible use of "resting" schedules for sensitive park areas.
- Formulate seasonal trail guidelines including possible rotation of access points to protect sensitive species from significant adverse user impacts during nesting or other sensitive periods.

7.3.2 Guiding Principles for Trails

Several principles are useful in considering additions or improvements to an existing trail system. These principles are also helpful in considering whether existing unauthorized trails provide an important feature of the improved trail system consistent with the primary goal for resource protection.

- Provide trail loops.
- Connect trails to regional trails when appropriate.
- Offer variety of trail type, difficulty and experience such as dirt roads, single track trails, and different environments (shade, exposed slopes, etc.)
- Provide scenic trails and access to destination points.
- Avoid duplicate or parallel trails.

7.3.3 Destinations

Destinations provide an obvious reason for traveling between two points. Trail users often enjoy hiking, cycling, or riding to a specific destination. AWCWP offers several attractive destinations within the park boundaries.

Dripping Cave. Dripping Cave is a popular natural interest point in the park. The sandstone overhang tucked into the narrow canyon was once used by 19th Century stagecoach and livestock thieves as a hide-out. Visitors can climb into the 15 x 40 foot cave for a closer inspection, viewing the holes in the wall that were once fitted with pegs to hold supplies or the blackened ceiling that is mistakenly thought to have been created by campfires. Moisture dripping from the ledges sustains the ferns and other plants that frame the opening of the cave.

Old Sycamore Grove. Large sycamores are among the largest trees in the park providing a distinctive destination and pleasant spot for a quick lunch or rest.

Old Corral. As the trail continues past the connection with Mathis Canyon Trail, the historic Old Corral site is located at the base of Corral Canyon. The corral dates back approximately 100 years and was once used as a pen for keeping sheep, calves, and horses.

Cave Rock. Cave Rock is a sandstone outcropping that features a cavity likely created by water erosion resulting from prehistoric wave action. Cave Rock is an interpretive site that allows for exploration of a unique sandstone rock feature.

Pecten Reef. Rich in paleontological resources, the exposed rock contains fossil impressions of pecten shells and other mollusks, sand dollars, barnacles, and additional marine creatures. The impressions are visible to the casual observer as the trail circles the rock outcrop through annual grassland habitat.

Willow Hut. Once a historical replica built by Domingo Belardes, the willow hut has long outlived itself and is returning to its natural state as a small grove of willow trees.

Plane Wreck. On April 23, 1946, a U.S. Marine Corps aircraft crashed in what is now AWCWP as a result of a mid-air collision. The wreckage of the crash can be found near the top of the Meadows Trail.

Laguna Coast Wilderness Park

City of Aliso Viejo

City of Laguna Hills

City of Laguna Beach

City of Laguna Niguel

Moulton Peak

Old Sycamore Grove

Old Corral

Alta Laguna Park

Top of the World

Dripping Cave

Soka University

Laguna Niguel Regional Park

Laguna Niguel Regional Park

Discovery Trail

Willow Hut

ACWHEP

Plane Wreck

Moulton Meadows Park

Coastal Treatment Plant

Rest Area

Seaview Park

Aliso Creek Golf Course

Aliso Beach

Aliso Beach Park

Badlands Park

Pectin Reef

Pacific Ocean

0 2,000 4,000 6,000 Feet

LEGEND

- Aliso and Wood Canyons Wilderness Park
- Laguna Coast Wilderness Park
- Laguna Niguel Regional Park
- Multi-Use Trail
- Proposed Multi-Use Trail
- Hiking Trail
- Bikeway
- Bikeway / Utility Access
- Utility Access
- Proposed Multi-Use Trail / Utility Access Road
- Creek
- Park Entrance - Level 1
- Park Entrance - Level 2
- Park Entrance - Level 3
- Park Entrance - Level 4
- Destinations
- Off-Site Destinations
- Scenic Overlook

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OC Public Works
GIS Mapping Unit
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DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 04/2004

DATE: May 12, 2009

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 19: Public Access and Recreation

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Back of Figure 19

Moulton Peak. At 891 feet, one of the highest viewing point in the park, Moulton Peak offers grand 360° views of Saddleback Valley and of the ridgelines, canyons, and hillsides that define the park. The peak also represents a visible landmark and destination for trail users.

Wood Creek. At Wood Creek, oak woodland canopies and chaparral shrubs create the most shaded trail experience within the park. Wood Creek flows for most of the year along this trail. The sound of the water flowing in the creek, frogs calling, and dry leaves churning in the breeze provides the backdrop to quiet nature appreciation and exploration.

7.3.4 Viewing Locations

Viewing locations (trail routes or overlooks) provide opportunities to appreciate the regional context (e.g., Pacific Ocean or San Gabriel Mountains), the immediate landscape (e.g., chaparral or oak woodland) or the influence of urban development (e.g., residences or utility lines). Several existing trails provide spectacular views.

Aliso Peak Trail. At 683 feet, the views of the Orange County Coast, Aliso Beach Park, and lower Aliso Canyon are spectacular. A steep and sometimes slippery hike up the bluff to Aliso Peak reveals a solitary bench positioned to take in views of the Pacific Ocean, Aliso Beach Park, City of Laguna Beach, and Aliso Creek Golf Course.

Aliso Summit Trail. The Aliso Summit Trail follows the eastern ridge of Aliso Canyon in Laguna Niguel and borders residential communities. The trail provides expansive views of Aliso and Wood Canyons and the Pacific Ocean along its entire route.

Aswut Trail. At 800 feet in elevation the Aswut Trail provides impressive views on either side: to the west lies the city of Laguna Beach and the Pacific Ocean with Santa Catalina Island visible on a clear day; and on the east sprawls the lower half of AWCWP, dense development east of the park, and the barely discernible San Gabriel and San Bernardino Mountain ranges.

West Ridge Trail. Beginning at an elevation of approximately 1000 feet, the trail traverses the ridge between Wood Canyon and Laguna Canyon. At this height there are breathtaking views of the Pacific Ocean and Santa Catalina Island to the west and the AWCWP with the San Gabriel and San Bernardino Mountains to the east.

Alwut Trail. The top of the Alwut Trail is designated as one of a handful of scenic overlooks in the park, providing impressive views of Corral, Mathis, and Wood Canyons.

Moulton Peak. At 890 feet, Moulton Peak offers expansive views of the ridgelines, canyons, and hillsides that define AWCWP. Single-family residential homes line the ridge immediately east and illustrate the proximity of AWCWP within a densely developed urban environment.

7.3.5 Off-Site Destinations

An important aspect of a regional park system is the ability to travel between desirable destinations without using a vehicle. Aliso Creek Bikeway represents a prime example of successfully linking a regional trail to local schools and neighborhoods. The Aliso Creek Bikeway connects visitors north to many city parks along the way, and to Limestone-Whiting Ranch Wilderness Park 12 miles north and to the Cleveland National Forest trails in the Santa Ana Mountains as well.

Several other off-site destinations have been consistently identified as logical and desirable links to AWCWP. In some cases, if an authorized trail does not provide an existing link, unauthorized trails achieve the connection.

Aliso Beach Park and the Pacific Ocean. Many vantage points in AWCWP provide views of the neighboring Pacific Ocean. Aliso Beach Park is located where Aliso Creek meets the ocean and is surrounded by coastal chaparral at its inland perimeters. The AWMA Road exits AWCWP through the Aliso Creek Golf Course and ends at PCH and the Beach parking lot. At present, this is not an authorized connection from AWCWP to Aliso Beach Park. A connection from AWCWP to Aliso Beach Park would be desirable.

Laguna Coast Wilderness Park. Laguna Coast Wilderness Park (LCWP) is part of the South Coast Wilderness area, which is comprised of AWCWP, Crystal Cove State Park, City of Irvine Open Space and Irvine Ranch Land Reserve, and LCWP. The Wilderness Park consists of approximately 6,500 acres of intact CSS, maritime chaparral, and oak woodland habitat with the only natural lakes (3) in Orange County. The park's great expanses can be viewed by AWCWP visitors hiking the West Ridge Trail. A connection between the two wilderness parks would be desirable.

Laguna Niguel Regional Park. The 236-acre Laguna Niguel Regional Park is located between Alicia Parkway and La Paz Road just east of AWCWP's main entrance. This suburban park features picnic sites; jogging, cycling, and equestrian trails; tennis and volleyball courts; and a 44 acre lake stocked with catfish, bass, blue gill, and trout for fishing.

Seaview Park. Seaview Park, an inconspicuous park located off of Talavera Drive, connects with the Aliso Peak Trail in the southern portion of AWCWP which provides expansive views of Aliso and Wood Canyons and the Pacific Ocean along its entire route.

Alta Laguna Park. Alta Laguna Park is located in Laguna Beach at the top of Alta Laguna Boulevard. This hilltop neighborhood park contains assorted playing fields, picnic sites, and a children's playground. A short trail extending from the park hooks up with the southern end of the West Ridge Trail in AWCWP.

Top of the World (TOW). The TOW vista point, at an elevation of approximately 1,050 feet, places the park within a regional context with its breathtaking views of the Pacific Ocean and Catalina Island, AWCWP sprawling to the east, and the San Gabriel and San Bernardino Mountains beyond. TOW is accessed by the West Ridge Trail at Alta Laguna Park.

Badlands Park. Badlands Park sits atop the sandstone oceanside cliffs that border the southeast corner of AWCWP. The park is perched on the oceanfront cliffs near the mouth of Aliso Canyon, 780 feet above South Laguna. Trails weaving through CSS lead to Aliso Peak in AWCWP.

Moulton Meadows Park. Moulton Meadows Park is located at Del Mar and Balboa Avenues in the City of Laguna Beach. The park has tennis and basketball courts, a children's playground, and a grassy playing field. From Moulton Meadows Park, visitors can enter AWCWP at the Aswut Trail.

7.3.6 New Park Trails

Recommendations for new trails respond to recognized destinations, prominent view locations and desirable off-site destinations described above. In some instances, the existing trail network does not provide sufficient opportunities for loop trail experiences. In response, several of the recommendations below formalize an existing unauthorized trail in order to achieve needed loops and/or connections.

1. **Reroute Corridor Trail.** The County Regional Riding and Hiking Trail Master Plan designates a connection between the northern end of AWCWP and LCWP. At present, users originating within Laguna Canyon at El Toro Road and the San Joaquin Hills Transportation Corridor, access AWCWP at Upper Wood Canyon via two unauthorized trails that lead to the Cholla Trail, these trails are known as the unauthorized Corridor routes. The existing unauthorized trails, along with the existing Stairstep Trail should be evaluated in order to create an accessible route in both an uphill and down hill direction for all trail uses. This rerouted Corridor Trail would become the preferred access to and from LCWP and El Moro. The Stairstep Trail currently provides the only legal option to access these other parks (legal access provided by the City of Laguna Beach). The Stairstep Trail is very steep and rugged and not a safe choice for many trail uses. A feasibility study should be initiated to evaluate several options with a goal to achieve this linkage.
2. **Aliso Beach Park Class 1 Bikeway.** The Aliso Creek Bikeway is an Orange County master-planned regional bikeway intended to stretch from the mountain foothills to the Pacific Ocean. The paved Class I bikeway begins at the foot of the Santa Ana Mountains, at the intersection of Santiago Canyon, El Toro, and Live Oak Canyon roads (Cook's Corner) and extends south toward AWCWP. The three mile section within AWCWP begins at Sheep Hills Park in Laguna Hills and ends at the junction of the creek and the AWMA Road just north of the main park entrance. The County Regional Riding and Hiking Trail Master Plan shows the regional trail continuing from AWCWP to the Pacific Ocean.

   The AWMA Road connects the main park entry to the treatment plant. Currently the agreement between the County and the Coastal Treatment Plant allows for public access Monday through Friday on the dirt trail that parallels the road up to the entry gate. On weekends the public is allowed to use the asphalt road up to the entry gate. Consistent with the County Regional Riding and Hiking Trail Master Plan, the Class 1

Bikeway should extend from the main park entry to the coast. Working with the Coastal Treatment Plant, the bikeway could be on the existing roadway with a parallel riding and hiking trail. At the southern terminus of the trail, this area could be improved as a rest stop for the eastern park boundary to include restrooms, a picnic area and interpretive displays. Equestrian use would terminate at the Coastal Treatment Plant with a corral for horses. From the proposed rest area, a new trail could take trail users upslope to an overlook with views of the Pacific Ocean.

In the future, the bikeway should be connected from the rest area to the Aliso Beach Park. The connection between AWCWP and the Aliso Beach Park would require a secure gate to prevent access to AWCWP at night.

3. **Car Wreck.** The unauthorized Car Wreck Trail, named for the crashed 1947 car protruding from a ravine along the route, snakes its way up a narrow and heavily rutted trail over exposed bedrock and through dense coastal sage scrub and chaparral before joining with Mathis Canyon Trail at the top. The Car Wreck Trail would offer an additional loop opportunity between the Mathis Trail, West Ridge Trail and Wood Canyon. Several sections of Car Wreck would need to be repaired or rerouted to improve drainage and safety. Oak Grove Trail is currently a dead end requiring and out and back trip. Improving Car Wreck as an authorized trail would provide access from the Oak Grove Trail to other areas of AWCWP.
4. **Nestall Trail (Birthday Trail).** Originating at the midpoint of Nestall Road, the Nestall Trail connects Nestall Road/Alta Laguna Boulevard at the Top of the World to the Dripping Cave Trail. This trail is extremely steep (elevation gain of 600 feet) and technical, crossing through the east facing hillside. Current conditions render uphill mountain biking very difficult and switchbacks would need to be added to protect native plants and enhance trail safety. In addition, authorization of this existing unauthorized trail would require signing and maintenance along most of its 1.25-mile length.
5. **East Ridge Trail (Five Oaks Link).** Five Oaks Trail connects Wood Canyon Trail to the water tank hill (Moulton Peak) at the east side of AWCWP. Private property prevents legal access to this trail from the east side of AWCWP. Five Oaks can only be accessed legally via Wood Canyon Trail thus requiring an out and back trail experience. A utility access road serves the water towers located at Moulton Peak and public access is currently prohibited. The utility road connects with several unauthorized trails in order to achieve a loop trail ride (or hike) from Five Oaks Trail. Lack of a loop trail in this location is a common complaint among trail users. A feasibility study should be initiated to work with the utility provider and evaluate the unauthorized routes in order to connect Five Oaks Trail north to Moulton Peak, Chollo Trail and Gate #7.
6. **Aliso Creek (East).** Along the east side of Aliso Creek, an on-grade dirt maintenance road runs through Aliso Canyon from Alicia Parkway to the Coastal Treatment Plant. The dirt road provides access to Coastal Treatment Plant's pipelines along the east side of Aliso Creek, is closed to the public, and is difficult to access from the west side of Aliso Creek. The County could work with the Coastal Treatment Plant to open this area in order to create a loop trail between the

ACWHEP structure (Aliso Creek Wetlands Habitat Enhancement Project) and the proposed trail on the west side of the creek that would come to the treatment plant and eventually connect to the coast. This trail provides an opportunity to connect the Laguna Niguel Regional Park with AWCWP. This trail would require an additional creek crossing for the public at the southern end. This trail may be for equestrian and hiking only.

7. **Aliso Summit Trail to Aliso Creek East.** The Aliso Summit Trail hugs the eastern ridge of Aliso Canyon in Laguna Niguel and borders residential communities. The trail is discontinuous in the existing route requiring users to make connections by leaving AWCWP and walking through a residential neighborhood before re-entering the park. At present the trail does not make a connection to other trails within AWCWP. A proposed connection from the Aliso Summit Trail downslope to the proposed Aliso Creek East Trail could follow an old road alignment and provide this needed connection to other areas of AWCWP.
8. **Moulton Meadows Linkage Trail.** The Moulton Meadows Linkage Trail would be a new trail that would begin northwest of the Coastal Treatment Plant and connect the AWMA Road to the existing Aswut Trail north of Moulton Meadows. From the AWMA Road the trail would extend diagonally northwest and upslope. The Moulton Meadows Linkage Trail would make a needed loop connection and provide access to desirable destinations in this southern area of AWCWP.

7.3.7 Unauthorized Trails (On-Site) to be Restored to Native Habitat

While the RMP recommends the formalization of specified unauthorized trails, the RMP also recommends that most of the unauthorized trails be closed and actively restored to native habitat consistent with the programs outlined in Section 8.0. To assure that impacts are lessened and a balance exists between trails restored to native habitat (closed trails) and trails being formalized (re-opening existing unauthorized trails) this RMP recommends that unauthorized trails slated to be authorized (opened) be opened once habitat restoration is successfully initiated for the unauthorized trails that are to remain closed within that area of the park. These unauthorized trails to be restored to native habitat include:

1. Ibis
2. Paradise
3. Dog Park
4. Smoothies
5. Alpine
6. Schoolyard
7. Red Rider
8. No Way Out
9. JT's

7.3.8 Trail Safety

Most of the trails in AWCWP are multi-use trails meaning that they are open to all types of trail users. Increased demand for trail access has resulted in a growing concern about conflicts between the different kinds of trail users and potentially unsafe trail conditions resulting from joint use. Safety concerns include:

- Collisions and near misses among users and/or their vehicles (bicycles)
- Reckless and irresponsible behavior
- Poor user preparation or judgment
- Unsafe conditions related to trail use (*e.g.,* deep ruts, erosion)
- Poor trail design, construction, maintenance or management
- Other hazards (*e.g.,* rattlesnakes, ticks, poison oak)

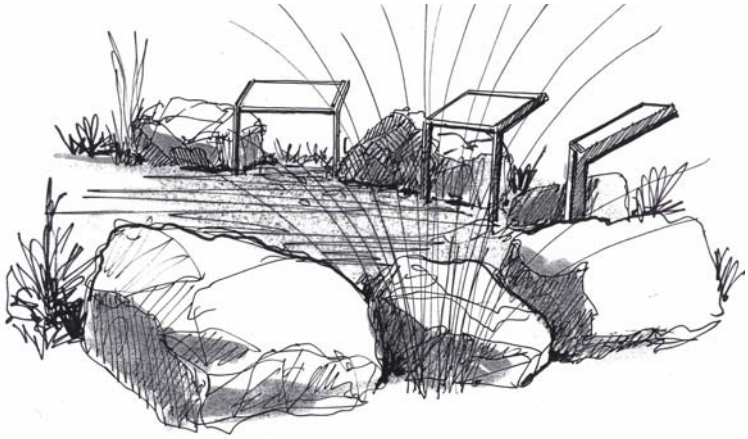
To help maintain user safety on trails, the County should:

- Implement an education program to promote awareness of trail safety and etiquette as a means of reducing trail conflicts.
- Provide additional ranger staffing to increase enforcement of park rules and regulations.
- Explore the potential for adopting a trail rating system to alert trail users to the level of difficulty of various trails. Post “Trail Rating” markers at the top and bottom of each trail.
- Monitor visitor use to determine trail popularity. On an annual basis, inspect park trails and make appropriate repairs.

7.4 PROPOSED PARK ENTRIES, IDENTITY AND IMAGE

AWCWP needs a clear sense of entry such that visitors immediately recognize that they have entered a County Wilderness Park. At the public meetings, people expressed a need to better define the entries to the park and to create an overall identity for the park: visitors should know that they are in a special place – possible with an entry monument(s). Communication of this identity begins with creating a clear hierarchy for entries with the design for each entry and continues in evaluating the content of displays, handouts and programs. The RMP presents concepts for park entry points (gateways), suggestions for organizing displays of information, and finally, ideas for themes and designs that will help reinforce a wilderness image for AWCWP.

Defining park gateways and reinforcing a park “image” are also management strategies as they are intended to help gain public respect for the park as well as to provide orientation and navigation to the park’s various resources. Accentuating the park’s identity defines AWCWP as a special place, contributes to protecting sensitive resources and creates a more attractive and informative place for residents and visitors.



Illustrative Gateway Concept
Aliso and Wood Canyons Wilderness Park has a wealth of resources and landscape stories to tell and interpret.

7.4.1 Gateway Concepts

AWCWP is surrounded by urbanized uses with over 35 potential points of entry. This can be confusing to the public in terms of knowing where they might be in relation to the entire park, but it is also a management challenge with regards to protecting resources and ensuring that the public is complying with park regulations and hours of operations. The gateways are critical for setting standards of conduct, directing the public to the various potential destinations and in explaining the purpose of the park and the richness and sensitivities of its resources. In review of the existing trail system, including authorized trails, unauthorized and new desirable trails, the points of entry become a key focus for how to make a successful trail system work – especially with all the existing and potential points of entry into the park.

A hierarchal system of gateways includes four types of park entry – graduated by the extent of available facilities and amenities, the amount of information and signage, and the extent that the gateway will require staffing and management. The following matrix illustrates the range of amenities and facilities combined with the primary purpose for each gateway type. This hierarchal system of entries is shown on Figure 19, Public Access and Recreation.

Table G: Suggested Gateway Hierarchy by Function and Amenities

Level (Type)	A Control Gate and Directional/ Regulatory Signage	Interpretive Signage w/ Kiosk	Drinking Fountain & Rest Facility	Parking	Staffing	Comments
1	√	√	√	√	√	Only one primary gateway, could also include expanded interpretive features and venues
2	√	√	√	√		Secondary level entry at major public interface
3	√	√	√			Tertiary entry point: Rest rooms and drinking fountain option if not provided by other
4	√					Typical low profile neighborhood entry point

7.4.2 Gateway Design Considerations

This section addresses some general design considerations for a park-wide system. "Design" in this sense means a consistent image or character or treatment in terms of materials, colors, surfaces, plants; consistency in graphic and text formats; and design in the layout of the developed areas such as the park gateways.

Comprehensive and Consistent Parkwide Image ("Branding"). One purpose of this management plan is to begin to create a park image that people can readily recognize as AWCWP. This "branding" helps define a sense of place that differentiates it from other parks and helps contribute to building pride and ownership by park users. It can also reinforce the stewardship of public lands for their recreation, open space, and conservation values.

A park-wide image includes consistency with written and graphic materials. Wherever it is displayed – on signs, in printed formats, or on the park's website – information concerning AWCWP should contain a recognizable and consistent style and image, accentuated by a recognizable icon or logo ("brand"). A park-wide "brand" defines and reinforces the unique character of place and accentuates the cohesion of the park's multiple resources. The process of this "branding" requires time, creativity, and "buy-in" from various parties.

Once an identifiable concept is developed, it can be expected to help in making park-related signs and materials more attractive, cohesive, as well as useful in creating a positive image for public outreach and marketing purposes.

Context-Sensitive Development. Recreation use and environmental conservation or restoration activities should be "context sensitive" and adapted to the intrinsic resource values of the site. A context-sensitive approach develops parks infrastructure and recreational facilities carefully, respecting the natural setting, surrounding land uses, onsite sensitive resources, and existing topographic contours. For example, improvements

associated with active uses – such as parking lots and restrooms – should be located away from sensitive habitat, such as riparian areas.

Recreational facilities or improvements should be developed where they are needed, but in such ways as to blend in and be compatible with the surroundings. When the design is responsive to the existing setting, appropriate recreational uses can be accommodated, and areas with environmental, cultural, and scenic sensitivities will be protected from major adverse effects.

Multiple Uses through Design. Open space and park planning often involves various uses or potential uses sharing a particular land or space. The County should seek to implement designs that promote compatibility for multiple park areas with integrated uses.

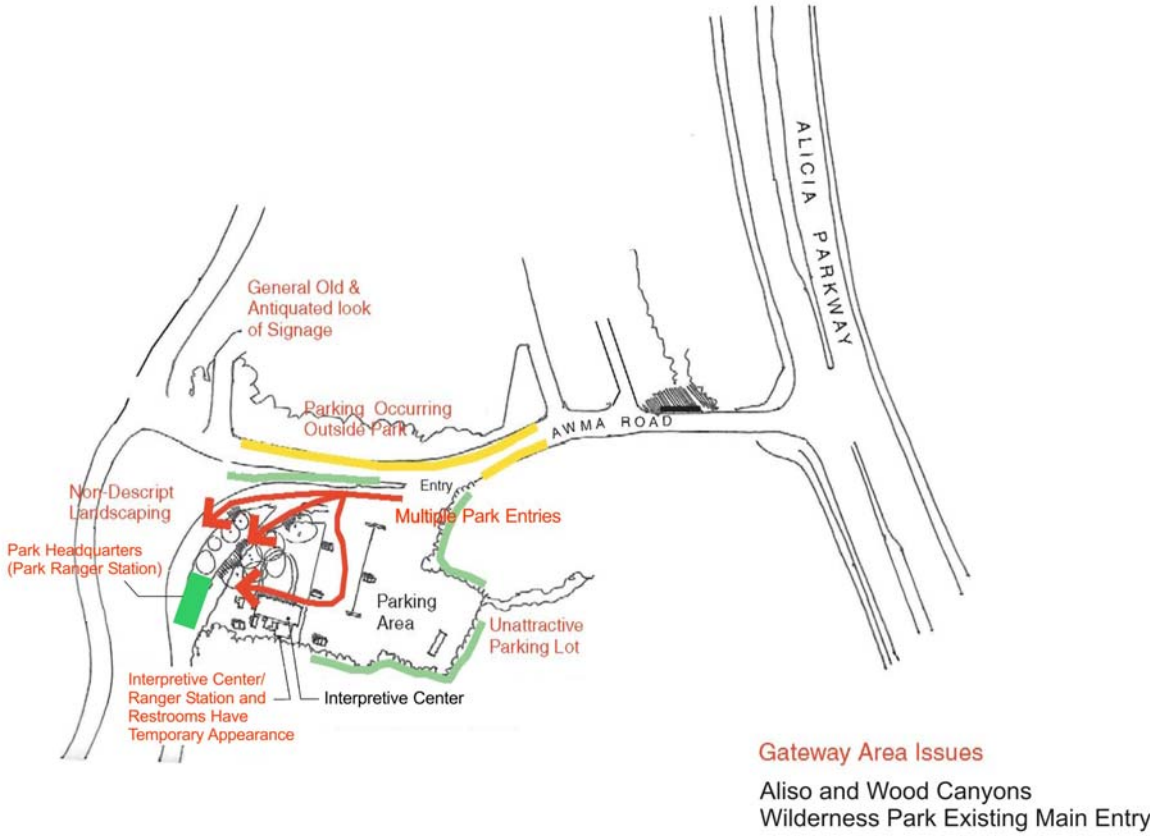
Large public land areas may have value as habitat, recreation sites, flood storage areas, and other uses. Multiple, integrated use is possible though careful designation and control of public access points, designation of uses, and public education.

Low Impact to the Environment. Design, operation, and management of the park system should be conducted in such ways as to have minimal impact on the environment. Park design and uses should conscientiously seek to minimize adverse effects on fish and wildlife and the habitats upon which they depend.

The intent of this plan is to integrate conservation values with recreation values, as much as possible. Park management – while meeting the recreational and safety needs of residents and visitors – should also help to accomplish other goals, such as regional conservation, water supply and replenishment, and floodplain management.

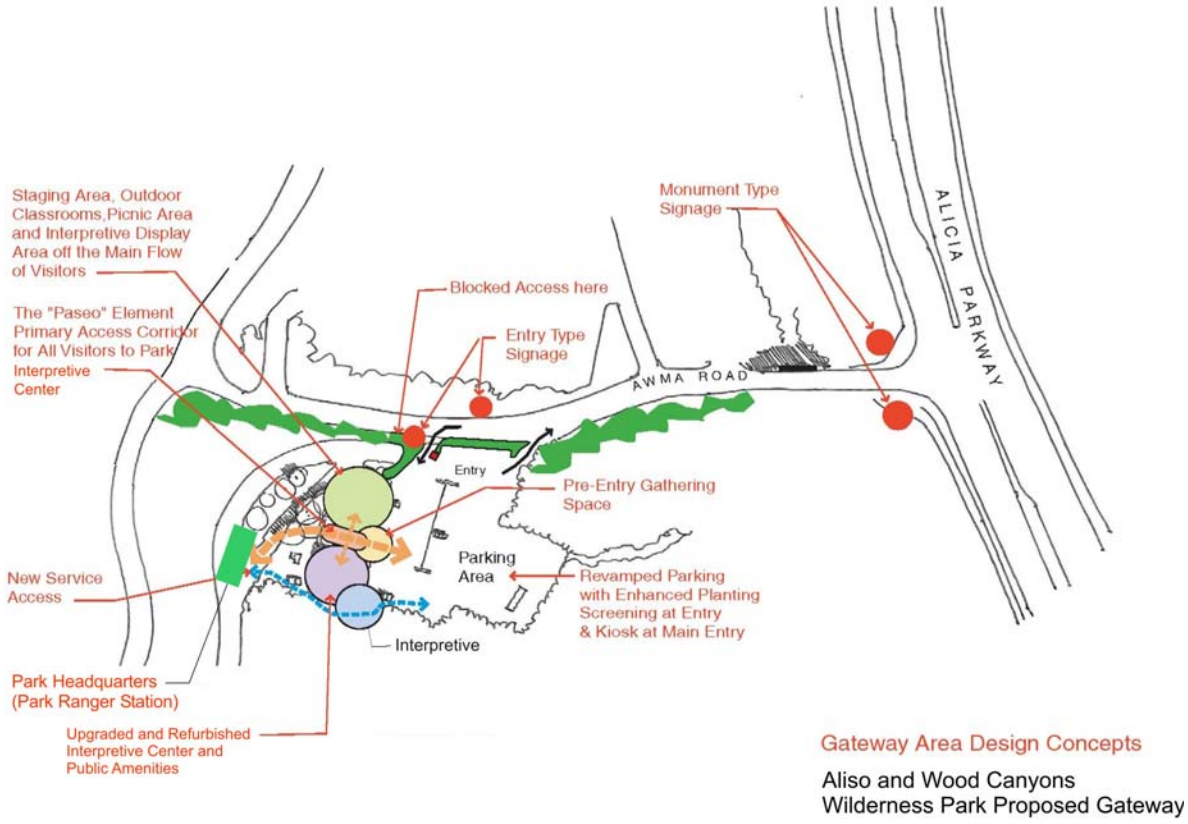
7.4.3 Park Gateway Issues and Design Concepts

Several challenges exist with the primary park gateway and entry facilities. Poor or antiquated signage, the absence of signage at key points near the entry, and the diffused multiple entry routes into to the park create confusion and lack of orientation for the park visitor. The lack of a coherent parking lot design creates inefficient use of the space; resulting in excessive unusable space and parking overflow onto the adjoining public street. In addition, the parking lot, as the first public destination to the park is neither attractive nor distinguished with landscaping. Lastly, the temporary appearance and quality of the park headquarters, interpretive center, the restrooms, and other public serving amenities offer little to enhance a sense of place or embellish the recreation and educational potentials of the primary entry to the park.



These challenges can be addressed with the development of a consistent image and well-thought out design**.** Clear, easy-to-understand directional signage can be key to the visitor's experience. Beginning with Alicia Parkway, monument park signage should be situated to announce the park and alert visitors and passerby of the presence of a high-quality park and facility. Enhancing this entry with native plants typical of the park can also draw attention to this entry. Additional planting of native trees and shrubs along the length of the entry road can further accentuate a sense of arrival and the visitor's transition from an urban space to a natural environment.

An efficiently designed parking lot can reduce visitor confusion and frustration and accentuate the sense of arrival while providing shade, enhancing the natural character of the site and contributing to a sense of place. A clearly marked entry with and informational kiosk will also reinforce a sense of arrival.



Upon approaching the park ranger's station (trailer), a forecourt is suggested to serve as a transition zone from the parking lot to the park as well as a gathering spot or waiting area for visitors including cyclists. The staging areas serve as important pre-trail spaces for activities such as organizing equipment and gear as well as warm up and cool down areas for trail users. Visitors need a place to meet. This staging area can include visitor information such as an introduction to the park, trail access and park orientation information.

The next recommended element is a paseo feature, a centralized access route into the park that will be used by all park visitors, linking the forecourt, the park ranger's station, the interpretive center, outdoor classrooms, and picnic and staging areas. The outdoor classrooms and interpretive area could then be situated like rooms off of this main circulation flow and may include picnic and other amenity features.

Outdoor interpretation could include enhanced native plant exhibits and self-guided tours, wildlife attractors such as butterfly gardens, birdfeeders, paleontological artifacts, and historical features.

Service roads should also be incorporated into the entry design and screened from the main visitor areas through the use of gates and landscape buffers. Removable bollards are suggested where pedestrian use is the primary traffic in the area.

7.5 RECOMMENDATIONS

General Actions

- Develop public access facilities and improvements that blend in and are compatible with the surroundings and in keeping with a wilderness park.
- Create a comprehensive and consistent park-wide image for use in all park signs, promotional materials, and park amenities.
- Implement an education program to promote awareness of trail safety and etiquette as a means of reducing trail conflicts.
- Provide additional park ranger staffing to increase enforcement of park rules and regulations.
- Explore the potential for adopting a trail rating system to alert trail users to the level of difficult of various trails. Post Trail Rating Markers at the top and bottom of each trail.
- Coordinate with City and private land owners to get/perfect legal access rights for trail entrances into the park, which cross City (Laguna Niguel, Aliso Viejo, or Laguna Beach) owned and management property or with benefit of an easement from any other land owner.
- Conduct routine monitoring and management to prevent construction of unauthorized trails.

As-Needed Actions

- Incorporate the guiding principles as outlined in this RMP for managing existing trails and creating new trails.
- Continue ongoing maintenance of existing authorized trails.

Annual Actions

- Monitor visitor use to determine trail traffic volumes. On an annual basis, inspect park trails and make appropriate repairs. For example, evaluate the need for a bridge at the current Arizona crossing on the Wood Canyon trail to remedy the unsafe, steep trail condition.

Five Year Actions

- Close and actively restore to native habitat the following trails consistent with the programs outlined in this RMP:
    1. Ibis
    2. Paradise
    3. Dog Park
    4. Smoothies

5. Alpine
6. Schoolyard
7. Red Rider
8. No Way Out
9. JTs

- Reclassify and improve the following existing unauthorized trails to an authorized trail status or create new trails to provide access to key destination points, viewing locations, off-site destinations, and to provide needed loops and connections:

  1. Reroute Corridor Trail
  2. Aliso Beach Park Class I Bikeway
  3. Car Wreck
  4. Nestall (aka Birthday)
  5. East Ridge Trail (Five Oaks Link)
  6. Aliso Creek (East)
  7. Aliso Summit Trail to Aliso Creek East
  8. Moulton Meadows Linkage Trail

- Implement the following minor improvements to enhance the main entry and parking area:

  1. Place monument park signage on Alicia Parkway to announce the park.
  2. Enhance the entry and entry road with native plants and trees typical to the park.
  3. Reconfigure the parking area to accentuate the sense of arrival.

Ten Year Actions

- Implement the following major improvements to enhance the main park entry:

  1. Create a forecourt or pre-entry to serve as a transition zone from the parking lot to the center as well as a gathering place for visitors.
  2. Create a paseo feature, a centralized access route to the park linking the forecourt, ranger's station, future Orange Coast Watershed and Environmental Center, interpretive exhibits, outdoor classrooms, and picnic and staging areas.

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8.0 Biological Resources

8.0 BIOLOGICAL RESOURCES

Due to variations in the character of vegetation, historic uses, and recreational impacts in AWCWP, management requirements for biological resources range from a "hands off" approach in some cases to relatively intensive, active habitat manipulation. Much of the vegetation in the park is composed of natural plant communities that are naturally adapted to recovery from disturbances such as fires or landslides. Therefore, in many cases where natural or even artificial disturbances have occurred, quick recovery or somewhat slower natural succession will lead to restored natural plant communities without benefit of active management techniques. The only management required will be to avoid additional impacts and let nature take its course. In other situations, particularly with regard to fire prevention, excessive management adversely affects the health of natural plant communities. Again, it may be advisable to allow natural events to occur, although some active management techniques may be required. Finally, there are times when the only means to restore a native plant community is intensive manipulation and management. This approach is usually only necessary where damage has been severe or where introduced exotic plants, such as Italian thistle or giant reed out-compete the native plants that historically occupied a given area.

The following management and monitoring techniques are organized according to the above approaches. For most plant associations, monitoring will either confirm that active management is not necessary, or indicate minimal management techniques. However, in a few cases, it is presumed that active management is appropriate, and the function of monitoring will be to assist in the timing of management activities and to assess management success.

More specific resource management information is included in Appendix F, Restoration Methods and Materials.

8.1 RESOURCE PROTECTION

8.1.1 Protection/Maintenance of Natural Assemblages

In order to protect and maintain populations of native plants and wildlife within the park several management actions are needed. In addition, while accomplishing these management actions, collaboration with other agencies, organizations and volunteers will likely be necessary.

Vegetation Communities. Ecological diversity must be maintained by managing plant associations, while still allowing natural succession to occur. This may require both active and "hands off" management. Importantly, threatened or under-protected vegetation communities such as coastal sage scrub, oak woodlands and riparian areas need to be protected from human disturbance to allow those communities to thrive. Figure 20, Sensitive

Vegetation Communities, depicts areas that have sensitive vegetation plant communities that should be targeted for protection and long-term persistence.

Edge Effects. Where the park boundary meets urban areas, "edge effects" can negatively impact the park's natural resources. Thus, it will be necessary to work with adjacent landowners and jurisdictions to create appropriate buffer zones to minimize edge effects. Where existing development does not provide an adequate buffer, methods need to be promoted with new and existing urban areas to minimize edge effects.

Park Trails. Park trails should be designed and located to avoid encroachment into sensitive habitats and principal off-site wildlife linkages to the maximum extent feasible. Most of the existing trails and some of the proposed trails go through important habitat, which is unavoidable as the entire park is considered important habitat. However, the benefits derived from closing and restoring unauthorized trails are intended to off-set these proposed impacts.

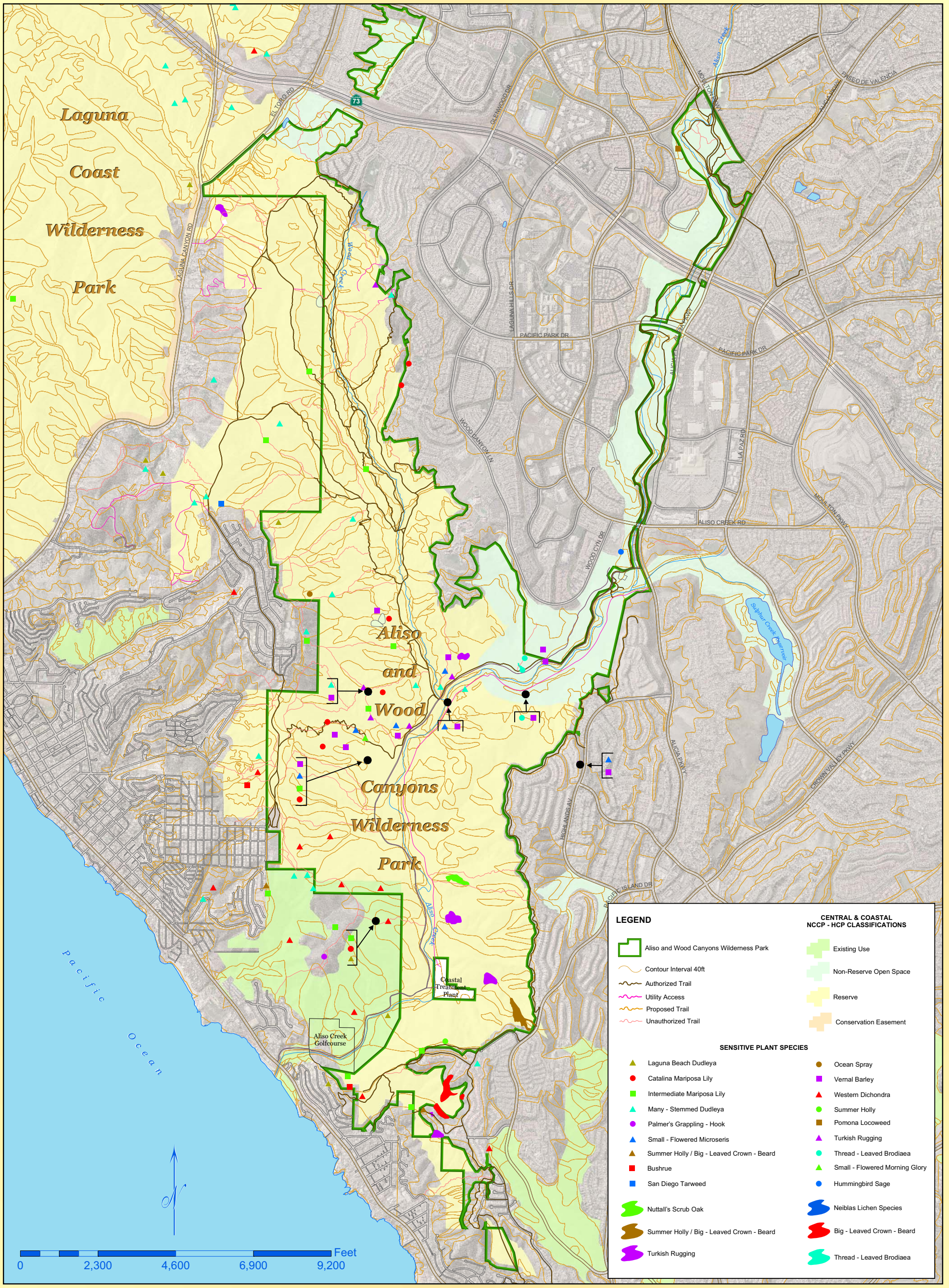
Access Restrictions. In areas that are unsafe or inappropriate for users, public access must be restricted. Such areas include sites where conflicts with wildlife may occur, where conditions are degraded, and where it is necessary to minimize impacts to sensitive habitat for conservation or restoration. In addition, temporary closure of trails or other facilities may be necessary to effect a beneficial change in a significant habitat.

8.1.2 Improving Biological Productivity and Diversity

In order to improve biological productivity and diversity, habitats must be protected, enhanced, restored, and controlled for pest animal species. Management of the NCCP/HCP Reserve (Reserve) should follow recommendations in the Habitat Restoration and Enhancement Plan (HREP) that was prepared for the NROC (LSA 2003). The HREP is an approved plan for the Reserve, is consistent with the strategies in the HCCP/NCP, and specifically addresses the restoration and management needs for the coastal subregion portion of the Reserve, of which AWCWP is a part.

Improving Habitat Quality. To improve habitat quality selected unauthorized trails within the park must be closed and restored to native habitat, as described in the trail section of the RMP (Section 6.4). Also, a long-term invasive exotic plant management plan and implementation program must be developed that includes both natural and disturbed areas in the park. Similarly, a park-wide management program needs to be developed to control vertebrate pest species for the purpose of protecting park resources and public health. Controlling the presence of non-native species will allow natural biodiversity and biological productivity to improve. To encourage native vegetation growth to increase and to restore the biotic and abiotic processes of naturally occurring plant communities, it will be necessary to explore the use of prescribed burns or other selective fuel reduction.

Ensuring Connectivity. Off-site areas that may serve as connection routes for large mammals between the AWCWP and other open space, including lands owned and managed by the County, must be considered in trail plans and habitat management. Connectivity between open spaces will ensure that animal movement constraints within the



LEGEND

- Aliso and Wood Canyons Wilderness Park
- Contour Interval 40ft
- Authorized Trail
- Utility Access
- Proposed Trail
- Unauthorized Trail

CENTRAL & COASTAL NCCP - HCP CLASSIFICATIONS

- Existing Use
- Non-Reserve Open Space
- Reserve
- Conservation Easement

SENSITIVE PLANT SPECIES

- Laguna Beach Dudleya
- Catalina Mariposa Lily
- Intermediate Mariposa Lily
- Many - Stemmed Dudleya
- Palmer's Grappling - Hook
- Small - Flowered Microseris
- Summer Holly / Big - Leaved Crown - Beard
- Bushrue
- San Diego Tarweed
- Ocean Spray
- Vernal Barley
- Western Dichondra
- Summer Holly
- Pomona Locoweed
- Turkish Rugging
- Thread - Leaved Brodiaea
- Small - Flowered Morning Glory
- Hummingbird Sage
- Nuttall's Scrub Oak
- Summer Holly / Big - Leaved Crown - Beard
- Turkish Rugging
- Neiblas Lichen Species
- Big - Leaved Crown - Beard
- Thread - Leaved Brodiaea

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- NOAA 3 meter DEM 2002
- Eagle Aerial Image 1 foot resolution, flown April 2004
- Draft Aliso and Wood Canyons Wilderness Park Resource Management Plan Dated July 1991
- California Natural Diversity Data Base, April 12, 1999
- Field Surveys conducted by Harmsworth and Associates between March and July, 1998
- Supervising Park Ranger Tom Maloney, February 10, 2006

DATE: June 4, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 20: Sensitive Vegetation Communities

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Back of Figure 20

park are minimized, thus creating a more natural environment for highly mobile species. Figure 15, Wildlife Corridors, displays areas that should be targeted for maintaining connectivity for wildlife.

8.2 HABITAT ENHANCEMENT AND RESTORATION

8.2.1 Existing Conditions

Biologically, the NCCP/HCP Habitat Reserve preserves a microcosm of the California Floristic Province, an identified biodiversity hot spot in North America and a genetic reserve for the continent. The Reserve, of which AWCWP is a part, is therefore regionally and nationally significant as a prime example of this unique habitat web, yet it occurs in an area that is nearly surrounded by existing development with attendant human influences.

The distribution of vegetation types and subtypes within the AWCWP is influenced by a variety of abiotic factors, including soils, slope steepness and aspect, elevation, and microclimate. These, in turn are influenced significantly by the combination of the geology of the region and local climatic influences (*e.g.*, coastal fog). AWCWP is in a region that represents a transition between two coastal sage scrub habitat types, Venturan and Diegan, as classified state-wide by Holland (1986).

The AWCWP contains many unique habitat types and includes the confluence of two creeks (Aliso Creek and Wood Creek) including the canyon slopes surrounding each of these creeks. As a result, the AWCWP is composed of a mosaic of wildlife habitats including coastal scrub, chaparral, grassland, riparian, woodland, and rock-and-cliff. The AWCWP is known to have high species diversity due to the quality native habitat associated with the undisturbed slopes and canyons, diverse habitat types and the connectivity and continuity of habitat with adjacent native lands (VST 1991; Almanza 1992; County 1998; County map 2002). A discussion of general wildlife and endangered, threatened and special interest species known to occur or having the potential to occur within the AWCWP are addressed in Section 4.4 and the Existing Conditions Report (Appendix I), including information based on previous and ongoing studies conducted by research biologists in and adjacent to the AWCWP. Vegetation communities in the park are greatly affected by modified fire regimes, changes in hydrology, and invasion by exotic plant species. These are major factors that influence the structure and composition of the park's habitats, and are further discussed in the Existing Conditions Report. Factors that influence the natural vegetation communities in the park need to be managed to reduce future degradation and encourage natural communities to emerge

Unauthorized Trails. Visitor-created unauthorized trails and shortcuts exist in the AWCWP due to a long history of use prior to the establishment of the park. The Lower Wood Canyon Management Zone contains many of the park's unauthorized trails which come down from the ridge separating Wood and Laguna Canyons. Unauthorized trails contribute to erosion, habitat fragmentation, alteration of natural drainage patterns, introduction of exotic vegetation, degradation of native vegetation, and increased human-wildlife conflicts. Steep trails without adequate ground cover are heavily eroded with cutting and compaction along their edges. In some areas, trails act as drainage ditches carrying water during storm

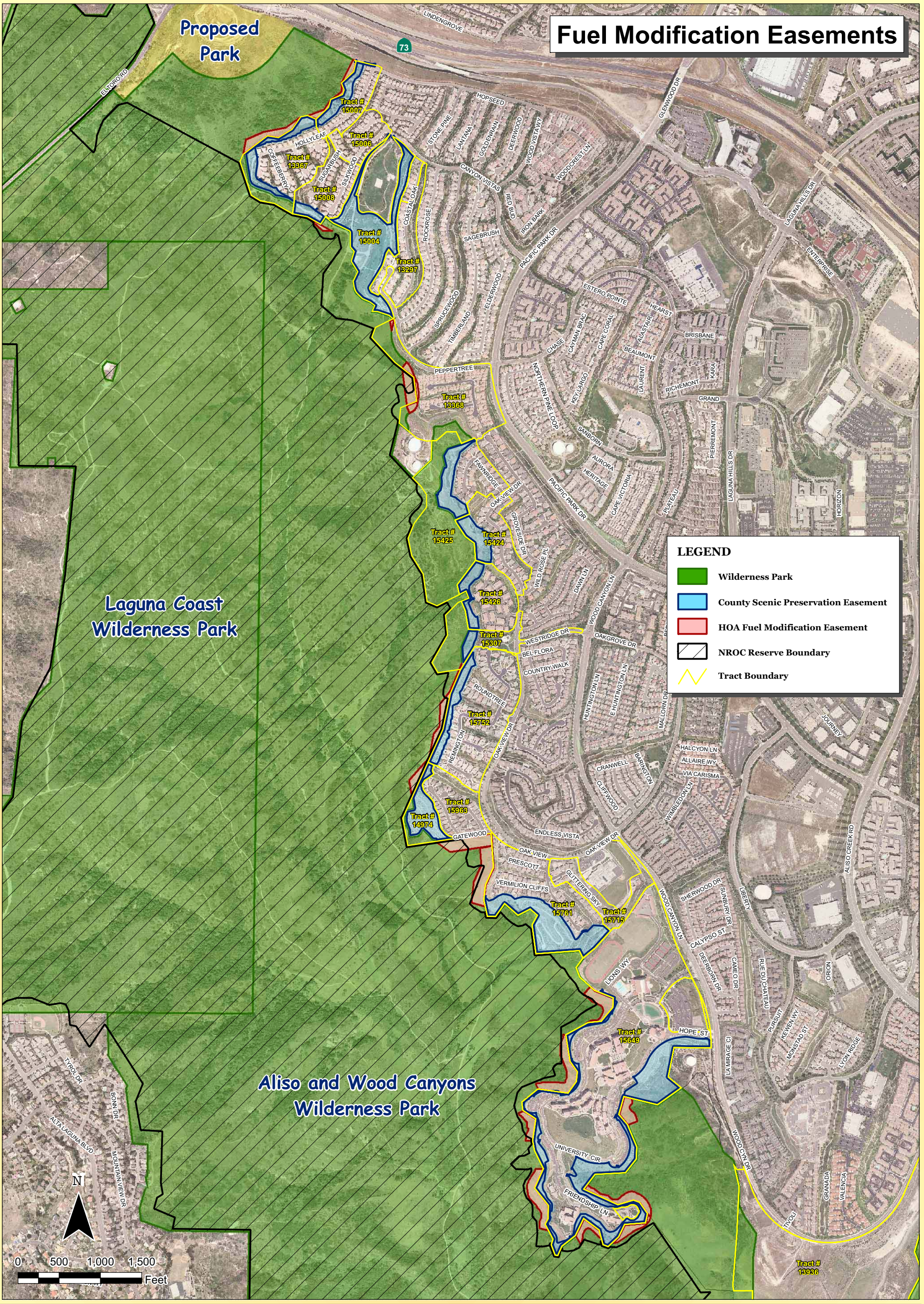
events. In addition, off-trail use by people and pets tramples native vegetation, degrades habitat, disturbs wildlife, and promotes invasive exotic species growth. In particular, downhill mountain biking trails on steep hillsides exacerbate conditions that lead to erosion because they compact soils, remove ground cover and concentrate runoff flows. Erosion in turn impacts streams and watercourses by increasing sedimentation and degrading water quality. Thus, soil productivity and water-holding capacity is reduced and the habitat value of riparian and wetland ecosystems are diminished or lost.

Fuel Modification Areas. The AWCWP has urban areas along most of its boundaries that require fuel modification (Figures 21A through 21D: Fuel Modification Zones). Mismanagement of these fuel modification zones has the potential to adversely affect the park. Overzealous vegetation removal, overuse of herbicides and failure to revegetate with fire-resistant, native plant species contribute to soil erosion, poor water quality and degradation of native habitat. In addition, the large number of fuel mod/landscape plans governing the fuel modification zones and inconsistency in management approaches make it difficult for park managers to ensure appropriate management is taking place. Proper management of these areas is important for erosion and weed control, and wildlife management.

Exotic Vegetation/Weed Polygons. California has become the adopted home of over 1,000 plant species from other parts of the world. Most of these originated in the Mediterranean region, where the climate is similar to Southern California's. The majority of California's exotic species are fast-growing annuals that prefer disturbed habitats and are prodigious seed producers (Barbour et al. 1993). Exotic or nonnative plant species often change the landscape and the natural relationships between native plant cover, soil, hydrology, and wildlife by outcompeting native plants. Not all nonnative species are invasive and harmful, but many (e.g., giant reed) can completely take over and change entire established ecosystems. The consequences of the invasion, including alteration of habitat and disruption of natural ecosystem processes, can be catastrophic for native species.

Weed polygons were mapped for the NROC Habitat Restoration and Enhancement Plan (LSA 2003) by The Nature Conservancy (Figures 22 and 23). The minimum mapping unit was one acre. Weed polygons were delineated based on the type of exotic species and their cover in a given area. New weed polygons within the disturbed habitat types were created if the suite of exotic species changed or if exotic species cover values changed. Variables collected for each weed polygon consisted of weed polygon number, access potential, erosion potential, disturbance factors, the top four dominant exotic species present, percent exotic cover value, existing native habitat, percent native cover value, and number of native species. Cover class values used were 0-10 percent, 11-30 percent, 31-50 percent, and greater than 50 percent. Native species occurring within the weed polygons were noted. Photographs were also taken of each new weed polygon. These data, along with updates of current weed infestation areas identified by park rangers and maintenance personnel, should be used to prepare a comprehensive Habitat Restoration and Enhancement Map. This map will be used to guide future habitat restoration activities, and track the locations of past and ongoing activities. Table H summarizes the weed polygon data.

Fuel Modification Easements



DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 04/2004

DATE: June 4, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Fuel Modification Within Park Boundary
Figure 21A: HOA Fuel Modification Easements

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Back of Figure 21a

NCCP Fuel Modification Zone

Crystal Cove State Park

Laguna Coast Wilderness Park

Laguna Heights

Temple Hills

Top of the World

Aliso & Wood Canyons Wilderness Park

Moulton Meadows

Laguna Beach County Water District

Irvine Ranch Land Reserve

City of Laguna Beach

150'

145'

155'

Pacific Ocean

N

0 800 1,600 2,400 3,200 4,000 Feet

LEGEND

- County Parks
- NCCP Reserve
- County Open Space Easement (Open Space Easement Allows Fuel Modification Within 100 Feet of Residential Development)
- NCCP Fuel Modification Zone

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OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 06/2005

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Fuel Modification Within Park Boundary
Figure 21B: NCCP Fuel Modification Zone

San Bernardino County
Los Angeles County
ORANGE COUNTY
Riverside County
San Diego County
Area of Interest
Pacific Ocean

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Back of Figure 21b

Fuel Mod Performed by Park Staff

Location	Affected Area	Method of Removal	Maintenance Schedule	Type
North Border of Anneliese's School 20062 Laguna Canyon Rd	100 Foot Wide Strip	Selective Thinning	April - June	Elective
Near Intersection of El Toro Rd and Laguna Canyon Rd	About 2 Acres	Mowing	April - June	Elective
Valido Trail	100 Foot Wide Strip	Selective Thinning	April - June	Elective
Villa Solana Apartments North Border of Tract 12039 Near Intersection of Moulton parkway and Via Lomas	100 Foot Wide Strip	Mowing	April - June	Elective
Park / SOCWA Access Road	10 Feet on Each Side of Road	Mowing	April - June	Elective
ASWUT Fire Access Road	20 Feet on Each Side of Road	Mowing	April - June	Required

Aliso and Wood Canyons Wilderness Park

Pacific Ocean

LEGEND

- Park / SOCWA Access Road
- ASWUT Fire Access Road
- Aliso and Wood Canyons Wilderness Park
- Laguna Coast Wilderness Park

Fuel Modification Method

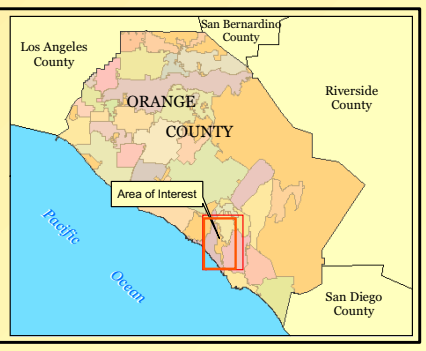
- Mowing
- Selective Thinning (100ft wide strip)

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 06/2005

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Fuel Modification Within Park Boundary
Figure 21C: OC Parks Fuel Modification



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Aliso and Wood Canyons Wilderness Park

Location	Affected Area	Method of Removal	Maintenance Schedule
North Border of Anneliese's School 20062 Laguna Canyon Rd	100 foot wide strip	Selective Thinning	April - June
Near Intersection of El Toro Rd and Laguna Canyon Rd	About 2 Acres	Mowing	April - June
Valido Trail	100 foot wide strip	Selective Thinning	April - June
Villa Solana Apartments North Border of Tract 12039 Near Intersection of Moulton Parkway and Via Lomas	100 foot wide strip	Mowing	April - June
Park / SOCWA Access Road	10 feet on each side of road	Mowing	April - June

LEGEND

Fuel Modification Method

- Mowing
- Selective Thinning (100ft wide strip)
- Park / SOCWA Access Road

Elective Fuel Modification

Aliso and Wood Canyons Wilderness Park

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 foot resolution, flown 06/2005

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Fuel Modification Within Park Boundary
Figure 21D: Elective OC Parks Fuel Modification

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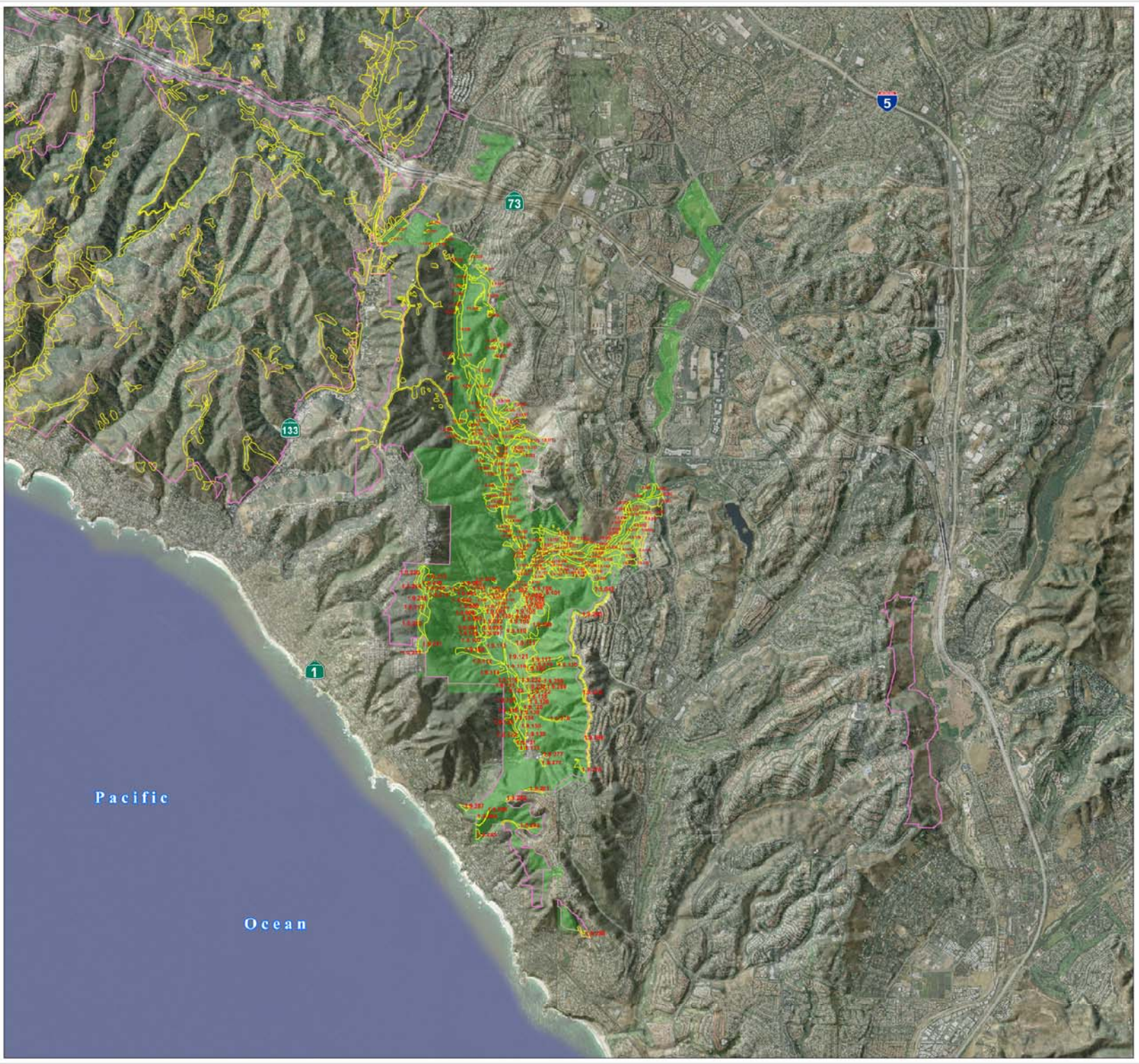

RESTORATION AND ENHANCEMENT

Orange County, California

Aliso & Wood Canyon Wilderness Park

county of orange
HARBORS BEACHES & PARKS
in coordination with
Planning & Development Services Department

Exotic Plant Survey
Aliso & Wood Canyons Wilderness Park
NCCP Reserve Boundary

Orange County, California
BRYAN G. SPEEGLE, DIRECTOR
RESOURCES & DEVELOPMENT MANAGEMENT DEPARTMENT (RDMD)
TIMOTHY S. KELLY, DIRECTOR
PLANNING & DEVELOPMENT SERVICES (PDS)
PLANNING III SECTION

0 1,500 2,800 3,000
Feet

DESIGNED AND PRODUCED BY:

Planning and Development Services
Planning GIS Section
Albert Lucero

DATA SOURCE:
- Planning and Development Services
- Nature Reserve of Orange County

DATE: May 11, 2009

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 22: Weed Polygons
(Restoration and Enhancement)

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Exotic Plant Treatment Sites 2007

Aliso & Wood Canyons

Nature Reserve of Orange County Weeding Program

Bryan G. Speegle, Director
Resources & Development Management Department

Timothy S. Neely
Planning & Development Services (PDS)
Resource & Development Management Department (RDMD)
Planning GIS Section

Pacific

Ocean

Artichoke Thistle Cover

- Less then or equal to 1 Percent (304 Total Acres)
- 2 - 10 Percent (98 Total Acres)
- 10 - 20 Percent (38 Total Acres)
- 20 - 30 Percent (15 Total Acres)
- 30 - 50 Percent (5 Total Acres)
- Greater then 50 Percent (20 Total Acres)
- NCCP Reserve

PGIS\Projects\Weeds2007 (Aliso & Wood).mxd

DESIGNED AND PRODUCED BY:

Planning and Development Services
Planning GIS Section
Albert Lucero

DATA SOURCE:

- Planning and Development Services
- Nature Reserve of Orange County

DATE: May 11, 2009

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 23: Weed Polygons
(Exotic Plant Treatment Sites)

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Table H: Weed Polygon Data within AWCWP

Total Number of Weed Polygons		293
Total Weed Polygon Acreage		1,006
% of AWCWP mapped as Weed Polygons		25%
Dominant Exotic Species in Order of Polygon Abundance (Scientific Name)	**Number of Polygons with the Species**	**Total Polygon Acreage**
Brassica nigra	192	693.12
Cynara cardunculus	165	635.39
Carpobrotus edulis	112	0.40
Nicotiana glauca	59	201.37
Nonnative grass	54	181.13
Centaurea melitensis	51	162.07
Foeniculum vulgare	43	182.62
Conium maculatum	38	138.55
Xanthium spinosum	30	95.14
Cortaderia selloana	20	130.56
Arundo donax	12	71.38
Melilotus indica	11	17.05
Marrubium vulgare	10	39.35
Silybum marianum	9	42.97
Cirsium vulgare	6	9.67
Schinus terebinthifolius	4	19.62
Eucalyptus globulus	3	14.10
Hirschfeldia incana	3	16.98
Pinus species	3	15.71
Carduus pycnocephalus	2	423.65
Myoporum laetum	2	8.62
Pennisetum setaceum	2	2.71
Ricinus communis	2	8.88
Salsola tragus	2	3.40
Agave species	1	0.14
Chrysanthemum coronarium	1	6.25
Ehrharta calycina	1	4.37
Lactuca serriola	1	0.54
Limonium sinuatum	1	12.89
Sonchus species	1	0.77

8.2.2 Locations of Dominant Invasive Exotic Weeds

The most abundant dominant exotic species occurring within grassland areas of AWCWP are: exotic annual grasses; black mustard; poison hemlock; artichoke thistle; milk thistle; Italian thistle; and bristly ox-tongue. Within the drainages and other areas, giant reed, tree

tobacco, poison hemlock, castor bean, and pampas grass are of concern (LSA 2003). Eucalyptus and other ornamental shrubs and groundcover are planted at the Coastal Treatment Plant, and the eucalyptus continues downstream to the nine-hole Aliso Creek Golf Club just outside of AWCWP. Many of the ornamental plants are not invasive in southern California. Clearly, nonnative grasses, black mustard, thistle species, and giant reed are the major obstacles to restoration in both distribution and density.

Artichoke Thistle (*Cynara cardunculus*), Milk Thistle (*Silybum marianum*), and Italian Thistle (*Carduus pycnocephalus*). Artichoke thistle is primarily found in patches along hillsides, gullies, and drainages in Aliso Canyon. It is plentiful in Aliso Canyon, particularly in the open slopes just north of the confluence with Wood Creek. It is not as dominant in Wood Canyon, except at the beginning of Mathis Canyon Trail. Milk thistle is found throughout the large grasslands of Aliso and Wood Canyons, often in association with black mustard, Italian thistle, and artichoke thistle. These exotic species are often found concentrated at the grassland/sage scrub ecotone, along roads and trails, and at the edges of oak woodlands.

Black Mustard (*Brassica nigra*) and Poison Hemlock (*Conium maculatum*). Black mustard and poison hemlock are found commonly in the disturbed lowlands and at the sage scrub/grassland ecotone. Black mustard appears to be invading from adjacent development areas on the ridges surrounding AWCWP. Dense stands are evident throughout Aliso and Wood Canyons, particularly on the disturbed slopes and in the fuel break areas below ridgeline homes. Poison hemlock grows in dense stands in the disturbed lowland areas in both Aliso and Wood Canyons.

Giant Reed (*Arundo donax*). The highly invasive giant reed from the Mediterranean is found in dense patches within Aliso Creek, often in association with invasive species like poison hemlock, sweet fennel, and common cocklebur. Giant reed spreads by thick rhizomes and requires a reliable water source. This dense, bamboo-like grass, which can reach heights of 30 feet, excludes many native species, particularly willows and western cottonwoods. Very little giant reed is found in Wood Creek. This species may be spreading more slowly due to increased channelization, which has lowered the water table in some areas.

Pampas Grass (*Cortaderia selloana*). Isolated individuals or clumps of pampas grass are found in a few locations in Aliso and Wood Canyons. Dispersal is through windblown seeds that grow on white, feathery stalks.

Tree Tobacco (*Nicotiana glauca*) and Castor Bean (*Ricinis communis*). Tree tobacco and castor bean are found in several areas in Aliso and Wood Canyons, but are more apparent in Aliso Canyon. Tree tobacco is typically found in steep ravines and hillsides, often in disturbed CSS. Large stands of the moderately invasive tree tobacco are also found in grassy lowlands. Tree tobacco was treated with Roundup from 1999 to 2001, which eradicated many of the concentrated areas. Both of these species is now somewhat uncommon in AWCWP.

8.2.3 Prioritization of Restoration/Enhancement Activities

In order to improve biological productivity and diversity, habitat areas first need to be evaluated for their conservation value and then prioritized for restoration and enhancement. The following NCCP/HCP criteria will be used in conjunction with professional judgment to evaluate habitats for their conservation value.

High conservation value areas are:

- Larger in size
- Close to or contiguous with other habitat areas
- Provide linkages between areas
- Contain a diversity of habitat types, associations, elevations, etc.
- Can be protected from encroachment to remain viable over the long term

Low conservation value areas are:

- Smaller in size
- Distant or separate from other habitat areas
- Are not strategically located to provide linkages (*i.e.,* form “dean-end fingers”)
- Have minimum diversity and/or are largely nonnative communities
- Are highly vulnerable to future disturbance

Medium conservation values are associated with characteristics intermediate between the higher and lower values described above.

Habitat areas (i.e., polygons) dominated by weeds have been prioritized (Appendix F) according to the recommendations in the HREP prepared for NROC to ensure that the most effective and valuable projects are undertaken first. The HREP for the NROC Central Coastal Subregion recommends that active restoration and enhancement efforts within the AWCWP be conducted effectively and cost-efficiently with focus on (1) control of artichoke thistle, (2) restoration of native grassland and CSS in areas where thistle control has already been completed, (3) control of Harding grass and Italian thistle in the El Toro drainage followed by active restoration to oak riparian woodland and wet meadow, and (4) control of giant reed in Aliso Creek. In addition, native habitats, including coastal sage scrub, that were impacted by goat grazing in the fuel modification zones can be quantified (estimated at 20 acres) and restored, as well as other areas impacted by manmade or natural phenomena.

Appendix F discusses management, restoration and enhancement activities and includes a table with the recommended restoration prioritization organized by weed polygons. Appendix F provides a table that includes polygon acreage, native habitat to be restored, percent of existing native cover, and the polygon numbers that correlate to the polygons mapped on Figure 24, Grassland Habitat Quality. The raw data collected by TNC used to generate this table is available at the County NROC department.

Restoration Activities

Close/Restore Unauthorized Trails. The first priority should be to close designated unauthorized trails within the park. Closing may be accomplished by covering the trails with leaf litter and blocking them with physical barriers or signage and citations as necessary to discontinue any additional human disturbance. Closing and abandoning all selected unauthorized trails within the AWCWP, and subsequently restoring the areas will improve the quality of habitat for wildlife.

Eradicate Invasive Weeds. Fuel modification areas should receive priority for invasive weed eradication, because excessive fuel management practices allow nonnative invasive weeds to become easily established within the fuel modification zones and adjacent natural areas. Existing fuel modification areas and zones are located on the edges of AWCWP where they meet residential developments (Figures 21A through 21D: Fuel Modification Zones), and along access roads (e.g., AWMA Road from the park ranger's station to the water treatment facility in the southernmost section of AWCWP) and some trails within AWCWP.

Weed polygons within the category of "interior" invasive weed polygons should be prioritized for eradication. Areas with new, fast-spreading and/or noxious weeds (e.g., thistles, garland chrysanthemum, etc.) should receive high priority for eradication to stop any further spread of the invasive species. Areas with established weeds that impact habitat value (e.g., giant reed) should receive medium priority because these areas are not quickly spreading. Because areas dominated by non-native annual grasses provide useful habitat for many species and are very difficult to eradicate completely, they should receive lowest priority for eradication.

Re-Establish Native Habitat by Replanting. Areas with excessive vegetation removal and type-conversion due to fuel-modification need to be managed aggressively by replanting native species that are compatible with the designated fuel modification zones. Table I has a list of suitable container plants, and Table J has a list of recommended seed types and quantity that may be used to revegetate areas within fuel modification zones. Container plants should be selected based on site specific conditions and the individual species' adaptations. Also, spacing of container plants should be consistent with OCFA guidelines. Selected unauthorized trails should be replanted to prevent further degradation and to encourage natural vegetation to establish. An emphasis should be placed on replanting native Opuntia cactus species for several reasons: cacti have high moisture content and thus are ideal vegetation for fuel-modification areas; and cacti can be used to maintain closures of unauthorized trails, and thus prevent undesirable uses. Importantly, replanting cholla and prickly pear cactus species will augment habitat for the NCCP/HCP-targeted coastal cactus wren, and thus help meet the NROC goal for cactus wren habitat supplementation.

These areas should receive priority for restoration because they can function as a buffer zone between the urban-wildland interfaces and management has already been initiated in some of these areas. In addition, the fuel modification in some of these areas may be in violation of the State Code (Section 51184(a)(b)), which states that fuel management radii

regulations do not apply in “lands kept in a predominantly natural state as habitat for wildlife, plant, or animal communities,” or in “open space lands that are environmentally sensitive parklands.”

Other natural habitat areas should receive moderate priority for restoration by implementing weed removal and replanting. Many of these areas with a moderate to high amount of native cover contain endangered or threatened species or are occupied by sensitive plant and/or animal species, or support sensitive vegetation communities and should be restored. Also, areas considered large enough by best professional judgment (or contiguous to other large areas) to provide essentially complete ecosystem needs for multiple species or temporary needs of migrating species should be restored. For native grassland areas that need revegetation (Figure 24: Grassland Habitat Quality), Table K has a list of recommended seed mix that may be used.

Table I: Recommended Container Plants List for Coastal Sage Scrub within AWCWP

Scientific Name	Common Name
Baccharis pilularis consanguinea	Coyote bush
Baccharis salicifolia	Mulefat
Encelia californica	California encelia
Epilobium canum	California fuchsia
Heteromeles arbutifolia	Toyon
Isocoma menziesii	Coast goldenbush
Isomeris arborea	Bladderpod
Leymus condensatus	Giant wild rye
Malosma laurina	Laurel sumac
Mimulus aurantiacus	Bush monkey flower
Mirabilis californica	California wishbone bush
Opuntia littoralis	Coastal prickly pear
Opuntia prolifera	Coastal cholla
Rhus integrifolia	Lemonade berry
Ribes speciosum	Fuchsia-flowered gooseberry
Sambucus mexicana	Mexican elderberry
Solanum xanti	Chaparral nightshade

Table J: Recommended Seed Mix for Coastal Sage Scrub within AWCWP

Scientific Name	Common Name	Pounds per Acre
Dichelostemma capitatum	Blue dicks	0.20
Encelia californica	California encelia	1.25
Eriophyllum confertiflorum	Golden yarrow	0.75
Eschscholzia californica	California poppy	0.50
Galium angustifolium	Narrow-leaved bedstraw	1.00
Gnaphalium californicum	California everlasting	0.50
Isocoma menziesii	Coast goldenbush	0.50
Lasthenia californica	Coastal goldfields	1.50
Lotus scoparius	Deerweed	0.80
Lupinus bicolor	Miniature lupine	1.00
Lupinus succulentus	Arroyo lupine	0.25
Melica imperfecta	Small-flowered melic	1.00
Nassella lepida	Foothill needlegrass	2.00
Nassella pulchra	Purple needlegrass	7.00
Plantago erecta	California plantain	2.00
Poa secunda	Perennial blue grass	2.00
Sisyrinchium bellum	Blue-eyed grass	0.10
Total		22.35

Table K: Recommended Seed Mix for Native Grasslands within AWCWP

Scientific Name	Common Name	Pounds per Acre
Nasella lepida	Foothill needlegrass	2.0
Nassella pulchra	Purple needlegrass	5.0+
Sisyrinchium bellum	Blue-eyed grass	0.5
Lotus purshianus	Spanish lotus	0.5
Lupinus bicolor	Miniature lupine	1.0-2.0
Lupinus succulentus	Arroyo lupine	1.0-2.0
Ericameria palmeri var. pachylepsis	Box springs goldenbush	0.5
Eschscholtzia californica	California poppy	2.0
Castilleja exserta	Purple owl's clover	0.5+
Hemizonia fasciculata	Clustered tarweed	2.0
Asclepias californica	California milkweed	trace
Asclepias fascicularis	Narrow-leaf milkweed	trace
Daucus pusillus	Rattlesnake weed	0.5
Poa secunda	Malpais bluegrass	0.5-1.0
Lasthenia glabrata	Coulter's goldfields	2.0
Amsinckiamenziesii var. intermedia	Common fiddleneck	2.0
Grindelia camporum var. bracteosum	White-stem gumplant	0.5-1.0
Total		**20.5+**

Laguna Coast Wilderness Park

Aliso and Wood Canyons Wilderness Park

Pacific Ocean

Aliso Creek Golfcourse

Coastal Treatment Plant

EL TORO RD

LAGUNA CANYON RD

73

GLENWOOD DR

LAGUNA HILLS DR

ALISO CREEK RD

PACIFIC PARK DR

WOOD CANYON LN

WOOD CYN DR

MOULTON PKWY

ALICIA PKWY

PASEO DE VALENCIA

LA PAZ RD

Aliso Creek

Wood Creek

Sulphur Creek Reservoir

HIGHLANDS AV

PACIFIC ISLAND DR

NIGUEL RD

MARINA HILLS DR

CROWN VALLEY PKWY

CLUB HO

N

0 2,000 4,000 6,000 8,000 Feet

LEGEND

- Contour Interval 40ft
- Authorized Trail
- Utility Access
- Proposed Trail
- Unauthorized Trail

CENTRAL & COASTAL NCCP - HCP CLASSIFICATIONS

- Existing Use
- Non-Reserve Open Space
- Reserve
- Aliso and Wood Canyons Wilderness Park

GRASSLAND HABITAT QUALITY

- High Quality - Grasslands with greater than 30% cover of native perennial grass or a dominant cover of diverse native annual grassess and forbs
- Moderate Quality - Grasslands with greater than 5% and less than 30% cover of native perennial or annual grasses, or a moderate cover of native annual grasses and native forbs
- Low Quality - Grasslands with less than 5% cover of native perennial or annual grasses

DESIGNED AND PRODUCED BY:
OC Public Works
GIS Mapping Unit
Brian Anderson

DATA SOURCE:
- Geomatics Land Information Systems Division
- Eagle Aerial Image 1 meter resolution, flown June 2001
- Draft Aliso and Wood Canyons Wilderness Park Resource Management Plan Dated July 1991
- California Natural Diversity Data Base, April 12, 1999
- Field Surveys conducted by Harmsworth and Associates between March and July, 1998

The degree of accuracy of these data sets may differ. In addition, the source of the data, as well as its intended use may also influence the precision. Therefore, Geomatics/LIS/GIS disclaims any responsibility for the accuracy of the data

DATE: June 3, 2008

Aliso and Wood Canyons Wilderness Park
Resource Management Plan
Figure 24: Grassland Habitat Quality

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8.3 HABITAT RESTORATION METHODS

Habitat restoration and enhancement must be site specific, with prescriptions developed based on the site's conditions. The feasibility of restoration/enhancement and the type of habitat most appropriate to be restored on a given site are determined by a number of factors. These include physical characteristics, such as soil type, soil compaction, hydrology, topography, aspect and insolation. Biotic characteristics include current vegetation types (e.g., extent of weed growth), previous use of soil sterilants, and proximity of native communities. Other key factors include access for equipment used in restoration (e.g., hydro seeding equipment) and suitability of terrain for restoration (ability to use equipment and erosion potential).

Restoration of CSS is appropriate where a candidate site's characteristics are consistent with characteristics of sites where CSS is typically found. CSS is typically found where soils are sandy or loamy, well drained, and thin to moderately deep. CSS is found in a wide variety of topographic situations including ridge lines, steep slopes, and gentle hillsides. Species composition within the community varies greatly with differences in soil type, aspect/insolation, fire history, topography, and disturbance history. This community can usually be established on a properly prepared site without supplemental irrigation. Restoration of other plant communities is appropriate where a candidate site's characteristics are not consistent with coastal sage scrub. Oak woodland is typically found where soils are deep, the site is mesic but well drained, and topography is a north-facing slope and/or valley floor. Riparian habitats are typically found where soils are moderate to deep, at least periodically poorly drained (ground water or surface water at or near the surface), and topographically along a drainage or around a spring or depression. Finally, grassland is typically found where soils are moderately deep to deep, with loam to clay textures and higher water holding capacity, and in topographic situations producing highly insulated sites (e.g., ridges, south-facing slopes).

8.3.1 Methods of Site Preparation and Planting of Native Species

Weed Control. Ideally, exotic plants/weeds should be removed from all areas to be revegetated, prior to any planting. Mechanical control methods should be employed, if feasible; however, heavy equipment (e.g., bulldozers, backhoes) should not be used in eradicating exotic plants and weeds, except for such species as pampas grass. Detailed information on exotic plant/weed control can be found in the Exotic Plant Control section.

Grading. Depending on the condition of the site, some grading may be necessary during site preparation. In particular, dirt roads may need to be regraded or created to allow for access onto the site. If grading is necessary, cultural resource issues may need to be addressed prior to construction activities.

Cross Ripping. Cross ripping or rototilling can be used to decompact soils and create an uneven surface for increasing water infiltration and safe sites for native seed and organic matter. Mycorrhizal fungi inoculum can be incorporated into the soil with the cross ripping. Cross ripping is limited to sites no steeper than 2:1 because of equipment access and maneuverability.

Soils Testing/Amendments. In most cases, the soil will not be lacking in nutrients or organic matter; however, if there is an indication of poor, stunted, or deformed plant growth, soil testing may be necessary to determine whether there is a nutrient deficiency or a toxic element in the soil. Another cause for these conditions is a thin soil layer covering an underlaying clay lens, rock, or hard pan layer. If soil nutrient deficiency or toxicity is suspected, soil analysis should be conducted to determine the fertility and agricultural suitability of the surface and subsurface soils. If soil analysis reveals a nutrient or organic deficiency or toxicity, remedial measures (i.e., incorporation of soil amendments, leaching) may be necessary. If there is a possibility that herbicide was applied to the site, agricultural records should be checked to determine whether (and when) an organic herbicide was applied to the site. If organic herbicides are present in the soil, remedial measures, including incorporation of a carbon slurry, may be required prior to plant installation.

Fencing and Signage. Depending on the site and adjacent land uses, fencing and signage may be necessary to keep pedestrian, mountain cyclists, and equestrians out of the revegetation areas during plant establishment. This need for and type of fencing should be determined during the planning phase. Informational signage size, type, and quantity should also be considered if human uses and vandalism are anticipated.

Erosion Control. Potential erosion protective measures should be considered as part of the revegetation effort, especially on sites that are on slopes. The potential for erosion will vary depending on the steepness and size of the slope, drainage patterns, and soil type. The type of erosion control should be determined during the planning phase, and may need to be amended following implementation of the revegetation plan. Some sort of erosion control may be required, since in most cases the weedy vegetation will be cleared from the site and the soil will be exposed for at least a few months. Erosion control measures may include soil swales, drainage ways, straw wattles, rice straw wattles, sand bags, netting, mulching, or other bio engineering techniques. (See Appendix F).

Container Plant Materials and Installation. This method is used to obtain an instant vegetation structure, or vegetation “islands.” It is used in extremely weedy areas where seeding may not be feasible, in order to ensure the presence of species that do not germinate reliably. Where feasible, plant material should be salvaged for replanting efforts from areas proposed for heavy ground disturbance within the park to preserve genetic material. This would be especially beneficial in infrastructure developments within the park where grading for trails or roads is necessary.

Container plants require water for the first one to two months after planting, thus temporary irrigation may be required. The method for this irrigation should be determined based on site specific conditions, such as access and availability of water. For extensive areas it may be worth the effort to run a temporary water supply hose to an installed temporary sprinkler system. For somewhat smaller areas, temporary sprinkler systems can be supplied with a water tank and/or water truck. Small areas may be irrigated by hand with a hose from a water truck or water bladder in the back of a pickup truck. Another option to be considered is supplying individual container plantings with Dri-Water (or similar product) which stores

water in a gelatinous matrix that releases moisture to the plant slowly over time. (See Appendix F).

Seed Materials and Installation. This method can be used on nearly all restoration sites; however, weed control is important to ensure germination of seeds. Site adapted seed materials must be used for each site; therefore, seed collection must be coordinated one to two years in advance and collected on-site or in nearby open space, whenever possible. To encourage the use of local genetic stock, the supervising park ranger should hire seed collectors to collect seed from within the AWCWP for use on restoration sites within or adjacent to the AWCWP. Several methods for dispersing seed materials are outlined below.

Hand Seeding. Hand seeding should be used in relatively flat areas. It should not be used where there is a potential for erosion.

- **Drill Seeding.** Drill seeding should be used on uncompacted sandy, silty soils where the gradient is 3: 1 or less.
- **Imprint Seeding.** This method should be used on uncompacted sandy or silty soils where the gradient is 3: 1 or less. It may be used on slopes of 2: 1 if there is special equipment available.
- **Hydroseeding.** Hydroseeding should be used on bare slopes that have a gradient greater than 3: l and where the potential for erosion is evident. Access to nearby water source by equipment is necessary.
- **Hydroseeding with Bonded Fiber Matrix (BFM).** This type of hydroseeding should also be used on bare slopes where the potential for erosion is evident; however, the gradient can be 2: 1. Access to nearby water source by equipment is necessary.
- **Import Native Topsoil.** Topsoil from a nearby native site that is relatively free of weeds and slated for disturbance may be imported to a site for revegetation.
- **Mycorrhizal Inoculum.** Materials (Inoculum Produced from Site Specific Sources). This should be used in sites that have compacted soil or in disturbed areas with no evidence of native soil. This can be done with most seeding operations, as well as in the container plants.

8.3.2 Exotic Plant Control

Mechanical Methods

Flail Mowing. Flail mowing is effective for clearing weedy vegetation from the site. Flail mowing should be completed prior to weed seed set. This method is useful in areas where patches of native vegetation may be present among a site dominated by nonnative annual species. If seed is not present on the mowed vegetation, the cut vegetation can be left on the site as an organic source. The cut vegetation can be vacuumed or raked off the site if the soil is to be exposed, or raked into three foot high berms to reduce water flow velocities on the slope or at the toe of slope.

This treatment is limited to areas that are accessible by mechanical equipment. Slopes more than 3:1 limit the feasibility and effectiveness of this treatment. In addition, fire prevention measures must be taken to avoid accidental fires due to sparks and machinery operation. These measures may be extensive during the dry season.

Discing. Discing can be used to turn under the thatch and germinate weed seed in the soil. The goal of this operation is to reduce the nonnative, annual grass seed bank that currently exists in the soil by encouraging the seed to germinate (through discing followed by precipitation), then destroying the resulting germinants with a subsequent discing. Discing is limited to large areas that are dominated by nonnative, annual species, without rocks in the substrate, and accessible by mechanical equipment. Slopes more than 3:1 limit the feasibility and effectiveness of this treatment. To minimize erosion, all discing should be conducted parallel to the slope contour. Discing should be conducted following the first rains in the fall and continue through the spring or summer to keep weeds from producing seed. Discing should be scheduled 1) following nonnative annual grass and forb seed germination, and 2) when soil is dry enough to run the equipment.

Extensive experience with discing in the Newport Coast open space enhancement project has demonstrated that discing ultimately encourages the germination of other seed. Therefore, one year of broadcast chemical applications or other treatment (i.e., solarization—see below) is recommended when weed seedlings are in active growth, to reduce the weed seed bank in the soil prior to plant installation.

Solarization. Soil solarization can be used following vegetation clearing and soil preparation to kill weeds and weed seeds in the top two to six inches of soil. This method works best on cool season weeds and grasses, but not on deep rooted summer weeds with rhizomes. Soil is solarized by applying sheets of clear one to two mil polyethylene plastic to the prepared soil during the hottest part of the year for a minimum of four months. This method should be used on sites that do not have obstructive objects such as rocks, or branches that can poke holes in the plastic.

Burning. Burning is useful for weed eradication and thatch removal in large native perennial grassland areas and steep slopes where access by mechanical equipment is often limited. In heavily weed infested areas, burning may be required for two to three consecutive years prior to plant or seed installation. For the most effective weed control, burning should be conducted when the weed seed is in the milky stage.

Given that the AWCWP is surrounded by urban development, burning may not be practical. However, if burning is to be considered, a detailed burn control plan must first be prepared. In addition, special interest species and nesting bird surveys may be required if the burn is to take place during the nesting season. In accordance with OCFA and California Department of Forestry guidelines this plan requires consideration of fuel loads, moisture levels, weather, etc. It also requires extensive notification to surrounding land owners and residents.

Chemical Methods. In circumstances where mechanical control is not effective, chemical application can be used to control weeds. Methods of chemical application include cut and paint, foliar application, and wicking. Herbicides must be carefully applied in order to avoid inadvertent damage to native plants. Some species, such as willows, are very susceptible to drift of small amounts of fine mist.

Cut and Paint Chemical Application. The cut and paint chemical method is typically used on large, woody, exotic species. This method involves cutting the stems to within six inches of the ground, then immediately applying chemicals to the cut stump within two minutes of cutting. The recommended chemical and application rate varies with species. This method often requires a second application, either by foliar or cut and paint, of resprouts within six months of treatment.

Foliar Chemical Application. This treatment involves broadcast spraying with an herbicide during the late winter, spring, and summer. Native seedlings present in this treatment area should be avoided during spraying. Clearing previous years' dried vegetation may be necessary to treat newly germinating weed seedlings. Following the first spray treatment, the dead vegetation, dominated by nonnative grasses and mustard can be cut and raked into berms along the contours or at the toe of the treated slope. The indicator dye "Blazon" should be used with the Roundup pro to keep track of sprayed plants. A low volume spray nozzle should be used to apply the chemical when applying manually.

Wicking. Wicking involves the use of a rag or sponge on the end of a controlled dispenser, typically in the form of a long wand or thin cylindrical stick. Wicking is good for treating smaller species in areas where native species are abundant.

8.4 INVASIVE AND PEST SPECIES CONTROL

8.4.1 Existing Conditions

A number of pest species have the potential to reduce the conservation value of AWCWP by directly affecting one or more NCCP/HCP target and identified species. This group of pests includes the brown-headed cowbird (*Molothrus ater*), a group of medium-sized mammalian predators known as "meso-predators" [including feral dogs and cats, opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), striped skunk, and nonnative red fox (*Vulpes fidva*)], red-eared sliders (*Trachemys scripta elegans*), African clawed frogs (*Xenopus laevis*), and Argentine ants (*Iridomyrmex humilis*).

Brown-headed Cowbird. Cowbirds are nest parasites of many sensitive bird species, most importantly the least Bell's vireo and coastal California gnatcatcher, a NCCP/HCP target species. This can cause high levels of reduced nest success and nest failures. Cowbird trapping has proven to be an effective tool in successful management efforts for the least Bell's vireo and coastal California gnatcatcher in Southern California.

Meso-predators. Meso-predators can cause high levels of adult mortality, as well as high rates of nest failure to numerous bird species including the gnatcatcher and cactus wren

(Campylorhynchus brunneicapillus). They are also known to prey on a variety of reptile species including the orange-throated whiptail lizard (Cnemidophorus hyperythrus beldingi), an NCCP/HCP target lizard species. There is some evidence to support the theory that removal of the top predators (coyotes, mountain lions, and bobcats in this context) from the system, removes the key population controls of "meso-predators," a phenomenon known as "meso-predator release" (Soule et. al. 1988). The release of the population controls allows the rates to reptilian, avian, and small mammalian species, and increased levels of nest failure among avian species. Since the coyote and bobcat are the main predator and possibly the key population control for these "meso-predators," keeping healthy coyote and bobcat populations is the key factor in the control of these pest species.

One of the most important factors in the maintenance of healthy coyote and bobcat populations in AWCWP is the presence of movement corridors and habitat linkages. The wildlife corridors between AWCWP and LCWP open space areas to the west provide access to a large expanse of suitable coyote and bobcat habitat and should ensure the continued existence of healthy coyote and bobcat populations. This will help to maintain the populations of "meso-predators" at acceptable levels.

Aquatic Species. Three aquatic organisms are present or potentially present in AWCWP and may reduce overall biodiversity within the park. The American bullfrog competes with and preys upon native frogs. The tadpole stage of the bullfrog can significantly impact benthic algae thus changing the community structure. The African clawed frog, an introduced amphibian species, occurs within AWCWP. This frog inhabits ephemeral pools and streams. Through predation, these nonnative frogs can severely damage native amphibian and fish habitat and populations within AWCWP. Red-eared sliders, a nonnative turtle species, may out compete native southwestern pond turtles for dragonflies, which are important indicators of a healthy environment and aggressive predators on both larval and adult mosquitoes.

Argentine Ants. Argentine ants are an insect pest species that could have a devastating effect on the lizard and bird populations of AWCWP. Argentine ants are more dependent on moisture than the native ant species. Argentine ants compete with native harvester ants, the main food item of the coast horned lizard, and are known to consume bird and mammal nestlings. Argentine ants could increase in AWCWP through irrigated areas or be introduced to new areas from infested container plant stock.

8.4.2 Control Methods

If monitoring of "target and identified" species show that populations are declining or their habitats are being degraded due to vertebrate pest species, then control efforts will be undertaken. All vertebrate pest control activities will be monitored, by recording initial pest species densities (as an index by capture effort) and any changes to that index as control efforts proceed. The following guidelines will be used to manage these vertebrate pest species.

1. All pest animal control activities shall be coordinated between the supervising park ranger and the Resource Specialist with, as needed, coordination with NROC,

USFWS, CDFG, and animal control officers and recorded to determine the initial pest densities and the changes in population following the control effort.

2. The supervising park ranger will cooperate with existing brown-headed cowbird control measures conducted by NROC. If monitoring of “target, identified and special interest species” (e.g., California gnatcatcher) show excessive parasitism, and if another entity is not already controlling cowbird populations, the supervising park ranger will undertake cowbird control by placing a cowbird trap(s) strategically. The need for cowbird traps will be determined by analysis of annual trapping results and resource monitoring. When cowbird traps are installed, inform AWCWP users of the reason for the cowbird trapping program through educational signage.
3. Make AWCWP less desirable to cowbirds by keeping staging areas and other equestrian use areas clean of horse droppings and not planting any turf within AWCWP. Local governments participating in the NCCP/HCP will use their best efforts to discourage projects that use extensive turf in projects adjacent to the reserve. This tends to attract cowbirds. As a Wilderness Park, there are no turf areas within the AWCWP and no turf areas will be considered in future plantings.
4. The supervising park ranger will undertake control activities in coordination with NROC for feral dogs and cats, red fox, and opossum if monitoring of these species indicates that control efforts are warranted due to predation on NCCP/HCP "target species." Control efforts will focus first on encouraging increased coyote use of problem areas, such as by providing artificial dens, improving movement corridors, and so forth. Meso-predator non-lethal capture and removal or lethal control measures will be employed only if monitoring shows efforts to encourage coyote use are ineffective. Lethal control measures may be used if non-lethal means are not effective, subject to appropriate safeguards for public safety and protection of other wildlife species.
5. Exclude domestic pets from the AWCWP by enforceable regulations. Park ranger staff should make annual inspections of AWCWP boundaries for feral domestic animals. If feral animals are observed in AWCWP, the park ranger shall coordinate with animal control officers to trap and remove them.
6. The County should encourage the removal and control of American bullfrogs, African clawed frogs, and/or red-eared sliders. The supervising park ranger will cooperate with any control efforts for these species undertaken by third parties to the degree the control measures do not conflict with the primary purpose of the NCCP/HCP.
7. To discourage and prevent the spread of Argentine ants, long-term irrigation within AWCWP should be avoided. Only use short-term irrigation where required to establish native plantings.
8. All container plant materials imported into the AWCWP shall be free of Argentine ants. Specifications for revegetation or habitat enhancement projects shall mandate that suppliers of container stock certify that such stock is free of Argentine ants and the restoration biologist can also check the containers at the time of plant delivery.
9. If Argentine ant colonies are discovered in the AWCWP, the land manager shall consult with the County agricultural commissioner or vector control to determine the most environmentally appropriate removal method.

8.5 BIOLOGICAL RESOURCES DATA KEEPING

The NCCP/HCP requires that all resource management activities be monitored directly to assess their effectiveness in meeting the goals set by the NROC to 1) promote biodiversity, 2) increase habitat for target species, and 3) increase habitat values. The data collected through the monitoring program, as described in the Monitoring and Adaptive Management Program, must be analyzed and used as the basis for evaluating and guiding park management. Analysis will include comparisons of current and previous data, with greater emphasis on identifying long-term trends rather than short-term phenomena. Data from species monitoring will be compiled and analyzed as monitoring cycles are completed. Analyses will include determining reproductive success, mortality rates, and patterns of dispersal. Particular emphasis will be given to identifying any management activities needed to improve or maintain necessary park functions. Data from active management efforts will be analyzed to assess the effectiveness of the management effort, and will guide decisions on future management efforts. Data from species inventories will be compiled in files and a GIS database. Data from passive management/monitoring will be compiled into report format for use in guiding future management. The monitoring program may reveal further research needs which can be used to guide future management practices.

8.5.1 Target and Identified Species Data

Park management will maintain a centralized database to document the populations of locally uncommon, sensitive, federally-threatened or endangered species and other sensitive resources in the AWCWP and their responses to management actions. It is recommended that special status species be monitored once every five years to track the populations, identify threats, develop management recommendations, and determine the effectiveness of management actions. However, monitoring frequency may vary and should be evaluated by the supervising park ranger, the Resource Specialist, NROC, and resource agencies (i.e., CDFG, USFWS).

8.5.2 Exotic Plant Data

To ensure effective exotic plant control NROC has established an exotic plant data collection. The supervising park ranger/Resource Specialist will maintain a database and maps of exotic plant and plant source locations, densities and control efforts on the NROC GIS database, which shall be updated by AWCWP every five years at a minimum with exotic species of greatest threat surveyed annually. The GIS maps will be used to document dates, locations and types of exotic control methods (e.g., mechanical or hand removal, herbicide applications, and/or prescribed burns).

8.5.3 Invasive and Pest Species Data

The supervising park ranger will cooperate with continuing NROC cowbird control efforts and will submit any incidental information to the NROC database. Other pest vertebrate species will also be monitored to determine if control efforts are needed to protect sensitive species. The supervising park ranger will coordinate and record all pest control activities to

determine the initial pest densities and the changes in population following the control effort. Domestic pets will be excluded from the park by enforceable regulations, and removed by the supervising park ranger when found within the park. Park personnel will conduct annual inspections of the fuel modification zones and park boundaries to monitor feral domestic animals.

8.5.4 Habitat Quality Data

The following information will be gathered and maintained in a database that is updated after each monitoring cycle to evaluate the quality of habitats found within the AWCWP.

- Document the location and dates of wildfire occurrences.
- Establish photo points along the creek and at vantage points overlooking the park. Take an annual photograph at the same date and time to compare photographs and determine whether management actions are necessary to maintain habitat quality.
- Once every five years, create a GIS map of the segment of Aliso Creek within AWCWP to track the creek's migration.
- To assess coastal sage scrub and riparian habitat quality, once every five years survey the following species: the threatened coastal California gnatcatcher; the endangered southwestern willow flycatcher and least Bell's vireo; and the sensitive yellow-breasted chat and yellow warbler.
- Once every ten years, create a habitat map using the County's habitat classification system (Gray and Bramlet 1992, Jones and Stokes Associated, Inc. 1993). This map will be used to track changes in habitat distribution, with a particular emphasis on detecting displacement of native vegetation types. If such losses and/or significant native habitat type conversion occur, the causes will be investigated. Remedial action will be implemented as appropriate to remedy human-induced effects on native habitat values. However, natural succession will be allowed to occur.

8.5.5 Habitat Enhancement and Restoration Monitoring Data

Habitat enhancement and restoration activities will be monitored and annual monitoring reports produced with written and photographic documentation of each restoration/enhancement site. The Habitat Enhancement and Restoration Map shall be updated bi-annually, showing existing and future restoration and enhancement areas.

8.6 RECOMMENDATIONS

General Actions

- Protect and maintain existing population of native plants and wildlife using active and passive ("hand off") techniques. Issues include sensitive vegetation communities, edge effects, trail management and design, and, if needed, restricting access permanently or temporarily. Collaborate with other agencies, organizations, adjacent landowners, jurisdictions, and volunteers.

- Develop a park-wide, long-term invasive management plan to control exotic plant species that includes both natural and disturbed areas in the park and Reserve and non-Reserve lands.
- Develop a park-wide, long-term management plan to control vertebrate pest species for the purpose of protecting park resources and public health in Reserve and non-Reserve lands.
- Incorporate applicable provisions of the NROC Fire Management Plan, when completed, into the RMP. That plan, through the NROC, is currently in preparation and shall be incorporated into this RMP when it is completed (See Chapter 13 Fire Management).
- Monitor species and habitat enhancement and restoration activities as part of the adaptive management program to evaluate effectiveness and progress. Through monitoring, seek to identify new enhancement and restoration opportunities and priorities within the park (See Chapter 15 Monitoring and Adaptive Management Program).

As-Needed Actions

- Control pest plants particularly within the known 293 mapped polygons (approximately 1,000 acres), fuel modification zones, and other disturbed priority areas. Follow the management plan (NREP) for NCCP/HCP Reserve lands and any other approved long-term management plan to locate, monitor, and eradicate exotic plant species. Removal methods may include flail mowing, discing, soil solarization, control burning, chemical application, cut and paint and/or wicking chemical application. Eradicate according to an established (maybe species specific) schedule.
- Control pest animal species using a long-term management plan. All pest animal control activities shall be coordinated between the supervising park ranger and the Resource Specialist or Resource Coordinator with, as needed, consultation with NROC, USFWS, CDFG, and animal control officers.
- Brown-headed cowbirds and other pest vertebrate species will also be monitored to determine if control efforts are needed to protect sensitive native species. Known vertebrate pests include the brown-headed cowbird, feral dogs and cats, opossum, raccoon, striped skunk, red fox, red-eared sliders, African clawed frogs, and Argentine ants.
- Restore native habitat actively using approved site specific seeding and planting techniques. Fencing and signage, weed management, and erosion control may be necessary to protect areas during plant establishment. Exotic species prevention measures (e.g., weeds, Argentine ants) should be implemented.
- Close all selected unauthorized trails by covering the trails with leaf litter and blocking them with physical barriers or signage and issue citations as necessary. Restore the areas actively or passively to improve habitat.

Annual Actions

- Conduct annual inspections of the fuel modification zones and park boundaries to monitor fuel modification zone limits, erosion, exotic plant and animal species, including feral domestic animals.

- Establish photo points along the creek and at vantage points overlooking the park. Take an annual photograph at the same date and time to compare photographs and determine whether management actions are necessary to maintain habitat quality.

Bi-annual (Two) Year Actions

- Map habitat enhancement and restoration activities and update the Habitat Enhancement and Restoration Map (HERM; at NROC) to show existing and future restoration and enhancement areas.

Five Year Actions

- Control pest plants particularly within the known 293 mapped polygons (approximately 1,000 acres), fuel modification zones, and other disturbed priority areas. Follow the management plan (NREP) for NCCP/HCP Reserve lands and other approved long-term management plan to locate, monitor, and eradicate exotic plant species. Update the NROC database once every five years, at a minimum.
- Monitor locally uncommon, sensitive, federally-threatened or endangered species and other sensitive resources to track the populations, identify threats, develop management recommendations, and determine the effectiveness of management actions. Monitoring frequency should be evaluated by the supervising park ranger, the Resource Specialist or Resource Coordinator, NROC, and resource agencies (e.g., CDFG, USFWS). Once every five years, recommended.
- Create a GIS map of the segment of Aliso Creek within AWCWP to track the creek's migration.
- To assess coastal sage scrub and riparian habitat quality, survey for the following species: the threatened coastal California gnatcatcher and endangered southwestern willow flycatcher and least Bell's vireo, and the sensitive yellow-breasted chat and yellow warbler.

Ten Year Actions

- Create a habitat map using the County's habitat classification system (Gray and Bramlet 1992, Jones and Stokes Associated, Inc. 1993) to track changes in habitat distribution, with emphasis on detecting conversion to ruderal habitats. Displacement causes will be investigated. Remedial action will be implemented as appropriate, but natural succession will be allowed.

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9.0 Hydrology and Water Quality

9.0 WATER QUALITY MANAGEMENT

The park is located within the Aliso Creek watershed, which encompasses a drainage area of approximately 36 square miles. The terrain in the Aliso Creek watershed varies dramatically along the course of the creek. While much of the upper and lower watershed is surrounded by reserved parkland, the middle reaches of the watershed are highly developed. The increasing urban development within the watershed has impacts on the creeks that flow into the park. Runoff from this development can adversely affect water quality by contributing sediment and other pollutants to creeks and streams in the park.

Aliso Creek and its tributary drainages are critical resources for much of the wildlife of the park. For this reason, the integrity of these drainages is a focus of resource management within the park. However, the majority of the Aliso Creek watershed lies outside the park boundary and thus, outside the direct control of park staff. Educational programs such as those offered through a Good Neighbor Program can help to diminish problems associated with potential contaminated urban runoff entering the wildlife habitat of the park's watercourses. Park staff should be alert to signs of potential contamination of park water resources resulting from park activities, as well as, urban runoff from outside park boundaries. The County should be apprised of proposed projects that may affect or change water quality and/or quantity within AWCWP.

9.1 EXISTING WATERSHED PROGRAMS

As described in Section 2.3.3, extensive study has been conducted to identify problems in the Aliso Creek watershed since 1995. The Aliso Creek watershed is also addressed as part of the South Orange County Integrated Water Resources Management Plan (IWRMP). These various studies and plans are described below.

9.1.1 U.S. Army Corps of Engineers Watershed Studies

The U.S. Army Corps of Engineers (Corps), Los Angeles District, completed a reconnaissance study of the Aliso Creek watershed in 1997. The study reviewed and assessed past and current activities and conditions in the watershed to help identify management opportunities. Issues addressed in this reconnaissance study included geomorphology, geology and soils, land use, environmental resources, hydrology, hydraulics, sedimentation, groundwater, water quality and economics. The findings from this study supported the identification and refinement of watershed problems and opportunities, involvement of key stakeholders, and conceptual watershed solutions.

Following completion of the reconnaissance study, a more detailed feasibility study was initiated in 1998. This phase of the watershed study built upon the findings of the reconnaissance study and developed more detailed technical data across a range of study

categories. After screening proposed management measures, a final array of alternative plans were proposed as components of the Aliso Creek Watershed Management Plan (WMP) (Corps 2001). The components of the WMP included ecosystem restoration projects, water quality projects, streambank erosion control, floodproofing plans and comprehensive plans. These components are described below:

- **Aliso Creek Mainstem Ecosystem Restoration Project.** This management measure proposes stream restoration and stabilization of the Aliso Creek in the reach beginning just upstream of the Coastal Treatment Plant and ending at Pacific Park Drive. This project includes the following components:
  - **Lower Aliso Creek Stabilization Plan**, a measure that includes a series of low riprap drop (or "riffle") structures with pools in between. The pools will have the long-term equilibrium slope necessary for a stable channel while the drops provide the fall necessary to meet the overall gradient of the creek. Each structure consists of a buried soil cement grade control, a grouted riprap riffle slope, a dumped riprap scour pad, and a side slope of open-celled articulated concrete revetment with vegetation planted in the voids. This stabilization measure begins in the reach just upstream of the South Coast Treatment Plant and ends at the Aliso Water Management Agency (AWMA) bridge.
  - **Middle and Upper Aliso Creek Stabilization Plan** extends the pool and riffle concept into the Aliso Creek reach beginning just upstream of the AWMA access road bridge and ending at Normandale. The riffles are intended as a replacement for the vertical concrete drops that currently segment the stream and restrict movement of aquatic, amphibious, and terrestrial wildlife species. The existing riprap will be removed and replaced with vegetation.
  - **Floodplain Riparian Habitat** proposes to flatten and terrace the vertical banks. In terms of stream stabilization, the modified sections will reduce stream velocities and unit discharges, and will be less erosive. In terms of restoration, the flattened slopes will provide a stable surface for plantings and for establishment of riparian and upland habitat. With a stable profile combined with flattened, terraced, and vegetated side slopes, lateral instability will be reduced.
  - **Off-Channel Aquatic Habitat and Riparian Restoration** proposes to construct an off-channel riparian and aquatic habitat in the abandoned oxbow near the confluence of Aliso Creek and Wood Canyon. A low-flow channel would be constructed along the outside of the abandoned bend with the appropriate depth, velocity, substrate, and vegetation to provide for fish spawning and rearing. The side slopes would be vegetated with emergent, riparian, and upland species at the appropriate elevations.
  - **Modify Existing Grade Control Structures (Interim Measure):** The two 10-foot vertical concrete drops located upstream of the AWMA road bridge result in wide shallow ponding on the upstream side. This ponding can be eliminated by cutting a low-flow triangular notch in each of the structures. This measure is a low-cost, interim solution that will immediately reduce ponding, but is not considered a permanent restoration alternative.

- **Aliso Creek Riparian Revegetation Plan** involves the planting of native vegetation within this reach of the Aliso Creek mainstem.

- **Sulphur Creek Ecosystem Restoration Project**. This management measure proposes restoration of Sulphur Creek in the reach beginning just upstream of the water treatment plant to the community center access road along Crown Valley Parkway. This restoration involves the modification of the existing flow control structure at the upstream boundary of the reach, modification of the small basins at the upstream and downstream ends of the reach, restoration of the riparian terraces and stabilization of side slopes, and reestablishment of native riparian vegetation.

  The measure also proposes to restore riparian habitat in the reach along the Crown Valley Parkway between La Plata Drive and Moulton Parkway. This project includes the replacement of the concrete low-flow V-ditch with a natural meandering low flow channel, removal of non-native species, as well as reestablishment of native riparian vegetation.

- **Wood Canyon Ecosystem Restoration Project.** The restoration alternatives included in this management measure are as follows:

  - **Gabion Removal and Stream Restoration** which proposes to remove the 300-foot gabion structure and realign the tributary from the end of the culvert until its terminus a the Wood Canyon Creek. Modification would include stream lengthening and meander restoration, creation of wetlands, and reestablishment of native riparian vegetation.

  - **Restoration at the Wood Canyon Detention Basin** proposes to modify the outlet of a detention basin located at the upstream extent of Wood Canyon.

  - **Localized Stream Restoration** addresses localized erosion and stream degradation sites located in heavily vegetated portion of upper Wood Canyon, approximately 3 miles from the gate at the AMWA Road.

- **English Canyon Ecosystem Restoration Project.** This management measure proposes to restore emergent wetland and riparian habitat along the English Canyon Creek between the confluence with Aliso Creek and Los Alisos Boulevard. This project would include the removal of riprap and exotic species, limited excavation and regrading of the north bank of the creek (between the Aliso Creek confluence and the existing culvert at the Los Alisos crossing), and the reestablishment of native riparian vegetation.

- **Pacific Park Basin Ecosystem Restoration.** The proposed measure is located just upstream of Pacific Park Drive. The area under consideration extends from Pacific Park Drive to the San Joaquin Hills Transportation Corridor and is bound by the ball fields on the west and the road embankment on the east. This measure proposes an emergent freshwater wetland and riparian habitat along a 2,460-foot section of Aliso Creek within the existing Pacific Park detention basin.

- **Expansion of Program, Monitoring, and Evaluation of Best Management Practices (BMPs).** This program involves expansion of the BMP Program to include on-site biofiltration, landscape controls, and enforcement of ordinances on pet waste disposal. This program also provides for a detailed review of design and development standards for Orange County and associated cities within the Aliso Creek watershed. The review

should be based on the need to have water quality controls on stormwater runoff as well as water quantity management. Also, the review needs to address BMPs from the perspective of implementation and effectiveness relative to water quality benefits.

Monitoring programs (i.e., Orange County NPDES Stormwater Program Drainage Area Management Plan, Management guidelines for the use of Fertilizers and Pesticides, etc.) to evaluate effectiveness of current standards need to be implemented. This program will identify opportunities for retrofitting current facilities and modifying standards.

- **Small Wetlands for Water Quality.** This management measure proposes to construct wetlands or wet detention areas at the confluences of Dairy Fork/Aliso Creek and English Canyon/Aliso Creek. At each location, the wetland area would be shaped by a combination of excavation and fill to provide for a variety of habitats, ranging from a relatively deep water zone to shallow water zone, with dry islands that support riparian vegetation and provide shading.
- **Bank Stabilization Study - SOCWA Treatment Plant.** This measure proposes to address the potential for failure of the South Orange County Wastewater Authority Treatment Plant Bridge. An abandoned, encased sewer pipe crosses the invert at grade immediately upstream of the bridge. This pipe contains residual sewage solids and is a potential health threat if it breaks. The modification includes installation of a soil cement grade control immediately downstream of the bridge, pavement of the invert with riprap, and capping and removal of the pipe.
- **English Canyon Erosion Control.** This management measure proposes to install riprap bank protection on the outside of a bend on English Canyon Creek between Los Alisos Boulevard and Trabuco Road. The bend may potentially threaten Los Alisos Boulevard. The measure will also repair the existing scour holes downstream of the Via Noveno and Vista del Lago bridges, and below the pipe outlet just downstream of Entidad. The scour, if unchecked, could eventually threaten the structures.
- **Floodproofing at Aliso Creek Inn.** Within the watershed, there are several locations at which flood damages cannot be addressed by cost-effective flood control solutions that would address more than a single beneficiary. This situation appears to be the case in the lower reach of the Aliso Creek watershed. Six general non-structural floodproofing methods could reduce the occurrence of flooding and/or the hazards associated with flood events. Unless a source of funds could be identified which is not tied to benefit-cost analyses, the current situation will continue. A flood warning system may be a viable alternative to structural measures at this site, should there be a desire to pursue this option.
- **Watershed Education.** The goal of this management measure is to provide technical guidance for the development of local education programs for K-12 that address scientific and cultural impacts of urbanization as it specifically relates to the Aliso Creek watershed. A significant opportunity exists to direct some of the potential community service hours required by some of the high schools into a focus on the watershed ecology and monitoring.

  The curriculum program should help students develop a sense of stewardship toward their environment and community, and give them a background to make educated and

informed decisions regarding wise resource management as part of their day to day life. The program should also focus on observation and appreciation, relationships and interaction, and how an understanding and application of scientific principles impacts watershed management, policies, and regulations.

In addition to the local schools and universities located within the watershed, there is a need for additional facilities that are dedicated to watershed program activities and community education. The opportunity for siting and developing an education center that provides a staging area for research-oriented science programs and community education should be further explored. Funding mechanisms for such a facility may be pursued through public-private partnerships with corporate sponsors contributing to the operation and maintenance of the facility.

- **Non-Point Source Public Awareness.** This program represents the second component of the overall education initiative. This effort targets the remainder of the general public living, recreating, vacationing, or conducting business within the Aliso Creek watershed. The public awareness program would target the residents and businesses within the watershed informing them how their activities have a direct influence on the creek and its quality. A general lack of understanding exists with limited information available to residents and proprietors about the purpose and impacts of best management practices (BMPs) that they can implement themselves.
- **Water Quality Monitoring Plan.** Water quality monitoring is an iterative process that will develop as the needs for subsequent sampling are determined by previous results. Availability of funding can also be a constraint for continued sampling. A volunteer program is proposed to involve the public in monitoring of the Aliso Creek watershed. This plan would increase public awareness of the status of Aliso Creek as well as supplement data available to agencies involved.
- **Exotic Species Eradication Program.** The goal of this program is to enhance habitat by allowing native plants to reestablish in the areas where non-native species have displaced natives. This plan would include removal and control approaches, as well as public education. The plan will also outline an annual monitoring element to track the progress of eradication and to locate any new outbreaks of the species within the Aliso Creek watershed.

A number of projects recommended in the WMP have been pursued. The current status of projects outlined in the WMP is shown in Table L.

Table L: Status of Projects Recommended in Aliso Creek Watershed Management Plan

Project	Status
Aliso Creek Mainstem Eocosystem Restoration	
- Lower Aliso Creek Stabilization Plan	Part of SUPER (see below)
- Middle and Upper Aliso Creek Stabilization Plan	Part of SUPER (see below)
- Floodplain Riparian Habitat	Part of SUPER (see below)
- Off-Channel Aquatic Habitat Restoration Project	No Plans to Pursue
- Modify Existing Grade Control Structure (Interim Measure)	Perhaps in the Future
- Aliso Creek Riparian Revegetation Plan	Part of SUPER (see below)
Sulphur Creek Ecosystem Restoration Project	Completed
Wood Canyon Ecosystem Restoration Project	In Progress
- Gabion Removal and Stream Restoration	Perhaps in the Future
- Restoration at Wood Canyon Detention Basin	Completed
- Localized Stream Restoration	Perhaps in the Future
English Canyon Ecosystem Restoration Project	In Progress
Pacific Park Basin Ecosystem Restoration Project	No Plans to Pursue
Expansion of Program, Monitoring and Evaluation of BMPs	Perhaps in the Future
Small Wetlands for Water Quality	No Plans to Pursue
Bank Stabilization Study – SOCWA Treatment Plant	In Progress
English Canyon Erosion Control	No Plans to Pursue
Exotic Species Eradication Program	In Progress

9.1.2 Aliso Creek Concept Plan – SUPER Project

Aliso Creek runs north to south from the Cleveland National Forest's Santiago Hills to the outlet at the Pacific Ocean near South Laguna Beach with a total length of 19.5 miles. The lower reach of the creek passes through AWCWP, a large land reserve that is relatively undeveloped within a heavily urbanized area. The surrounding large-scale urbanization has resulted in a decline in the watershed stability, degradation in the Aliso Creek channel and concern for water quality.

The Aliso Creek Water Quality SUPER project united individual efforts that were initiated to address the needed stability of the Aliso Creek Channel. A majority of the Aliso Creek Water Quality SUPER project will be built within the boundaries of AWCWP. The project name addresses the four goals of the project:

- Water Quality
- **S**tability of the Creek Bed and Banks
- **U**tility **P**rotection
- **E**nvironmental **R**estoration

The County of Orange, SOCWA (South Orange County Wastewater Authority), MNWD (Moulton Niguel Water District), and SCWD (South Coast Water District) propose to implement the Aliso Creek Water Quality SUPER Project. The SUPER Project will provide water quality benefits, stabilize stream bed and banks, protect utility infrastructure, and restore ecosystems in Aliso Creek beginning at Aliso Creek Road then downstream to the SOCWA Coastal Treatment Plant Bridge and from the Pacific Ocean upstream and through the County owned property.

The water quality treatment and beneficial use component of the project includes: diverting low flows of Aliso Creek just upstream of the Pacific Coast Highway, treating the water to beneficial use standards, and selling the water to users within the watershed for irrigation.

The stabilization and ecosystem restoration component of the project will include: constructing a series of low riprap drop structures to control grades and establish aquatic habitat connectivity, shaving side slopes to reduce vertical banks, removing invasive species and revegetating with native riparian species, and restoring floodplain moisture.

The infrastructure protection component of the project will include locking the low flow channel in place by placing rock at the toe of the channel with soil wraps above the rock.

The project follows a multi-objective approach to Aliso Creek watershed development and enhancement, to accommodate water quality improvements, to stabilize channels, to reduce flood hazards, to allow economic uses, to provide aesthetic and recreational opportunities, and to address habitat concerns.

Background. The Aliso Creek Water Quality SUPER Project originally began as two separate projects:

- The Aliso Creek Mainstem Ecosystem Restoration Project (County of Orange)
- The Aliso Creek Emergency Sewer Relocation Project (South Orange County Wastewater Authority (SOCWA), Moulton Niguel Water District (MNWD)

During the Integrated Regional Water Management Plan (IRWMP) process, it became apparent that the two projects were linked and thus they were combined.

The main project features of the Aliso Creek Water Quality SUPER project are described below.

- A series of two-foot grade control structures downstream from the Aliso Creek Wildlife Habitat Enhancement Project (ACWHEP) and two six-foot grade control structures downstream from the confluence with Sulphur Creek will stabilize the channel gradient and reduce erosion. As a result, a low flow natural channel will be able to meander in a natural state over the grade control structures. It is anticipated that the width of the low flow channel will vary, at times hiding the grade control structure and at other times leaving a portion of the grade control structure dry and visible. In the floodplain areas, the grade control structure will be buried. The grade control structures in the low flow channel would be constructed of soil cement and would include other aesthetic improvements such as the use of large boulders, designed to achieve a natural appearance. Soil cement uses native soil in the cement mix allowing the color of the structure to match the natural environment. Vegetation will also help to mask the grade control structure.
- Grading and contouring will re-establish connectivity between the creek channel and the floodplain. Reconnecting the creek channel to the floodplain will reduce the high velocity

of flood waters and also provide added natural water quality treatment and habitat enhancement to the entire reach.

- Native habitat restoration will increase the abundance of wildlife, create natural water quality treatment opportunities for urban runoff, help detain and infiltrate water, and assist in the sustenance and development of natural wetland systems.
- The existing ACWHEP structure located about 2.5 miles upstream from Aliso Beach will be retrofited. This structure has exacerbated downstream erosion and created a large drop in the downstream channel, thereby segmenting the creek and causing substantial habitat degradation. The downstream area will be re-graded and restored to match the elevation of the upstream area and the existing structure will be buried and retrofitted to match up with the other grade control structures.
- A new low flow water diversion and treatment facility will be constructed that will divert dry-weather flows from the creek and provide water for beneficial use. This project element will reduce pollutants in the urban runoff that would otherwise reach the coastal zone and the creek mouth, and as a result will protect public health and ocean resources at Aliso Beach. This project element will also reduce dry-weather flows at the mouth of the creek to proximate natural flow levels and will alleviate the need to maintain the mouth artificially to protect safety and property.
- In conjunction with this project, ongoing implementation of best management practices (BMPs) in the watershed will help to reduce the contribution of pollutants to Aliso Creek from the upstream urban areas.

Funding for the SUPER Project. As of January 2008, the SUPER project has secured a $1 million Department of Water Resources grant and a $4.6 million State Water Resources Control Board grant funded by Proposition 50. The Corps will continue to allocate funds for the SUPER project with the Water Resources Development Act in 2007 allocating $5 million. The County of Orange, as the local sponsor, will continue to work with local, state and federal agencies to obtain the balance of the funding.

Next Steps for SUPER Project. The Corps is updating hydrologic, hydraulic and sediment transport analytical tools to address water resources and sedimentation issues with work anticipated to be complete by June 2009. A public scoping meeting will take place in May 2009; this will initiate the National Environmental Quality Act (NEPA) process along with the California Environmental Quality Act (CEQA) process. Engineering design and required permitting will follow.

Impacts of SUPER Project. Implementation of the SUPER project has the potential to affect resources in the park. These potential impacts are described below.

Trails and Public Access. The Water Quality SUPER project has the potential to affect several trails, crossings and AWCWP access points adjacent to Aliso Creek during installation of grade control structures, grading and contouring, habitat restoration, and other water quality improvement activities. The project area runs 4.5 miles along Aliso Creek from the northern limit at the AWMA Road Bridge to the southern limit at Pacific Coast Highway

bridge. The following trails and entrances are adjacent to the project site and access to these sites may be limited or closed temporarily due to improvement activities:

- Aliso Creek Trail
- Aliso Creek Bikeway
- AWMA Utilities Road
- Gates # 1,3,14,15,18,19 & 20
- Access # 12

The public should be notified in advance of any water quality improvement activities, and should be informed if access will be restricted to any of the above trails or access points. Notification could include signs at all entry points and/or a posting on the AWCWP web page. The County could also take the opportunity to educate the public on the importance of water quality protection and habitat restoration.

Natural Resources. The portion of Aliso Creek within the SUPER project area is set on young axial channel deposits, overlain primarily with sandy loam and clay loam soils. A portion of the project area is directly below slopes which are prone to landslides. The upland portion of the project area is comprised primarily of grassland and scrub vegetation communities, with smaller amounts of martime chaparral towards the southern end of the creek. The creek itself is vegetation with willow forest and riparian scrub communities, with extensive stands of non-native giant reed. There are several sensitive plant species in the SUPER project area, including vernal barley, small-flowered microseris, thread-leaved brodiaea, Turkish rugging and many-stemmed dudleya. In addition to native and sensitive plant species, a number of invasive exotic plants exist along the creek corridor, especially in the grassland habitat. The creek and surrounding habitat is also used by a variety of native fish, birds, reptiles, amphibians, mammals and invertebrates, including several species listed as threatened or endangered.

During SUPER project water quality improvement and restoration activities, care should be taken to prevent erosion, protect sensitive plant species, prevent the spread of invasive exotic plants and minimize impacts to fish, nesting birds and other wildlife.

Cultural Resources. Many of the archaeological resources within AWCWP are located along the Aliso Creek Drainage. Specifically, a National Register eligible resource is located at the upper end of AWCWP along Aliso Creek, and other un-evaluated resources are present along lower reaches of the drainage. Some of the sites along Aliso Creek are also deeply buried, with one significant resource located over 18 feet (6 meters) below the existing landform. These important sites are known to contain important artifacts, human and animal burials, and be significant for scientific research (Dr. Gary Hurd, personal communication, 1999). Proposed project activities, including slope and streambed stabilization, have a high likelihood for causing substantial adverse impacts to cultural resources. The specific project designs should be evaluated by a qualified archaeologist. Steps to minimize project impacts should include a comprehensive survey of the SUPER Project area to identify cultural resources, evaluation of all sites that have not had prior California or National Register evaluations, development – in conjunction with appropriate

consultation with local Native American and advocational groups – of a suitable mitigation plan to allow scientific excavation to recover important scientific data, and promote preservation in place of the archaeological resources. Cultural resource monitoring during construction should also be required to allow recovery of incidental discoveries from known archaeological sites, and to allow evaluation and treatment of any buried resources discovered through construction.

9.1.3 South Orange County IRWMP

The South Orange County Integrate Regional Water Management Plan (IRWMP) includes the Aliso Creek watershed. The IRWMP is a result of a collaborative effort of local and regional agencies – 12 cities, seven water and wastewater agencies, and the County of Orange – to achieve total watershed efficiency in the southern Orange County area. The purpose of the IRWMP is to identify potential projects intended to improve water quality and supply in order to investigate their feasibility, engage in long range water planning, to establish priorities among the proposal of the member entities, and to obtain potential funding. The IRWMP focuses primarily on the projects and plans of the member agencies, with an emphasis on water supply and water quality. The principal challenges facing South Orange County are reflected in each of the individual member agencies, with a focus on the following:

- Water Reliability
- Watershed Management
- Seasonal Storage
- Environmental Protection
- Water Quality
- Grant/Agency Funding
- Water Recycling

The projects identified in the IRWMP for the Aliso Creek watershed rely on the Aliso Creek Watershed Management Plan described above. Current activities to improve water quality within the Aliso Creek Watershed include:

- Aliso Creek Water Quality SUPER (Stabilization, Utility, Protection, and Environmental Restoration) Project
- Sulphur Creek Ecosystem Restoration Project
- Sulphur Solution Restoration Project
- Development of plans for English Canyon Ecosystem Restoration Project, Wood Canyon Emergent Wetland Project, and Aliso Creek Mainstem Ecosystem Restoration Project
- Continued monitoring and benefits from the Wetland Capture and Treatment Network, a constructed, multi-purpose wetlands
- Aliso Beach Clean Beach Initiative Project

- Munger Storm Drain Pilot Sand Filter Project
- Giant Reed Removal

9.2 EXISTING WATER QUALITY PROGRAMS

In California, the regulation, protection, and administration of water quality are carried out by the State Water Resources Control Board (SWRCB) and nine California Regional Water Quality Control Boards. The Aliso Creek Watershed is within the San Diego Regional Water Quality Control Board (RWQCB) area (Region 9). The RWQCB is responsible for adopting and implementing water quality control plans, issuing waste discharge requirements, and performing other functions concerning water quality control within their region. Currently, three regulatory programs are on-going to address water quality issues within Aliso Creek: the Clean Water Act 303(d) List, the Aliso Creek California Water Code §13225 Directive and the Bacteria-Impaired Total Maximum Daily Load (TMDL) Project for Beaches and Creeks in the San Diego Region.

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9.2.1 Aliso Creek Watershed Action Plan

The 1972 amendments to the Federal Water Pollution Control Act prohibit the discharge of any pollutant to navigable waters from a point source unless the discharge is authorized by a National Pollution Discharge Elimination System (NPDES) permit. Since 1990, operators of stormwater systems in Orange County have been required to: (1) develop a stormwater management program designed to prevent harmful pollutants from being dumped or washed by stormwater runoff into the stormwater system and into local waterbodies, and (2) obtain a NPDES permit.

Entities within the Aliso Creek Watershed, including the cities of Aliso Viejo, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, and Mission Viejo, County of Orange, and the Orange County Flood Control District (Permittees), have obtained, renewed, and complied with three NPDES permits: First (1990-1996), Second (1996-2002) and Third (2002-2007). Each permit renewal has required the Permittees to continue to implement ongoing stormwater quality management programs and develop additional programs in order to control pollutants in stormwater discharges.

In 2006, the Aliso Creek Watershed Action Plan was developed to: meet the requirements for a Watershed Urban Runoff Management Plan (WURMP) contained in the NPDES stormwater permit (Third), identify the most significant water quality issues, focus pollution

prevention and source control programs, incorporate information obtained from prior planning studies, and develop an integrated plan of action that results in meaningful water quality improvement in Aliso Creek at a watershed scale. The Aliso Creek Watershed Action Plan is part of the larger Drainage Area Management Plan (2003).

9.2.2 Clean Water Act 303(d) List

Under Section 303(d) of the 1972 Clean Water Act (CWA), states are required to develop a list of water quality segments that are not meeting water quality standards. The CWA requires that the regulatory authorities establish priority rankings for water bodies on the lists and develop action plans, called Total Maximum Daily Loads (TMDL), to improve water quality. Aliso Creek is currently listed on the 2002 CWA 303(d) List for bacteria indicators, phosphorus and toxicity. The mouth of Aliso Creek is listed for bacteria indicators. The 2008 CWA 303(d) List is currently under development, but includes no new listings for Aliso Creek.

9.2.3 Aliso Creek California Water Code §13225 Directive

On March 2, 2001 the San Diego RWQCB issued a directive pursuant to California Water Code Section 13225 (Directive) to the County of Orange, the Orange County Flood Control District, the City of Laguna Beach, the City of Laguna Hills, the City of Laguna Niguel, the City of Laguna Woods, the City of Lake Forest and the City of Mission Viejo (Watershed Permittees) for an investigation of urban runoff in the Aliso Creek watershed. The Directive found that the Watershed Permittees may be discharging waste with high bacteria levels from municipal storm drain outfalls into Aliso Creek and its tributaries. Since the issuance of the Directive, the City of Aliso Viejo was officially incorporated on July 1, 2001 and currently participates in compliance activities under the Directive.

9.2.4 Bacteria-Impaired Waters TMDL Project I for Beaches and Creeks in the San Diego Region

The CWA requires states to establish Total Maximum Daily Loads (TMDLs) for waters placed on the CWA 303(d) List. The purpose of a TMDL is to restore the beneficial uses and to attain the water quality objectives in the waterbody. A TMDL represents the maximum amount of the pollutant of concern that the waterbody can receive and still attain water quality standards. Once this maximum pollutant amount has been calculated, it is then divided up and allocated among all of the contributing sources in the watershed.

Due to frequent, high concentrations of bacteria, the RWQCB placed 38 waterbodies in the San Diego Region on the 2002 CWA List of Water Quality Limited Segments. Bacteria densities have been found to frequently exceed the numeric water quality objectives (WQOs) for total, fecal, and enterococci bacteria as defined in the RWQCB's Water Quality Control Plan for the San Diego Basin (Basin Plan). The RWQCB is currently calculating the TMDLs for the impaired waterbodies through the development of Region-wide watershed models. This project, known as the Bacteria-Impaired Waters TMDL Project I for Beaches and Creeks (Bacteria Project I), was developed to address 17 out of the 38 bacteria-

impaired waterbodies on the 2002 CWA Section 303(d) List in the San Diego Region, including Aliso Creek. This project includes TMDL calculations for roughly 24 miles of coastal shoreline and creeks. In order to meet the TMDL, an Implementation Plan is also developed that describes the pollutant reduction actions that must be taken by various responsible parties to meet the allocations. The Implementation Plan includes a time schedule for meeting the required pollutant reductions and monitoring requirements to assess the effectiveness of the load reduction activities in attaining water quality objectives and restoring beneficial uses.

9.3 AWCWP WATER QUALITY

A supplemental study, the Water Quality Technical Memorandum (See Appendix J), was prepared to provide detailed information on water quality conditions within the park. The Water Quality Technical Memorandum includes:

- Background Research on existing surface water, storm water, dry weather flow and water quality regulations
- List of Constituents to be used to evaluate potential options including specific surface and groundwater quality objectives, re-use criteria, and/or compliance with local and state regulations
- Conceptual Programmatic Approach for water quality preservation and/or improvement that identifies potential opportunities that are compatible with RMP objectives, have a recognized and expected effect on site conditions, can be integrated within the existing drainage system and address constituents of concern

These three elements are described in more detail below.

9.3.1 Regulatory Background

In California, surface water quality is protected by several statutes and regulations promulgated at the federal, state, and local (e.g., municipal) levels. Regulations that pertain to the AWCWP are described below.

- The Clean Water Act (CWA) (federal): NPDES permits and TMDLs, as described in previous sections.
- California Toxics Rule (CTR) (federal): The CTR is within the Code of Federal Regulations (40 CFR 131.38) and was issued by the U.S. EPA to provide water quality criteria for potentially toxic constituents in receiving waters with human health or aquatic life designated uses in California. It includes criteria for 57 constituents based on human health, and 23 constituents based on the health of aquatic life. These criteria have not yet been implemented by the RWQCB for the AWCWP, but will likely be utilized in evaluations related to TMDL implementation by 2019.

- Porter-Cologne Act (state): The Porter-Cologne Act requires the SWRCB and the RWQCBs to adopt plans and policies to regulate discharges to surface and groundwater, including a region specific water quality control plan (Basin Plan).
- San Diego Basin Plan (local, state mandated): The San Diego Basin Plan provides quantitative and narrative criteria for a range of water quality constituents applicable to certain receiving water bodies within the San Diego Region.
- Ocean Plan (state): The Ocean Plan provides water quality objectives for beach and near-coast waters; important to the Aliso Creek watershed in that surface waters discharge to the ocean.
- Permits (federal, state and local)
    - Industrial and Construction Stormwater Permits: Under CWA Section 402, permits are required for stormwater discharges from industrial activities and construction sites. A Stormwater Pollution Prevention Plan (SWPPP) is required to obtain these permits.
    - MS4 Permit: The Orange County Flood Control District and the southern Orange County cities (including the project site) are required to obtain an MS4 Permit from the San Diego RWQCB (#CAS0108740) for discharges to the municipal separate storm sewer system in southern Orange County. A Drainage Area Management Plan (DAMP) that includes a Model New Development and Redevelopment Program is used to implement the MS4 requirements. This Model Program includes a Model Water Quality Management Plan (WQMP) that provides guidance for complying with MS4 permit requirements for project specific planning, selection, and design of BMPs in new development or significant redevelopment projects (DAMP Section 7 and Exhibit 7.II). Major redevelopment projects (which could take place in areas surrounding the AWCWP) are required to develop and implement a WQMP that addresses regional or watershed programs and relevant BMPs.
    - Stream Protection: Section 404 of the CWA regulates the discharge of dredged and fill material into waters of the United States, including wetlands. Section 404 of the CWA is administered by the U.S. EPA and the U.S. Army Corps of Engineers.
    - Lake or Streambed Alteration Agreement: Under CDFG Section 1602, a Lake or Streambed Alteration Agreement is required if a project that proposes to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake or use materials from a streambed is determined by the CDFG to adversely affect existing fish and wildlife resources.

9.3.2 Existing Surface Water Quality Studies and Constituents of Potential Concern

Surface water quality has been studied extensively over the past approximately 15 years within the Aliso Creek watershed. These studies initially focused on the degraded nature of

waters within the watershed and specifically the Park due to incising of Aliso Creek. Several historical and recent studies have concluded that the incising of Aliso Creek is due to the increased quantity and peak flow rate of stormwater (i.e., "wet weather") discharges to the creek due to development. More recently, studies within the watershed have focused on individual chemical constituents within the surface waters in Aliso Creek and its tributaries.

In addition, the watershed stakeholders have implemented an extensive program of both structural and non-structural BMPs in drainages leading to the Aliso and Wood Canyons to address both wet weather and dry weather water quality of discharges into the canyons. Three interrelated water quality planning processes were developed by the stakeholders: the DAMP/Local Implementation Plan (LIP), DAMP/Watershed Action Plan (WAP), and a third process focused on watershed system integrity [City of Aliso Viejo, et. al., quarterly reports]. These processes were implemented in response to the city stakeholder involvement in the DAMP, as well as the RWQCB 13225 Directive (for bacteriological indicator monitoring).

Water quality data for dry weather flow was collected from many of these BMP programs and was used to develop the Constituents, Parameters, or Conditions of Potential Concern (CPCOPCs) for the surface urban runoff waters flowing through the Park. In addition, these projects serve a critical role as demonstration projects for other water quality BMPs considered within the Park and on adjacent property having an influence on drainage through the Park.

The above studies and BMP programs identified the CPCOPCs listed below based on: 1) their prevalence in urban storm water runoff, 2) water quality standards in the park vicinity, 3) protection of park facilities, 4) receiving water body impairments as indicated by the 2006 CWA 303(d) List, and 5) regulatory requirements and guidance outlined in the Basin Plan, MS4 Permit, and the DAMP implementation plan. The CPCOPCs are as follows:

- Bacteriological indicators
- Toxicity (specifically chlordane, dieldrin, heptachloroperoxide, PCBs)
- Temperature

The CPCOPCs list may change depending on regulatory standards, new or updated toxicological information, and/or changing conditions within the watershed. Based on additional information developed within the watershed, as well as information provided by OC Parks personnel, other constituents or conditions exist that have the potential to affect Park resources. These include:

- Erosion and resulting Sediments (Total Suspended Solids)
- Biostimulatory Nutrients (Phosphorus and Nitrogen)

Similar to the CPCOPCs described above, this list of issues may change depending on regulatory standards, new or updated toxicological information, and/or changing conditions within the watershed.

9.3.3 Surface Water Quality Conceptual Programmatic Approach

The following is a summary of the five key elements in the AWCWP conceptual programmatic approach to evaluating projects that may affect surface water quality, as described in the Water Quality Technical Memorandum.

1. Steps in Project Evaluation-Qualitative Steps: Six step process for evaluating projects highlighted in the DAMP: 1) Consider the project characteristics as provided by the applicant, 2) Identify receiving waters, 3) Determine the sensitivity of the receiving waters, 4) Characterize the potential water quality impacts, 5) Identify hydrologic conditions of concern, and 6) Assess project impact significance to water quality. This process can be followed for any size project.
2. Significance Criteria for evaluating projects: The criteria that can be used for evaluating the significance of a proposed project on CPCOPCs within surface waters and the thresholds for significance (for projects within the Park) are summarized below:
    - CEQA Standard (pre-project): In order to evaluate significance under CEQA, potentially substantial increases to pollutant concentrations and/or loads resulting from a project will be evaluated for significant adverse impacts to receiving water quality by comparing pre-project and post-project water quality concentrations and loads. Analysis of potential significant impacts will be based on the results of water quality modeling and qualitative analysis that takes into account water quality controls that will be considered Project Design Features (PDFs).
    - Water Quality Permitting (pre-project): Satisfaction of MS4 NPDES permit requirements, and General Construction Permit and General Waste Discharge Requirements will establish compliance with water quality regulatory requirements applicable to stormwater runoff. Natural resource permits (from CDFG, USFWS, or ACOE), especially timing related to acquiring such permits, need to be considered.
    - Water Quality Criteria (post project): Comparison of post-project water quality concentrations in the runoff discharge with benchmark receiving water quality criteria as provided in the Basin Plan and the CTR (for comparison/guidance) will facilitate analysis of the potential for runoff to cause or contribute to exceedances of receiving water quality standards or adversely affect beneficial uses. Narrative and numeric water quality objectives contained in the San Diego Basin Plan apply to the Project's receiving waters.
    - Maintenance Evaluation (post project): Following the construction or implementation of a project, the performance monitoring should be coupled with operational evaluations. The project should be evaluated with respect to effectiveness, ease of operation and maintenance, cost / time intensiveness of operation and maintenance. The operational and maintenance qualities of the project, as constructed or implemented, have the ability to affect long term effectiveness of the project.
3. Park-Specific- Qualitative Evaluation Items: Specific evaluation tools issues related to the Park's operation and maintenance that may not be issues for other engineered or

constructed projects. These qualitative criteria need to be developed with OC Parks personnel in order to prioritize them and relate them to Park-specific resource protection goals (e.g., sensitive species identification and impact assessment).

4. Project/BMP Selection Methodology- Quantitative Steps: A quantitative evaluation of projects for project prioritization and BMP selection. A potentially useful template being utilized in Los Angeles consists of the following steps: catchment prioritization, project area screening, general BMP screening and site-specific BMP evaluation. Based on discussion with the OC Parks, preference will be given to BMP approaches: having low or minimal impact on existing habitat or recreational uses within the Park; focused on restoring the natural ecological system (and natural assimilative capacity) to the greatest degree possible; incorporating designs that re-connect the riparian zone to the mainstem creek; and having a source-based approach that addresses the observed water quality impairment as close to the source of the impairment as possible. The County's preference includes non-structural BMPs that advocate education, water conservation (e.g., advanced landscape irrigation), good housekeeping practices, and chemical-free weed control/pest management. With respect to structural BMPs, preference will be given to BMPs having a natural treatment approach, as opposed to above-ground or mechanical "systems" that are constructed adjacent to the flow line of the creek. These include: wet ponds or constructed wetlands, vegetated swales/biofilters, dispersed micro-catchment enhancements to the flow line of the creek (e.g., bio-structural solutions, including crib and streambank designs that replicate the surrounding riparian corridor to the greatest extent possible). Each of these structural BMPs ideally would incorporate a soil mantle that allows for vegetation to grow, versus hard-armored approaches such as concrete veneers.

5. Adaptive Management: Although several definitions of adaptive management exist, the approach is founded on testing assumptions systematically to achieve a desired outcome, in this case, improved water quality and protection of Park resources. Adaptation involves modifying the implementation plan or action, based on the results of monitoring. The County of Orange is currently part of watershed stakeholder groups that are participating in a series of in-depth analyses of water quality issues within and adjacent to the Park. The evaluations are not yet complete, and therefore will need to be incorporated as the results become available. In addition, the RDMD can apply adaptive management approaches for evaluating existing projects both within Park boundaries and adjacent to its border.

9.4 RECOMMENDATIONS

General Actions

- Continue to actively participate in watershed planning efforts.
- Assess projects and recommendations resulting from watershed planning efforts for their potential impacts to park resources.
- Incorporate water quality education and BMPs into public outreach efforts. Most of the objectives of the WMP are to promote and encourage practices and behavior that supports development of a healthy environment for the watershed. Education is

therefore a major component of a watershed management program, as well as enhanced public outreach to promote a more complete understanding of the environmental problems and the ecological value of the Aliso Creek watershed.

- Conduct water quality monitoring within the park at appropriate intervals for the presence of manmade debris, nutrients, and other non-point source pollutants.
- Recognize efforts of on-going regulatory programs to address water quality in Aliso Creek. Ensure that park activities do not exacerbate existing water quality conditions.
- Use the findings and recommendations of the Water Quality Technical Memorandum to guide the evaluation and prioritization of projects and BMPs.

10.0 Cultural Resources

10.0 CULTURAL RESOURCES MANAGEMENT

In 1990, LSA prepared a Resource Management Plan that identified all of the known cultural resources within AWCWP. At that time a record search showed that a total of 51 resources have been previously recorded within AWCWP. Of these 51 sites, 33 are broadly identified as Habitation Sites that include rock shelters and midden sites, four are Native American Heritage Value Sites that encompass rock art and rock alignments, six are Lithic or Artifact Scatters, and eight are Historic Sites.

Results of test excavations of several archaeological sites in the AWCWP reveal prehistoric occupations of long duration, often spanning several thousands of years. Furthermore, some of these sites include components of several recognized Coastal Southern California traditions including Milling Stone, Intermediate, and Late Periods. This dates occupation of the AWCWP area to as early as approximately AD 150 to as recent as approximately AD 1800. Since only a few of the sites within the AWCWP have been thoroughly excavated, there are still many unknown resources within known sites, and there exists much research potential.

Historic resources are also found within the AWCWP. Sites include historic structures associated with the ranching of AWCWP, a set of wagon tracks worn into sandstone, and rock graffiti and the Mormon Trading Post from the 1850s. Numerous unevaluated vehicular and aircraft wreck sites are present within the AWCWP, with the most notable being an aircraft wreck dating to 1946.

Information potential for prehistoric settlement and subsistence activities is high, and there also exist many significant historic resources in the AWCWP. Impacts could be considered significant even on sites that have already been investigated to some degree. Some of the cultural resources within AWCWP have been or are in danger of being destroyed by human or natural disturbances and/or neglect. As a result, all sites within the AWCWP are considered highly significant, with site preservation as a priority. Whenever possible, the preservation of archaeological sites is an objective of the AWCWP by maintaining park resources in an undisturbed condition. The locations of cultural resources are a major factor in the placement of both park facilities and their improvements.

The overall goal of the RMP is to present a comprehensive, long-term management plan for AWCWP. In dealing with the cultural resources located within the AWCWP, the specific fundamental objective is the identification of the best way to manage, protect, and enhance park resources while still providing educational opportunities to the public, as well as a safe recreational environment. The cultural resource management plan is discussed in detail below.

10.1 RECORD AND COLLECTION MANAGEMENT

A cultural resource records management system needs to be established for AWCWP that incorporates previously recorded sites within the AWCWP, in addition to the discovered resources of the future. The first step is the creation of a relational database system in Microsoft Access for site inventory information, including photographs and locational maps. With its Model Curation Program, California State University, Fullerton (CSUF) has put much time and effort into creating a format for the reporting and subsequent cataloguing of cultural resource collections from Orange County (Eisentraut and Cooper 2002). Using this format as a template, a condensed version of the CSUF database should be created for the AWCWP collection to record pertinent site information. Once in place for the existing collection, this database can be continually updated to include new information about the resources, as well as document newly discovered cultural resources.

In addition to this recommended database, known park resource boundaries should be digitized into a GIS format in order to produce a base map of AWCWP. Once created, this base map can be used to overlay existing resource conditions. In using a GIS format, this base map can also accommodate a global positioning system (GPS) as a source of data input for resource mapping. Creation of this type of map using GIS programs will allow for the presentation of either the base maps or the resource maps in both small- and large-scale formats. On a smaller scale, these data can be used to produce a constraints map to help identify areas where sensitive cultural resources may occur. Larger formats will aid in presentations to the public. This flexibility in formatting scale is also important for review and use within the park system.

The existence of both GIS information and a resource database allows for the linkage of a multitude of data regarding cultural resources, existing collections, and park resources. For example, geographical locations can be compared with any of the following: stratigraphic formations, artifact and site provenience information, specific project information including reports and other site documentation, site and/or collection photographs, and the scientific status of the resource. Creating these data resources with this level of technology will aid in resource identification, investigation, evaluation, determination, and interpretation, as well as the documentation and curation of these resources for future generations.

The County of Orange currently maintains its collections and records through the OC Parks Historical and Cultural Programs office. Standards for the proper collection, preparation, curation, and long-term management are provided in Part IV of the California State University, Fullerton Proposed Policy and Procedural Guidelines document developed by Eisentraut and Cooper (2002). These Guidelines can be found on the World Wide Web at: http://www.ocparks.com/uploadgraphics/CSUF%20final%20curation%20report.pdf.

Since OC Parks has adopted the proposed policies for format of the reporting and cataloguing cultural resources put forth by CSUF, the OC Parks Historical and Cultural Programs office should play a central role as a custodian in the work pertaining to the collections and records for AWCWP.

10.2 RESOURCE IDENTIFICATION AND RECORDATION

A current records search needs to be completed for the AWCWP. This search of the records maintained at the South Central Coastal Information Center at CSUF should include a review of all recorded historic and prehistoric archaeological sites. A review of known cultural resources surveys and excavation reports within the AWCWP should also be conducted. In 1991, a records search was done for AWCWP, and from that search LSA has an inventory of what work has been previously completed in the area. At that time a total of 51 known cultural resources were within the AWCWP. Information obtained through the Information Centers is protected by a confidentiality agreement that restricts access to site information to qualified individuals. The current Policy Manual of the California Historical Resources Information System provides a thorough discussion of the required qualifications for access to the site information. These policies should be observed concerning this proprietary information.

The updated records search will show what archaeological or historical surveys have been conducted within the AWCWP and what cultural resources have been identified. From the information gathered from the records search, a site inventory checklist should be created that would be the instrument for inventorying all archaeological sites in the AWCWP. A major feature of the checklist should be a section that details threats to the site. Such threats include natural processes of weathering, fire, and erosion; unauthorized trails running close to or through site locations; and vandalism and theft of cultural resources. This site inventory checklist should be recorded within a Microsoft Access database format in order to keep the data compatible with other AWCWP resource management information. Once this checklist is drafted and subsequently approved, archaeologists working with park stewards would have a greater ability to systematically inventory and document cultural resources. Thus, the site inventory checklist can be used as a resource management tool.

A park-wide systematic reconnaissance survey should be conducted by an Orange County certified archaeologist. Survey work should be completed to a level that will satisfy the requirements of Section 106 of the National Historic Preservation Act, the California Environmental Quality Act (CEQA), and the County of Orange. To help staff this endeavor, qualified volunteer groups should be utilized to assist in the survey of the AWCWP, possibly using students from local archaeological field schools or members of local professional societies. When sites and/or isolates are located during a survey, they should be recorded on California Department of Parks and Recreation (CDPR) 523 series forms. Locational data should be recorded using a handheld GPS unit, so that the data can be imported into existing park resource management databases. Site updates, including photos and maps, should be completed for previously documented sites that are reevaluated; site updates can augment or correct information that is known about a specific resource by corroborating that the existing record remains accurate. Previously recorded information that appears to be erroneous should be noted, especially when changes occur to the resource or its immediate setting. A resource should have a new CDPR 523 form filled out only when extensive changes to the resource are visible. For resource protection, confidentiality should be maintained for all records of cultural site locations. Surface collection is recommended for any materials encountered if the site appears to be threatened by natural or human factors.

A total of four Native American Heritage Value Sites that include rock art and rock alignments have been previously recorded with AWCWP boundaries. It is recommended that a Sacred Lands File search be conducted by the Native American Heritage Commission (NAHC) for the lands within the AWCWP in order to identify further Traditional Cultural Areas. These areas include ceremonial and/or procurement sites. Native American groups should be involved with park management personnel in checking sacred sites and/or natural resources procurement areas. Further discussion of this involvement can be found below in discussing stewardship programs for the AWCWP.

If human remains are encountered during survey activities within AWCWP, State Health and Safety Code Section 7050.5 states that the County Coroner should make a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). With the permission of the Director of Harbors, Beaches, and Park, or his designee, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 24 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

10.3 RESOURCE INVESTIGATION AND EVALUATION

The AWCWP has a variety of recorded cultural resources within park boundaries, all with different levels of impacts associated with proposed park usage. Potential effects on archaeological resources that would occur as a result of construction of a trail may differ from those caused by maintenance of park facilities such as biological restoration activities, weed removal, and fire management practices. When site-specific plans are created that detail future park improvements, they can be compared with the AWCWP resource constraints map to identify cultural resource sites that are known to be significant in the area. If a known significant site will undergo direct impacts, an Orange County certified archaeologist shall be consulted to both recommend and implement mitigation measures that are appropriate for the impacts to these sites. Preference shall be given to avoidance of impacts through project design to eliminate site disruption. Impact avoidance may be paired with other measures to protect the resource such as capping, fencing, or planting native vegetation that would be difficult to penetrate.

When the significance of an archaeological resource is unknown, prior to any grading or development in the vicinity of the site that will undergo direct impacts from park development, an Orange County certified archaeologist shall conduct test level excavations at those sites. The archaeologist shall provide recommendations for further action based on the findings of test level excavations. Recommendations may include:

- Adjustments to site-specific development plans to avoid disturbance of the site
- Preservation of the site through capping, fencing, or planting of impenetrable vegetation
- Complete excavation
- No further action required

When a park project will indirectly impact sites where the significance of a resource is unknown, the site will undergo test excavation followed by recommendations for further action.

An Orange County certified archaeologist shall provide a Cultural Resources Survey of the area within the AWCWP prior to activities that may impact sites, both known and unknown for exposed artifacts and/or features. The surveys shall be completed with both their findings and recommendations incorporated into the mitigation program prior to any grading or development in these areas.

In addition, a Research Design Program needs to be prepared by an Orange County certified archaeologist that identifies research strategies to be implemented by subsequent research within the AWCWP. Topics of the Research Design should include the appropriate research to be conducted on sites that are known to occur within the AWCWP but that were not addressed as part of any prior mitigation program (*e.g.*, those surveys of the park property that were conducted prior to its designation as a park). These sites should include those not anticipated to undergo either a direct or indirect impact. The Research Design shall also address what additional research may be appropriate for sites that have been preserved and/or tested as a result of the mitigation program. As field work proceeds in AWCWP, this Research Design Program should be periodically updated.

Any AWCWP project that involves earth disturbing activities in culturally rich soils, including but not limited to biological enhancement programs, fire prevention activities, or general construction activities, should not occur unless a trained archaeologist is present to monitor the work. Artifacts that are unearthed during this construction should be collected with provenience information when available. Archaeological monitors shall have the authority to divert construction if cultural features are encountered during construction until the discovery can be assessed by a qualified archaeologist.

The implementations of the measures cited above by the AWCWP will successfully avoid and/or reduce impacts to cultural resources to a level below significance. If human remains are encountered during ground-disturbing activities in the park, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resource Code (PRC) §5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the NAHC, which will determine and notify an MLD. With the permission of AWCWP or its authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 24 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

10.4 RESOURCE RESEARCH AND INTERPRETATION OPPORTUNITIES

The range of cultural resources that have been documented within the AWCWP signifies a somewhat comprehensive representation of the human settlement and use history of the

San Joaquin Hills. Sites within the AWCWP are a priceless source of anthropological information for the public interpretation of local prehistory, archaeology, and larger anthropological concepts. As previously mentioned, a current and comprehensive survey of the AWCWP is lacking, and very few of the sites that have been recorded within the AWCWP have been thoroughly excavated. Until a complete inventory of park resources has been compiled, little can be known about the interrelationship of these cultural resources. This fact signals that there exists much research potential, as well as many unknown resources within the AWCWP.

The cultural work that is discussed in this Resource Management Plan provides a framework for both the existing and discovered information to be stored for future research. Potential research can focus on a variety of topics such as:

- The sites of AWCWP and the larger picture-site types and regional settlement patterns
- Resource utilization and trade
- Subsistence strategies and what drives change over time
- Human adaptation to environmental change
- Prehistoric Southern California political organization
- Native American religion and cosmology

These general topics are an indication of the limitless opportunities for resource interpretation for AWCWP.

As previously stated, a major goal in dealing with the cultural resources located within AWCWP is to provide educational opportunities to the public. This goal can be realized through the creation of a cultural resources information hub that would help to disseminate information from the AWCWP to both the public and the scientific communities. Given their close proximity to the AWCWP, either the NHM or Soka University would be viable options as locations for such an information hub.

10.5 RESOURCE STEWARDSHIP

The topic of resource stewardship comes into play on several levels for the AWCWP. Stewardship needs to be designated for the basic management of AWCWP collections and records. Site recordation and maintenance also requires stewardship. Additionally, there are stewardship opportunities in dealing with Native American sacred sites and resources.

Currently, the OC Parks Historical and Cultural Programs Office maintain the collections and records for the County of Orange. It is, therefore, recommended that the OC Parks play an integral role in the collection and record management for AWCWP. This would include assistance to the AWCWP in the establishment of a volunteer program for artifact analysis and inventory work, as well as aiding in the creation of a database and GIS mapping system to accommodate proper recordation of cultural resources from the AWCWP.

The contents of archaeological sites are largely unpredictable, with the greater portion of the material existing beneath the ground surface. This buried archaeological information is often discovered when it is exposed on the ground's surface as the result of a variety of impacts, from natural erosional factors to disturbances caused by animals and humans. Within the AWCWP, human remains have been found at a total of seven sites; the most recent burial was exposed as a result of erosion in 1998 at ORA-403 in Spring Canyon. Given the existence of a wide cross-section of site types in the AWCWP, as well as the prevalence of sites within the AWCWP where Native American remains have been found, the creation of a site stewardship program for the protection of AWCWP resources is crucial.

The OC Parks Historical and Cultural Programs Office should also play a central role in developing a stewardship program for the AWCWP. Due to the amount of work involved with the identification, recordation, investigation, and evaluation of the cultural resources within the AWCWP, it is recommended that a volunteer program be put into place to assist with this work. Volunteers for the AWCWP site stewardship program may be found from local professional societies such as PCAS. Locally run archaeological field schools may also be involved in the survey, recordation, and subsequent curation processes.

Most important for the protection of the resources is a schedule of routine patrols in culturally sensitive areas in order to help evaluate known archaeological sites. These sites should be evaluated in terms of the potential effects on the resources by the natural weathering and erosion of sites and the impacts of park visitors (such as the indiscriminate collection and/or vandalism of sites and the creation of illegal trails that could potentially erode site components and produce negative effects on sites). As GPS mapping becomes more prevalent in our society, using this technology to assist in the location and recordation of resources by volunteers will be key for the AWCWP.

A total of four Native American Heritage Value Sites have been recorded within the AWCWP. The AWCWP should make a concerted effort to develop a Native American stewardship program. Native Americans can implement an evaluation of sacred sites or resources that they have deemed important to ensure the protection of the resource in perpetuity.

In conjunction with a stewardship program, the implementation of an emergency response plan for sites that have been exposed by erosion is a necessity. When cultural resources including artifacts or features are encountered, either during a planned patrol or in another unexpected manner, an Orange County certified archaeologist shall be consulted. The certified archaeologist will both recommend and implement mitigation measures that are appropriate for the impacts to the sites. If human remains are encountered during any routine patrols of AWCWP cultural resources, the County Coroner must be contacted immediately to make a determination of origin and disposition pursuant to PRC §5097.98. If the remains are determined to be Native American, the County Coroner will notify the NAHC, which will determine and notify an MLD. With the permission of AWCWP or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 24 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

10.6 RECOMMENDATIONS

General Actions

- Establish a cultural resources records management system.
  - Create a relational database system to record pertinent site information using the Modal Curation Program, CSUF as a template.
  - Digitize known park resources into a controlled-access GIS format to produce a base map of AWCWP.
- Implement a formal procedure for care of existing collections with AWCWP through the OC Parks Historical and Cultural Programs office. Use standards provided in Part IV of the CSUF Proposed Policy and Procedural Guidelines (Eisentraut and Cooper 2002) and relevant County P&Ps.
- In association with a qualified archaeologist, establish a volunteer program to help complete necessary artifact analysis and inventory. Create a training manual for working with archaeological collections. Volunteers should be organized through the County's Adopt-a-Park program.
- Create a site inventory checklist for inventorying all archaeological sites within AWCWP. A major feature of the checklist should be a section that details threats to the site. Digital photographs of the site conditions, and GPS location data should be incorporated.
- Conduct a search of the Native American Heritage Commission (NAHC) Sacred Lands Files in order to identify Traditional Cultural Areas within the park. Native American groups should be appropriately consulted by park management personnel in identifying sacred sites and natural resources procurement areas; and to help develop management programs for these resources.
- When site-specific plans are created that detail future park improvements, they can be compared with known cultural resource locations in the vicinity of disturbance. In addition, focused pedestrian surveys consistent with the County SCA A01 should be conducted for all future park improvements.
- For any cultural resource work conducted within the Park, an Orange County certified archaeologist should prepare a Research Design that identifies research strategies to be implemented during the research program. A review team of cultural resource professionals should establish research priorities for the park, and cultural resource work within the park should be designed to address these priorities.
- Create a cultural resources interpretive display or hub to help disseminate information from the park to both the public and the scientific communities.
- Routinely patrol culturally sensitive areas in order to help evaluate ongoing impacts to known archaeological sites. Sites should be evaluated in terms of the potential effects on the resources by natural weathering and erosion of site and the impacts of park visitors.

- Make a concerted effort to develop a Native American stewardship program. Native Americans can implement an evaluation of sacred sites or resources that they have deemed important to ensure the protection of the resource in perpetuity.

As – Needed Actions

- When sites and/or isolates are located, they should be recorded on California Department of Parks and Recreation (DPR) 523 series forms. Location data should be recorded using a handheld GPS unit. Site updates, including photos and maps, should be completed for previously documented sites that are reevaluated. Surface collection is recommended for any materials encountered if the site appears to be threatened by natural or human factors. Forms should comply with both the CSUF Model Curation Program format, and the California Historical Resources Information System (CHRIS) Format. Updates and new forms should be submitted to the South Central Coastal Information Center of the CHRIS.
- If human remains are encountered during survey and/or ground disturbing activities, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code §5097.98.
- If a known significant site will undergo direct impacts, an Orange County certified archaeologist should be consulted to both recommend and implement appropriate mitigation measures. Mitigation Measures should follow the County Standard Conditions of Approval (SCA) A01 – A04.
- When the significance of a site is unknown, an Orange County certified archaeologist should conduct test excavations at those sites to determine if they are eligible for listing on the National Register of Historic Places and/or the California Register of Historical Resources. The archaeologist shall provide recommendations for further action based on the findings of test level excavations.
- Monitoring of any project that involves earth disturbing activities in culturally rich soils should be conducted by a trained archaeologist under the supervision of an Orange County Certified Archaeologist. Artifacts that are unearthed during this construction should be collected with provenience information when available. Monitoring should comply with County SCA A04.
- Implement an emergency response plan for sites that have been exposed by erosion. When cultural resources, including artifacts or features, are encountered, either during a planned patrol or in another unexpected manner, an Orange County certified archaeologist should be consulted. The certified archaeologist will both recommend and, with parks approval, implement mitigation measures that are appropriate for the impacts to the sites.

Ten Year Actions

- Presence/Absence archaeological surveys are considered to have limited lifetime. The park has not been surveyed for cultural resources in over ten years. A park-wide systematic reconnaissance survey should be conducted every ten years under the direction of an Orange County certified archaeologist. To help staff this endeavor, qualified volunteer groups could be utilized to assist in the survey of the AWCWP. Update the park-wide survey every five years, particularly in high visitation, and high erosion areas.

11.0 Paleontological Resources

11.0 PALEONTOLOGICAL RESOURCE MANAGEMENT

11.1 LOCALITY AND COLLECTION MANAGEMENT

A paleontological management system needs to be established for AWCWP that incorporates previously recorded localities within the AWCWP, in addition to localities that will be discovered in the future. The first step is the creation of a relational database system in Microsoft Access for locality inventory information, including photographs and locational maps. With its Model Curation Program, CSUF has put a great deal of time and effort into creating a format for the reporting and subsequent cataloguing of paleontological resource collections from Orange County (Eisentraut and Cooper 2002). Using this format as a template, a condensed version of the CSUF database should be created for the AWCWP collection to record pertinent locality information. Once in place for the existing collection, this database could be continually updated to include new information about previously recorded localities, as well as document newly discovered localities.

In addition to this recommended database, known park resource boundaries should be digitized into a geographical information system (GIS) format to produce a base map of AWCWP. Once created, this base map could be used to overlay existing conditions such as the boundaries of geologic formations. In using a GIS format, this base map could also accommodate a global positioning system (GPS) as a source of data input for locality and geologic mapping. Creation of this type of map using GIS programs would allow for the presentation of either the base maps or the locality maps in both small- and large-scale formats. On a smaller scale, these data could be used to produce a constraints map to help identify areas where sensitive paleontological resources may occur. This could be used to determine where to build, or not build park trails and facilities. Larger formats will aid in presentations to the public. This flexibility in formatting scale is also important for review and use within the park system.

The existence of both GIS information and a locality database allows for the linkage of a multitude of data regarding paleontological resources, existing collections, and park resources. For example, geographical locations can be compared with any of the following: stratigraphic formations, sediment types, locality provenience information, fossil types, specific project information including reports and other locality documentation, collection photographs, and the scientific status of the resource. Creating these data resources with this level of technology will aid in resource identification, investigation, evaluation, determination, and interpretation, as well as the documentation and curation of these resources for future generations.

The County of Orange currently maintains its collections and records through the OC Parks Historical and Cultural Programs office. Standards for the proper collection, preparation, curation, and long-term management are provided in Part IV of the California State University, Fullerton Proposed Policy and Procedural Guidelines document developed by

Eisentraut and Cooper (2002). These Guidelines can be found on the World Wide Web at: http://www.ocparks.com/uploadgraphics/CSUF%20final%20curation%20report.pdf.

Since OC Parks has adopted the proposed policies for format of the reporting and cataloguing cultural resources put forth by CSUF, the OC Parks Historical and Cultural Programs office should play a central role as a custodian in the work pertaining to the collections and records for AWCWP.

11.2 PERIODIC LOCALITY PROSPECTING AND SALVAGE COLLECTING

A park-wide systematic reconnaissance survey should be conducted under the direction of an Orange County certified paleontologist. Survey work should be completed to a level that will satisfy the County of Orange Standard Condition of Approval A05. To help staff with this endeavor, volunteer groups, possibly students from local geology field schools or members of local professional societies, could assist in the survey of the AWCWP.

When fossil localities are located during a survey, they should be recorded on fossil locality sheets that will document important information about the find such as a temporary field number, tentative identification of the find(s), description of the sediments, formation name, location of the find within the AWCWP, elevation, and GPS locational information. Locational data should be recorded using a handheld GPS unit so that the data can be imported into existing park resource management databases, and when needed, the resource can be easily relocated. Locality updates, including photos and maps, should be completed for previously documented localities that are reevaluated; locality updates can augment or correct information that is known about a specific resource by corroborating that the existing records remain accurate. Previously recorded information that appears to be erroneous should be noted, especially when changes occur to the resource or its immediate setting. For resource protection, confidentiality should be maintained for all records of fossil site locations. Every effort should be made to preserve the resource in situ for future generations. Collection by staff or volunteers under the direction of a County-certified paleontologist is recommended for significant fossil materials encountered if the fossil appears to be threatened by natural or human factors. Therefore, surveyors, and park rangers, should at a minimum have access to picks, shovels, rock hammers, dental picks, brushes, mason trowels, one-quarter-inch mesh screens, plaster medical bandages, and chemical hardeners to help stabilize and collect fossil resources.

In addition, prior to any proposed ground disturbing activities within the AWCWP, whether routine or emergency trail maintenance, biological revegetation efforts, or construction of new facilities, a paleontological assessment survey of the proposed construction area should be completed under the direction of a County-certified paleontologist to identify both the rock types present in the area and the potential for significant fossil resources to be discovered. If significant fossils are identified during the survey, these should be scientifically salvaged prior to initiation of construction activities. A County-certified paleontologist should develop a paleontological resources impact mitigation program (PRIMP) consistent with guidelines developed by the Society of Vertebrate Paleontologists (SVP 1995) to direct resource monitoring of excavations in order to collect and properly curate any fossils that may be discovered during the ground-disturbing activities. Standards

for the assessment survey and monitoring program can be found in the County Standard Conditions of Approval A05 (Survey), A06 (Salvage), and A07 (Monitoring).

11.3 RESEARCH OPPORTUNITIES AND INTERPRETIVE THEMES

The paleontological resources that may exist within the AWCWP can range in age from the Late Eocene through the Pleistocene and may be either marine or nonmarine organisms. Localities within the AWCWP are a priceless source of paleontological information for the public interpretation of local prehistory. As previously mentioned, a current and comprehensive survey of the AWCWP is lacking, and very few of the localities that have been recorded within the AWCWP have been thoroughly studied. Until a complete inventory of park localities has been compiled, little can be known about the interrelationship of these paleontological resources. This fact signals that there exists much research potential, as well as many unknown resources within the AWCWP.

The paleontological work that is discussed in this RMP provides a framework for both the existing and discovered information to be stored for future research. Potential research can focus on a variety of topics such as:

- What types of plant and animal life existed in the County at specific times in the past? Provide an epoch-by-epoch description of the gradual changes that affected both the landform and fauna of the County.
- What geologic conditions are represented by the sediments and fossils at specific times in the past? Was the area under water? If so, how deep? Was the area a flood plain? Was the area a swamp?
- Are there any new species that may help shed light on evolution or evolutionary processes?
- Do some specific sediment types produce more fossils than others?
- The geological history of the Sespe/Vaqueros Formations has been proposed to be one of a large river delta that was eventually diverted through activation of the San Andres Fault system along the western margin of the United States. Fossils from this time are found in the Sespe deposits within the AWCWP.

These general topics are an indication of the opportunities for resource interpretation for AWCWP. Research objectives to direct scientific investigations in the park may be more easily developed in conjunction with a local museum (Orange County Natural History Museum) or university (CSUF). An ad hoc committee of local paleontologists could develop a list of relevant research questions that might be investigated in AWCWP. A review panel, including a County Certified Paleontologist, could review paleontological research proposals designed to aid park resource management and make recommendations to park staff on approval of research.

A major goal in dealing with the paleontological resources located within AWCWP is to provide educational opportunities to the public. This goal could be realized through the creation of a paleontological resources display (possibly housed within a kiosk) that would

help to disseminate information from the Park to both the public and the scientific communities. The County Paleontologist at the Ralph B. Clark Interpretive Center, could also be contacted to assist in developing materials and locations for conducting paleontology outreach as an interpretive element of the park.

The Pecten Reef area contains significant invertebrate fossils, but an interpretive facility, ranging from simple kiosks to an interpretive center, could be constructed in this area, with impacts to paleontological resources mitigated below a level of California Environmental Quality Act (CEQA) significance. Education could focus on several topics such as the differences between an archaeologist and a paleontologist. Another topic could deal with defining a fossil and the processes required to form a fossil. Other topics could concentrate on what scientists can learn from studying fossils and why it is important to collect locational information, sediment descriptions, descriptions of other associated fossils, etc. along with the find. It should be stressed that a fossil without all this other information is not very useful to science since the complete story of the fossil is lost. Paleontological interpretive and visitor education programs should be coordinated with other interpretation and education efforts throughout the park. Information about paleontological resources should also be included in general information and maps of the park.

11.4 FOSSIL RESOURCE STEWARDSHIP

The topic of resource stewardship comes into play on several levels for the AWCWP. Stewardship needs to be designated for the basic management of AWCWP collections and records. Locality recordation and maintenance also requires stewardship.

Currently, the OC Parks Historical and Cultural Programs Office maintain the collections and records for the County of Orange. Fossil analysis and inventory work should occur at the County curation facility, or at the AWCWP under the direction of the County curation facility. However, it is recommended that the OC Parks play an integral role in the collection and record management for AWCWP. This would include assistance to the County in the establishment of a volunteer program for fossil analysis and inventory work, as well as aiding in the creation of a database and GIS mapping system to accommodate proper recordation of paleontological resources from the AWCWP.

The contents of paleontological localities are largely unpredictable, with some areas exhibiting abundant remains in one area, while a few feet away there will be fewer or even no remains. Paleontological information is most often discovered when it is exposed on the ground's surface as the result of a variety of impacts, from natural erosional factors to disturbances caused by humans through excavations to modify the landscape. Given the existence of a wide variety of sediment types in the AWCWP, with the potential to produce vertebrate and invertebrate fossil remains, the creation of a site stewardship program for the protection of AWCWP resources is crucial.

The OC Parks Historical and Cultural Programs Office should also play a central role in developing a stewardship program for the AWCWP. Due to the amount of work involved with the identification, recordation, investigation, and evaluation of the paleontological resources within the AWCWP, it is recommended that a volunteer program be put into place to assist

with this work. An active stewardship program can also be established for the monitoring and management of known paleontological resource localities within the park. Volunteers for the AWCWP site stewardship program may be found from local professional societies. Locally run geologic field schools may also be involved in the survey, recordation, and subsequent curation processes. Sources for paleontological volunteers include: 1) Ralph B. Clark Interpretive Center, 2) County Curation facility, 3) Paleontological consulting community, and 4) City of Laguna Hills Community Center.

Most important for the protection of the resources is a schedule of routine patrols in paleontologically sensitive areas to help evaluate known and as yet undiscovered paleontological localities. These localities should be evaluated in terms of the potential effects on the resources by the natural weathering and erosion of the locality and the impacts of park visitors (such as the indiscriminate collection and/or vandalism of sites and the creation of illegal trails that could potentially damage rare fossils within the locality and produce negative effects on it). These efforts will assist AWCWP in prioritizing paleontological resources for protection and management measures and actions. As GPS mapping becomes more prevalent in our society, using this technology to assist in the location and recordation of resources by volunteers will be key for the AWCWP.

In conjunction with a stewardship program, the implementation of an emergency response plan for localities that have been exposed by erosion or planned park maintenance is a necessity. When paleontological resources are encountered, during either a patrol or Park maintenance, an Orange County certified paleontologist shall be consulted. The certified paleontologist w ill both recommend and implement mitigation measures that are appropriate for the impacts to the locality. The mitigation may range from simple recording of location and noting the types of fossils present with no material actually being collected, to collecting a representative sample of the exposed fossil material, to a full-scale excavation to salvage the resource before further damage occurs.

11.5 RECOMMENDATIONS

General Actions

- Establish a paleontological resources records management system.
  - Create a relational database system to record pertinent site information using the Modal Curation Program, CSUF as a template. Once in place, this database should be continually updated to include new information about previously recorded localities, as well as document newly discovered localities.
  - Digitize known park fossil resources into a access-controlled GIS format to produce a base map of AWCWP.
- Implement a formal procedure for care of existing collections with AWCWP. Collections are managed through the OC Parks Historical and Cultural Programs office using standards provided in Part IV of the CSUF Proposed Policy and Procedural Guidelines (Eisentraut and Cooper 2002) and relevant County policies and procedures.
- Place paleontological resource collections from AWCWP in a suitable repository within Orange County.

- Conduct a park-wide systematic reconnaissance survey under the direction of an Orange County certified paleontologist. Survey work should be completed to a level that will satisfy Orange County Standard Condition of Approval A05.
- Create a site inventory checklist for inventorying all paleontological sites within AWCWP. A major feature of the checklist should be a section that details threats to the locality.
- Develop research objectives to direct scientific investigations in the park.
- Create paleontological resource information exhibits that would help to disseminate information about AWCWP to both the public and scientific communities.
- Develop an interpretive facility in the Pecten Reef area with impacts to resources mitigated below a level of California Environmental Quality Act (CEQA) significance.
- Coordinate paleontological interpretive and visitor education programs with other interpretation and education efforts throughout the park.
- Schedule routine patrols in paleontologically sensitive areas to help evaluate known and as yet undiscovered paleontological localities. Localities should be evaluated in terms of the potential effects on the resources by the natural weathering and erosion of the locality and the impacts of park visitors.

As-Needed Actions

- When fossil localities are identified, they should be recorded on fossil locality sheets that will document important information about the find such as a temporary field number, tentative identification of the find(s), description of the sediments, formation name, location of the find within the AWCWP, elevation and GPS locational information. Every effort should be made to preserve the site in situ for future generations. Collection is recommended for any materials encountered if the fossil appears to be threatened by natural or human factors.
- Prior to any proposed ground disturbing activities within AWCWP, conduct a paleontological assessment survey under the direction of a County-certified paleontologist to identify both the rock types present in the area and the potential for significant fossil resources to be discovered. The survey should comply with SCA A05.
- If significant fossils are identified, they should be scientifically salvaged prior to initiation of construction activities. A County-certified paleontologist should develop a paleontological resources impact mitigation program (PRIMP) consistent with guidelines developed by the Society of Vertebrate Paleontologists (SVP 1995) to direct resource monitoring of excavations in order to collect and properly curate any fossils that may be discovered during the ground-disturbing activities. Salvage activities should comply with County SCA A06.
- Implement an emergency response plan for sites that have been exposed by erosion or planned AWCWP maintenance. When paleontological resources are encountered, an Orange County certified paleontologist should be consulted. The certified paleontologist will recommend mitigation measures that are appropriate for the impacts to the locality.

12.0 Public Outreach and Education

12.0 PUBLIC OUTREACH AND EDUCATION PLAN

12.1 INTRODUCTION

A comprehensive interpretative program is the means to convey information about the AWCWP and the nature of the land it was established to protect. Trail use lends itself to an active recreational experience that can be enhanced by educating trail users on the local environment and history. The County has initiated several interpretive displays and programs to convey information about the park. These displays and programs include interpretive panels, kiosks, and signs along with interactive outreach programs. The County thus provides the public with trail maps, public safety information, and rules and regulations along with descriptions of local wildlife, habitats, and the environmental values of the park.

12.2 EXISTING INTERPRETATION AND EDUCATION

12.2.1 Interpretive Panels

Interpretive panels are a valuable tool to educate the public on issues such as wildlife habitat, habitat restoration, environmentally sensitive areas, benefits of using the designated system of roads and trails, trail safety, and detriments of non-system trail use. Interpretive panels also provide important information on unique park resources such as geologic formations, sensitive habitats, scenic vistas, and historical features. Currently, interpretive panels are located at Top of the World, Dripping Cave, Old Corral, and at the Pecten Reef Trail.

12.2.2 Information Kiosks

Information kiosks convey information and communicate with users of the park. Information kiosks currently exist throughout the park at the following locations:

- Main Park Entrance
- Aliso and Wood Canyons Confluence
- Moulton Meadows
- Top of the World
- Intersection of the Wood Canyon and Mathis Canyon trails
- Intersection of the Wood Canyon and Cholla trails
- Intersection of the West Ridge and Cholla trails
- Intersection of the West Ridge and Mathis Canyon trails
- Base of Meadow Trail adjacent to the foot trail

Informational kiosks address a variety of topics including rules and regulations, maps of the park, safety information, wildlife information and sightings, and upcoming events.

12.2.3 Signs

Information signs are posted throughout the park to convey information to park users. Signs are used to post use restrictions, regulations, or other important information. Signs include warnings about potential safety hazards from wildlife, such as mountain lions and snakes, as well as poison oak, ticks, and steep slopes. Directional signs are also used at trail intersections to identify trails and indicate trail lengths.

12.2.4 Public Outreach

Park rangers conduct a free 30 minute nature walk on the second and fourth Saturday of every month, limited only by the current number of available staff. Topics explored include native flora and fauna as well as the cultural and historical resources of AWCWP. These nature walks introduce residents to the many resources of the AWCWP lands and promote public understanding of the value of wildlife and habitat.

The Laguna Canyon Foundation conducts tours for underprivileged 4th grade students from an inter-city Santa Ana elementary school. These outdoor science classes are oriented specifically for children with little or no experience with the natural world. The program offers a unique combination of environmental science, outdoor skills and learning by experience, and leadership activities. The program is ongoing and will continue into the future, targeting different schools each year (Stan Bengtson, pers. comm.).

12.3 PUBLIC OUTREACH AND EDUCATION PLAN

Interpretation provides the means to deepen an appreciation and encourage the protection of AWCWP. Interpretation provides lasting benefits to individuals and the local communities. Interpretive services can introduce visitors to the intrinsic values of the park and educate about the appropriate management of natural and cultural resources. The following discusses interpretation in the context of Resource Management for AWCWP using guidelines for State Park planning as outlined in the Planning Handbook, California State Parks, February 2002.

Interpretive goals and guidelines provide the basis to prepare interpretive plans that expand upon the interpretive themes, and detail methods, media and programs for the park. Specific project interpretive plans and exhibit plans that focus on more detailed interpretation may then follow in future documents. Three main goals are identified for the park's interpretive programs:

- Visitors will understand and appreciate the importance of California's native habitats.

- Visitors will learn about and understand how humans have affected California's native habitats.
- Visitors will understand the need for ongoing protection and enhancement of the natural, cultural, and recreation resources for present and future generations.

12.3.1 Interpretative Themes

AWCWP contains intact native habitat and remnants of Southern California's historic landscape. Interpretation will include the significance of the historical use of the land, the local wildlife and their habitat still present, and the need for preservation of the land for the future to instill a sense of place and stewardship of the natural community.

- Develop an Interpretive Plan that reflects the unifying and primary themes outlined below. The Plan should articulate strategies necessary to implement the goals and objectives for interpretation, including interpretive trails and displays; enhancement of existing facilities and displays; interpretive programming; and interpretive methods, such as live programs, tours, brochures, maps, and school programs.
- Adopt interpretive themes that establish the overall interpretive direction and tone, as outlined below. Unifying themes provide overall focus to interpretive development for AWCWP. The unifying theme must relate to the resources, the definition of a wilderness park and the interests of visitors. Primary and supporting interpretive themes elaborate and further describe the unifying theme.

UNIFYING THEME:	**Natural forces, plants, animals and people continually change the fragile and endangered habitats of AWCWP.**
Primary Theme:	**AWCWP contains a diverse collection of plant and animal species that depend on the native habitat.**
Secondary Theme:	The urban edge effects wildlife and the native habitat. Visitors and adjacent residents must learn about the importance of AWCWP and how to co-exist. The diverse ecosystems within AWCWP require that recreational use must be balanced to provide long term preservation.
Secondary Theme:	The Nature Reserve of Orange County (NROC), of which AWCWP is a part, preserves a microcosm of the California Floristic Province, an identified biodiversity hot spot in North America and a genetic reserve for the continent.
Secondary Theme:	AWCWP is an important location for migratory birds, such as the endangered least Bell's vireo, the lazuli bunting, the little willow flycatcher, and the white-crowned sparrow.
Primary Theme:	**AWCWP contains a landscape that is rich in both history and culture.**

Secondary Theme:	Native people depended on the land for their way of life. This theme will explore traditional uses of the natural resources. Native people had an intimate knowledge of plants, water and the cycles of nature. The theme allows for comparison with later settlers and present day visitors.
Secondary Theme:	Early settlers helped to shape the communities that are present today.
Secondary Theme:	Development of the automobile for travel, touring and business changed settlement patterns, lifestyles and transportation in Southern California.
Secondary Theme:	Past agricultural practices (*e.g.,* ranching and grazing) helped shape the landscape as we see it today.
Primary Theme:	**AWCWP is part of a much greater watershed that begins in the Santa Ana Mountains.**
Secondary Theme:	Humans have impacted the natural resources of the Aliso Creek watershed.
Secondary Theme:	Natural resources of AWCWP play an important role in the health of the Aliso Creek watershed.
Primary Theme:	**AWCWP has a wealth of paleontological resources that provide evidence of the ancient plant and animal species of AWCWP.**
Secondary Theme:	AWCWP is a dynamic and naturally evolving area. Fossils help us to understand how past geologic events, processes, and environmental conditions have resulted in the park we see today.

12.3.2 Park Brochures/Internet

Brochures. Park literature should include maps and information about park regulations and hours of operation, park access and recreation, NCCP/HCP, park geology, plant communities, wildlife habitat, history and pre-history, environmental restoration programs, resource conservation issues, and educational programs offered by the park.

Internet. The internet provides an opportunity to better communicate information to a broad spectrum of County residents, Southern Californians, and the world. OC Parks could contract with a professional group to update and enhance the County's website, including the site for AWCWP. Topics for the AWCWP site could include:

- Topographic maps as an overlay to aerial photographs with trails and key access points
- Plant lists, bird lists, and wildlife sightings available on line for trail users
- Fire safety including information for residents who live adjacent to AWCWP (*e.g.* appropriate landscaping, emergency exits)
- Resource management and the need for active and ongoing work by both the County and local residents to ensure the future of this park
- Park events (*e.g.* night hikes, bird walks)
- Water quality/pollution
- Good neighbor policies/how to co-exist with the wilderness

12.3.3 Outreach Programs

The education of park visitors may well be the most important element of the resource management program. The location of the park in the midst of an urban environment renders it subject to profound influences of human activities. Many of the potential human impacts upon the park resources stem from a lack of understanding of the often complex relationships between human activities and natural processes in the environment. A diverse educational program designed to appeal to a broad spectrum of park users and County residents should be offered.

Interface with Schools and Youth Groups. AWCWP can provide an outdoor classroom for educational programs in the natural science, history, and pre-history for students ranging from pre-school to high school levels and other youth groups such as scout organizations. Schools located adjacent to AWCWP, in particular, should be targeted for such programs. Programs should coordinate interpretive and educational programs for pre-K-12 age groups with the California Department of Education's framework and content standards. Special programs could include events such as field trips with guided nature walks or cultural presentations. Students could then share their knowledge and enthusiasm with their families. Schools can be a vehicle to enhance public awareness of park resources. AWCWP could conduct a competition with local high school art students to create ideas for entry gates to the park that could later be constructed by a local artisan. The Puente Hills Landfill Native Habitat Preservation Authority has successfully conducted such competitions that produce intriguing iron entry gates with natural motifs at multiple entrances to their property.

Academic Research or Internships. AWCWP can also provide opportunities for academic research at the junior college or university level. Such research could involve specific technical studies and expand knowledge of existing resources, as well as encourage field visits and resource documentation. Due to its proximity to AWCWP, Soka University, in particular, provides a unique opportunity for developing research partnerships. Create youth and adult educational, research, and interpretive opportunities. Develop an ongoing relationship with local school districts, colleges, and universities. The County could provide opportunities for academic internships related to park resources. Interns could monitor visitor impacts on park resources, trails and other high use areas; research and develop

interpretive displays; document plant and animal species occurring in the park; research on habitat restoration techniques; document wildlife corridors; and present interpretive talks.

Docent Training. AWCWP could initiate a docent program that eventually could be self-sustaining with minimal staff oversight. Volunteer professionals (*e.g.,* Laguna Greenbelt) could begin the process of training docents about the natural and cultural resources of AWCWP. Upon completion of a defined program trainees could be eligible to serve as AWCWP docents. Docent programs should include: plant communities, wildlife and wildlife habitats, sensitive plants, watersheds (impacts of nonpoint source pollution), cultural and paleontological history.

Volunteer Stewardship Program. Staff could solicit and encourage the development of a volunteer organization dedicated to stewardship of AWCWP. Such a group could be organized and run by volunteers with support, guidance, and supervision from park staff. Volunteers could participate in habitat restoration and revegetation, invasive weed eradication, biologic inventories and bird counts, observation and documentation, protection of archaeological and paleontological sites, park tours, trail and slope stabilization, Earth Day festivities, and preparation of educational/interpretive materials (*e.g.* photography, specimen collection). Establish an oral history program. Keep an active list of people associated with the history of AWCWP including the history of preserving the land for future generations. Obtain and preserve oral histories of these people.

Good Neighbor Program. AWCWP should provide educational materials for visitors who live in the vicinity of the park. Such educational materials should include information about invasive landscape plants, non-point source water pollution, conflicts between domestic pets, urban edge effects, urban wildlife coexistence, wildfire risk and prevention, trail safety and wildlife habitat, and wildfire prevention. These materials should be made available to the public at the AWCWP and LCWP main entries, the Laguna Niguel Regional Park ranger office, other County offices, and adjacent schools and property owners (if possible). Interpretive talks geared to local residents, including those living in the watershed of upstream of Aliso Creek, could be offered. Park staff should meet on an annual basis with Homeowners' Associations and other local groups to discuss planned management actions in the park, ongoing management problems, and to seek neighbors' comments on problems they have observed.

Adopt-a-Creek Program. AWCWP could start an Adopt-a-Creek program to encourage local residents to take an active role in helping to preserve the health and beauty of their local creeks. Adopt-a-Creek participants adopt an area of creek and make a commitment to protect and preserve it. Participants could assist the County by: regularly picking up trash, planting site-appropriate native plants and/or removing non-native plants, and studying and reporting on water quality and habitat.

Arts Community Outreach. Given the strong local interest in the arts, AWCWP could enlist the help of these artists to help the park on many different levels. Art events could attract both artists and those who appreciate artwork. Local artists who have used AWCWP for their landscape work (*e.g.,* photography, plein air painting, sculpture) could display their work at the main park entry. Local art groups could conduct day events such as outdoor

watercolor or photography classes. Local artists could participate in the park's educational and interpretive programs. Artistic events (*e.g.,* short plays, puppet shows, music or dance) could communicate information about park resources and conservation issues. Events could include walking on the trails, touching or smelling plants, bird calls. Events could be advertised through public service announcements on the television or radio, or on the County's website. Design competitions could be initiated to create a unique logo or "brand" for AWCWP that could be used on the website, park literature, and signs throughout the park.

Orange Coast Watershed and Environmental Center (OCWEC). AWCWP should continue partnerships with other environmental and educational organizations, including the OCWEC, for public outreach and education. Public agencies, nonprofit organizations, and educational groups can work together to develop regional and local programs for public education.

12.4 SIGNAGE

Park signs are required to convey four types of information: directions, regulations, interpretation, and identification. As with other wilderness park management tools, signs must be related to specific park management objectives. A goal will be to accomplish these objectives with the fewest number of signs necessary to prevent "sign clutter." Whenever, possible, maps and informational brochures should be used in place of signs. In general, park signs should be low profile to preserve the full wilderness experience and constructed of durable materials to complement the park's wilderness character. Graphic symbols will be used to convey information in a simple manner. Braille and/or audible signage should be included to assist the visually impaired.

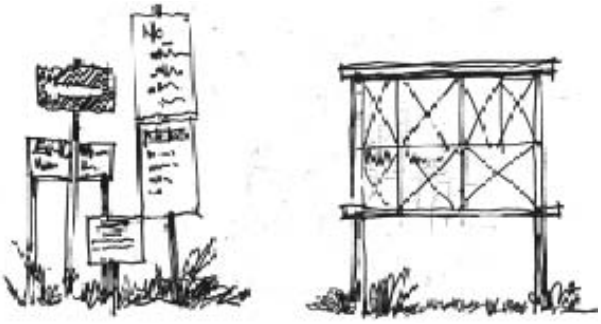
- Place directional signs to convey trail and park facility locations, and distance to destination where appropriate. Directional signs shall be placed at access points, trailheads, and trail intersections.
- Define the rules and regulations of the park and convey acceptable and restricted used within the park. Regulatory signs shall be placed at access points and trailheads.
- Implement a clear hierarchy of signs, consistent with the hierarchy of entries outlined in Section 7.4.1 and detailed in Table E. The location of these entries is depicted on Figure 19, Public Access.
- Convey interpretation and education using a wide range of methods including, but not limited to, brochures, signs, special events, and web-based strategies. Provide interpretive kiosks at key locations throughout the AWCWP including: Level 1-3 entries, major trail junctions and key resource sites such as Dripping Cave, Pecten Reef, and Old Corral.

Signage Concepts. AWCWP needs a well-designed, coherent signage system to notify users of park rules, wilderness safety, direct the public to appropriate use areas, present and interpret park resources, explain recreational opportunities, and encourage public participation the stewardship of the park.

The County should prepare a signage guidebook specific to AWCWP, to include detailed specifications for sign design. Basic considerations should include the following.

- The signage program should include a unique logo or icon to represent the overall park identity for AWCWP. Under this main logo, the secondary identities of the individual park areas and features can be developed.
- The signage program should convey an understanding of the natural and historic rural character of AWCWP. It should also use creativity, quality of craftsmanship, durable materials, simple design, and an economy of words.
- An integrated sign system should include coordination of sign types, sizes, shapes, and colors.
- Signage should be limited in quantity and size to that which is necessary for information and safety purposes in order to avoid visual clutter.
- Signs should be as unobtrusive as possible. Natural materials are generally preferred, such as sand-blasted wood; to improve resistance to vandalism, recycled plastic and metal graphics should also be considered.
- Signs should be designed for ease of production and replacement. Consideration should be given to use of materials and paints that would be resistant to color fading.
- If signs include maps or aerial photos, the graphic should be oriented correctly (i.e., as seen from the viewer's point of view, and with the north arrow on map pointing north).
- The signage program should consider achieving the fewest signs and be located in the most appropriate places. Where possible, signs should be clustered.
- Where appropriate, particularly for signs related to public health and safety, signs should include languages in addition to English.
- Whenever feasible, the signs specified in the signage program should comply with universal access requirements (*e.g.*, ADA). Raised characters and Braille for the visually impaired should be used where possible on onsite park maps and other essential graphic information.
- The existing signage should be gradually phased out and replaced to conform to an integrated signage system.

Typical Trail Marker Post– with carved white letters on raised, dark brown panels with a light brown background --



Reduce clutter (above left) by consolidating sign messages (above right).

12.5 RECOMMENDATIONS

General Actions

- Adopt interpretive themes that establish the overall interpretive direction and tone for AWCWP.
- Offer a diverse educational program to include primary and secondary schools, academic institutions, neighbors, volunteers, local artists and other agencies and non-profit groups.
- Develop a well-designed, coherent signage system.
- Coordinate with the Orange Coast Watershed and Environmental Center (OCWEC) and other partners and non-profit groups to provide interpretive opportunities for the public.

Five Year Actions

- Develop a comprehensive Interpretive Plan for AWCWP that includes recommendations for interpretive trails and displays; enhancement of existing facilities and displays; interpretive programming; and interpretive methods, such as live programs, tours, brochures, maps, and school programs. Update the Interpretive Plan every 5 years.
- Prepare a signage guidebook specific to AWCWP, to include detailed specifications for the design of all signs.

Ten Year Actions

- Update the Interpretive Plan every 10 years.

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13.0 Fire Management

13.0 FIRE MANAGEMENT PLAN

13.1 EXISTING FUELS AND FIRE HAZARD CONDITIONS

Droughts coupled with high temperatures, and often human influence, have caused frequent wildfires in Orange County. Although regular fires are an essential component of the ecology of certain AWCWP habitats, such as CSS and chaparral, an excess of plant fuel may increase the severity of a wildfire and threaten native habitat and neighboring development. As such, plant fuels may need to be controlled, requiring either prescribed burns or regular fuel reduction.

Existing fuel modification areas and zones are located on the edges of AWCWP where they meet residential developments. The current maintenance procedures for the fuel modification zones require the residential developments to mow, disc, weed whip, and hand-thin/clear these areas according to the fuel management plans for individual development areas. Fuel modification areas are also located along access roads to the Coastal Treatment Plant in the southernmost section of Aliso Canyon and along some trails within AWCWP.

Excessive fuel management practices allow nonnative invasive weeds, rather than natives, to become easily established within the fuel modification zones and adjacent natural areas. Existing fuel management and long and short term fire management practices appear to be severe (erosion, denuded slopes) along some of the areas between residential development and AWCWP. For example, in recent years, goats have been used to clear vegetation in some areas, leading in some cases to complete removal of habitat, type conversion of habitat and invasions of weeds. Proper management of these areas is important for erosion and weed control, and wildlife management.

13.2 EXISTING FIRE MANAGEMENT PROGRAMS

In response to the 1993 Laguna Fire, a required component of the NCCP/HCP is preparation of a Fire Management Plan. This Plan is currently being finalized. The purpose of the Fire Management Plan is to address the role of fire in the NROC and to provide for appropriate short and long term fire management policies that are sensitive to species conservation while providing for effective fire protection of urban development adjoining the NROC. Among the policies adopted as part of the Fire Management Plan are:

- The Orange County Fire Authority's (OCFA's) typical fuel modification zone standard of maintaining a 170-foot fuel modification zone adjoining residential structures.
- A requirement for development adjoining the NROC to use a formally approve plant palette in fuel modification zones that is free of invasive non-native plant species.

- The prohibition of fuel modification zones from being included in the NROC, with the exception of limited and identified areas adjacent to already developed areas located in proximity to the NROC boundary (*e.g.*, Emerald Bay and Top of the World).

The Fire Management Plan is currently undergoing revision to refine management compartments boundaries, identify appropriate standards for maintenance of fire roads and fire breaks, and to identify fuel management needs that may have been overlooked in the first draft Fire Management Plan. The extension of the NCCP/HCP fuel modification limits to achieve the 170-fooot wide zone will be considered for those few areas where no building setbacks were required at the time of initial development.

13.3 FUTURE FIRE MANAGEMENT PROGRAMS

Park boundary fuel management. The proximity of residential development to natural areas of the park prompts the issue of wildfire safety. Fuel modification zones are primarily the responsibility of individual owners or Home Owners Associations (HOA), although local agencies may take on this responsibility. These areas are designed to reduce flame length and radiant heat and allow firefighters to safely protect structures from approaching fires.

Fuel modification around the park boundary includes: 1) areas where fuel modification is allowed within the park boundaries due to previous agreements with adjacent developments or fuel modification zones established by the NCCP/HCP outside the Reserve both within the park, 2) areas where fuel modification occurs within the development adjacent to the park boundary, and 3) areas where fuel modification is not allowed but either has occurred or may potentially occur in the future within the NROC.

OC Parks must survey the park and the NCCP/HCP defined fuel modification boundaries and delineate the limits of the various NCCP/HCP authorized fuel modification zones with high visibility field markers. In addition, OC Parks should conduct an outreach program with the affected homeowners, HOA, and cities to advise them of the limits of the authorized fuel modification activities. In the outreach program to follow approved fuel modification/ landscaping plans, limited use of herbicides, fuel modification should be suggested that can both lessen the impacts on resources and potentially reduce costs; for example, selective removal of vegetation, preserving or planting plants that are not detrimental or that are helpful (*e.g.*, cactus) within the fuel modification zones.

Park interior fuel management. Since the park is surrounded by urban development, prescribed burns are not feasible. However, the supervising park ranger will develop a program to consult the OCFA once every five years to determine if fuel loads within the park reach dangerously high levels. If fuel levels are ever determined to be dangerously high, then a fuel reduction plan shall be prepared and reviewed by the USFWS and CDFG to ensure that it will not negatively affect the park's natural resources including "target and identified species." The fuel modification plan might entail actions such as mulching significant dead wood build up, and spreading the mulch over the ground. In addition, a meeting with local fire agencies should be conducted once every five years to coordinate

on-site drills (include where to stage fire fighters, where to land helicopters, etc.) and to develop emergency access maps.

13.4 FUEL MODIFICATION RECOMMENDATIONS

Recommendations for the installation and maintenance of the fuel modification areas adjacent to the Park are described below. These should be encouraged for use by adjacent property owners especially those that must conduct fuel modification on AWCWP property.

- Maintain fuel modification areas to:
  - Comply with the most current OCFA Fuel Modification Plan Guidelines
  - Establish the maximum vegetation cover allowed by the OCFA guidelines that provide habitat for native animal species and reduces the edge effect to the park.

- Implement fuel modification using the following procedures:
  - Use container plants, that are low fire hazard natives identified by OCFA as appropriate for planting adjacent to Reserve and compatible with the adjacent native habitat, for the fuel modification area with CSS or chaparral adjacent to the site (see Table I: Recommended Container Plants List, in section 8.2.3 Biological Resource Management).
  - Use seed mixes with a genetic source from within 10 miles of the Park and of similar microclimate regime (see Table J: Recommended Seed Mix, in section 8.2.3 Biological Resource Management).
  - Remove trash and inorganic debris associated with site preparation activities prior to installation.
  - Remove all exotic species including enough of the root mass to prevent resprouting. These exotic species include but are not limited to the list in Table M: Exotic Plant Species, below.
  - Individuals whose root mass is too large to remove should be cut horizontally above ground and immediately (within 15 seconds) treated with a 100 percent solution of Roundup Pro.
  - Manually remove all other high fire hazard native species not allowed within the fuel modification zone, including enough of the root mass to prevent resprouting (see Table N: Nonapproved Native Plant Species List, below)
  - Apply vesicular-arbuscular mycorrhizal fungi inoculum during hydroseeding at the rate of 80 pounds per acre.
  - Install plants and seed according to the installation technique described in the Habitat Restoration Methods (section 7.3.1). Refer to OCFA Fuel Modification Plan Guidelines to determine the allowed spacing.
  - Thin and maintain the fuel modification area according to the most current OCFA Fuel Modification Plan Guidelines.
  - Remove nonnative weeds to reduce the amount of competition for natural resources.

Table M: Exotic Plant Species to be Removed from Fuel Modification Areas

Scientific Name	Common Name
Cortaderia selloana	pampas grass
Atriplex semibaccata	Australian saltbush
Acacia spp.	Acacia
Eucalyptus spp.	Eucalyptus
Washingtonia sp.	Mexican fan palm
Festuca rubra	red fescue
Pennisetum setaceum	fountain grass
Picris echioides	bristly ox tongue
Erodium cicutarium	red-stemmed filaree
Sonchus oleraceus	common sow-thistle
Baccharis pilularis pilularis	dwarf baccharis
Nicotiana glauca	tree tobacco
Cistus creticus	purple rock rose
Nerium oleander	Oleander
Tamarix sp.	Tamarisk
Lobularia maritime	sweet alyssum
Coprosma kirkii	creeping comprosma
Salsola tragus	Russian thistle
Carduus pycnocephalus	Italian thistle
Conium maculatum	Poison hemlock
	other nonnative grasses

Table N: Nonapproved Native Plant Species List

Scientific Name	Common Name
Baccharis salicifolia	Mulefat
Dichelostemma capitatum	Blue dicks
Eriophyllum confertiflorum	Golden yarrow
Eschscholzia californica	California poppy
Galium angustifolium	Chaparral bedstraw
Gnaphalium californicum	California cudweed
Isocoma menziesii	Coast goldenbush
Lasthenia californica	Coastal goldfields
Leymus condensatus	Giant wildrye
Lotus scoparius	Deer weed
Melica imperfecta	Coast melic
Mirabilis californica	California wishbone bush
Nassella lepida	Foothill needlegrass
Nassella pulchra	Purple needlegrass
Plantago erecta	California plantain
Poa secunda	Perennial blue grass
Sambucus Mexicana	Mexican elderberry
Sisyrinchium bellum	Blue-eyed grass
Solanum xanti	Chaparral nightshade

13.4.1 Installation Methods

The plants and seed should be installed according to the installation techniques described in the Habitat Restoration Methods (Section 8.3.1). The plantings should be spaced in natural-looking patterns to replicate the character of the adjacent native habitat with fuel modification characteristics and with consideration of the microclimate requirements for each species. The spacing of the plants will be sparser then in non-fuel modification areas. The OCFA Fuel Modification Plan Guidelines must be referenced to determine the allowed spacing for a particular area. It is also advisable to meet with the OCFA to get their feedback on what they will approve for a particular area. If trees are placed within the fuel modification area, they should be spaced much farther apart then the shrubs.

The container plants should be installed in the fall, by November 30, to allow the container plants to become established during the wet season, so they will survive through the first summer.

Maintenance. The fuel modification area should be thinned and maintained in accordance with the most current OCFA Fuel Modification Plan Guidelines. Normal maintenance will include weeding, thinning, herbivore and erosion control, and supplemental irrigation and planting as necessary.

Maintenance should commence immediately following installation of container plants and the application of the seed. During this time, the plant community should be regularly maintained to ensure its successful establishment.

Weed Control. In order to help establish the developing plant community, all nonnative weeds should be removed to reduce the amount of competition for natural resources including water, nutrients, and sunlight. The amount of weeding required will be determined by the amount of weed seed in the soil, weather conditions, and the diligence in removing the weeds, thereby reducing the weed seed bank. Intense weeding should only be required for the first few years if done properly.

Irrigation. Native vegetation does not require supplemental irrigation under normal conditions. However, if the vegetation is planted in the irrigated zone, then irrigation will be necessary to meet the minimum requirements of the OCFA. Within the two thinning zones, the vegetation should receive temporary irrigation when environmental conditions (*e.g.*, low seasonal rainfall, severely hot winds) are such that the plants exhibit signs of stress, in order to prevent loss of the plantings and dieback that creates fine fuel. The use and method of irrigation will depend on the location of the fuel modification area. All water used for irrigation should be free of impurities, excess chlorine, and salts.

Pruning, Thinning, and Leaf Litter Removal. The fuel modification areas should be thinned according to the OCFA guidelines. Thinning and litter removal will take place within the fuel modification zones where it is required. All litter removal should be in accordance with the OCFA Fuel Modification Plan Guidelines that follow.

13.5 FIRE MANAGEMENT PLAN

For existing and proposed developments in the unincorporated areas, the Laguna Beach Fire Department and the Orange County Fire Authority are active in insuring that proper fuel modification zones are established and maintained along the urban/wildland interface.

Following adoption of the fire management plan for the entire NCCP/HCP Reserve, a specific fire management plan should be prepared for AWCWP by working with appropriate agencies such as CDFG, USFWS, and county and city fire departments. The plan should address all aspects of wildfire planning, including prevention, pre-suppression, and suppression.

Pending completion of the Reserve-wide plan, development of a long-term fire management plan for AWCWP should consider the following fire management policies:

- Restrict the use of bulldozers and other mechanical land altering equipment used to widen and improve existing (access) roads.
- Any necessary new firebreaks shall be created with hand crews whenever practicable or feasible.
- Consider backfiring from existing fire access roads, natural features, trails (or fuel breaks) as preferable to constructing new fire control lines and other means of suppression.
- Use natural features such as ridgelines along with roads and firebreaks for containment lines.
- Allow the minimum number of fire suppression vehicles considered necessary for effective fire control by the command fire agency or ground tactical units.
- Use water saturation as a mop up technique rather than digging out and stirring hot spots in areas with significant resources and in areas subject to significant post fire erosion.
- Prepare a wildfire management plan in coordination with the OCFA and the Nature Reserve of Orange County that is consistent with NCCP/HCP guidelines and fire planning requirements.

The fire management plan shall include the following information:

- A discussion of the natural and historic role of fire, the existing fire environment, ecological effects of fire
- A summary of natural resources (topography, climate, hydrology, geology, soils, vegetation and wildlife)
- An assessment of the fuel load and the fuel characteristics for each vegetative community (*e.g.*, measuring tree canopy crown height, shrub crown height, litter depth)
- Use of fuel characteristics to assess the potential fire behavior in each vegetation community and to determine the fire risk from existing fuel levels

- Documentation of management alternatives (*e.g.*, proposed action, no action, mechanical treatment, manual treatment, chemical, grazing, prescribed fire)
- A detailed fire program by management unit with priorities, treatment schedule and exclusion zones
- A discussion of treatment constraints such as air quality and smoke management, wildlife, geologically sensitive areas, aesthetics, and public safety
- A discussion of fire response readiness
- A description of the urban-wildland interface including local regulations for fire protection for homes adjacent to the park
- A description of community relations and public education

13.6 RECOMMENDATIONS

General Actions

- Incorporate applicable provisions of the NROC Fire Management Plan, when completed, into the RMP. That plan, through NROC, is currently in preparation.
- Continue existing fire control methods required by the City of Laguna Beach and OCFA within the designated zones at the urban-wildland interface.
- Develop one fuel modification plan for the park in cooperation with the applicable agencies. Encourage the HOAs would to adopt a section of the park in a “good neighbor” program.
- Develop and implement a program to educate local jurisdictions, park neighbors, and the public about wildfire management. Include the natural role of fire in native vegetation communities, fire safe practices in designing and building structures in interfaces areas and in landscaping.
- Collaborate with the OCFA, local fire agencies, fire safety councils, neighborhood groups, and others in implementation of the NROC Fire Management Plan.
- Precisely locate and permanently mark fuel modification areas in the field.

As-Needed Actions

- Locate park facilities away from fire hazard areas.
- Document the location and dates of wildlife occurrences.
- Evaluate soil, slope and vegetation of burned areas in the aftermath of a wildfire in the park. Employ temporary soil/slope stabilization measures if area is subject to soil or slope erosion or failure before vegetation can recover.

Annual Actions

- Monitor fuel modification areas required for adjacent properties to ensure that no park areas are being adversely impacted by fuel modification zone maintenance practices being conducted by other parties.

Five Years

- Develop a program in which the Park Ranger will consult with the OCFA and the City of Laguna Beach Fire Department once every five years to determine if fuel loads within the park reach dangerous levels.

14.0 Park Maintenance

14.0 PARK MAINTENANCE

14.1 GENERAL OPERATIONS AND MAINTENANCE

Operations and maintenance efforts in AWCWP strive to keep the park safe, functional and attractive for residents and visitors. A top priority is responsible stewardship of park resources for both present and future generations. Three staff, a Senior Park Ranger, Park Ranger II and Groundskeeper, provides enforcement management and maintenance for AWCWP.

On-going maintenance promotes successful implementation of management activities. The County will maintain facilities in the park to ensure that resource values are preserved and that management activities are supported.

- Perform routine operation and maintenance activities as directed by the policies contained in the NCCP/HCP.
- Maintain park facilities and infrastructure. Existing gates and roads restrict public access and allow for emergency and fire response. Ongoing maintenance of gates, fences, and roads will allow these functions to continue. Remove derelict/damaged structures in the park to enhance aesthetic values of the park.
- Maintain trailheads to retain the integrity and value of the park.
- Remove litter, trash, and debris that may attract nonnative wildlife and reduce the aesthetic values of the park. Establish responsibilities for removing trash and for regular collection at specific locations. Enlist the help of volunteers for clean-up events at the park.

Routine patrol of public use ensures compliance with the rules and regulations and allows staff to assess level of use by area of the park. County staff will continue to enforce park policies to promote safety for park visitors and protect park resources.

- Provide sufficient ranger staff to adequately manage and monitor the park.
- Monitor visitor use to determine trail popularity. On an annual basis, inspect park trails and mitigate for impacts. This may include restoring the outslope of the trail, installing soil swales, and pruning along the edge of the trail.
- Issue citations to persons that violate park regulations. Fines levied for abuse of park facilities resulting in harm to cultural and paleontological resources, wildlife, or sensitive habitat should be sufficient to discourage repeat occurrences.

Adaptive management depends on ongoing maintenance data collection to assess the success of management strategies and the potential impacts of public use on park resources. The County will develop a data management system to incorporate baseline data

collected for the preparation of this management plan. See Chapter 15.0 Monitoring and Adaptive Management Program for specific information regarding monitoring of natural resources.

14.2 FENCING AND BOUNDARY CONTROL

As a result of AWCWP's irregular shape and size, the park has a lengthy perimeter that borders on several different communities. As a consequence, multiple access points are available for visitors entering and leaving the park. Approximately 36 entry sites into AWCWP are currently available as shown on Figure 18, Existing Public Access. Some of these entry points are gated meaning that they can be closed, as needed, to prevent unwanted access. The majority of these gates are open during park operating hours.

There are numerous unofficial entry points from community parks and schools along the Aliso Creek Bikeway and from adjacent residential neighborhoods. Some of these entry points are unauthorized, "end of street" points used to gain access to unauthorized trails; others are informal entries meaning that there are no developed trailheads at these locations. In addition, there are several trails and/or trail segments that leave AWCWP and venture onto or into and out of private property. In order to protect park resources and public safety, the County will enforce park boundaries by maintaining property fencing and access points and signing park property.

- Identify portions of the park where fencing may be needed. Fencing should be installed or reinforced in areas adjacent to residential lots, roads, and other level areas where accessibility impacts to sensitive park resources are problematic. Fencing should be maintained as needed and monitored annually.
- Establish property signs along the park boundary and at each access point, identifying the area as a wilderness park and providing directions for access and contact information.
- Ensure that all trail entrances to the park are across City (*e.g.,* Laguna Beach, Laguna Niguel, Aliso Viejo) owned and managed property or with benefit of an easement from any other landowner. When an easement does not exist, erect a sign to signal "End of County Trail."
- Maintain park fencing and gates.
- Allow for wildlife movement.

14.3 ROAD AND TRAIL MAINTENANCE

The County will evaluate the potential for new trail routes, but focus on improving the current network of trails and implementing management actions to minimize road and trail impacts. At present the County uses trail guidelines as detailed in the Regional Riding and Hiking Trails Design Manual (September 13, 1991). This section augments the detail found in that document and describes, in general, best management practices (BMPs), design standards,

maintenance, and management strategies that the County should implement for roads and trails within AWCWP.

Due to the wide variety of trail and resource conditions encountered within AWCWP, these guidelines should be adjusted based on specific on-site conditions. Before deciding when and where to reconstruct or upgrade a portion of a road or trail, the County should carefully consider different strategies and techniques available to remedy a particular problem and identify those that will have the least environmental impact.

14.3.1 Trail Design Guidelines

The road and trail system already exists; therefore, planning for new routes is not a priority. However, new sections of trail may need to be constructed to reroute an existing road or trail in order to minimize environmental impacts. The following are general guidelines for trail design and selection of trail alignments:

Location

- Where needed, new trails should be integrated into the existing trail system.
- Trail location should utilize the maximum number of staging areas in order to disperse user loads and provide for the greatest variety of trail length options.
- Trail alignment should follow the natural contours of the landscape and take advantage of natural topographic features as turning points. Sharp angular turns over 50 degrees and long straight stretches, particularly downhill straights, should be avoided, as practicable.
- Trails should be designed and aligned so that minimal maintenance will be required.
- Hillside alignments should cross-drain over the natural slope and take advantage of natural drainage to minimize the need for major drainage modifications.
- Avoid mixing trail types without a proper segue. The transition from open and flowing to tight and technical should be gradual or on an uphill section of trail. Constant change from one type to the other encourages skidding and the formation of braking bumps. Mixing trail types should be avoided without a proper segue.

Use

- Consolidate different trail uses where safe within the same trail way, depending on the steepness, available right-of-way, safety, user frequencies, and other conditions. Some uses may be prohibited on a trail due to safety or environmental concerns.
- Where a trail is restricted to a particular type of user(s), the trail should be clearly designated with use signs and, where appropriate, barriers to discourage unauthorized use.
- The durability and erodibility of the native soils should be considered where mountain bike use is present. Many old road beds serving as trails are appropriate for mountain bike use because they tend to be wider, have greater sight distance, have more passing room between users, and have less slope.

Dimensions

- Trail dimensions should be based on the type and volume of use anticipated, on the stability of native materials, and on the type of terrain along the route. Generally, a trail tread width should not be less than 18 inches for foot trails and 24 inches for single-track, multiple use riding and hiking trails.
- Minimum vertical distance from overhanging branches shall be 12 feet on trails open to equestrian or bicycle use. Minimum vertical distance from overhanging branches shall be 7 feet on hiking trails. Clearing shall be determined on a case-by-case basis to protect natural features (MHA 2001).
- Outsloping is an important part of the trail tread and design. Water will not flow across the trail tread without proper outslope. The finished tread should have a 3%-5% outslope from the back of the tread to the outer edge (IMBA 2005).

Grade

- As a general rule, grades for new trails should not be steeper than 10%. For new trails, grades of less than 7% are ideal (Point Reyes National Seashore 2003).
- Where grades are steeper, long, gradual switchbacks should be used rather than short, steep switchbacks.
- In flatter areas, trails should be located so that there is some grade to provide for proper drainage.
- A grade should undulate gently to provide natural drainage and to eliminate monotonous level stretches and long, steep grades that are tiring to trail users.

Environmental Considerations

- Before specific trail routes are implemented, biological resource assessments should be conducted as part of the trail alignment process. Assessments should be conducted by a qualified biologist and include surveys for sensitive habitats and special-status species in the appropriate seasons. These assessments should include recommendations to align the trail to avoid impacts to sensitive habitats, special-status species, and significant trees.
- Removal of native vegetation should be avoided as much as possible. The appropriate resource agencies should be contacted regarding any trail alignments that may impact sensitive habitats, special status species, or their habitat. Maintain a viable native plant gene pool by collecting and storing plant seeds from the site using replacement plants that are native to the area.
- In special status species habitat areas, trail use shall be limited as appropriate to ensure protection of resources. Techniques for limiting use may include, but are not limited to: physical access controls, seasonal or intermittent closures, restricted use permits, and exclusion of domestic pets.
- The Resource Specialist should evaluate existing vegetation patterns in terms of their fuel characteristics, such as ease of ignition, relative flammability, fuel load, responsiveness to suppression actions, and ramifications if the vegetation should burn.

Where alternate trail alignment siting is available, the alignment with the least flammable vegetation should be given priority.

ADA Access

Where feasible, the design of AWCWP trails should recognize the intent of the American with Disabilities Act (ADA) and should emphasize accessibility for everyone. To determine feasibility and the degree to which trails will be designed for accessibility, the overall terrain conditions of the area surrounding the trail route should be evaluated. As feasible, all construction of new trails or modifications to existing trails should comply with the provisions of the ADA Accessibility Guidelines, as shown in Table O and described below. No guidelines exist for accessible recreation trails in primitive recreation settings (Resources Agency 1998).

Table O: Summary of Design Standards for Accessible Recreation Trails

	Easy	Moderate	Difficult
	(urban/rural)	(roaded/natural)	(semi-primitive)
Clear width (minimum)	48 inches	36 inches	28 inches
Sustained running slope (maximum)	5%	8.3%	12.55%
Maximum grade allowed for a maximum distance of 50 feet	10%	14%	20%
Cross slope (maximum)	3%	5%	8.3%
Passing space interval (maximum)	200 feet	300 feet	400 feet
Rest area interval (maximum)	400 feet	900 feet	1200 feet
Small level changes (maximum)	1 inch	2 inches	3 inches

Source: Resources Agency 1998

ADA Accessibility Design Guidelines

- Accessible recreation trails should be designed to provide the gentlest slope possible within the constraints of the natural environment. The maximum sustained running slope allowed for accessible recreation trails in each setting is outlined above (Resources Agency 1998).
- If an accessible recreation trail has less than 60 inches of clear width, passing space must be provided at reasonable intervals not to exceed the distances outlined above. Each passing space must be at least 60 inches by 60 inches. A T-intersection of two trails is also an acceptable passing space (Resources Agency 1998).
- Passing spaces can provide valuable rest areas for all people. In urban/rural and roaded natural settings, benches and other types of fixed seating should be provided adjacent to passing spaces as a matter of convenience and accommodation and should be accessible. On accessible recreation trails, rest areas at passing spaces should be provided at reasonable intervals, as shown below (Resources Agency 1998).

Level of Accessibility	Type of Trail	Interval of Rest Areas
Easy	Urban/rural	Minimum every other passing space
Moderate	Roaded natural	Minimum every third passing space
Difficult	Semi-private	Minimum every third passing space
Most Difficult	Primitive	Not Applicable

- Resting intervals should be 60 inches minimum in length, should have a width at least as wide as the widest portion of the trail segment leading to the resting interval, and have a slope not exceeding 5% in any direction (Architectural 1999).
- Accessible trails whose edges drop off sharply (greater than 12.5%) or have hazardous edge conditions should have a 6 inch minimum high curb at the trail's edge, a safety railing with diagonal or bull rails, or both. All safety railings should be 32 inches high and be placed at the trail's edge. Railing must be required on both sides of the trail on all ramps where hazardous conditions warrant (U.S. Department of Transportation 2004).
- Distinctive tactile surface textures should be provided in areas of potential danger to persons with visual impairments. In addition, distinctive tactile surface textures should be provided to call attention to any interpretive displays, panels, or information signs (U.S. Department of Transportation 2004).
- Whether natural or manmade, the surface of accessible trails should be firm and stable. Where manmade trail surfaces (*i.e.,* planking, decking, concrete) are used to make trails accessible, openings in the trail surface should not be larger than ½-inch in diameter. Elongated openings (*i.e.,* wood decking) should be placed so that the long dimension is perpendicular or diagonal to the dominant direction of travel (Architectural 1999).
- No obstacles (i.e., interpretive signs, plaques, benches, lighting) should overhang the edge of accessible trails by more than 4 inches, if the lower edge of the obstacle is more than 27 inches above the trail's surface (U.S. Department of Transportation 2004).
- Accessibility guidelines are not yet available regarding the use of cross-drains and water bars in outdoor recreation settings. Designers and managers of recreation settings are encouraged to use their best judgment in ensuring that the use of cross-drains or water bars does not create an undue barrier to accessibility on recreation trails (Resources Agency 1998).
- If the surface of an accessible recreation trail changes in level more than the allowed maximums, such change must be accomplished by means of a graded surface. An accessible recreation trail may not include stairs or steps (Resources Agency 1998).
- All accessible recreation trails must have clear head room of at least 80 inches. If vertical clearance of an area adjoining an accessible recreation trail is reduced to less than 80 inches, a barrier must be provided to warn people with limited vision (Resources Agency 1998).

14.3.2 Trail Amenities

Signage

- Sign standards should be adopted and implemented uniformly throughout AWCWP.
- Each trailhead should have an informational kiosk. Informational kiosks should include a copy of the most recent AWCWP map of the roads and trails. These kiosks should provide a summary of the rules and regulations regarding use of the roads and trails, trail safety guidelines, wilderness cautions and wilderness sightings, and describe benefits of using the designated system of roads and trails and the detriments of non-system trail use and construction.

- Identity signs should be located at all staging areas and trail intersections. Identity signs should include: trail name and distance to staging areas, intersections with other trails, or other points of interest along the trail route.
- Use signs should inform visitors of which types of trail use are appropriate, permitted, or prohibited on the trail; identify accessibility conditions and other ADA related information; educate trail users about respecting private property along the trail route and/or any special land use considerations; and prohibit smoking and use of matches or lighters. Use signs should be placed at each trail staging area.
- Safety signs should display warnings of upcoming underpasses, street intersections, and blind curves; advise trail users of the need to reduce speed or dismount and walk their bicycles or horses; warn of wildlife danger; identify any use restrictions during the fire season; and explain the hierarchy of yielding among trail users. Safety signs should be located on an as-needed basis.
- Private property signs should be posted at regular intervals in conformance with legal requirements to remind the trail user not to trespass. The County should also sign its park boundaries.
- Interpretive and protective signs should be located where appropriate. Interpretive and protective signs should indicate natural resource or historical points of interest or sensitive areas. Signs should be designed to identify specimen habitat types and to educate the visitor by describing resource characteristics and values.

Structures/Facilities

- Trail crossings of freshwater stream zones and drainages should be designed to minimize disturbance, through the use of bridges or culverts, whichever is least environmentally damaging. Bridges and culverts should be designed so that they visually and functionally blend with the environment and do not interfere with the movement of native fish.
- Switchbacks should be used to reduce trail grades by lengthening the trail. Trail grades should rarely exceed 10 to 15 percent. Switchback turns (or landings) must be located on stable soils to reduce erosion. Favor flat benches or areas with the least slope. A minimum turning radius of 4 feet is required for hiking trails; 8 feet is required for other trail users. Shortcut trails often develop at switchbacks. Construct log, rock, or shrub barriers at trail turns to ensure that users remain on the trail. Alternatively, attractive features such as benches and vistas may be located at the turn (Rathke and Baughman 2005).
- Steps may be required on steep terrain with highly erodible soil. Steps should be thoughtfully placed to ensure that hikers will use them. Steps should be in the most appropriate place to walk and have evenly spaced rise and run. Steps should rise at least 5 inches but not more than 9 inches. Construction materials for steps include stone slabs, railroad ties, or rough-sawn, rot-resistant timbers (Rathke and Baughman 2005).
- When designing equestrian trailhead facilities, provide for parking of tandem axle vehicles, turning radius, off loading of horses, and space for ingress and egress of additional vehicles. Class II base material crushed shale provides the surest footing. An area should be provided for saddling the animals. Several single or double hitching posts

are generally better than one long hitching post. Water may be provided for horses at the trail head in troughs or in a container suitable for horses.

- When developing trailhead facilities, it is important to design the trail head access points to meet both management and user needs. For trails designed for multiple use, a step-through stile is appropriate. Through use of barriers, stiles, vegetation, and natural terrain, access can be provided for the intended users and eliminated for off-road vehicles. A simple and effective stile that accommodates both hikers and horses is a walk-through stile. This stile uses the combination of posts, log step-over barriers, gates, and log and rock barriers. The posts are placed 5 feet apart to provide an opening for both hikers and horses. The log step-over barriers are placed in front of the opening. Three logs 18-inch in diameter are placed parallel to the opening with 30-inch landings in between them. They are then bedded 4 inches into the ground and anchored with either pipe or rebar. Two additional logs are then placed perpendicular to these logs across their ends. They also are bedded 4 inches into the ground and pinned. All five logs should have a finished height of 14 inches above the trail grade (U.S. Department of Transportation 2004).

Drainage Structures

Ideally, pathways built along hillsides will have an outsloped tread that allows water to flow off the pathway before it can do any damage. However, where an outslope cannot be maintained, where the volume of water coming onto a trail overwhelms the ability of the outslope to shed it, where pools of water form, or where trail users exacerbate the effects of erosion, drainage structures, rolling grade dips, waterbars and knicks may be needed to insure a long life for the trail.

- In the construction of a trail, the trail surface should be outsloped 3 to 5 percent grade toward the downhill side.
- Rolling grade dips can also be used to divert water from the trail. Grade dips are short trail sections cut at a grade opposite that of the prevailing trail surface. Grade dips are typically established at natural drainage ways or ditches with intermittent flows. Grade dips are permanent and low maintenance. They often take advantage of natural features, descending into and then climbing out of slight folds in the terrain. Rolling grade dips are ideal for trails frequented by cyclists or wheelchairs because they provide for barrier-free drainage.
- For existing trails, drain dips can be dug into the tread. Drain dips can most effectively be installed in trails with a prevailing grade of no more than 12 percent. The dip must be large enough to divert water from the trail and to withstand the impact of traveler's feet, hooves, and wheels. Outslope the dip to direct water toward the spill point and protect the spillway with rocks (Resources Agency 1998).
- Waterbars can also be used for existing trails. Waterbars can be made of rubber, a combination of wood and belt or a compacted soil. Both devices are designed to divert water off the trail. On gentle trails, a waterbar should be set at a maximum 5 degree angle. On steeper routes where the speed of the water may wash out barriers embedded at shallow angles, a waterbar may need to be set at a maximum angle of 10 degrees. Five feet or more of tread called an apron is shaped to direct water off the trail;

and an outlet ditch is used to capture diverted water. Waterbars are often placed in switchbacks and in climbing turns to prevent water flowing down the upper leg or a trail from continuing onto the lower leg (Resources Agency 1998).

- In determining where to place a water bar, a site should be selected that will discourage travelers from going around the ends of the bar. A tree or boulder can be a good barrier. If no natural barriers present themselves, a few large rocks should be embedded near one or both ends of the water bar to direct traffic toward the center of the trail.
- Once the waterbar has been installed, the trail tread should be sculpted for 5 feet or more leading down to the bar in such a way that water will gradually turn off of the pathway, exiting the trail a foot or more before hitting the bar itself. The effectiveness of this funnel-shaped apron may be tested by rolling an orange toward the water bar; the track of the orange will indicate the route that the water will take.
- Complete the waterbar by digging a rainwater diversion outlet ditch from the low point of the apron far enough away to assure that water will be carried away from the trail. Steep sideslopes may not require ditches at all, while a waterbar ditch on a moderate hillside may extend several yards or more. Each ditch should be cut wider than the blade of a shovel to facilitate easy maintenance in years to come. On steeper slopes, stones placed below the end of the ditch will dissipate the force of exiting water and help protect the downslope from erosion.
- Soil removed during construction or maintenance of a waterbar can be shoveled against the uptrail side of the waterbar to allow for natural gravity replacement of soil lost down hill. Some trail builders also advocate packing soil against the upper side of a waterbar barrier to restore the curving outslope of the tread, especially when erosion has begun to undercut the bar.

14.3.3 Trail Closure

Decommissioning

The goal of decommissioning is to restore natural topography and habitat as much as possible so that maintenance work is no longer needed and to prevent future environmental impacts. Unauthorized trails must be eliminated as soon as they are discovered. If left uncorrected, these unauthorized trails will encourage additional use and lead to damaged vegetation, soil erosion, and drainage problems. A key component of any trail closure plan is to create a fun and sustainable alternative.

- In areas where the old trail is being relocated or abandoned, time should be taken to obliterate the old trail and restore it to as natural a condition as possible. This will avoid confusion as to which trail to use, eliminate sources of erosion, restore it to a more natural appearance, and help eliminate short cutting. Depending on the terrain, one may use rock, brush, fallen timber, and transplanted vegetation. It may, in some extreme cases, require the construction of temporary fencing to prevent use.
- Compacted soil in the old trail tread should be broken up or scarified to allow the seeds and roots of new plants to penetrate.

- Surface drainage on abandoned routes needs to be addressed so that it is self-maintaining, adequately serves the area it drains, and does not deliver sediment to a creek. Abandoned tread should be stabilized to prevent further erosion. This will promote natural revegetation in some instances. Trails break natural drainage patterns and collect and concentrate surface water flows. Restoring the natural contour of the slope reestablishes the local drainage patterns and reduces the likelihood of erosion. Recontouring usually eliminates any temptation to use the old trail and facilitates revegetation efforts.
- Starting plants on the old trail is the best way to restore the landscape. Disturbed soil often provides an opportunity for invasive plant species to take hold. Only native species should be planted in these areas. Proper transplanting techniques, fertilizer, and a portable drip irrigation system should be used to reduce transplant shock.
- The best way to keep people off the closed trail is to make it look like it was never there. The goal is to eliminate the visual corridor, including the airspace above the old trail tread. Logs and branches may be dragged across the tread and deadfall planted in the ground vertically to block the corridor at eye level. Leaves and other organic matter should be raked over the tread as the final step to complete the disguise and aid new plants. As a last resort, the beginning and end of the trail may be blocked with a fence and signs. However, the fence will look out of place, and could draw more attention to the closure, which may cause controversy. Answer expected questions by posting signage explaining the closure on, or near the fence. When the trail has been closed for a while the fence can be removed.

Seasonal Closure

- Minimizing heavy traffic loads, especially during the rainy season, is one of the simplest ways to maintain an unpaved road or trail.
- Close roads and trails susceptible to erosion whenever possible provided that they do not allow access to critical public water supply facilities or utilities.
- All entry points onto a closed trail should be signed appropriately. Some consideration may be given to including on the sign reference the estimated reopening date. Care should be exercised to promptly remove all closure signs when conditions have changed.

14.3.4 Trail Maintenance

Trail work should be planned and implemented with the objective of providing for visitor safety, resource protection, and public access. Operating within budgetary and staffing constraints, the trail maintenance program should include:

1. Regular monitoring of each trail
2. Annual trail work aimed toward preventing serious damage during the cooler months after each rainfall
3. Emergency repair work and/or signing to eliminate or to identify a possible safety hazard

General Trail Maintenance Guidelines

- Practice environmentally sound maintenance and use techniques appropriate for the type of trail. For example, avoid the use of chemicals to retard vegetation growth.
- Prepare an annual Trail Maintenance Plan.
- Assess the type of volume of use by reviewing trail register records and counting the type and volume of vehicles at the trailhead.
- Repair heavily used trails in the spring and maintain them throughout the season on an as-needed basis.
- Priorities for trail maintenance tasks are: 1) to correct unsafe trail conditions, 2) to repair environmental damage, and 3) to restore the trail to the desired conditions.

Annual Spring and Early Summer Tasks

- Clear windfalls and dangerous trees from the trail bed for safety and to prevent detouring.
- Remove loose rocks and debris from the tread surface.
- Repair trail wash-outs.
- Remove new plant growth on the trail annually. Clear in the spring and early summer when the new growth is soft. Vegetation on the sides of the trail should be pruned to allow passage, but should be preserved, as much as possible, to protect the aesthetic quality of the trail. Typically, vegetation is cleared to a height of seven feet to accommodate hikers and to a height of ten feet to accommodate equestrian use. Good pruning practices must be followed, including cutting branches almost flush with the limb and cutting stumps at ground level or below. Large limbs should be pruned almost flush with the trunk. Dead and dying limbs and snags which may fall on the trail should be removed. Ground cover plants and low shrubs should not be removed except on the actual trail tread.
- Level the trail tread as necessary and restore the tread grade to the original slopes. Use local material to fill ruts, holes, low spots, or muddy areas.
- Repair erosion-damaged facilities promptly to prevent further damage. Check for erosion effects after spring runoff. Check and repair water bars, drainage ditches, culverts, and drainage dips. Construct additional drainage structures if needed. Corrective work for drainage or erosion problems shall be performed within a reasonable period of time. Where necessary, barriers to prevent further erosion shall be erected until problems are corrected.
- Check and repair all structures after spring runoff and after severe summer storms.
- Check, repair, or replace signs and trail markers prior to the major use season.
- Clear rainwater runoff diverters of silt and brush.

Weekly or Monthly Tasks (As Warranted)

- Maintain trailhead facilities such as toilets and waste containers.

- Resupply trailhead information kiosks with route or safety brochures.
- Maintain switchbacks to reduce the need of costly reconstruction. Switchback maintenance involves the reshaping of tread to the intended drainage, cleaning of the inboard ditch on the upper leg, maintenance of the landing between upper and lower legs and the rehabilitation of any short cuts developing between legs.

14.3.5 Monitoring

A yearly inventory of all trail maintenance, including drainage, vegetation clearing, signing, surfacing, need for graffiti removal and repair of structures, gates, fences and barriers should be pursued in early spring, prior to the heavy use period. A sample trail assessment form is located in Appendix G. Based on maintenance reports done yearly at the end of fall, trails should be subject to seasonal closures or repair as warranted.

14.4 VIEWSHED PROTECTION

AWCWP represents a significant visual and scenic resource within the region offering panoramic views of the Pacific Ocean, Santa Catalina Island, and the community of Laguna Beach to the west; the San Gabriel and San Bernardino Mountains to the northeast; and Wood Canyon and surrounding urban development to the south and east. Situated in the midst of a highly developed region, the AWCWP includes a variety of landscapes from the solitude of Wood Canyon and the rugged Mathis Canyon, to the meandering walk with the creek and beautiful trees of Aliso Creek. The historic uses of the property for grazing has preserved the property from development, affording visitors with dramatic panoramic views of the region. Together the properties provide a wealth of viewing conditions and opportunities. The County will protect and enhance views and distinctive landscape features that contribute to the setting, character, and visitor experience of the park.

- Expand recreation and interpretive opportunities associated with the visual and scenic resources of the park. Opportunities include view-oriented day-use facilities and interpretive programming in key locations.
- Work with local jurisdictions in the land use planning and development process to protect key views in AWCWP from continued visual intrusion from surrounding development. This coordination will include appropriate general plan land use designations, zoning to regulate building height and setbacks, ridgeline protection ordinances and development review and enforcement.
- Work with local jurisdictions in the land use planning and development process to protect the AWCWP from existing and future ambient light sources in nearby developments.
- Coordinate protection and enhancement of visual resources in AWCWP with efforts to enhance County holdings through land acquisition. Priority areas for protection and enhancement include focal public use areas and main recreational facilities within AWCWP to prevent visual intrusion from adjacent development.
- Native plantings should be used to visually buffer developed areas, enhance visual quality and integrate with the surrounding native landscape.

- Site structures (*e.g.* Restrooms, Interpretive Kiosks) to be sensitive to scenic views from and into the AWCWP.

14.5 WILDLIFE CORRIDOR MAINTENANCE

14.5.1 Existing Wildlife Corridors

As described in Section 4.4, the NCCP/HCP identifies several important linkage functions for the AWCWP that unify locally established open space and wilderness areas. Several wildlife corridors still exist, although they have been significantly reduced in width and continuity due to dense residential developments immediately west and east of AWCWP. Existing wildlife corridors within AWCWP are described below and shown on Figure 15, Wildlife Corridors.

Corridor A: Corridor A consists of several segments linking AWCWP with LCWP. One steep portion of Corridor A connects LCWP to the northernmost section of AWCWP through Upper Wood Canyon near El Toro Road and State Route 73 and crosses over El Toro Road and Laguna Canyon Road. Sparse riparian habitat also continues under the State Route 73 bridge into James Dilley Greenbelt Reserve. A similarly steep and open section of the corridor exists along the entire length of the northern two-thirds of Wood Canyon. This wide, natural corridor continues west to LCWP after passing over Laguna Canyon Road, which is lined with homes and small businesses. These segments make up a nearly contiguous, wide passage that is suitable for use by most plant and wildlife species. This area is scattered with rock outcroppings and densely vegetated with mature coastal sage scrub, and chaparral.

Corridor B: Corridor B consists of the upper portion of Aliso Creek between Moulton Parkway and the confluence with Wood Canyon. The Aliso Creek Bikeway and Aliso Creek Trail pass through this area. This section of Aliso Creek is vegetated with a very narrow band of willow riparian forest edged with coyote bush scrub and coastal goldenbush scrub but has large section that are infested with nonnative giant reed. Beyond Moulton Parkway, Aliso Creek narrows through dense urban development and agriculture and continues eastward nearly to the Cleveland National Forest.

Corridor C: A second corridor from upper Aliso Creek (Corridor C) passes along Sulphur Creek between the main park entry under Alicia Parkway to the Sulphur Creek Reservoir open space area.

Corridor D: This connection includes several narrow corridors through residential communities in Laguna Beach. From lower Aliso Canyon, this corridor passes west over the steep and naturally vegetated hills topped by Aswut Trail near Meadows Trail and then passes northwest through currently undeveloped land and patches of ridgetop homes before crossing over Laguna Canyon Road into LCWP. This same route could also be accessed from the southernmost portion of Aliso Canyon but would also pass through ridgetop homes after passing through very steep and heavily vegetated hills owned by the Athens Group, just west of the Coastal Treatment Plant.

Corridors E and F: Two eastern corridors (Corridors E and F) pass from lower Aliso Creek, up the steep slope northeast of the Coastal Treatment Plant, then over Aliso Summit Trail through narrow portions of a housing tract. Corridor E terminates in non-reserve open space; while Corridor F terminates in an existing use area. Both canyon corridors terminate before meeting Crown Valley Parkway and extensive residential developments. The vegetation along these corridors and within the canyons is dominated by coastal sage scrub and chaparral.

Corridor G: Corridor G passes through two small patches of AWCWP, crossing Emerald Ridge Trail, Monarch Point Trail, Sea Island Drive, and Pacific Island Drive. This corridor also has a somewhat interrupted connection to Salt Creek Corridor Regional Park, a narrow park that terminates at Golden Lantern Street. The corridor is vegetated with native scrub and chaparral, while Salt Creek Corridor Regional Park is vegetated with nonnative annual grasses and forbs with patches of native plant communities along the riparian scrub creek channel.

14.5.2 Wildlife Corridor Maintenance

In general, AWCWP is an established park surrounded by urbanization; therefore, resource management is necessary to preserve corridor usage as much as possible particularly along the interface between natural and developed areas. Corridor function can be influenced by fire management practices, exotic species encroachment, recreational use, and existing or future structures such as parking lots, buildings, lighting features, fencing, trails and roads. Park management and planning processes shall implement corridor enhancement and maintenance measures. This process should be considered ongoing, as new information will become available that provide specific baseline data and management practices. Research studies from AWCWP can demonstrate wildlife use areas that can be avoided or managed. The following should be considered as part of wildlife corridor maintenance.

- Conduct fire management only within designated areas and the approved fuel modification zones. Mitigate any impacts to protected areas with habitat restoration to maintain corridor function.
- Eradicate exotic species, both plant and animal, to prevent negative impacts to naturally occurring species. The presence of exotic plants and animals can impede corridor function (e.g., dense vegetative growth) and successful usage (e.g., increased predation pressures, displace wildlife and activity functions).
- Enforce prohibition of domestic pets (e.g., dogs), including monitoring for the presence of feral individuals and implementing, as needed, trapping.
- Avoid disturbing natural environments, building structures or adding human-made elements in natural areas whenever possible, particularly high use wildlife areas.
- Reduce night lighting so that it covers only the needed area with the minimum amount of intensity and range. Light glare and spillage into wilderness areas shall be reduced or eliminated.

- Utilize barrier fencing that allows for wildlife movement through the area, whenever possible. Animals should be able to jump over (e.g., deer) or pass under (e.g., reptiles, small mammals) barrier fencing.
- Manage and monitor access to wildlife corridor areas. Maintain trails and roads so side trails are not illegally created. Consider potential impacts to wildlife movement when planning for new roads or trails.
- Install traffic control features within wildlife crossing areas, particularly along Laguna Canyon Road and El Toro Road. Safety is a concern for both vehicle traffic and wildlife use. Warning systems (i.e., flashing warning lights, posting reduced speed limit, installation of raised pavement markers [Botts' dots]) can be helpful.

14.6 EROSION/SEDIMENT CONTROL/LANDSLIDE MANAGEMENT PRACTICES

Wind, water, and human land use practices have resulted in severe erosion in parts of AWCWP. Roads, trails, and unvegetated areas along steep slopes are the most susceptible to erosion. Erosion control is critical for maintaining natural drainage patterns, water and soil quality, healthy aquatic ecosystems, and safe trail conditions. The County will maintain trails and roads to prevent erosion and provide a safe and high quality visitor experience.

- Restrict or prohibit trail users from areas where erosion has created a public hazard.
- Correct erosion problems especially where adjacent to sensitive plant populations. Identify areas that have the potential to impact these populations. Install repairs thatr reduce or eliminate erosion problems.
- Install swales across dirt roads and trails. Soil swales made of local native soils is the preferred method to control erosion. Identify locations where erosion problems can be minimized by maintaining trails and roads and installing water bars.

14.6.1 Erosion Control Guidelines

Due to the wide variety of soil conditions encountered within AWCWP, these guidelines should be adjusted based on specific on-site conditions. The County should carefully consider different strategies and techniques available to remedy a particular problem and identify those that will have the minimum environmental impact. These guidelines augment the trail and road design guidelines described in Section 14.3.

- Develop a comprehensive Erosion and Sediment Control Plan. The Erosion and Sediment Control Plan should include: description of all structural erosion and sediment control measures; description of seeding and mulching plan including locations, seed mixes, and mulch/matting methods; design calculations for structural control measures; and description of the inspection, maintenance, and records program for control measures.
- Evaluate the site. On-site areas that are subject to severe erosion should be evaluated by a qualified erosion control professional each year prior to and immediately following

the rainy season. Trees and vegetation to be preserved should be located and flagged and areas where access should be limited should be identified.

- Select and install erosion/sediment control practices. A qualified professional should determine the specific practices needed and direct installation as appropriate. All Best Management Practices (BMPs) must be chosen carefully, located and installed correctly, and maintained well to be effective in controlling erosion and sediment. Ensure that sediment-trapping devices and erosion control measures are accessible for maintenance and removal. The following BMPs should be considered, designed, and implemented on a site-specific basis (roughly in order from source to destination):
  - Interceptor berms or wattles at the top of slope to divert and dissipate runoff away from unstable or denuded areas
  - Properly designed culverts and drains that avoid concentration of runoff
  - Vegetation (preserved and/or planted)
  - Mulch (straw, wood chips, hydromulch, erosion control blankets etc.)
  - Contour wattles, rolling dips or water bars to slow down and divert runoff on steep slopes, trails and roads.
  - Gravel filters, sand bags, permeable dams etc. for filtering sediment out of runoff
  - Sediment traps/basins at base of slope to allow soil particles to settle out and to attenuate runoff peaks
- Develop a practice maintenance program. Maintenance of all BMPs is essential for them to function properly. They should be inspected regularly and after each rainfall event. When a problem is identified, repair the practice immediately.
- Control surface water runoff. Divert and disperse surface water runoff originating upgrade of exposed areas to reduce erosion and sediment loss.

14.7 RECOMMENDATIONS

General Actions

- Perform routine operation and maintenance activities consistent with the NCCP/HCP.
- Provide sufficient ranger staff to adequately manage and monitor the park.
- Maintain a record of management and monitoring activities.
- Establish property signs along the park boundary and at each access point, identifying the area as a wilderness park and providing directions for access and contact information.
- Allow for wildlife movement. Adopt the measures contained in Section 14.5.2 of this RMP to protect and enhance wildlife corridors.
- Work with local jurisdictions in the land use planning and development process to protect key views in AWCWP from continued visual intrusion by surrounding development. This coordination will include appropriate general plan land use designations, zoning to

regulate building height and setbacks, ridgeline protection ordinances and development review and enforcement.

- Work with local jurisdictions in the land use planning and development process to protect the AWCWP from existing and future ambient light sources in nearby developments.
- Coordinate protection and enhancement of visual resources in AWCWP with efforts to enhance County holdings through land acquisition. Priority areas for protection and enhancement include focal public use areas and main recreational facilities within AWCWP to prevent visual intrusion from adjacent development.

As-Needed Actions

- Remove litter, trash, and debris that may attract nonnative wildlife and reduces the aesthetic values of the park.
- Establish responsibilities for removing trash and for regular collection at specific locations.
- Enlist the help of volunteers for clean-up events at the park.
- Issue citations to persons that violate park regulations. Fines levied for abuse of park facilities resulting in harm to cultural and paleontological resources, wildlife, or sensitive habitat should be sufficient to discourage repeat occurrences.
- Implement the appropriate design guidelines, as detailed in Section 14.3, when constructing new trails or re-routing existing trails or roads in order to minimize environmental impacts.
- Use native plantings to visually buffer developed areas, enhance visual quality and integrate with the surrounding native landscape.
- Site structures (*e.g.* Restrooms, Interpretive Kiosks) to be sensitive to scenic views from and into the AWCWP.
- Restrict or prohibit trail users from areas where erosion has created a public hazard.
- Correct erosion problems especially where adjacent to sensitive plant populations. Identify areas that have the potential to impact these populations. Install repairs that reduce or eliminate erosion problems.
- Install swales across dirt roads and trails. Soil swales made of local native soils is the preferred method to control erosion. Identify locations where erosion problems can be minimized by maintaining trails and roads and installing water bars.
- Implement the erosion control guidelines as detailed in Section 14.6, as appropriate, to repair and prevent erosion within the park.

Annual Actions

- Maintain facilities, including trailheads, gates, roads, and infrastructure to retain the integrity and value of the park.
- Monitor visitor use to determine trail traffic volumes. On an annual basis, inspect park trails and make appropriate repairs.

- Identify portions of the park where fencing may be needed. Fencing should be installed or reinforced in areas adjacent to residential lots, roads, and other level areas where accessibility impacts to sensitive park resources are problematic. Fencing should be maintained as needed and monitored annually.

Five Year Actions

- Expand recreation and interpretive opportunities associated with the visual and scenic resources of the park. Opportunities include view-oriented day-use facilities and interpretive programming in key locations.

15.0 Monitoring and Adaptive Management

15.0 MONITORING AND ADAPTIVE MANAGEMENT PROGRAM

15.1 ADAPTIVE MANAGEMENT

Adaptive management is defined as a flexible, iterative approach to long-term management of biotic resources that is directed over time by the results of ongoing monitoring activities and other information. Under this approach, biological management techniques and specific objectives are regularly evaluated in light of monitoring results and other new information. These periodic evaluations are used over time to adapt both the management objectives and techniques to better achieve overall management goals. This approach involves managing CSS and adjacent habitats in a manner designed to support a broad range of "CSS Species" over the long term, with particular emphasis on the "target and identified" species.

15.1.1 Elements of the Adaptive Management Program

Each of the management elements below contributes to the maintenance of natural resources in the AWCWP, and is discussed in the following sections.

- Monitoring and associated adaptive management of the biological resources located within the park
- Restoration and enhancement actions (other than creation of new CSS habitat) such as eradication of invasive, non-native plant species, predator control, and fuel modification activities
- Management carried out by means of short-term and long-term fire management programs within the park
- Management of public access and recreational uses within the park
- Management designed to minimize the impacts of ongoing operations/maintenance of uses within the park that existed prior to approval of the NCCP/HCP
- Assurance that permitted infrastructure uses proceed in the manner provided for in the NCCP/HCP in order to minimize impacts of new uses to be allowed within the AWCWP

15.2 BIOLOGICAL RESOURCE MANAGEMENT AND MONITORING

Monitoring and targeted studies for the park shall be designed to assist management decision-making. Under this model, management moves forward in a scientifically-based way that involves monitoring, conducting targeted studies, and applying management activities as experimental treatments. The results feed back into decision-making, reducing uncertainty and improving the effectiveness of the program through time.

Steps that may be involved in a long-term adaptive implementation program include opportunistic learning, hypothesis testing, management, monitoring, and directing the results of analysis and assessment back into the program through decision makers. Existing biological inventory, direct observation, and empirical information are expected to inform the strategy for implementing the RMP's Goals and Strategies (Section 6.0).

Monitoring allows the supervising park ranger to measure resource condition and responses of the resource to human-caused and natural perturbations. Ideally, monitoring can identify problems early so that corrective management action can be taken as soon as it is needed. In contrast, targeted studies (at small spatial scales or in pilot studies) may be more appropriately used to resolve critical questions regarding ecosystem functioning or management applications. While some management activities may have little uncertainty regarding application or outcomes (*e.g.*, habitat restoration), such activities should be designed as experiments to increase our understanding of the system and the effectiveness of management (*e.g.*, determining the most effective way to control exotic species). The results from monitoring and targeted studies will be evaluated and used to refine goals and conceptual models, improve the management program for the park, and refine monitoring methods.

15.2.1 Active Monitoring Strategy

The following methods will be used to monitor sensitive species on a regular basis to keep track of the current status of the species within the park and to monitor wildlife to determine the health, quality, and functionality of different portions of the park. All data are ideally collected into a spatially linked (*e.g.*, GIS) database to allow for better comparison and tracking.

Direct monitoring of some of the "target and identified species" and key vegetation communities (*e.g.*, coastal sage scrub, riparian habitat) is necessary to evaluate the effectiveness of the AWCWP adaptive management program. Data from annual park-wide plot monitoring activities primarily provide information on the overall status of target resources, especially in key portions of the park (*e.g.*, habitats dominated by coastal sage scrub, habitats dominated by cactus, Aliso and Wood Creeks). Further, target resource monitoring contributes basic knowledge of the park's biodiversity, dispersal and demography of the "target species" studied, and community dynamics.

Target resource monitoring will be accomplished through a systematic sampling program designed by biologists with appropriate management expertise and field experience. Strategically directed sampling will be employed, rather than repeating broad census/inventory efforts. Elements of the sampling program will focus on target species of the CSS community (i.e., coastal California gnatcatcher, coastal cactus wren, and western whiptail[5]), the CSS vegetation, and representative riparian bird species, with other selected vertebrate and invertebrate species. Table P summarizes a recommended initial monitoring

[5] The orange-throated whiptail is one of the target species designated in the NCCP/HCP. The more common western whiptail is used here because it is more readily observable and will serve as a good indicator species.

schedule for the cited species. This schedule may be modified in the future as monitoring needs are refined through adaptive management.

Table P: Monitoring Schedule for Species of Interest in AWCWP

Species/Resource	Description	Activity/ Blooming Period	Monitoring Frequency
AMPHIBIANS			
Black-bellied slender salamander *Batrachoseps nigriventris*	Survey for presence every five years.	December –February Rainy nights	Every 5 years
BIRDS			
Coastal cactus wren *Campylorhynchus brunnecapillus sandiegensis*	Survey existing territories to determine if still present and/or expanding.	Year-round Breeds March –June	Every 2 years
Coastal California gnatcatcher *Polioptila californica californica*	Survey existing territories to determine if still present and/or expanding.	Year-round Breeds March – May	Every 2 years
Least Bell's vireo *Vireo bellii pusillus*	Survey for presence during the appropriate survey period.	Mid April –July	Every 2 years
Southwestern willow flycatcher *Empidonax traillii extimus*	Survey for presence during the appropriate survey period.	Mid May –July	Every 2 years
INVERTEBRATES			
Butterfly species	Survey for presence.	June – July	Every 2 years
REPTILES			
Western whiptail *Cnemidophorus tigris*	Survey for presence.	June –September	Every 5 years
VASCULAR PLANTS*			
In conjunction with the vegetation community plot and transect surveys, the following rare plants will be quantified, qualified, mapped, and the plant community in which they occur recorded.			
Big-leaved crown-beard *Verbesina dissita*	Record species data.	Perennial Blooms April – July	Annually
Catalina mariposa lily *Calochortus catalinae*	Record species data.	Perennial Blooms February -May	Annually
Intermediate mariposa lily *Calochortus weedii var. intermedius*	Record species data.	Perennial Blooms May - July	Annually
Laguna Beach dudleya *Dudleya stolonifera*	Record species data.	Perennial Blooms May – July	Annually
Many-stemmed dudleya *Dudleya multicaulis*	Record species data.	Perennial Blooms February -May	Annually
Nuttall's scrub oak *Quercus dumosa*	Record species data.	Evergreen Blooms February - April	Annually
Palmer's grappling-hook *Harpagonella palmeri*	Record species data.	Annual Blooms March - May	Annually
Small-flowered Microseris	Record species data.	Annual	Annually

Species/Resource	Description	Activity/ Blooming Period	Monitoring Frequency
Microseris douglasii ssp. Platycarpha		Blooms March -May	
Small-flowered morning glory *Convolvulus simulans*	Record species data.	Annual Blooms March - July	Annually
Summer Holly *Comarostaphylis diversifolia ssp. Diversifolia*	Record species data.	Evergreen Blooms April - June	Annually
Thread-leaved brodiaea *Brodiaea filifolia*	Record species data.	Annual Blooms March - June	Annually
Vernal barley *Hordeum intercedens*	Record species data.	Annual Blooms March - June	Annually
Western dichondra *Dichondra occidentalis*	Record species data.	Perennial Blooms March - July	Annually

*The vascular plants listed in this table pertain to the Plant community composition survey in Table Q.

Target resource monitoring will occur on semi-permanent plots (*e.g.,* 2 to 40 acres) each with a point-intercept line transect of 25- and 100-meters (plot or transect locations may be adjusted if subsequent data analysis and/or additional surveys show changes to be warranted).

- Plots will be of a size and shape to allow statistically valid analysis (*e.g.*, 2 to 40 acres), and wherever feasible, located and shaped so that at least half of their area is coastal sage scrub. Plot shape will be as regular as possible, but flexible given the constraints of strategic locations.
- Point-intercept line transects will be established for habitat areas that require progress monitoring, such as areas that have been actively revegetated, treated for weeds, or impacted by fire, landslide or other unexpected events. Point-intercept line transects will be used to gather vegetation data as the area matures, reestablishes through natural recruitment and regeneration and/or active plantings/seeding of plant species.

  In general, each point-intercept line transect shall be 100 meters in length (or less [*e.g.,* 25 meter] depending on the study area size) and species and cover data recorded at every 1 meter mark. Transect locations and spacing shall be placed randomly and in suitable numbers for representative sampling of existing and expected future conditions.
- Plots will be strategically located and of variable size and quality to monitor overall population status of the "target species" in Table P, intended function of the park, and detect relative changes.
  - To monitor overall population status, approximately one-third of the plots will be established at representative locations in core habitat areas of the park.
  - To monitor intended function of the park, the remaining plots will be located in non-core areas believed to be of particular importance to park function. These include

areas designated as wildlife corridors, fuel modification areas, and areas of high recreational use.

15.2.2 Active Management Monitoring Activities

Table P provides a survey schedule and summarizes the following monitoring activities, which use the above described transect and plot survey techniques.

- **Coastal Western Whiptail** - each plot will include one semi-permanent 200-meter long transect. The transect will be located in representative habitat types within the plot and along a trail or dirt road, to the degree practical, to maximize lizard detectability. It will be walked once every five years during late spring/summer/early fall and under appropriate weather conditions for high lizard activity. The data to be collected includes number of lizards seen per transect and number of lizards per kilometer of transect in various habitat types.
- **Black-bellied Slender Salamander** - plots selected for black-bellied salamander habitat (oak woodlands, grasslands, and streamsides) will include one semi-permanent 200 meter long transect with cover boards placed every five meters on alternating sides of the transect. The transect will be located in representative habitat types within the plot and along Aliso and Wood Creeks to the degree practical, to maximize salamander detectability. It will be walked once every five years during the winter months and under appropriate weather conditions for high salamander activity. The data to be collected includes the number of salamanders seen per transect and the number of salamanders per kilometer of transect according to habitat types.
- **Coastal Cactus Wren** - each cactus patch within a plot will be visited once every two years to determine if cactus wrens are present. The number of patches visited in each plot will be recorded, as well as the number of patches having cactus >1 m tall. If wrens are present, their status (single, pair, family group) and estimated number will be recorded. The data to be collected includes number of cactus patches per plot, proportion of patches potentially suitable for wren nesting (those with cactus > 1 m tall), and the estimated number and status of wrens in each plot.
- **Coastal California Gnatcatchers and Southern California Rufous-crowned Sparrow** - each plot will be surveyed for California gnatcatchers and/or rufous-crowned sparrow once every two years, at least one week apart and in summer/early fall to the degree possible (after nesting and before dispersal, focused on determining overall population trends). Any gnatcatchers and/or sparrows with all or a portion of their home range within the plot will be recorded, along with their status (single, pair, with young) and estimated number. Location of nesting pairs (within or outside the plot) will be determined. Data collected includes frequency of gnatcatchers and/or sparrows per plot (proportion of plots where gnatcatchers and/or sparrows are detected) and nesting pair density (number of nesting pairs per plot area).
- **Least Bell's Vireo and Southwestern Willow Flycatcher** - each plot will be surveyed for least Bell's vireos and southwestern willow flycatchers once every two years, in mid spring/early summer to the degree possible, focusing on determining overall population trends). Any vireos and/or flycatchers with all or a portion of their home range within the plot will be recorded, along with their status (single, pair, with young) and estimated

number. Territory location of any nesting pairs (within or outside the plot) will be determined. Data collected includes frequency of vireos and/or flycatchers per plot (proportion of plots where vireos and/or flycatchers are detected) and nesting pair density (number of nesting pairs per plot area).

- **Butterfly Species** - each plot will include one semi-permanent 800 meter long transect. The transect will be located in representative habitat types within the plot. It will be walked once every two years during June or July and under appropriate weather conditions (*e.g.,* calm, clear, and warm) for high butterfly activity. The data to be collected includes number of butterflies seen per plot transect and the number of butterflies per kilometer of transect according to each habitat type.

The following monitoring activities and schedules are summarized in Table Q.

- **General Bird Surveys** - shall be conducted every two years to record species diversity in the park as a whole.
- **Focused Bird Surveys** (*e.g.,* least Bell's vireo, southwestern willow flycatcher) – shall be conducted every two years at the appropriate time of year for detection since these birds are migratory. The survey period is summarized in Table Q.
- **Plant Community Composition** - will be recorded and documented every two years on each plot at four semi permanent photo points. Each plot will include two semi-permanent line-intercept transects 100-400 m long, located to be representative of slopes, aspects, and soil types within each plot. Each year, the transects in one fifth of the plots will be read (each transect pair is read every five years), and the proportion of the transect falling into different plant communities will be recorded. The data to be collected includes qualitative habitat conditions (photos) and quantitative data on the relative extent of plant communities within the plot. Specific plant species to be surveyed for include the sensitive species listed in Table P.
- **Accidental Burns and Prescribed Vegetation Clearing** – can be monitored using plot and/or transect survey techniques. Accidental burns are possible within AWCWP, but prescribed burns are not a feasible fire management alternative within AWCWP due to proximity to urban development and residential communities. This monitoring should be applied to any unintended burn areas, with recognition that the pre-burn data will likely not be available. For accidental burns and prescribed vegetation clearing, pre-clearing data on plant communities and vegetative structure and composition within communities will be collected by use of plots (including photo plots) and/ or transects. The area will also be surveyed for coastal cactus wren, coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher as described above. Sizes and numbers of plots and transects will be adjusted to fit the size of the prescribed cleared area. Following the clearing or burning, the same surveys will be performed in years one, three and five. Quantitative data will be collected on the relative extent and composition of plant communities and the densities and distribution of the coastal California gnatcatcher and the least Bell's vireo both before the burn and as they reestablish after the burn.
- **Fuel Modification Areas** - will be surveyed every two years and appropriate vegetation cover and composition data will be collected depending on the vegetation type being

cleared. The data collected will be quantitative data on vegetation cover and composition in fuel modification and adjacent non-fuel modification areas so the effects of fuel modification can be evaluated.

- **Fuel Modification Programs** - will also be qualitatively monitored twice a year to prevent excessive fuel modification.
- **Vertebrate Pest Species** - Treatment data for cowbird trapping and other vertebrate pest management (*e.g.*, feral cats and dogs) will be derived from records of pest individuals trapped and disposed of every two years. A treatment index of pest species abundance will be determined from the number of individuals caught per trap day over the trapping efforts. Data to be collected will be an index of pest species abundance at the beginning and during control efforts, suitable for analysis to determine if pest abundance changes as a result of treatment. Appropriate controls for seasonal and other effects on pest species abundance will be incorporated into the study.
- **Noxious Weed Eradication** - For noxious weed eradication efforts, baseline plant frequency and/or cover data will be collected from semi-permanent line- or point-intercept transects or plots appropriate to the weed being removed. The number and size of plots and transects will be adjusted to fit the size of the weed eradication unit. Following the eradication, the same surveys will be performed in years one, three and five. Data collected will be quantitative with respect to the relative extent and composition of plant communities, both before and after the eradication work.
- **Habitat Enhancement and Restoration Activities** - will be monitored and annual monitoring reports produced with written and photographic documentation of each restoration/enhancement site.
- **Habitat Enhancement and Restoration Map**[6] - shall be created and updated annually, showing existing and future restoration and enhancement areas.
- **Other Forms of Active Management** - will be permissible and consistent with the overall objective of the AWCWP. Monitoring programs consistent with the examples above and including treatment monitoring will be developed and approved for such activities.

[6] If the data become available, a Habitat Enhancement and Restoration map will be prepared before the Resource Management Plan is finished.

Table Q: Schedule of Additional Monitoring Activities for AWCWP

Monitoring Activity	Description	Time of Year	Monitoring Frequency
General bird surveys	Survey all birds observed for biodiversity measure.	Spring	Every 2 years
Plant community composition survey	Record proportion of transect falling into different plant communities and characteristics. Photographs.	Same time each year	Annually in 5 year rotations
Accidental burns or prescribed vegetation clearing	Pre- and post-clearing data on plant communities, California gnatcatcher, and least Bell's vireo distribution.	Any	For any burns or prescribed clearing
Fuel modification areas	Vegetation cover/composition data for both modified and unmodified areas	Any	Every 2 years
Fuel modification programs	Qualitative monitoring	Any	Every 6 months
Vertebrate pest species	Use records from trappings	Any	Every 2 years
Noxious weed eradication	Frequency and/or cover data before and after eradication	Any	For any eradication
Habitat enhancement and restoration	Reported and photographed	Any	Annually
Habitat enhancement and restoration map	Update	Any	Annually
Perturbation event	Qualitative/Quantitative monitoring of how community recovers after perturbation event.	Any	For any perturbation event
Photo points	Qualitative habitat quality monitoring	Same time each year	Annually
Suitable habitat survey	Survey areas in the park for new suitable habitat.	Any	Every 5 years
Habitat types and quality	Track trends and changes over time with photographs.	Same time each year	Annually

15.2.3 Passive Management Monitoring Activities

The Resource Specialist will schedule studies to collect data on passively managed special interest species and resources, and will focus on identifying any special management needs for such species/resources and on identifying any previously unrecognized resources. Data will be qualitative in most cases, using techniques such as permanent photo points accompanied by a description of current management practices.

- **Perturbation Event** - When a periodic perturbation event (*e.g.*, a significant wildfire, flood) occurs, the supervising park ranger may schedule passive management monitoring in response to the event for one or more years. The techniques to be used will be quantitative where practical, and will be similar to those described above, but will

be tailored to the event and the monitoring opportunity. The types of data to be collected include data on the nature and timing of a community's response to a perturbation event.

- **Aliso Creek Channel Map.** A GIS map of the Aliso creek channel will be created and updated, as needed, to monitor the extent to which the creek channel meanders so that appropriate management measures can be taken. After implementation of the SUPER project, channel dynamics may be reduced. If this is confirmed (*i.e.,* monitoring shows no migration after 10 to 15 years that include some major storm event), the success of the SUPER project would be demonstrated and creek monitoring may be discontinued.
- **Photo points** - shall be established along the creeks and at vantage points overlooking the park. In 2005, the County GIS division collected survey data and photos along Aliso Creek from the main park entry to the Coastal Treatment Plant as part of the Aliso Creek SOCWA Bridge to Aliso and Wood Canyons Park Project (Project 056056WS400009); this information should be used as baseline data for lower Aliso Creek. The collection of similar survey data and photos should be initiated for Wood Creek and upper Aliso Creek. It is recommended that data be collected every five years to track changes along these drainages.
- **Suitable Sensitive Plant Habitat Surveys** - shall be conducted in areas that are not known to have sensitive plants or suitable sensitive plant habitat. Survey once every five years during the spring.
- **Habitat Map** – The NROC habitat map will be updated once every ten years using the County's habitat classification system (Gray and Bramlet 1992, Jones and Stokes Associated, Inc. 1993). This map will be used to track changes in habitat distribution, with a particular emphasis on detecting displacement of native vegetation types. If such losses and/or significant native habitat type conversion occur, the causes will be investigated. Remedial action will be implemented as appropriate to remedy human-induced effects on native habitat values. However, natural succession will be allowed to occur. During the vegetation mapping effort invasive plant species shall be mapped to determine if control of these populations should be considered a priority within certain areas of the AWCWP.

15.3 DATA ANALYSIS

The data collected through the monitoring program must be analyzed and used as the basis for evaluating and guiding park management. A key responsibility of the Resource Specialist will be to compile and analyze the monitoring data, and in collaboration with park rangers, make regular assessments of park management based on the analyzed data.

- Data from "target, identified and special interest" species monitoring will be compiled and analyzed as monitoring cycles are completed. Analysis will include comparisons of current and previous year data, with greater emphasis on identifying long-term trends rather than short-term phenomena. These data may be used in a population model, if a proven and tested model is available; to help assess the park's function/viability. Particular emphasis will be given to identifying any management activities needed to improve or maintain necessary park functions.

- Data from "active management" efforts will be analyzed to assess the effectiveness of the management effort, and will guide decisions on future management efforts.
- Data from “active” species inventories will be compiled in files and a GIS database. Data from "passive" management/monitoring will be compiled into report format for use in guiding future management.

15.4 RESEARCH

Provide opportunities of university-level research especially in cases where research would help to answer fundamental management questions or contribute to the conceptual models of species of interest and habitats. Work with university researchers and graduate students to develop projects that would provide useful information to the supervising park ranger and the Resource Specialist. Research proposals would be evaluated on a case-by-case basis in consideration of potential impacts associated with the research.

Whenever possible, the supervising park ranger will obtain data from interested parties (*e.g.*, local agencies, local chapter of the National Audubon Society) to compile with the park’s monitoring data. These data may be qualitative or quantitative in nature and will be used to augment general information about the park’s natural resources. Data may be submitted to an internal website to which only the supervising park ranger has access since some data may be considered and not suitable for public distribution.

15.5 RECOMMENDATIONS

General Actions

- Monitor species and habitat enhancement and restoration activities as part of the adaptive management program. Evaluate the effectiveness and progress of habitat enhancement and restoration efforts. Through monitoring, seek to identify new enhancement and restoration opportunities and priorities within the park.
- Develop an electronic data management system to include baseline data collected for the preparation of this RMP and that allows for new information to be added.
    1. Maintain a general record of management and monitoring activities, as needed.
    2. Incorporate monitoring data collected to track the responses of resources to management actions. Data from “active” species inventories will be compiled in files and a GIS database. Data from “passive” management/monitoring will be compiled into report format for use in guiding future management. Incorporate data when available.
    3. Coordinate with managers in other parts of the NCCP/HCP to compare monitoring and management results, as needed.
    4. Incorporate data from NROC studies (*e.g.,* wildlife movement, target species, habitat restoration activities) into the park database and use to adapt management practices.

As-Needed Actions

- Monitor key ecological processes, such as perturbation events either actively or passively, which ever is more appropriate, as determined by the Resource Specialist and other concerned parties to interpret biological change and responses to management measures.
- Create a GIS map of the Aliso Creek channel to track the creek's migration.

Annual Actions

- Record monitoring data for all resource management activities, as described in the NROC Monitoring and Adaptive Management Program. Data from species inventories will be compiled in files and a GIS database. Monitoring frequency may vary and should be evaluated by the supervising park ranger, the Resource Specialist, NROC, and resource agencies (*e.g.,* CDFG, USFWS). Produce report and photographic documentation for each site.
- Conduct annual inspections of fuel modification zones and park boundaries to monitor fuel modification zone limits, erosion, exotic plant and animal species, including feral domestic animals.

One, Three, and Five Year Actions

- Actively monitor noxious weed eradication using semi-permanent line or point-intercept transects or plots, depending on the area characteristics, to collect quantitative data both before eradication, to collect baseline data, and after eradication in years one, three, and five.
- Actively monitor accidental burns and prescribed vegetation clearing areas for floral and faunal characteristics. Methods shall include plot and transect techniques and other suitable techniques.

Biannual Actions

- Map habitat enhancement and restoration activities and update the Habitat Enhancement and Restoration Map (HERM; at NROC) to show existing and future restoration and enhancement areas.
- Actively monitor the populations of the "targeted and identified species," general bird species, plant community composition, and other sensitive resources, including CSS vegetation and their responses to management actions. Methods shall include plot and transect sampling techniques.
- Actively monitor fuel modification areas collecting qualitative and quantitative data every two years.
- Update treatment data for vertebrate pest management (*e.g.,* brown-headed cowbird, feral animals).

Five Year Actions

- Monitor locally uncommon, sensitive, federally-threatened or endangered species and other sensitive resources to track the populations, identify threats, develop management

recommendations, and determine the effectiveness of management actions. Monitoring frequency should be evaluated by the supervising park ranger, the Resource Specialist or Resource Coordinator, NROC, and resource agencies (e.g., CDFG, USFWS). Once every five years, recommended.

- To assess coastal sage scrub and riparian habitat quality, survey for the following species: the threatened coastal California gnatcatcher and endangered southwestern willow flycatcher and least Bell's vireo, and the sensitive yellow-breasted chat and yellow warbler.
- Conduct suitable sensitive plant habitat surveys in areas not known to have sensitive plant habitat. Survey every five years during the spring.
- Establish photopoints and collect survey data along the creeks. Utilize baseline data for lower Aliso Creek collected as part of the Aliso Creek SOCWA Bridge to Aliso and Wood Canyons Park Project (Project 056056WS400009). Collect similar survey data and photos for Wood Creek and upper Aliso Creek. Collect data every five years to track changes along these drainages.
- Evaluate the suitability of the data management system for management purposes and refine the system, as necessary.

Ten Year Actions

- Create a habitat map using the County's habitat classification system (Gray and Bramlet 1992, Jones and Stokes Associates, Inc. 1993) to track changes in habitat distribution, with emphasis on detecting conversion to ruderal habitats. Displacement causes will be investigated. Remedial action will be implemented, as appropriate, but natural succession will be allowed.
- Research opportunities for university-level research and data contributions by interested parties should be encouraged. Project development and proposals would be evaluated by the supervising park ranger and the Resource Specialist. Data submission should be facilitated either through an internal website or other secure methods.

16.0 Administration, Operations and Management

16.0 PARK ADMINISTRATION, MANAGEMENT AND OPERATIONS

Orange County Parks (OC Parks) will continue to administer and operate AWCWP. OC Parks is responsible for the entire parkland within the current border excluding inholdings such as the Coastal Treatment Plant and easements.

Park administrative operations may continue in a park office at the Main Entry. The park office may be incorporated into the site plan and architectural plans for a renovated interpretive center at the main entry. This office will be the center of control for all park operations and resource management operations. Maintenance operations will continue to be conducted from the maintenance yard at the park's main entry.

Visitors hiking, riding horses, or cycling into AWCWP are not charged an admission fee. A fee is charged at the main entry for motor vehicle parking. Fees are collected using a pay box. Annual passes are available for purchase.

16.1 INTERIM PARK OPERATIONS PLAN

Aliso and Wood Canyons Regional Park opened for limited public use in 1990. Prior to this public opening, the Regional Park Operations Division of OC Parks prepared an Interim Operations Plan that the Board of Supervisors subsequently approved. Through the intervening years the plan has served as a general procedural guide for the management of the park and resources, public recreation and safety, and environmental education.

A copy of the Interim Operations Plan is included in Appendix H.

16.2 CURRENT OPERATIONS

The County of Orange Codified Ordinance, Article 2. Recreational Areas in General, provides detailed information regarding the operations of County parks, permitted and prohibited uses as summarized below.

Park Hours. AWCWP is open from 7 a.m. to sunset, seven days a week. No person shall enter or remain in AWCWP at any time other than during these hours. Heavy rains or high fire danger may necessitate closure of trails or road or the entire park (Section 2-5-46).

Trails and Closed Areas. The OC Parks Director designates horseback riding, bicycle riding and hiking trails within AWCWP. The OC Parks Director may also designate closed areas where entry is prohibited for safety or for the protection of natural or cultural resources. No person shall enter (foot, horseback, bicycle) areas within AWCWP that are posted as closed. No person may leave a designated trail other than for law enforcement, lifesaving or emergency purposes. (Section 2-5-46).

Special Permits. Written permits are required for public gatherings (picnics, special events, meetings) larger than 100 persons. (Section 2-5-25)

Prohibited Activities
Prohibited activities within AWCWP include those activities that result in the loss or degradation of park resources and facilities.

- **Collecting.** Collecting plants and animals, paleontological, historical and cultural specimens and cultural or archaeological artifacts is prohibited except with valid research collecting permit. (Section 2-5-40).
- **Camping.** No camping at AWCWP.
- **Fires and Fireworks**. Fires, fireworks, and firearms (including air guns, paint ball guns, BB guns, slingshots) are prohibited at AWCWP (Section 2-5-65).
- **Domestic Animals.** Dogs are not permitted at AWCWP, except in designated areas. No person shall leave an animal unattended, tied to an object or confined in a vehicle. People shall remove and dispose of animal waste. (Section 2-5-39).
- **Motorized Vehicles.** Operation of motorized vehicles (including motorcycles, motor bikes, motor dirt bikes) within AWCWP beyond the designated roads at the main entry parking area is not permitted. Authorized exceptions include park access for management, maintenance, police and fire service or by easement or special permit. (Section 2-5-29).
- **Boating.** Public boating is not permitted at AWCWP.
- **Bicycles.** Bicycles may be operated only on designated roads or trails. Bicycles may not be operated in any manner that endangers a person or animal, with regard for other users, surface, width and grade and in no event in excess of 10 miles per hour, unless posted otherwise. (Section 2-5-43).
- **Swimming and Wading.** Swimming or wading is not allowed at AWCWP.

16.3 LAW AND ORDINANCE ENFORCEMENT

Applicable local, state and federal laws and/or ordinances pertaining to the protection and use of AWCWP are in effect and enforced (see Appendix I).

16.4 ADMINISTRATION AND MANAGEMENT

Administration and management will continue to be the responsibility of the County of Orange, OC Parks, Regional Parks Operations staff. At present, there are four staff positions whose work responsibilities are dedicated solely to AWCWP. A Senior Ranger, Park Ranger II (two positions), and a Groundskeeper provide enforcement, management and maintenance for AWCWP. In addition, an Interpretive Specialist provides oversight of interpretive facilities and programs for both AWCWP and Laguna Coast Wilderness Park (LCWP). These existing staff positions are described below:

Senior Park Ranger (One Position). The Senior Park Ranger manages, operates and provides resource protection at AWCWP. The Senior Park Ranger also directs and supervises the work of other staff that may include Park Rangers and Groundskeepers. The Senior Park Ranger also organizes and directs the work/activities of volunteers and other alternative work forces; provides community liaison and is primary contact for police, fire and other public programs such as the National Communities Conservation Program, Resource Management and General Development Plans.

- Manages and ensures resource protection in assigned facility by enforcement of County Ordinances, Resource Management Plans, Natural Communities Conservation Plan Documents (where applicable), and other planning or management guidelines that may be adopted; retains land management responsibilities for OC Parks facilities during emergency situations.
- Liaisons and establishes cooperative relationships with local, state and federal agencies, environmental, youth, community, homeowner associations and other special interest groups; represents OC Parks at various meetings and on assigned committees.
- Organizes, plans, supervises and evaluates the work of Park Rangers, Park Maintenance Supervisors and park maintenance personnel; coordinates and provides direction to volunteer groups and other community support groups; supervises and evaluates contractors' work; assists code enforcement, planning and design and engineering sections with facility projects.
- Establishes and manages interpretive, educational, recreational and other public programs (either fee based or at no cost) and assigns qualified staff or volunteers; establishes facility based training and safety programs.
- Responsible for contract enforcement and encroachment abatement within assigned facility; issues parking citations to the public as required.
- Administers permits, reservations and other revenue generating activities; identifies and/or coordinates acquisition of non-traditional funding such as grants, donations, corporate sponsorships; plans and coordinates fund raising activities.
- First responder to medical, fire and other life threatening emergencies within OC Parks facilities; administers basic first aid and fire suppression; remains in command of emergency situation until appropriate response team arrives.

Park Ranger II (Two Positions). The Park Ranger II has patrol and shift responsibility for the operation and maintenance of AWCWP. Under direction, the Park Ranger II provides resource protection and visitor safety; responds to all emergencies within assigned facility; enforces the codified Ordinances and County Policy and Procedures; directs and supervises the work of subordinate staff, contractors, volunteers, alternative work force or other County staff doing work within their assigned facility; liaisons with community groups, police, Sheriff, fire and other public organizations; provides visitor or specialized services including recreation, interpretive, special events, volunteer coordination, division training or administrative function.

- In the absence of the Supervising and Senior Park Rangers, the Park Ranger II is responsible for the operation and maintenance of assigned facility.
- Responsible for public safety and resource protection during assigned shift by enforcement of Codified Ordinances, Resource Management Plans, Natural Communities Conservation Plan documents (where applicable) and other planning or management guidelines that may be adopted.
- May issue parking citations as required.
- Retains land management responsibilities for OC Parks facilities during emergency situations until such time as relieved by Supervising and Senior Park Rangers or OC Parks management.
- Is first responder to medical, fire and other life threatening emergencies within OC Parks facilities.
- In the absence of the Supervising and Senior Park Rangers, liaisons with other local, state and federal public safety agencies in the course of their job duties and protects the natural, cultural, historical and structural resources of their assigned facility.
- May conduct training and safety programs, conduct visitor services either directly or via contract service providers,
- Develops and supervises volunteer programs/activities and supervises special events/permit activities.

Interpretive Specialist (One Position). This position is responsible for developing and implementing the interpretive programs developed for AWCWP. The Interpretive Specialist is shared with LCWP due to the close proximity and similar resources and comparable interpretive themes. The Interpretive Specialist coordinates interpretive programming with other South Coast Wilderness Park agencies and non-profit support groups.

Groundskeeper (One Position). The groundskeeper performs routine grounds maintenance, landscape gardening and facility maintenance and repair work along with other work as required.

- Performs routine groundskeeping work such as cultivating planter areas, planting, preparing soil for planting and applying insecticides; rakes leaves and picks up papers and rubbish; edges and sweeps walks and other paved areas.
- Operates and maintains power equipment such as light tractors, mowers, gang mowers, power parking lot sweepers, litter lifts, sprayers, edgers and clippers; may drive a light truck to carry equipment and crews to and from work areas and haul trash.
- Performs routine grounds maintenance or laboring work such as collecting trash, replacing posts, digging trenches, clearing brush and weeds, and cleaning garbage cans.
- Cleans, stocks and maintains restrooms; performs limited custodial duties at isolated locations in connection with regular assigned tasks.

16.4.1 Proposed Staffing For Resource Management

The RMP includes recommendations for natural and cultural resource protection that will require the need for additional staffing. Improved connections to adjacent corridors (*e.g.,* Aliso Beach Park and Laguna Coast Wilderness Park), will likely present new issues related to enforcement: how to make sure that park users visit the park during operating hours. Recommendations to close and restore many of the unauthorized trails will require planning, work effort, and diligent enforcement. The time commitment and physical labor required to implement the program for resource management (e.g., removal of invasives) cannot be initiated with current staffing. The following premises guide the recommendations below:

- AWCWP will continue to be operated by the County of Orange, Harbors, Beaches and Parks.
- The County manages the entire property, including parcels owned by the City of Laguna Beach.
- The park is in need of a staff person with experience in resource management who can coordinate resource management activities.
- LCWP, in close proximity to AWCWP, may offer opportunities for sharing of certain recommended positions.

Upgrade Existing Goundskeeper Position. The existing groundskeeper position should be upgraded to “Parks Maintenance Worker” to better reflect the expected and assigned duties and responsibilities performed by this position. Such duties and responsibilities include: trail construction and maintenance exotic species removal and habitat enhancement projects, park sign and interpretive kiosk construction, fencing installation to protect sensitive park resources. The Parks Maintenance Worker would perform routine maintenance activities as recommended in this RMP.

Resource Specialist/Resource Coordinator. Resource protection will continue to be a major focus for park operations at AWCWP. A full time position, Resource Specialist or Resource Coordinator, is recommended as a technical specialist responsible for implementing the overall resource management program. Duties would include:

- Hold detailed knowledge of the natural and cultural resources of AWCWP.
- Implement vegetation management, habitat enhancement and removal of invasive exotic species.
- Ensure conformance between the NCCP/HCP and the AWCWP RMP.
- Perform on-site surveys and prepare monitoring reports with assessments and recommendations.
- Supervise the workforce to implement resource strategies including the maintenance staff and volunteer groups.
- Serve as the technical interface with the County Fire Authority, the County Planning Department, adjacent jurisdictions and homeowner groups and others to insure appropriate trail connections, consistent trail signing, improved staging areas, and needed fire breaks.

- Design and assist in implementing the interpretive program for AWCWP.
- Provide expertise in wildland management and interpretation.

This position could be shared with Laguna Coast Wilderness Park due to the close proximity and similar landscape with comparable management issues. The addition of the Resource Coordinator would increase the need for administrative/operations work space at AWCWP. A resource program would require a storage area for maintenance equipment and supplies (approximately 1000 square feet) in the vicinity of the other Administrative functions at the Main Park Entry. Under a more ambitious scenario, this facility could ultimately be expanded in support of the museum with an interpretive center for the public that could also be used by school classes, bike clubs and others for meetings and other park-related programs.

16.5 PUBLIC SAFETY

AWCWP is a wilderness park and subject to inherent public dangers. Park visitors will continue to be informed of these potential dangers with signs and trail entries, information on handouts, and more detail on the internet. These warnings read as follows:

This area is characterized by certain inherent dangers. These include but are not limited to: mountain lions, rattlesnakes, poisonous insects, extremes in weather and rugged terrain. Your safety can not be guaranteed. Stay alert to potential danger.

16.6 BUDGET

Appropriations for AWCWP operations are incorporated in the OC Parks Fund 405 Budget.

16.7 VOLUNTEER PROGRAMS

Volunteers are playing an increasing role in assisting with a variety of public services, including park and recreation services. Their value to AWCWP may be much greater than the tasks that they perform. Volunteers contribute to a constituency for the park that increases community involvement and provides political support. Management and supervision of volunteers is critical to their effectiveness. Volunteers must be used to fill maintenance voids that existing staff cannot handle, without jeopardizing the jobs of park staff. Volunteers should work under the direction of park staff. AWCWP has a long history of local support. Some of volunteer groups working in and for the park include:

Laguna Canyon Foundation is a 501(C)(3) nonprofit corporation that has worked to preserve the land within and around Laguna Canyon since 1991. Through contributions, the Laguna Canyon Foundation provides financial support to protect and enhance existing parkland and to preserve additional wilderness. The Laguna Canyon Foundation is a partnership between community and environmental activists, civic and municipal leaders, and private property owners and developers.

Laguna Greenbelt, Inc. is a grassroots organization founded in 1967 to promote the preservation of Orange County open space for the benefit of the general public, and to inform and educate the public about local natural history. The Laguna Greenbelt has established several self-guiding nature trails and provides trained volunteer naturalists that offer guided tours of LCWP.

County's Adopt-A-Park Program. The County's Adopt a Park Program organizes volunteers wanting to assist Harbors, Beaches, and Parks. Some volunteer activities include: greeting visitors at nature centers; working with computers in administrative offices; taking photographs; planting trees and seeding damaged areas as well as seed collecting for new plant growth; presenting environmental education programs/nature walks and programs; building and repairing nesting boxes, picnic tables, and other structures; and building and repairing trails.

County's Ranger Reserves Program. To assist with the management of County open space, the Park Ranger Reserves program was developed. The Park Ranger Reserves is an ancillary unit of dedicated volunteers responsible for assisting with park management, operations, and patrol for several hours per month following a training program.

Orange Coast Watershed and Environmental Center (OCWEC). The OCWEC is a non-profit group dedicated to the watershed and environmental education and awareness. In conjunction with OC Parks, the OCWEC will develop a permanent watershed interpretive facility at AWCWP to provide hands-on experience and up-close observation of the creek environment and its surroundings. It is the intention of the OCWEC to partner with governmental watershed agencies, local colleges and universities, and other watershed program providers for program support.

Trails 4 All. Trails 4 All was established in 1992 as the Trails Council of Orange County and incorporate as a 501(C)(3) nonprofit organization in 1995. Trails 4 All assists coordinating and funding volunteer trail projects throughout Orange County. Through donations and the work of volunteers, Trails 4 All is able to help maintain and improve facilities for recreation use. Trails 4 All is involved with trail construction, instructional seminars, creek and watershed clean-up, youth programs, and trail maintenance.

SHARE Mountain Bike Club. SHARE is a non-profit, International Mountain Bicycling Association (IMBA) affiliated, organization dedicated to promoting responsible mountain biking. SHARE has organized trail maintenance programs and education programs in Crystal Cove State Park (CCSP), AWCWP, Limestone Canyon & Whiting Ranch Wilderness Park, and Peters Canyon Regional Park. SHARE has also assisted with trail projects in LCWP. Several members are also docents with the Nature Conservancy and serve on the Nature Conservancy's IMBA National Mountain Bike Patrol Program in LCWP and CCSP.

16.7.1 Proposed Volunteer Programs

Trail Patrol. To supplement the Ranger Reserves Program, a group of "Park Watch" volunteers could be formed to patrol the park on weekends, evenings, and high-use times to answer visitors' questions, inform visitors about park rules and immediately report violations.

The volunteers would be supplied with radios to enable them to inform the park ranger and/or police of situations needing their attention. The volunteers could be trained by the park ranger and the local police departments experienced in "Neighborhood Watch" programs.

This program could also include a volunteer bike patrol that would focus their attention on mountain bikers who use the park, especially keeping an eye out for the creation and use of unauthorized trails and unsafe trail use. Mountain bikers are more likely to cooperate with other bikers than with volunteers on foot. Regular volunteer bike patrols have the potential to be very effective in reducing the number of hiker/cyclist conflicts and in reducing both the number of new trails created and the number of unauthorized trail re-opening attempts. Trail closure efforts on damaged and unauthorized trails are easily undone by cyclists and hikers who ignore or destroy barricades and off limit signs. Regular reminders from volunteer patrollers may also increase the number of riders who wear helmets.

The use of volunteer crime watch groups and volunteer trail patrols is expected to provide an additional level of security and safety provided that an adequate number of volunteers can be relied on for the long-term.

Maintenance Crews. Volunteer trail crews, composed of cycling enthusiasts, and other dedicated park users can be a valuable asset. A trail maintenance coordinator (*e.g.* park ranger or resource coordinator) could strengthen the services of volunteer groups to assist with trail maintenance and to patrol park trails. Cycling organizations can assist the rangers with trail repair oversight and to provide regular bike patrols to educate other cyclists on trail etiquette and safety. Volunteers would benefit from workshop training to discourage the use of unauthorized trails by placing logs, brush, and other obstructions across the head of the trails. Trained volunteers could provide skilled oversight to assist the park rangers in directing trail crew volunteers. If the additional funds for repair materials and tools are provided, then volunteer labor can be more effectively directed.

Multiple opportunities for trail repair training are available in California, including annual workshops offered by the California Trails and Greenways Foundation, the California State Parks Trail Building School, the Student Conservation Organization, and the International Mountain Biking Association (IMBA), among others.

Restoration volunteers could be recruited to assist with the implementation of restoration techniques. Restoration efforts could be overseen and directed by park personnel or by a restoration consultant. The benefits of volunteer labor would include educational opportunities in restoration, a sense of teamwork and accomplishment, and increased commitment to and care of the park by volunteers.

16.8 RECOMMENDATIONS

General Actions

- Upgrade the Existing Groundskeeper Position to Parks Maintenance Worker.

- Create a new position, Resource Specialist, to implement the overall resource management program.
- Form a group of volunteers to patrol the park on weekends, evenings and high-use times to answer visitors' questions, inform visitors about park rules and immediately report violations.
- Use volunteer trail crews to assist with trail maintenance. Conduct workshop training to discourage the use of unauthorized trails by placing logs, brush, and other obstructions across the head of the trails.
- Recruit volunteers to assist with the implementation of restoration techniques.

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17.0 References

17.0 REFERENCES

Alameda County Department of Public Works. Cross Alameda Trail Design Characteristics. Accessed on November 2005: http://www.ci.alameda.ca.us/publicworks/pdf/Chap6TRAILDESIGN.pdf

Alta Transportation Consulting. 2001. OCTA Commuter Bikeways Strategic Plan. Prepared for the Orange County Transportation Authority. August 2001.

Architectural and Transportation Barriers Compliance Board. 1999. Regulatory Negotiation Committee on Accessiblity Guidelines for Outdoor Developed Areas Final Report. Accessed November 2005: http://www.access-board-gov/outdoor/outdoor-rec-rpt.htm

Arnold, Ralph. 1903. The Paleontology and Stratigraphy of the Marine Pliocene and Pleistocene of San Pedro, California, Academy of Sciences Memoir, 3:1-420, San Francisco.

Atkinson, J. I. 1933. Los Angeles Historical Directory. McFarland, North Carolina.

Atwood, J.L. 1993. California gnatcatchers and coastal sage scrub: the biological basis for endangered species listing. Pp. 149-169, in J.E. Keeley, ed., Interface between Ecology and Land Development in California. Southern Calif. Academy Sciences; Los Angeles, California.

Avina, Rose H. 1932. Spanish and Mexican Land Grants in California. Unpublished M.A. Thesis, Department of History, University of California, Berkeley.

Bancroft, Hubert Howe. 1966. History of California, Volume II. In The Works of Hubert Howe Bancroft, Volume XIX. Originally published in 1886 by The History Company Publishers, San Francisco. Facsimile reprint by Wallace Hebberd, Santa Barbara, California.

Bancroft, Hubert Howe. 1967. History of California, Volume I. In The Works of Hubert Howe Bancroft, Volume XVIII. Originally published in 1884 by A.L. Bancroft and Company, San Francisco. Facsimile reprint by McGraw-Hill Book Company, New York.

Barbour, Michael, et al. 1993. California's Changing Landscapes: Diversity and Conservation of California Vegetation. Sacramento, California: California Native Plant Society.

Barnes, Joy E. 2005. Aliso and Wood Canyons Wilderness Park Sensitive Plant Species Technical Report. Report completed to meet Environmental Studies M.S. Requirements for California State University Fullerton. Fall 2005.

Barnes, L. G., Ph.D. 2003. Final report of Paleontological Mitigation Monitoring Program. Planning Area 17. "Quail Hill," Irvine Community Development Company, Irvine, California. Prepared by Dr. Barnes on behalf of the Keith Companies, Inc. for Irvine Community Development Company. Project Number: JN 013767.04.000.

Barrie, D., T. Totnall, and E. Gath. 1992. Neotectonic Uplift and Ages of Pleistocene Marine Terraces, San Joaquin Hills, Orange County, California. In Heath, E.G., and W.L. Lewis, eds., 1992, The Regressive Pleistocene Shoreline, Coastal Southern California, South Coast Geological Society, Annual Field Trip Guidebook Number 20.

Baumgartner, Jerome W. 1989. Rancho Santa Margarita Remembered. Fithian Press, Santa Barbara, California.

Bean, L. and J. T. King. 1974. ANTAP: California Indian Political and Economic Organization. Ballena Press Anthropological Papers 2. Ramona, California.

Bean, Lowell John, and Charles R. Smith. 1978. Gabrielino. In R. Heizer ed., Handbook of North American Indians, Vol. 8, California, pp. 538–549. Smithsonian Institution, Washington, D.C.

Bean, Lowell John, and Florence C. Shipek. 1978. Luiseño. In R. Heizer ed., Handbook of North American Indians, Vol. 8, California, pp. 550–563. Smithsonian Institution, Washington, D.C.

Belyea, R.B. and J.A. Minch. 1989. Stratigraphy and Depositional Environments of the Sespe Formation, Northern Santa Ana Mountains, California, In: Field Geology in Orange County, Southern California. NAGT-FWS Field Guidebook, 1994.

Bengtson, Stan. Senior Park Ranger, Aliso and Wood Canyons Wilderness Park. March 25 and April 12, 2006. Personal communication.

Bird Species of Special Concern in California, Long-eared Owl. California Department of Fish and Game, 1978. Author: J.V. Remsen, Jr.

Bolton, Herbert Eugene. 1971. Fray Juan Crespi: Missionary Explorer on the Pacific Coast 1769–1774. Reprinted. AMS Press, Inc., New York. Originally published 1927, Berkeley, University of California.

Boscana, Gerónimo. 1978. Chinigchinich: A Revised and Annotated Version of Alfred Robinson's Translation of Father Geronimo Boscana's Historical Account of the Beliefs, Usages, Customs and Extravagancies of the Indians of this Mission San Juan Capistrano Called the Acagchemen Tribe [1846]. Edited by P. T. Hanna. Reprinted Annotations by John P. Harrington. Foreword by Frederick Webb Hodge. Illustrations by Jean Goodwin. Malki Museum Press, Banning, California. Originally published 1933. Originally written by Father Boscana in the 1820s and translated and first published by Alfred Robinson in 1846. Fine Arts Press, Santa Ana, California.

Brandes, Ray. 1970. The Costansó Narrative of the Portolá Expedition: First Chronicle of the Spanish Conquest of Alta California. Translated, with an introduction and bibliography. Facsimile reproduction of an original in the Los Angeles Public Library. Hogarth Press, Newhall, California.

Brewer, William H. 1930. Up and Down California in 1860-1864: The Journal of William H. Brewer, Professor of Agriculture in the Sheffield Scientific School from 1864 to 1903. Francis P. Farquhar, ed. New Haven: Yale University Press.

Bright, William. 1978. Preface. In: Chinigchinich: A Revised and Annotated Version of Alfred Robinson's Translation of Father Geronimo Boscana's Historical Account of the Beliefs, Usages, Customs, and Extravagancies of the Indians of this Mission San Juan Capistrano Called the Acagchemen Tribe [1846]. Edited by P. T. Hanna. Reprinted. Malki Museum Press, Banning, California. Originally published 1933, Fine Arts Press, Santa Ana, California.

Byrd, Brian. 1998. Re-Evaluation of the San Mateo Archaeological National Register District, San Diego County, California. ASM Affiliates, Inc. Prepared for the U.S. Army Corps of Engineers, Los Angeles District. Contract Number DACA09-95-D-0013, Delivery Order Number 0012. Ms. on file at LSA Associates, Inc.

Byrd, Brian, D. Pallette, and C. Serr. 1995. Archaeological Testing Along San Mateo and Onofre Creeks, Northwestern Camp Pendleton, San Diego County, California. Brian F. Mooney Associates, submitted to the U.S. Army Corps of Engineers, Los Angeles District.

California Coastal Conservancy. 2001. San Juan Hydrologic Unit Profile. Accessed via the web on April 6, 2006. (http://www.wrpinfo.scc.ca.gov/watersheds/briefs/sanjuan/index.html)

California Department of Fish and Game, Natural Heritage Division. Natural Diversity Database (CNDDB). 2000. RareFind 3.0.5. Records search executed March 6, 2003. Sacramento, California: The Resource Agency.

California Geologic Survey. 2002.California Geomorphic Provinces. California Department of Conservation. Note 36.

California Regional Water Quality Control Board San Diego Region. 1994. Water Quality Control Plan for the San Diego Basin (Region 9). September 1994.

Chambers Group, Inc. and Robert Goodman, Jr. 1999. Southwestern pond turtle (Clemmys marmorata pallida) relocation plan for the City of Laguna Hills, Orange County, California. Prepared for the City of Laguna Hills. June 1999.

City of Fayetteville. Parks and Recreation Division. 2003. Alternative Transportation and Trails Master Plan.

City of Pasadena Arroyo Seco Design Guidelines. Accessed November 2005: http://www.ci.pasadena.ca.us/publicworks/PNR/ArroyoSeco/ArroyoSecoDesignGuidelines.asp

Cleland, Robert Glass. 1952. The Cattle on a Thousand Hills, Southern California, 1850–1880. Second Edition. The Huntington Library, San Marino, California.

———. 1952. The Irvine Ranch. San Marino: The Huntington Library.

———. 1962. Introduction. In Historic Spots in California, by M. B. Hoover, H. E. Rensch, and E. G. Rensch, pp. xi–xiv. Fourth printing revised by R. Teiser. Stanford University Press, Palo Alto, California.

Clevenger, Joyce M. 1986. Archaeological Investigations at CA-ORA-287: A Multicomponent Site on Newport Bay. Westec Services. Ms. on file, South Central Coastal Archaeological Information Center, California State University, Fullerton.

Colorado State Parks, September 1998. Planning Trails with Wildlife in Mind. Accessed November 2005: http://parks.state.co.us/home/publications/trails%20handbook%20section%20one.pdf

Cooper, J. D. 1982. County of Orange Foothill Transportation Corridor Study, Phase II Paleo Assessment, Appendix B. In LSA, Inc, 1983 Draft EIR #423, Foothill Transportation Corridor, OC General Plan Transportation Element amendment, Specific Route Location. Prepared for the County of Orange Environmental Management Agency.

———. 1982. Paleontological Resources. In LSA, Inc. Draft EIR #423, Foothill Transportation Corridor, OC General Plan Transportation Element Amendment, Specific Route Location. Prepared for the County of Orange Environmental Management Agency.

Cooper, J. D. and F. A. Sundberg. 1976. Paleontologic Localities of the Silverado-Mojeska Planning Area, Orange County. Prepared for the County of Orange Environmental Management Agency.

Conkling, S.W. 1988. A Floral and Fauna Analysis of Clark Regional Park (La Habra Formation: Rancholabrean), Orange County California, Abstract, Journal of Vertebrate Paleontology, 8(3), p. 12A.

———. 1997. Report of Paleontological Resource Monitoring, Trabuco Retention Basin, Orange County California. Prepared by LSA Associates for the County of Orange Environmental Management Agency. On file at LSA.

Conkling, S. W., S. E. Clay, L. L. Sample, B. R. Smith, K. L. Finger, and J. Michalsky. 1997. Report of Paleontological Resource Monitoring, San Joaquin Hills Transportation Corridor, Between Station 756+00 to 1010+00, Orange County, California. Prepared by LSA Associates, Inc for Sverdrup. LSA Project Number SVC501.

Costansó, Miguel. 1911. The Portolá Expedition of 1769–1770, Diary of Miguel Costansó. Edited by Frederick J. Teggert. Publications of the Academy of Pacific Coast History 2(4).

County of Orange Harbors, Beaches and Parks. 2004. Aliso and Wood Canyons Wilderness Park Brochure with Trail Map. August. Orange County, California.

———. 1995. Orange County Regional Parks Unpaved Trail Assessment. August. Orange County, California.

County of Orange Public Environmental Management Agency and Harbors, Beaches and Parks. 1996. Laguna Coast Wilderness Park Existing Conditions Report. May 1996. Orange County, California.

———. 1989. Aliso and Wood Canyons Regional Park Interim Operations Plan. June 21. Orange County, California.

County of Orange Public Facilities and Resource Development and Harbors, Beaches and Parks. 1998. Laguna Coast Wilderness Park Resource Management Plan. September 1998. Orange County, California.

———. Codified Ordinances Field Guide. Orange County, California.

———. 2005. South Orange County Integrated Regional Water Management Plan – Total Watershed Efficiency. 7 June 2005. Orange County, California.

Crooks, Kevin, Shalene George, and Don Jones. 1999. Monitoring program for mammalian carnivores in the Nature Reserve of Orange County–Annual progress report 1999. Prepared for the Nature Reserve of Orange County. Biodiversity Conservation Consultants, San Diego, California.

Crownover, C. Scott, Beth Padon, and E. Jane Rosenthal. 1990. Archaeological Investigations at CA-ORA-121, Orange County, California. LSA Associates, Inc. Ms. on file, South Central Coastal Archaeological Information Center, California State University, Fullerton.

Davies S. N. and A. O. Woodford. 1949. Geology of the northwestern Puente Hills, Los Angeles County, California. U. S. Geological Survey Oil And Gas Investigations Preliminary Map 83, scale 1:12,000.

Decker, Donald and Mary Decker. 2005. Laguna Niguel, Honoring the Past Fulfilling the Present. Royal Literary Publications, Laguna Niguel, California.

Demcak, Carol R. 1981. Fused Shale as Time Marker in Southern California: Review and Hypothesis. Unpublished Master's Thesis. Department of Anthropology, California State University, Long Beach.

———. 2000. Report of Archaeological Resources Survey for Rancho Mission Viejo Project 2000, Rancho Mission Viejo, South Orange County, California. Report prepared by ARMC for Rancho Mission Viejo, LLC.

———. 2002. Report of Archaeological Testing for Project 2000, Phase II-A, Rancho Mission Viejo, South Orange County, California. Report Prepared by ARMC for Rancho Mission Viejo, LLC. April 2002.

Drover, Christopher E., Henry C. Koerper, and Paul E. Langenwalter III. 1983. Early Holocene Adaptation on the Southern California Coast: A Summary Report of Investigations at the Irvine Site (CA-ORA-64), Newport Bay, Orange County, California. Pacific Coast Archaeological Society Quarterly 19 (3&4):1–84.

Drucker, Philip. 1937. Culture Element Distributions: V Southern California. Anthropological Records 1 (1):1–52.

Dudek & Associates, Inc. 2001. Spring Survey Report for the Aliso Creek Emergency Sewer and Park Improvements Project, Orange County, California. Prepared for the Aliso Water Management Agency and Moulton Niguel Water District. October.

Dumke, G. S. 1944. The Boom of the Eighties. Huntington Library, San Marino, California.

Duncan, D.A. and R.G. Woodmansee. 1975. Forecasting forage yield from precipitation in California's annual rangeland. J. Range Manage, 28:327-329.

East Bay Regional Park District, 1995. Trail Manual for the Maintenance and Operation of Trails in the East Bay Regional Park District.

Ed Almanza and Associates. 1992. Aliso and Wood Canyons Regional Park General Development Plan. Environmental Impact Report prepared for County of Orange Environmental Management Agency. 2 June 1992. Orange County, CA.

Edgington, W. J. 1974. Geology of the Dana Point Quadrangle, Orange County, California. California Division of Mines and Geology, Special Report 109, 31 p., map scale 1:12,000.

Ehlig, P. L. 1979. Miocene Stratigraphy and Depositional Environments of the San Onofre Area and Their Tectonic Significance, in Stewart, C. J., ed., A Guidebook to Miocene Lithofacies and Depositional Environments, Coastal Southern California and North-western Baja California, Pacific Section, Society of Economic Paleontologists and Mineralogists, published for the 1979 annual meeting of the Geological Society of America, pages 43-51.

Eisentraut, P. and J. Cooper. 2002. Final Report: Development of a Model Curation Program for Orange County's Archaeological and Paleontological Collections. Prepared

by California State University, Fullerton and submitted to the County of Orange PFRD/HPB

Eldridge G. H. and Ralph Arnold. 1907. Santa Clara Valley, Puente Hills, and Los Angeles Oil Districts, Southern California. U. S. Geological Survey, Bulletin 309, 226 pp., map scale 1:62,500.

Engelhardt, Zephyrin. 1998. San Luis Rey, the King of the Missions. Originally published 1921, James H. Barry Company, San Francisco. Facsimile reproduction. McNally and Loftin, Santa Barbara.

English, W.A. 1926. Geology and Oil Resources of the Puente Hills Region. USGS Bulletin 768. 110 p.

Erlandson, Jon M. 1994. Early Hunter-Gatherers of the California Coast. Plenum Press, New York.

Fife, D. L. 1974. Geology of the South Half of the El Toro Quadrangle, Orange County, California. California Division of Mines and Geology, Special Report 110, 27 pp., map scale 1:12,000.

Fife, D. L., J. A. Minch, P. J. Crampton. 1967. Late Jurassic Age of the Santiago Peak Volcanics, California. Geological Society of America Bulletin, Volume 78, pp. 299-304.

Firewise. Everyone's Responsibility Handbook. Accessed via the web on April 4, 2006. http://www.firewise.org/pubs/everyones_resp/orange_county.html

Fish Species of Special Concern in California, Southern Steelhead. California Department of Fish and Game, 1995.

Fish Species of Special Concern in California, Tidewater Goby. California Department of Fish and Game, 1995.

Fisher, R.N. et. al. 2000. Monitoring Reptile and Amphibians at Long-Term Biodiversity Monitoring Stations: Nature Reserve of Orange County. 12 August 2000. Prepared for Nature Reserve of Orange County by the U.S. Geological Survey.

Flink, Charles; Kristine Olka, and Robert M. Searns. 2001. Trails for the Twenty-First Century. Washington, D.C.: Rails to Trails Conservancy.

Fotheringham, CJ. 2006. Preliminary Observations of City of Laguna Beach Goat-mediated Fuel Modification Program and the Impacts to Aliso and Wood Canyons Wilderness Park and the NCCP Reserve California. 24, January.

Galvin, Paul. March 16, 2006. Personal communication with Art Homrighausen (LSA Associates).

Gardett, Peter H. 1972. Petroleum Exploration–Results and Significance, in P. K. Morton, ed., Geologic Guidebook to the Northern Peninsular Ranges, Orange and Riverside Counties, California. South Coast Geological Society, October.

Geofon and Zeiser. 1989. Preliminary Geotechnical/Geological Project Report, San Joaquin Hills Transportation Corridor, Orange County California. Prepared by Geofon Inc. and Zieser Geotechnical Inc. Geofon Project number 88-363.06, Geofon Document number 36306002.

Gifford, Eugene W. 1936. Californian Balanophagy. Essays in Anthropology Presented to A. L. Kroeber, pp. 87–98. Reprinted in 1971. The California Indians, A Source Book, edited by R. Heizer and M. Whipple, pp. 301–305. University of California Press, Berkeley and Los Angeles.

Grant, L. B., E. M. Gath, H. Cheng, R. L. Edwards, R. Munro, and G. L. Kennedy. 1999. Late Quaternary Uplift and Earthquake Potential of the San Joaquin Hills, Southern Los Angeles Basin, California. Geology, 27(11), pp. 1031–1034.

Grant IV, U. S. and H. R. Gale. 1931. Catalogue of the Marine Pliocene and Pleistocene Mollusca of California and Adjacent Regions. Memoirs of the San Diego Society of Natural History. 1:1-1034.

Gray, J. and D. Bramlet. 1992. Habitat Classification System: Natural Resources, Geographic Information System (GIS) Project. Prepared for County of Orange, Environmental Management Agency, Santa Ana, California.

Gudde, Erwin G.1998. California Place Names: The Origin and Etymology of Current Geographical Names. Fourth edition, revised and enlarged by William Bright. University of California Press, Berkeley and Los Angeles.

Gurevitch, Jessica, Scheiner, Samuel, and Gordon A. Fox. 2002. The Ecology of Plants. Sunderland, Massachusetts: Sinauer Associates, Inc.

Gutierrez, R. A. and R. J. Orsi ed., et al. 1998. Contested Eden: California Before the Gold Rush. University of California Press, Berkley, California.

Hall, Matt C. 1988. For the Record: Notes and Comments on "Obsidian Exchange in Prehistoric Orange County." Pacific Coast Archaeological Society Quarterly 24(4):34-48.

Hamlin, H. 1904. Water Resources of the Salinas Valley, California. U.S. Geological Survey Water-Supply Paper, 89:91.

Harmsworth Associates. 2006. Draft Baseline Biological Monitoring Report and Resource Plan for Silmod Conservation Easement. April.

Harrington, John P. 1934. A New Original Version of Boscana's Historical Account of the San Juan Capistrano Indians of Southwest California. Smithsonian Miscellaneous Collections 92 (4):1–62. Smithsonian Institution, Washington, D.C.

———. 1942. Culture Element Distributions: XIX Central California Coast. Anthropological Records 7:1.

———. 1978. Annotations. In Chinigchinich: A Revised and Annotated Version of Alfred Robinson's Translation of Father Geronimo Boscana's Historical Account of the Beliefs, Usages, Customs and Extravagancies of the Indians of this Mission San Juan Capistrano Called the Acagchemen Tribe [1846]. Edited by P. T. Hanna. Reprinted. Malki Museum Press, Banning California. Originally published 1933, Fine Arts Press, Santa Ana, California.

Heady, H.F. 1977. Valley grassland. Pages 491-514 in M.G. Barbour and J. Major, eds. Terrestrial vegetation of California. John Wiley and Sons, New York.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Grace Rensch. 1962. Historic Spots in California. Fourth printing revised by R. Teiser. Stanford University Press, Palo Alto, California.

Horton, J. S., and C. J. Kraebel. 1955. Development of vegetation after fire in the chamise chaparral of southern California. Ecology 36:244-262.

Howard, J.L. 1995. Conglomerates of the Upper Middle Eocene to Lower Miocene Sespe Formation along the Santa Ynez Fault–Implications for the Geologic History of the Eastern Santa Maria Basin Area, California. U.S. Geological Survey Bulletin 1995:H,I.

HRP Landesign. 1991. Aliso and Wood Canyons Regional Park General Development Plan. Prepared for the County of Orange Environmental Management Agency Parks and Recreation. January 1991.

Hudson, D. Travis. 1971. Proto-Gabrielino Patterns of Territorial Organization in Southern Coastal California. Pacific Coast Archaeological Society Quarterly 7(2):449–476.

International Mountain Bicycling Association. "Closing and Reclaiming Damaged Trails." Accessed November 2005 from the IMBA website: (http://www.imba.com/resources/trail_building/reclaiming_trail.html)

International Mountain Bicycling Association. Trail Building Basics. Accessed November 2005 from the IMBA website: www.imba.com/resources/trail_building/index.html

Irvine Valley College. The Geologic History of California (modified from "Orange County Geology – Teachers Guide," by Carol J. Stadum, Chapman College for the Orange County Department of Education). Accessed via the web on April 5, 2006. (http://www.ivc.edu/geology/ocgeo.aspx)

Jaeger, Edmund C., and Arthur C. Smith. 1966. Introduction to the Natural History of Southern California. University of California Press, Berkeley.

Jefferson, G. T. 1991a. A Catalogue of Late Quaternary Vertebrates from California: Part One. Non-marine Lower Vertebrate and Avian Taxa. Natural History Museum of Los Angeles County Technical Reports Number 5, Los Angeles.

———. 1991b. A Catalogue of Late Quaternary Vertebrates from California: Part Two. Mammals. Natural History Museum of Los Angeles County Technical Reports Number 7, Los Angeles.

———. 1987. A Catalogue of Rancholabrean Vertebrate Taxa from Localities in the United States, Canada and Mexico, West of the Rocky Mountains. Unpublished Manuscript, 213pp.

John Day Fossil Beds National Park. 2006. Accessed via the web on April 17, 2009. (www.nps.gov/joda/pbclarno.htm.)

Johnson, John R., Dinah J. Crawford, and Stephen O'Neil. 1998. The Ethnohistoric Basis for Cultural Affiliation in the Marine Corps Base Camp Pendleton Area: Contributions to Luiseño and Juaneño Ethnohistory Based on Mission Register Research. Science Applications International Corporation. Ms. on file, U. S. Army Corps of Engineers, Los Angeles District, and at Natural Resources Office, AC/S Environmental Security, MCB Camp Pendleton, California.

Johnston, Bernice E. 1962. California's Gabrielino Indians. Frederick Webb Hodge Anniversary Fund Publication No. 8. Southwest Museum, Los Angeles.

Jones, C. S. 1991. Archaeological Monitoring, Recovery and Analysis of Buried Deposits Encountered on Contract 1486, South County Pipeline Project, South Orange County, California. ARMC. Submitted to Santa Margarita Water District.

Jones and Stokes Associated, Inc. 1993. Methods used to survey the vegetation of Orange County Parks and Open Space Areas and The Irvine Company Property. Prepared for County of Orange, Environmental Management Agency, Santa Ana, California.

Kew, W.S.W. 1923. Geologic Formation of a Part of Southern California and Their Correlation. American Association of Petroleum Geologists Bulletin, 7(4):411-420.

Klemme, Daniel N. and Donald L. Fife. 1973. Geology of the Upper Aliso Creek Area, in M.S. Woyski, G. A. Miller, D. N. Klemme, and L. E. Redwine, eds., Guidebook to the Tertiary Geology of Eastern Orange and Los Angeles Counties, California. South Coast Geological Society, October 6.

Koerper, Henry C. 1981. Prehistoric Subsistence and Settlement in the Newport Bay Area and Environs, Orange County, California. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Riverside.

Koerper, Henry C., and Christopher E. Drover. 1983. Chronology Building for Coastal Orange County: The Case from CA-ORA-119-A. Pacific Coast Archaeological Society Quarterly 19 (2):1–34.

Kroeber, Alfred L. 1908. A Mission Record of the California Indians. University of California Publications in American Archaeology and Ethnology 8 (1):1–27. Reprinted. Coyote Press, Salinas, California.

———. 1925. Handbook of the Indians of California. Bureau of American Ethnology Bulletin, No. 78. Washington, D.C.: Smithsonian Institution. Reprinted in 1976. Dover Publications, New York.

Lander, E. B. 2003. Eastern Transportation Corridor Paleontologic Resource Impact Mitigation Program Final Technical Report of Results and Findings, Part 1. Prepared for the Foothill/Eastern Transportation Corridor Agency by Paleo Environmental Associates, Inc., August.

Lander, E. B., Chambers Group, Inc. 1994. Paleontologic Resource Impact Mitigation Program Final Report, Santiago Canyon Landfill Southeast and Southwest Borrows Orange County, California - July 1991 to April 1994. Prepared for the County of Orange Integrated Waste Management Department.

Lang, H. R. 1977. Late Cretaceous Biostratigraphy of the Southeastern Los Angeles Basin. California Division of Oil and Gas, Report number TR20.

Larson, E. S. 1951. Crystalline Rocks of the Corona, Elsinore, and San Luis Rey Quadrangles, Southern California, in Crystaline Rocks of Southwestern California. California Division of Mines and Geology, Bulletin 170, Chapter 7.

Liebeck, Judy. 1990. Irvine: A History of Innovation and Growth. Pioneer Publications, Houston.

LSA Associates, Inc. 2003. Habitat Restoration and Enhancement Plan. Report prepared for Natural Reserve of Orange County. August 2003. Orange County, California.

———. 2004. Town of Danville Townwide Trails Master Plan.

———. 2006a. Laguna Coast Trail Draft 401 Permit. July 31.

———. 2006b. Laguna Coast Trail Draft 404 Permit. July 31.

———. 2006c. Laguna Coast Trail Draft 1602 Permit. July 31.

———. 2006d. Laguna Canyon Multi-Use Trail Initial Study/Mitigated Negative Declaration. July.

Lowman, Hubert A. 1993. The Old Spanish Missions of California. Edited by Martha H. Lowman. Lawson Mardon Group Publishers.

Maloney, Thomas, Supervising Park Ranger, OCRDMD – OC Parks. Former ranger in charge from 1994-2000.

Marin Municipal Water District, July 2005. Mt. Tamalpais Watershed Road and Trail Management Plan. Accessed November 2005: http://www.marinwater.org/documents/RTMP_plan.pdf

Marsh, Karlin G., Fred Roberts Jr., John Lubina, and Gordon Marsh. 1983. Laguna Beach Biological Resources Inventory.

Mason, Roger D., Nancy A. Whitney-Desautels, and Mark L. Peterson. 1987. Test Plan for National Register Evaluation of Archaeological Sites on the Coyote Canyon Sanitary Landfill Property, Orange County, California. Scientific Resource Surveys (SRS). Copies Available from Orange County Integrated Waste Management Department.

Mayer, Kenneth E. and W. F. Laudenslayer, Jr. 1988. A Guide to Wildlife Habitats of California. State of California, Resources Agency, Department of Fish and Game. Sacramento, CA. 166 pp.

McCawley, William. 1995. Ethnohistoric Report. In Results of Archaeological Significance Testing at Site CA-SDI-10156/12599/H, MCAS Camp Pendleton, San Diego County, California, by I. Strudwick et al., Volume 2. LSA Associates, Inc. Ms. on file, MCB Camp Pendleton, Natural Resources Office and at the South Coastal Archaeological Information Center, San Diego State University, San Diego, California.

———. 1996. The First Angelinos: The Gabrielino Indians of Los Angeles. Malki Museum Press and Ballena Press, Banning and Novato.

McCulloh, T. H., L. A. Beyer, and R. J. Enrico. 2000. Paleogene Strata of the Eastern Los Angeles Basin, California: Paleogeography and Constraints on Neogene Structural Evolution. Geological Society of America Bulletin, 112(7):1155-1178.

McGroarty, John S. 1911. California, Its History and Romance. Grafton Publishing Company, Los Angeles.

Meadows, Don. 1966. Historic Place Names in Orange County. Balboa Island: California: Paisano Press, Inc.

Merriam, C. Hart. 1968. Village Names in Twelve California Mission Records. University of California Archaeological Survey Report 74.

MHA Environmental Consulting Inc., 2001. San Mateo County Trails Plan. Accessed November 2005:

http://www.eparks.net/vgn/images/portal/cit_609/12503872399%20Final%20Trails%20Plan.pdf

Miller, R. V. and S. S. Tan. 1976. Geology and Engineering Aspects of the South Half of the Tustin Quadrangle, Orange County, California. California Division of Mines And Geology, Special Report 126.

Miller, W. E. 1971. Pleistocene Vertebrates of the Los Angeles Basin and Vicinity (Exclusive of Rancho La Brea). Los Angeles County Museum of Natural History Bulletin, Science: No. 10.

Moratto, Michael J. 1984. California Archaeology. Academic Press, San Diego.

Morris, William J. 1973. A Review of Pacific Coast Hadrosaurs. Journal of Paleontology, 47:551-561.

Morton, P. K. 1970. Preliminary Geologic Map of the NE 1/4 and the NW 1/4 Ca□ada Gobernardora Quadrangle, Orange County California. California Division of Mines and Geology, Preliminary Report 10, Map Scale 1:12,000.

———. 1973. Geology and Engineering Aspects of the South Half of the Ca□ada Gobernardora Quadrangle, Orange County California. California Division of Mines and Geology, Special Report 111.

Morton, P. K., ed. 1972. Geologic Guidebook to the Northern Peninsular Ranges, Orange and Riverside Counties, California. South Coast Geological Society.

Morton, P.K., R.V. Miller, and D. L. Fife. 1973. Preliminary Geo-environmental Maps of Orange County, California. California Division of Mines And Geology, Preliminary Report 15.

Morton, P. K., R. V. Miller, and J. R. Evans. 1976. Environmental Geology of Orange County, California. California Division of Mines and Geology, Open-file Report79-8LA.

Morton, P. K., W. J. Edgington, and D. L. Fife. 1974. Geology and Engineering Geologic Aspects of the San Juan Capistrano Quadrangle, Orange County, California. California Division of Mines and Geology Special Report 112.

National Park Service, August 1996. North Country National Scenic Trail Handbook for Trail Design, Construction and Maintenance. Accessed November 2005: http://www.nps.gov/noco/pphtml/documents.html

The Nature Conservancy. 2000. The Five-S Framework for Site Conservation: A Practitioner's Handbook for Site Conservation Planning and Measuring Conservation Success. June.

Norris, R.M. and R.W. Webb. 1976. Geology of California. John Wiley and Sons, Inc., Santa Barbara.

North Fork Associates, September 2003. North Fork American River Trail Plan.

O'Neil, Stephen. 1988. Their Mark Upon the Land: Native American Place Names in Orange County and Adjacent Areas. In The Natural and Social Sciences of Orange County, edited by H. Koerper, pp. 106–122. Natural History Foundation of Orange County.

O'Neil, Stephen, and Nancy H. Evans. 1980. Notes on Historical Juaneño Villages and Geographical Features. Journal of California and Great Basin Anthropology 2 (2):226–232.

Orange County Fire Authority. 2005. Wildland Fire Management Plan.

Orange County Fire Authority Planning and Development Services Section. 2004. Fuel Modification Plans and Maintenance Program. July 9.

Orange County Natural History Museum. 2003-2004. Mission Statement. Accessed via the web on April 17, 2006. (http://ocnhm.com/)

Orange County Planning and Development Services Department Planning GIS Section. 2002. Short-Term Fire Management Plan. Resource Sensitive Areas Fire Compartment 1: Aliso-Wood Canyon. Coastal NCCP/HCD Subregion. 21 October. Orange County, California.

Orange County Resources and Development Management Department. 2004. Orange County General Plan. April 2004. Orange County, California.

Orange County Resources and Development Management Department GIS Mapping Unit. 2005. Aliso and Wood Canyons Wilderness Park California Native Species- 2005 Survey. 16 November. Orange County, California.

———. 2005. Aliso and Wood Canyons Wilderness Park Landslide Areas. 23 August. Orange County, California.

———. 2006. Aliso and Wood Canyons Wilderness Park Public Access. 22 March. Orange County, California.

———. 2002. Aliso and Wood Canyons Wilderness Park Sensitive Riparian Bird Species. 11 February. Orange County, California.

———. 2005. Aliso and Wood Canyons Wilderness Park Sensitive Plant Species. 24 May. Orange County, California.

———. 2005. Aliso and Wood Canyons Wilderness Park 2003 Trail Status (map). 9 September. Orange County, California.

———. 2005. NDDB Plant Listings within Aliso & Wood Canyons Wilderness Park. 24 June. Orange County, California.

———. 2005. Tracts 13297, 13367, 13368, 15004, 15006, 15007, 15008 & 15425 and Surrounding Open Space Easements. 29 August. Orange County, California.

———. 2005. Tracts 14974, 15307, 15424, 15425, 15426, 15752, 15761 & 15963 and Surrounding Open Space Easements. 29 August. Orange County, California.

———. 2005. Tracts 14974, 15307, 15424, 15425, 15426, 15752, 15761 & 15963 and Surrounding Open Space Easements. 29 August. Orange County, California.

———. 2005. Tracts 13936, 15649, 15715 & 15761and Surrounding Open Space Easements. 29 August. Orange County, California.

———. 2005. Tracts 7884, 9455, 13292, 15682, 15683 & PM 203/42 and Surrounding Open Space Easements. 29 August. Orange County, California.

———. 2005. Fuel Modification Easements. 29 August. Orange County, California.

———. 2006. Proposed Fuel Breaks Aliso and Wood Canyons Wilderness Park. 4 January. Orange County, California.

———. 2007. Fuel Modification Zones 5 & 6. 1 July. Orange County, California.

———. 2007. NCCP Fuel Modification Zone. 30 July. Orange County, California.

Orange County Transportation Authority website. 2006. Accessed via the web on March 22, 2006. (http://www.octa.net/)

Oxendine, Joan. 1983. The Luiseño Village During the Late Prehistoric Era. Unpublished Ph.D. Dissertation, University of California, Riverside.

Paris Mountain State Park Trail Management Plan. Accessed November 2005: http://www/pmspf.org/trail_plan.htm.

PLAE, Inc. 1993. A Design Guide: Universal Access to Outdoor Recreation.

Point Reyes National Seashore and the North District of Golden Gate National Recreation Area National Park Service, November 2003. Trail Inventory and Condition Assessment with Recommendations. Accessed November 2005: http://www.nps.gov/pore/home_mngmntdocs_trailinventory2003.htm

Popenoe, W.P. 1937. Upper Cretaceous Mollusks Southern California. Journal of Paleontology, 379-402.

———. 1942. Upper Cretaceous Formations and Faunas of Southern California. American Association of Petroleum Geologists Bulletin, Volume 26, pp. 162-187.

Popenoe, W. P., R. W. Imlay, and M. A. Murphy. 1960. Correlation of the Cretaceous Formations of the Pacific Coast. Geological Society of America Bulletin, 71(10):1491-1540.

Portolá, Gaspar de. 1909. Diary of Gaspar de Portolá during the California Expedition 1769–1770. Edited by Donald Eugene Smith and Frederick J. Teggert. Publications of the Academy of Pacific Coast History 1(3).

Pourade, Richard L. 1969. Historic Ranchos of San Diego. Text by C. Moyer. Union Tribune Publishing Co., San Diego.

Prothero, D. R. 2001. Magnetic Stritigraphy of the Middle Eocene Santiago Formatio, San Diego and Orange Counties, California. In Prothero, D. R., ed 2001, Magnetic Stratigraphy of the Pacific Coast Cenozoic. Pacific Section SEPM (Society for Seddimentary Geoogy), Book 91.

Prothero, D., T. Tierney, C.C. Swisher, and J.B. Swinehart. 1991. Magnetostratigraphy and Geochronology of the Late Oligocene Gering Formation, Nebraska: Implications for the Arikareean, Abstract, Journal of Vertebrate Paleontology, 11(3):51A.

Raschke, R. R. 1978. Paleontological Resources of the Coyote Canyon Landfill Area, Phase I, Initial Assessment of the Project Area. Leighton and Associates, Consultant Report.

———. 1984. Early and Middle Miocene Vertebrates from the Santa Ana Mountains, in The Natural Sciences of Orange County, Butler B., Gant J., Stadum, C. J., eds., Memoirs of the Natural History Foundation of Orange County, 1:61-67.

———. 1988. Final Report on Paleontological Monitoring for the Bee Canyon Access Road, Irvine, California. Prepared by RMW Paleo Associates, INC. Prepared for the County of Orange Integrated Waste Management Department.

———. 1997. Paleontological Monitoring Report Frank R. Bowerman Landfill, Orange County California. Prepared by RMW Paleo Associates, INC. Prepared for the County of Orange Integrated Waste Management Department. RWM Project Number 91-1084.

Rathke, David M. and Melvin J. Baughman, 2005. “Recreational Trail Design and Construction” from the University of Minnesota website. Accessed November 2005: http://www.extension.umn.edu/distribution/naturalresources/DD6371.html

Reddy, S. N. 1998. Prehistoric Landscapes in Coastal Southern California: Archaeological Survey on Camp Pendleton, San Diego County, California. Prepared by ASM Affiliates for the U. S. Army Corps of Engineers.

Reid, Hugo. 1852. Los Angeles County Indians. Los Angeles Star 1 (41)–2 (11), February 21–July 24. Reprinted from The Indians of Los Angeles County: Hugo Reid's Letters of 1852. Edited and annotated by R. Heizer. Los Angeles: Southwest Museum.

Remington, Stephanie. March 30, 2006. Personal communication.

The Resources Agency. Department of Parks and Recreation. 1998. Trails Handbook. Sacramento: California State Parks.

Reynolds, R. E. 1999. Paleontological Mitigation Monitoring for The Flint Ridge Development (Galstian Tract 14285) in Chino Hills, California. Report prepared by LSA Associates Inc for Richmond American Homes.

Reynolds, R. E., J. Reynolds, M. A. Roeder and R. W. Huddleston. 1985. Paleontologic Salvage, Robert O. Townsend Junior High School, Chino, California. San Bernardino County Museum., 273 pp.

Rivers, Betty. 1991. The Pendleton Coast District: Ethnographic and Historical Background. State of California Department of Parks and Recreation, Sacramento. Ms. on file at LSA Associates, Inc., Irvine, California.

R.J. Meade Consulting, Inc. 1996. Central and Coastal Subregion Natural Community Conservation Plan/ Habitat Conservation Plan. Parts I&II: NCCP/HCP and Implementation Agreement. Part III: Joint Programmatic EIR/EIS. Map Section. Report prepared for County of Orange Environmental Management Agency and U.S. Fish and Wildlife Service/ California Department of Fish and Game. 17 July. Orange County, CA.

Robinson, W. W. 1979. Land in California. Berkeley and Los Angeles: University of California Press.

Rosenthal, E. Jane, Patricia Jertberg, Steven Williams, and Susan Colby. 1991. CA-ORA-236, Coyote Canyon Cave Data Recovery Investigations, Coyote Canyon Sanitary Landfill, Orange County, California. LSA Associates, Inc. Ms. on file, South Central Coastal Archaeological Information Center, California State University, Fullerton.

Salt Lake County. Parks and Recreation Division. 2002. Northern Bonneville Shoreline Trail Master Plan.

Sample, Lloyd. 2006. Personal Communication.

Santa Clara County, November 1995. Final Countywide Trails Master Plan.

Santa Clara County Interjurisdictional Trails Committee, 1999. Uniform Interjurisdictional Trail Design, Use, and Management Guidelines. April 15.

Savage, D. E. and D. E. Russell. 1983. Mammalian Paleofaunas of the World. Benjamin/Cummings, Menlo Park, CA.

Savage, D.E., T. Downs, and O. J. Poe. 1954. Cenozoic Land Life of Southern California, in Geology of Southern California: California Division of Mines Bulletin 170, 1:43-58.

Schad, Jerry. 1988. Afoot & Afield in Orange County. Berkeley, California: Wilderness Press.

Schoellhamer, J. E., D. M. Kinney, R. F. Yerkes, and J. G. Vedder. 1954. Geologic Map of the Northern Santa Ana Mountains, Orange and Riverside Counties, California. U. S. Geological Survey, Oil and Gas Investigations Map OM-154, Map Scale 1:24,000.

Schoellhamer J. E., J. G. Vedder, R. F. Yerkes, and D. M. Kinney. 1980. Geology of the Northern Santa Ana Mountains, California, U. S. Geologic Survey, Professional Paper 420-D.

Sharp, Robert P. 1976. Geology: Field Guide to Southern California, 2nd edition. Dubuque, Iowa: Kendall/Hunt Publishing Company.

Sharp, R. P. and Allen F. Glazner. 1993. Geology Underfoot in Southern California. Missoula, Montana: Mountain Press Publishing Company.

Shumway, Burgess McK. 1988. California Ranchos: Patented Private Land Grants Listed by County. Edited by Michael and Mary Burgess. Stokvis Studies in Historical Chronology and Thought, No. 11. The Borgo Press, San Bernardino.

Silberling, N. W., J. E. Schoellhamer, C. H. Gray, and R. W. Imlay. 1961. Upper Jurassic Fossils from the Bedford Canyon Formation, Southern California. American Association of Petroleum Geologists Bulletin, 45(10):1746-1748.

Simons, LI & Assoc.1999. Aliso Creek Environmental Restoration Study Design Criteria and Guidelines for Aliso Creek Interim Improvements. County of Orange, Public Facilities and Resources Department.

Sleeper, Jim. 1969. The Many Mansions of José Sepúlveda. Pacific Coast Archaeological Society Quarterly 5 (3):1–38.

———. 1988. Rancho Santa Margarita. In A Hundred Years of Yesterdays, edited by E. Cramer, K. Dixon, D. Marsh, P. Brigandi, and C. Blamer, pp. 159–163. Orange County Register, Santa Ana, California.

Smith, Alan G., David G. Smith, and Brian M. Funnell. 1995. Atlas of Mesozoic and Cenozoic Coastlines. Cambridge University Press.

Smith, P. B. 1960. Foraminifera of the Monterey Shale and Puente Formation, Santa Ana Mountains and San Juan Capistrano Area, California. U.S. Geologic Survey, Professional Paper 294-M, pp. 463-495.

Smith, Sarah Bixby. 1931. Adobe Days. Reprinted. Lincoln: University of Nebraska Press.

Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines.

———. 1995. News Bulletin, 163:22–27

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

Stadum, Carol J. 1984. The Fossils of the Niguel Formation of Southeastern Orange County in Betty Butler, Joanne Gant, and Carol J. Stadum, eds., The Natural Sciences of Orange County, Memoirs of the Natural History Foundation of Orange County, Volume 1, January 1.

Stebbins, Robert C. 2003. A Field Guide to Western Reptiles and Amphibians, 3rd edition. Boston, Massachusetts: Houghton Mifflin.

Stewart, C. J., ed. 1978. A Guidebook to Miocene Lithofacies and Depositional Environments, Coastal Southern California and Northwestern Baja California, Pacific Section, Society of Economic Paleontologists and Mineralogists, published for the 1979 Annual Meeting of the Geological Society of America.

Strudwick, Ivan H. 1996. Prehistoric and Early Historic Occupation of Topamai, CA-SDI-10156/12599/H, the Santa Margarita Ranch House. LSA Associates, Inc. Paper presented at the Annual Meeting of the Society for California Archaeology, Bakersfield, California.

Strudwick, Ivan H., William McCawley, Bradley L. Sturm, and Steven Conkling. 1995. Volume I, Results of Archaeological Significance Testing at Site CA-SDI-10156/12599/H, MCAS Camp Pendleton, San Diego County, California. LSA Associates, Inc. Ms. on file, South Coastal Information Center, San Diego State University, San Diego, California, and at the Natural Resources Office, AC/S Environmental Security, MCB Camp Pendleton, California.

———. 1996. Results of Archaeological Testing in the Northeast Portion of CA-ORA-196/H for the Michelson Drive Bridge Widening, San Diego Creek, California. LSA Associates, Inc. Ms. on file, South Central Coastal Archaeological Information Center, California State University, Fullerton.

Sundberg, F.A. 1979. Late Cretaceous Paleoecology of the Holz Shale, Orange County, California. Journal of Paleontology, 54:804-857.

———. 1984. Paleontological Grading Monitoring Report on TT 10896, 11217, and 11281, Colonias de Capistrano, Orange County, California. SRS report for Colonias de Capistrano Developments, Inc.

———. 1991. Paleontologic Monitoring Report for the Foothill Ranch Project Tentative Tract 117525 and 13419, Orange County, California. Scientific Resources Surveys, Inc., SRS Project numbers 845, 853, 929, and 930.

Sundberg, F. and Warter, J. K. 1984. Paleontological Grading Monitoring Report on Wastewater Treatment Plant and Associated Dams, Robinson Ranch, Orange County, California. Unpublished Consultant's report: Scientific Resource Surveys, Inc., Huntington Beach, California, 69 pp.

Swift, Camm, Jack Nelson, Carolyn Maslow, and Theodore Stein. 1989. Biology and Distribution of the Tidewater Goby, Eucyclogobius newberryi (Pisces: Gobiidae) of California. Contributions in Science 404:1-19.

Tan, S.S., and W.J. Edgington. 1976. Geology and Engineering Aspects of the Laguna Beach Quadrangle, Orange County, California. California Division of Mines and Geology, Special Report 127.

Tetratech, Inc. 2007. Aliso Creek Concept Plan Report. Report prepared for the County of Orange. Orange County, California.

Tieje, A.J. 1926. The Pliocene and Pleistocene History of the Baldwin Hills, Los Angeles County, California. Bulletin of American Association of Petroleum Geologists, 10:502-512.

Trump, Matthew. 2004. Wikipedia: en.wikipedia.org/wiki/Image:Wpdms_shdrlfi020l_santa_ana_mountains.jpg.

U.S. Army Corps of Engineers, Los Angeles District. 2001. Aliso Creek Watershed Management Plan. September 2001.

U.S. Army Corps of Engineers, Los Angeles District. 2001. Aliso Creek Watershed Management Study Orange County, California, Draft Watershed Management Report Feasiblity Phase. September 2001.

U.S. Department of Transportation Federal Highway Administration. 2004. Trail Construction and Maintenance Handbook. Accessed November 2005: http://www.fhwa.dot.gov/environment/fspubs/00232839/page12.htm

U.S. Fish and Wildlife Service. 2003. Recovery Plan for the Quino Checkerspot Butterfly (Euphydryas editha quino). Portland, Oregon. X+179 pp.

U.S. Geological Survey. 2006. San Joaquin Hills Bobcat Study, Orange County Quarterly Report. Prepared for The Nature Conservancy. April 2006. Sacramento, California.

Vail Speck Taylor, Inc. 1991. Aliso and Wood Canyons Regional Park Resource Management Plan. Report prepared for Harbors, Beaches and Parks. February 1991. Orange County, California.

Vedder, J. G. 1970. Summary of the San Joaquin Hills, In Geologic Guidebook, Southeastern Rim of the Los Angeles Basin, Orange County, California, Headlee, L. A., ed., Society of Economic Paleontologists and Mineralogists and the Society of Exploration Geophysicists, p. 2

Vedder J. G., R. F. Yerkes, and J. E. Schoellhamer. 1957. Geologic Map of the San Joaquin Hills Area, San Juan Capistrano area, Orange County, California, U. S. Geologic Survey Oil and Gas Investigation Map OM-193, Map Scale 1:24,000.

Vogel, Charles, 1982. Equestrian Trails Manual. Sylmar: Equestrian Trails, Inc.

Watts, W.L. 1897. Oil and Gas Yielding Formations of Los Angeles, Ventura and Santa Barbara Counties. California State Mining Bureau Bulletin Number 11, page 94.

Waid, Beverly Henrickson.1988. The Picos in California. In R. Slayton and L. Estes, editors, Proceedings of the Conference of Orange County History. Chapman College, Orange, California.

Wallace, William J. 1955. Suggested Chronology for Southern California Coastal Archaeology. Southwestern Journal of Anthropology 11 (3). Reprinted in The California Indians: A Source Book, edited by R. Heizer and M. Whipple, pp. 186–201. University of California Press, Berkeley. Second Edition, 1971.

———. 1978. Post Pleistocene Archaeology 9000–2000 B.C. In California, edited by R. Heizer, pp. 25–36. Handbook of North American Indians, Vol. 8, W. Sturtevant, general editor. Smithsonian Institution, Washington, D. C.

Warren, Claude N. 1968. Cultural Tradition and Ecological Adaptation on the Southern California Coast. Eastern New Mexico University Contributions in Anthropology 1 (3):1–4.

Webster, L. 1981. Composition of native grasslands in the San Joaquin Valley, California. Madrono 28:231-241.

Westec Services, Inc. 1982. Cultural and Paleontological Inventory of the Ford DIVAD Test Facilities Site. Prepared by Boyle Engineering Coorporation

White, Raymond C. 1963. Luiseño Social Organization. Berkeley and Los Angeles: University of California Publications in American Archaeology and Ethnology 48(2):91–194.

Woodford, A. O. 1925. The San Onofre Breccia: Its Nature and Origin. University of California Publications, Department of Geological Sciences, 15(7):159-280.

Woodring, W. P., M. N. Bramlette, and W. S. W. Kew. 1946. Geology and Paleontology of the Palos Verdes Hills, California. U.S. Geological Survey Professional Paper 207, p 145.

Woodring, W. P. and W. P. Popenoe. 1945. Paleocene and Eocene Stratigraphy of the Northwestern Santa Ana Mountains, Orange County, California. U. S. Geological Survey Oil and Gas Investigations, Preliminary Chart 12.

Yerkes R. F. 1957. Volcanic Rocks of the El Modeno Area, Orange County, California. U. S. Geological Survey Professional Paper 274-L.

———. 1972. Geology and Oil Resources of the Western Puente Hills Area, Southern California. U. S. Geologic Survey Professional Paper-420C.

Yerkes R. F., T. H. McCulloh, J. E. Schoellhamer, and J. G. Vedder. 1965. Geology of the Los Angeles Basin, California–An Introduction. U. S. Geological Survey, Professional Paper 420-A.

Young, J. A., R. A. Evans, and J. Major. 1977. Sagebrush steppe. Pages 763-796 In M.G. Barbour and J. Major, eds. Terrestrial vegetation of California. John Wiley & Sons, New York.