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## **REGIONAL PARK TRAIL GUIDELINES**

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Prepared by:

County of San Diego

- Parks and Recreation Department

City of Chula Vista

- Planning Department
- Landscape Architecture Division / Office of Building & Park Construction

City of San Diego

- Community and Economic Development Department
- Parks and Recreation Department

Otay Valley Regional Park Citizens Advisory Committee (CAC)

- Trails Subcommittee (TSC)

DeLorenzo Incorporated



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# Executive Summary

## Trail System

The OVRP Trail Guidelines establishes guidelines for development of a multi-use trail system from the San Diego Bay, along the Otay River and around the perimeter of Otay Lake Reservoirs that will:

- provide connections to existing and proposed park and recreation facilities,
- create links to adjacent trail systems, and
- avoid adverse effects on environmentally and culturally sensitive areas.

## Trail Plan

This document sets criteria for alignment of a future trail system on both sides of the Otay River that will be comprised of three components:

- a regional trail corridor that provides a looping trail system through the Otay River Valley and around the Reservoirs,
- connector trails that provide access to recreational areas, overlooks, and adjacent trail systems, and
- narrow spur trails that provide access from the regional trail corridor to points of natural, historic or cultural interest.

## Trail Guidelines

This document also contains guidelines to aide in selection of the trail route and implementation of the trail system. Guidelines fall into four categories:

1. *Trail alignment guidelines* reflect the goal of the Concept Plan - to develop a continuous trail that highlights a wide variety of recreational and interpretive experiences.
2. *Financial guidelines* are designed to minimize financial impacts to the public.
3. *Development guidelines* underscore the importance of creating a trail which is accessible to the widest possible range of trail users and which is designed to respect the natural or cultural environments through which it passes. Guidelines for environmental and cultural resources are compatible with Federal, State and local environmental regulations.
4. *Management guidelines* define a structure for successful oversight and maintenance of the trail system.

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## Section I: Introduction

As shown in Figure 1, below, the Otay Valley Regional Park (OVRP) is located in the southern portion of San Diego County, four miles north of the United States/Mexico International Border. It is a 13 mile linear park with more than 8,000 acres. The Park crosses three jurisdictions: City of San Diego, City of Chula Vista and the County of San Diego. It encompasses the core of Otay River Valley from South San Diego Bay to the Otay Lake Reservoirs. It is under private, semi-private and public land ownership. Existing land uses within the Valley include agriculture, surface mining and recreation. Surrounding the OVRP is an urbanized area with a variety of residential, commercial, and industrial land uses. The OVRP provides significant open space and recreational opportunities for citizens of the region.

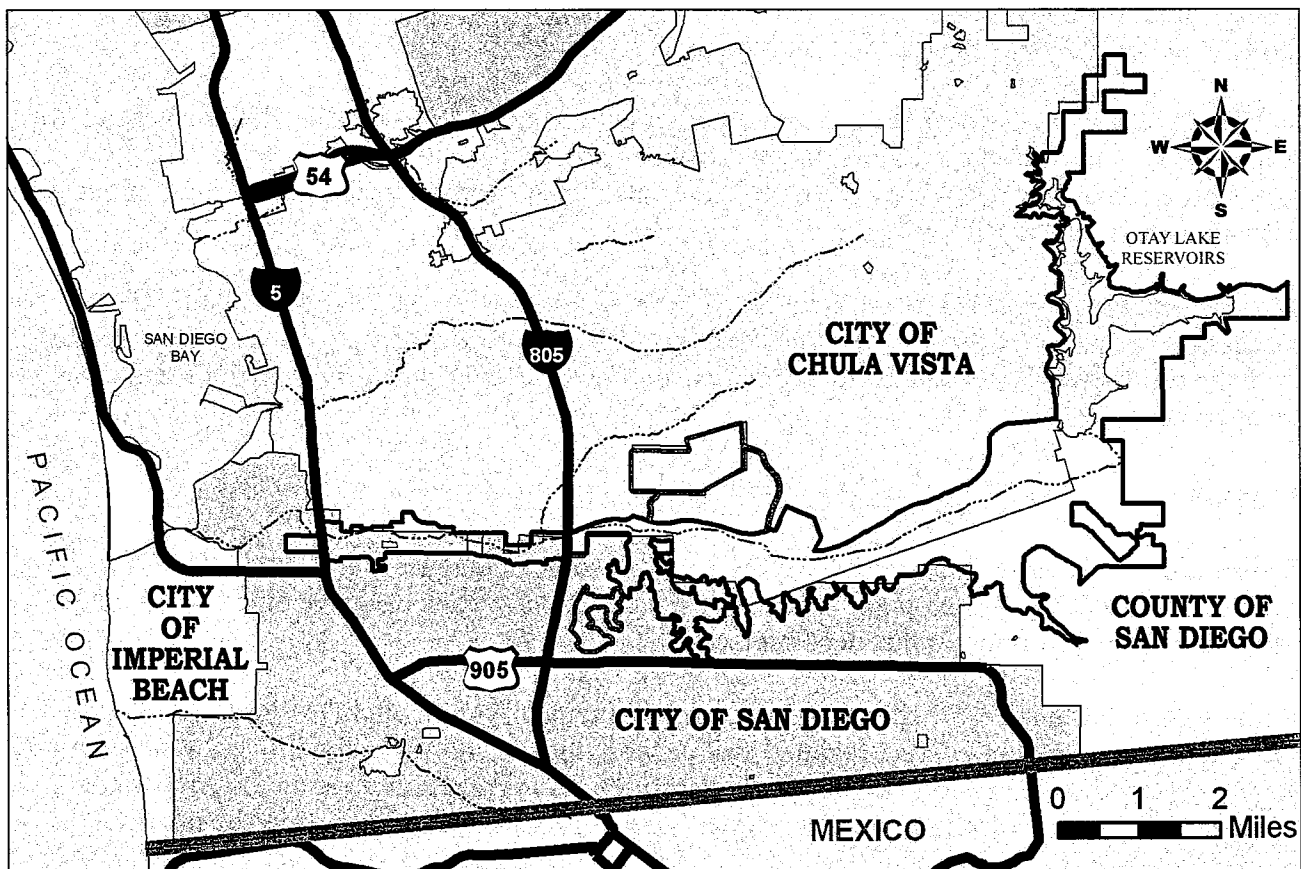


Figure 1: Location Map

## **Planning Background**

Like the other river parks of the region, the Otay Valley area has experienced an increase in development. This has resulted in reduction of open space and destruction of natural and cultural resources. To protect and preserve the Otay River Valley, a multi-jurisdictional planning effort was formed between the City of Chula Vista, the City of San Diego and the County of San Diego. A Joint Exercise of Powers Agreement (JEPA) was implemented to plan and acquire property for the Regional Park.

The JEPA recognizes a three-member policy committee (PC), consisting of one elected official from each participating jurisdiction. To advise the PC on matters related to planning, the JEPA established a thirty-member Citizens Advisory Committee (CAC) comprised of ten individuals from each jurisdiction representing community organizations, property owners, and special interest groups. In order to coordinate and implement this planning effort, staff members from each jurisdiction were appointed to a Joint Staff team.

In 2001 the OVRP Concept Plan<sup>1</sup> was approved by the three jurisdictions. The Plan identified three major goals: 1) protect sensitive cultural and natural resources; 2) provide a mix of active and passive recreational opportunities, including trails, and; 3) provide opportunities for environmental education and/or interpretive programs.

The focus of this proposal is on the development of the trail system in the Regional Park. The success of this system depends on continued support from the participating jurisdictions as well as from the residents, who understand the importance of experiencing nature through trails and open space preservation.

## **Purpose**

Trails offer a wide variety of outdoor experiences for people of all ages and abilities. Trails improve quality of life and increase property value. If designed properly trails can have minimal impact on natural and cultural resources that need protection.

A trail system for the OVRP will not only be a self-contained system within the Regional Park but will be an integral part of a larger regional trail network that extends from the Silver Strand through the Otay Valley, ultimately connecting to the California Riding and Hiking at its eastern boundary. Other existing or proposed trail systems, which are connected to and/or influenced by the OVRP, include the Chula Vista Greenbelt, Sweetwater River Park, Jamul/ Dulzura Trail system, Eastlake Community Trails, and the Otay Ranch Neighborhood Trails.

This document will provide guidelines for development, management and maintenance of the OVRP trail system. It strives to meet trail goals and objectives as established by surrounding communities. These design guidelines are consistent with other planning efforts to provide recreational opportunities while protecting the natural and cultural elements within the park. A list of related planning efforts can be found in Appendix 6.

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<sup>1</sup> See Appendix 2 for the Concept Plan.



This document divides the park into five segments<sup>2</sup> in order to clearly illustrate the geographic and demographic complexities within and around the park. The five segments are:

- South San Diego Bay to Interstate 5,
- Interstate 5 to Interstate 805,
- Interstate 805 to Heritage Road,
- Heritage Road to Lower Otay Lake Reservoir, and
- Otay Lake Reservoirs Vicinity.

The trail system should be aligned and constructed in phases as circumstances permit using the following objectives:

1. Provide a system of safe “non-motorized” trails that meets the needs of hikers, bicyclists, and equestrians.
2. Provide connections with important sites, such as parks, transit facilities, access points, adjacent trail systems, and points of interest.
3. Encourage trail routes that highlight the Otay River Valley’s recreational and educational resources, including natural, scenic, cultural, and historic resources without compromising sensitive resources.

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<sup>2</sup> See Figure 2.



## **Section II: Background Information**

### **Existing Conditions**

Existing conditions in the OVRP that may influence trail planning, design, implementation and/or management issues are identified in this section.

### **Topography**

Near the river/bay interface in the western portion of the Park several salt ponds and fresh water ponds have been carved out of the South San Diego Bay and Otay River floodplain for commercial purposes. This area is mainly flat with slopes of less than ten percent. The land climbs gently to the east. To the north are gentle low slopes. To the south are steeper, higher slopes, with some being greater than 25 percent. Thirteen miles to the east and north, the topography reaches an elevation of 600 feet.

### **Hydrology**

The river flows east to west from the Lower Otay Lake Reservoir to South San Diego Bay and was once a perennial stream. Because of the diversion of water within the watershed due to the construction of Savage Dam, it now flows only intermittently during and immediately after rains. However, significant flows have occurred as a result of spills from the Lower Otay Lake Reservoir during heavy rains. Consequently, the overall flow regime is one of little or no flow over long periods, interrupted by larger episodic flows.

Damming, development and in-stream surface mining have created conditions that result in erosion and the movement of sediment along the river.

### **Biological Resources**

Several vegetation communities exist within the OVRP and serve as habitats for a variety of birds, mammals, reptiles and amphibians, including sensitive, rare and endangered species. However, the quality and integrity of biological resources in the valley have been fragmented and disturbed by a variety of human activities, that includes salt mining, sand and gravel extraction, agriculture, surrounding urban development and damming of the river.

### **Cultural Resources**

People have occupied the Otay River Valley and Otay Mesa during for the last 9,000 years. Over 280 cultural resource sites have been identified including prehistoric and historic archaeological sites. Two large prehistoric village complexes provide important information about prehistoric and historic use of the Otay River Valley. The sites also include evidence of the arrival of non-indigenous people in the Valley, beginning with the Spanish missionaries in the late 1700s and continuing until the present day.

## **Land Use**

There are numerous commercial, private recreational, and agricultural operations inside the Park. Therefore, implementing the Design Guidelines will partially depend on working with or around current land uses. Planning will also be influenced to a lesser extent, by commercial, industrial and residential users adjacent to the park but outside its boundaries.

Lands west of Heritage Road have been generally put to more urban uses while east of Heritage Road they retain a more rural, agricultural flavor. In the western region uses include two asphalt and concrete batch plants, plant nurseries, and private recreational facilities such as the Palms Golf Center, Fun Farm Go Karts and Arcade, Knotts Soak City U.S.A. Water Park, and Coors Amphitheater. In addition, ponds and a significant amount of debris remain from past sand and gravel extraction operations.

In the eastern region of the Park uses include Rock Mountain Quarry, recreation boat launches on Lower Otay Lake Reservoir, an airpark and the R.J. Donovan and George Bailey Correctional Facilities.

## **Opportunities and Constraints**

The first phase of this process included a detailed analysis of opportunities and constraints within the OVRP. Opportunities provide direction for planners and influence choice of locations for Park facilities and features such as trails, interpretive centers, viewpoints/overlooks, and recreation areas. Natural, cultural and other trail-related data was collected, converted to an electronic format and analyzed utilizing Geographic Information System (GIS) software. Then, all opportunities and constraints were ranked, combined and displayed in two final exhibits, an Opportunity Exhibit (Appendix 3) and a Constraints Exhibit (Appendix 4). These two exhibits directly influenced trail planning methodology, design and alignment. The collected data served as the platform for developing the trail system. As an example, the cultural, historical and archaeological significance of the Park combined with its rich wildlife and vegetation communities supply excellent opportunities for education and interpretation, but can also present a constraint when required preservation of these resources may limit access to them.

Existing land uses on private property can be a constraint. Future trail locations through private property may require cooperation and coordination with the landowners, agreements to use existing utility easements, purchasing land or negotiating new easements.

Physical elements within the OVRP can influence trail planning and alignments. For example, hydrological considerations could impact poorly located trails during flood conditions. Different soil types are subject to erosion. Slope can be an important constraint, especially in areas with highly erosive soils and trail guideline limitations.

## Section III: Trail Plan

### Phasing Plan

This Trails Plan was developed as a team effort with a large emphasis on community input. Because of the Park's long linear configuration, past planning efforts, and land ownership issues, this document describes the OVRP in five segments. Dividing the OVRP into segments allows for focused studies and planning efforts that can address the various issues within each segment. Trail segments will be aligned and constructed for each segment as sufficient land is acquired for public use. Figure 2<sup>1</sup> shows the locations of the five segments, from west to east. They are:

- South San Diego Bay to Interstate 5,
- Interstate 5 to Interstate 805,
- Interstate 805 to Heritage Road,
- Heritage Road to Lower Otay Lake Reservoir, and
- Otay Lake Reservoirs Vicinity.

Due to land ownership in other areas of the Park, only the segment from Interstate 5 to Interstate 805 has been aligned. Because a majority of the land between I-5 and I-805 is publicly owned this is the only segment that has had a trails alignment prepared as part of this process. The phasing of the other four segments has no specific timeline, since the availability of public lands for purchase or easement access varies with the consent of landowners.

The proposed phasing plan may be fine tuned based on future circumstances. The completion of the trails system will only be possible through a partnership between property owners, developers and the Joint Staff. The following guidelines for trail alignment will help to ensure this partnership:

1. During the planning process, coordinate with landowners affected by trail alignments. Policies and trail design measures shall be utilized that protect the landowner by providing privacy, security, and indemnity agreements.
2. Secure trail routes across private lands through purchase, easements, and dedication, or by other means from willing property owners and sellers.
3. Seek to provide indemnity to persons granting trail easements and landowners adjacent to trails in order to encourage voluntary dedications and landowner support for efforts to implement trails.
4. Discourage non-consenting public use of private trail systems through restricting connections, staging area locations, and trail map publications.
5. When appropriate, encourage private developers to incorporate trail routes within their development.

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<sup>1</sup> Map legend items are defined in the Glossary in Appendix 1.

## **Trail Plan Segments**

### **South San Diego Bay To Interstate 5**

This most western segment of the OVRP includes a special study area, a major regional trail connection to the Bay Shore Bikeway, a habitat connection to the South San Diego Bay Unit of the San Diego National Wildlife Refuge (SSDB Unit), a proposed recreational area, various viewpoints and interpretive opportunities.

Figure 2 identifies a regional trail linkage that would pass under Interstate 5 and connect to an existing bicycle trail that bisects the SSDB Unit and will ultimately provide a connection to the Bayshore Bikeway.

Figure 2 also shows a Recreation Area<sup>2</sup>, which will be developed by the City of San Diego. The U.S. Fish and Wildlife Service is currently preparing a comprehensive Conservation Plan for the SSDB Unit that will include discussions of the process for developing trail linkage within this National Wildlife Refuge. Detailed trail planning, design and implementation within this segment will require coordination and approval from the Service if the trail is to be aligned through the SSDB Unit.

### **Interstate 5 To Interstate 805**

Most of this Park segment is publicly owned. For this reason, it was the logical place to begin the first phase of the trail planning process, including trail design, alignment, and implementation. With the help of the Citizen's Advisory Committee, the trails system has been identified and mapped for this segment (see figure 3).

This segment of the OVRP is surrounded by urban development, and includes about 400 acres of publicly owned land. A variety of terrain, native and disturbed habitat, sensitive species, wetlands, ponds, habitat monitoring sites, mitigation sites, vegetation enhancement/restoration sites and unauthorized trails are present in this area. Utility easements with access roads traverse both public and private lands.

### **Interstate 805 To Heritage Road**

This segment of the OVRP is severely constrained by residential development to the south and business/commercial development and public improvements such as the widening of Otay Valley Road to the north. The natural streambed has been impacted by sand and gravel extraction from upstream gravel operations. Two Recreation Areas are proposed in this segment as well as an alternative boundary, which includes most of Dennery Canyon.

A trail corridor running along both sides of the river that includes a trail through Dennery Canyon to connect to a possible trail extending south.

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<sup>2</sup> See Appendix 1 for a definition of "Recreation Area".

## **Heritage Road to Lower Otay Lake Reservoir**

Much of this segment falls within the planned Otay Ranch Preserve. As part of the Otay Ranch development, a Resource Management Plan that identifies Preserve Owner Management will be implemented to protect and restore the vast open space located in this segment. The eastern half of this segment is located within the approved acquisition boundary of the San Diego National Wildlife Refuge (NWR).<sup>3</sup>

A special study area within the segment is Rock Mountain, a quarry operation. Rock Mountain is expected to continue as a working quarry for the next 50 years. Once completed, the quarry site will be considered for possible inclusion in the OVRP.

The Concept Plan proposes trail corridors on both sides of the river and will continue offsite, connecting to Bureau of Land Management (BLM) property and to proposed regional trails adjacent to Salt Creek Canyon. Trails will connect with an interpretive center along with approximately 400 acres of recreation.

## **Otay Lake Reservoirs**

This segment of the OVRP contains both the Upper and Lower Otay Lake Reservoirs, and offers numerous recreational opportunities. It includes public and commercial recreational facilities, such as the Otay Lakes County Regional Park, a developed recreational facility; the City of San Diego's public boat launch and picnic area; Arco Olympic Training Center's boat launch; picnic/fishing around the Harvey Arm of Lower Otay Lake Reservoir; and land leased by the City of San Diego to a private operation for gliders, ultra-light aircraft and parachutists. Most of this segment has been designated as Open Space/Preserve Area and is included within the acquisition boundary of the San Diego NWR. Trail corridors are proposed around the lakes and continue off site to BLM trails and other regional trails.

## **Phase I Trail Alignment: Interstate 5 to Interstate 805**

As the first phase in the trail alignment process, this segment serves as a model for later phases. During this planning effort the Citizen's Advisory Committee Trails Subcommittee played a strategic part as members of the planning team. This dedicated "hands-on" group of volunteers was responsible for in-field data gathering, initial trail alignment proposals, final trail alignment verification, and gathering feedback related to trails from other local community members and special interest groups. Their role will continue as subsequent phases of the Plan are completed.

The CAC identified the locations of Type A Trails (see section IV for a detailed description of trail types). Type A trails will be used to form the regional trail corridor, which is the backbone of the trails system. In later phases, Type B and C trails will be constructed to form a network of connector and spur trails that connect with the regional trail and provide access to points of interest within the

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<sup>3</sup> No properties have been acquired in this area for inclusion in the NWR to date. Should properties be acquired by San Diego NWR, existing trails, and any future routes, will be managed in accordance with NWR policies as detailed in the forthcoming San Diego NWR trails management plan.

Park. Figure 4 is an example of what the trail system might look like after the alignment of several trail types (Type A, B, and C) as well as defining a regional staging area. This is an example only, and is intended to provide insight concerning future planning efforts that are required to fully develop a trail system within this section of the OVRP.

Several trail alignment guidelines were used to identify trails within this segment. These guidelines will also be used for future phases:

1. Consider long-range regional trail "connectivity" from west to east on both sides of the Otay River as the principal planning element of the OVRP trail system.
2. One continuous (Type A) regional trail corridor shall be aligned and implemented on public lands, which may cross the Otay River. Where possible, the Type A Trails should be aligned on both sides of the river.
3. Utilize areas designated for vegetation removal as high priority for future trail locations.
4. Identify, dedicate, and improve trails and pathways where the OVRP Trail system coincides with the required land dedication or improvements from a proposed development.
5. Minimizing significant impacts to natural and cultural resources by prioritizing trail segments that avoid sensitive environmental resources, which have not been designated or identified for recreational, educational or interpretational opportunities.
7. Utilize temporary alignments where necessary.

## **Financial Impact**

The following list may serve as a guide for approximating trail construction costs derived from 2003 dollars. These are probable costs only and may vary due to material selection and availability, on-site conditions, accessibility, labor source, use of mechanical equipment and economic inflation.

| <b>Facility</b>         | <b>Probable Cost</b> |
|-------------------------|----------------------|
| New 8' Wide Trail       | \$26 l.f.            |
| Improved 8' Wide Trails | \$14 l.f.            |
| New 4' Wide Trail       | \$12 l.f.            |
| Improved 4' Wide Trails | \$7 l.f.             |
| Bridge 8' Wide          | \$100 s.f.           |
| Fencing                 | \$20 l.f.            |

Financial impacts to the public could be minimized by utilizing the following guidelines:

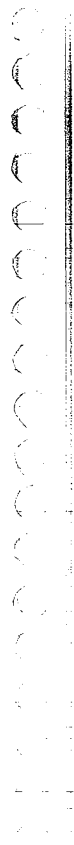
1. Identify, dedicate, and improve lands for trails and pathways where trail connections may be made with dedication/improvement requirements of proposed developments.
2. Offer incentives to private landowners to voluntarily dedicate trail easements, or to donate land for trails.
3. Utilize transportation-related funds to develop pathways within or adjacent to road right-of-ways.
4. Encourage non-profit organizations to seek funding from citizens, philanthropists, and environmental groups by partnering with non-profits on grant proposals.



5. Review tax default properties and other properties being sold, or easements vacated, for potential opportunities to secure trail routes.
6. Seek trail opportunities through easements, dedications, license agreements, or joint-use agreements with public and semipublic agencies including utility districts, water districts, transportation agencies, and parks and open space agencies.
7. Locate trails along existing non-designated paths, roads, and utility easements, drainage channels, flood plains, excess street right-of-ways, and major utility right-of-ways.
8. Implement regional trails and their associated features and facilities above the 100-year floodway where appropriate.

OVRP management should establish funding priorities for OVRP trails system annually. Potential funding includes Coastal Conservancy grants, State Parks and Recreation grant, and possible future State bond initiatives, operating budget and/or community group fundraising. Funding may be secured for the following trail related elements:

1. *trails* – planning, design, management, implementation, and maintenance;
2. *additional trail facilities* - overlooks, bridges, fords, fencing signage and interpretive displays;
3. *programs* – interpretive, educational, research, and volunteer; and *land acquisition*.



## **Section IV: Development Guidelines**

These guidelines address a range of typical trail planning, design and implementation issues. However, when physical or environmental constraints in a specific situation prevent their application, these guidelines may be modified to achieve trail goals. All proposed deviations from these development guidelines require the approval of OVRP operations management.

These guidelines supplement but do not replace existing codes, regulations regarding land management, and permitting agencies. Although these guidelines were developed for the OVRP they may be utilized by development adjacent to the OVRP for consistency of design.

### **Education**

The public will benefit from experiencing environmentally sensitive habitats and resources with cultural and historic significance. Trails will be designed to take advantage of these special environments, while providing interpretive features and appropriate environmental protection. Interpretive and educational programs should be organized around central concepts, themes or stories. Interpretive themes for the OVRP may include:

- history,
- dependence on water,
- biological and cultural resources, and
- restoration.

Important sites and self-guided trails should be chosen to best tell the story of the Otay River Valley. Interpretive signs along the trails will provide educational elements of the story. Interpretive centers should include signage, interactive exhibits and a place for park rangers to provide information on the Valley. Interpretive trails and specific interpretive locations shall be included in the Park signage and orientation program, utilizing kiosks, trail booklets or similar facilities located at main trail access points, nature centers and other key locations.

In addition to fostering an appreciation for local habitat, educational programs will be used to teach habitat protection. A balance between public exposure to sensitive habitat and the need to protect it can be achieved by incorporating programs as an educational resource.

### **Habitat Restoration**

Trail construction may need to mitigate for environmental impacts. Areas designated for restoration may include trails that have been closed, disturbed areas adjacent to a trail pathway, cut or fill slopes, and areas of non-native invasive plant material. Restoration may include transplanting or seeding native plant species typically found in the area. See Appendix 5 for native plants recommended for restoration. Criteria for selecting native plant materials include: whether the species is indigenous to the area, habitat value, fire resistance, resistance to pests and diseases, aesthetic characteristics, ability to provide shade, and ease of maintenance.

## **Community Involvement**

The community provided input through every phase of this planning effort. The primary vehicles of community input were the Policy Committee (PC), Citizens Advisory Committee (CAC) and CAC Trails Subcommittee. The CAC Trails Subcommittee members represent a cross section of the local community and special interest groups. In addition, the CAC hosted two public outreach workshops, which were conducted to gather information from the local community. Each workshop was publicly advertised and open to all community members.

## **Design and Layout**

Trail locations may cross various types of terrain, land uses, drainage patterns, microclimates and vegetation as well as private and public property. This presents opportunities and constraints when selecting trail location as discussed earlier. These guidelines have been developed to balance a high-quality user experience with protection of natural and cultural resources. These guidelines shall be considered during the planning, design and construction of trails and facilities.

The guidelines listed below reflect the Western OVRP Natural Resource Management Plan. Their application will help minimize future maintenance, operation problems, user conflicts, and impacts to cultural and natural resources.

1. Use existing access roads or existing unauthorized trails.
2. Locate equestrian trails away from sensitive natural resources. Locate equestrian staging areas 300' to 500' from riparian and Coastal, Sage Scrub.
3. Avoid endangered or sensitive plant species and wildlife breeding habitats. When possible, site new trails on north facing slopes in chaparral, away from the Coastal Sage Scrub habitat (usually found on south-facing slopes) and all other sensitive habitat. Be sensitive to the surrounding natural resources when considering trails with south-facing slopes. Avoid routing trail alignments parallel to habitat ecotones.
4. Consider alternative surface materials for erosion control including gravel, fiber matting, polymer-based compounds, and mulching with organic or non-organic materials. Trails and maintenance/emergency roads shall not be paved unless otherwise specified.
5. Trails, erosion control devices, fences or other barriers, exotic species removal, and signage are allowed within the established 100' buffer zones surrounding sensitive biologic resources (based on current local and State requirements).
6. Use earth berms or walls to reduce noise and visual impacts adjacent to recreational areas. Incorporate noise reduction measures adjacent to breeding areas.
7. Landscaping shall not include invasive exotic species. Only locally native vegetation should be planted in natural areas. Refer to Appendix 5 for an approved plant list.
8. Optimum trail widths and other conditions shall be determined on a case-by-case basis.
9. Avoid construction of switchbacks and climbing turns in favor of gaining elevation by maximizing long contour trail sections. Where switchbacks cannot be avoided, they should be designed to take advantage of natural barriers that discourage shortcutting.

## **Accessibility**

Accessibility shall be considered in the decision-making processes for planning, design, construction, maintenance and management of trails within the OVRP. Current State and Federal regulations concerning the Americans with Disabilities Act (ADA) shall be applied to provide access to a wide range of user capabilities where it is deemed appropriate.

## **Aesthetics**

Sight distance, views and the overall visual quality of the surrounding environment are important to the human experience and the more practical applications of safety and environmental protection. The following are guidelines concerning sight distances and views:

1. Design trails to blend in with the surrounding environment while providing various views of the surrounding area.
2. Screen views of the trail from adjacent landowners who may not want to view the trail from their property.
3. Align trails to avoid creating permanent, noticeably visible lines on the existing landscape.
4. Ensure the existence of native soils to support restoration of natural vegetation or provide amended soils of similar soil structure.
5. Align trails on cross-slopes of less than 45 percent.

## **Conflicts**

Trail use conflicts and user safety are critical issues on multi-use trails. Collisions, near misses, reckless and irresponsible behavior, poor user preparation and/or judgment, as well as unsafe trail tread may result from combining pedestrians, cyclists, and equestrians on the same trail. Methods to consider for preventing potential user conflicts include:

- separating user types at trail heads and along the first, most crowded stretches of trail;
- providing adequate sight distances;
- building trails wide enough to accommodate expected levels and types of use<sup>1</sup>;
- building and maintaining trails wide enough for safe passing and/or provide periodic turnouts;
- designing trails to control speeds where necessary by varying the trail surface and avoiding long, straight, downhill stretches;
- providing adequate trailhead facilities for all user types; and
- providing physical barriers for traffic/speed control.

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<sup>1</sup> Impacts on biological resources should always be considered when designing trail widths.

