Design Team:
Hope Escario
Michael J. Kelley
doreen Morrissey

Studio Principals:
Susan Mulley, MLA, Ph.D
Gerald O. Taylor, Jr., ASLA, RLA
Philip N. Pregill, ASLA
Doug Delgado

Vision Plan for the Lower Ventura River Parkway

Reconnecting People with the Ventura River

Prepared for The Trust for Public Land and the California State Coastal Conservancy

606 Studio • Department of Landscape Architecture • California State Polytechnic University, Pomona • 2008

FIGURE i *View of the Lower Ventura River valley.*

Executive Summary

This Vision Plan was created by the 606 Studio, a consortium of faculty and graduate students in the Department of Landscape Architecture at California State Polytechnic University, Pomona. The Plan was completed in June 2010 and represents the partial fulfillment of the requirements for the degree of Master of Landscape Architecture for the planning team.

This project was sponsored by The Trust for Public Land, the Ventura Hillsides Conservancy, and the California Coastal Conservancy. Funding for this project originated with a resource enhancement grant from the California Coastal Conservancy.

PURPOSE

The California River Parkways Act of 2004 and related legislation provides for the establishment of river parkways on lands along rivers or streams. The purposes of river parkways include the protection, improvement and restoration of riverine and riparian open space and wildlife habitat, the provision of opportunities to the public for recreation as well as awareness regarding the conservation and restoration of rivers and streams, and the conversion of existing developed riverfront land uses into uses consistent with river parkways. This document envisions a plan for a river parkway along the Lower Ventura River, located in Ventura County, California. The proposed Lower Ventura River Parkway is approximately six miles in length beginning at the Pacific Ocean and ending upstream at Foster Park.

This document is intended as an analysis, planning, and design tool for government and non-governmental agencies and the surrounding community who are interested in creating a river parkway that is compatible with recreational use, stewardship, river function, and regional ecosystems.

GOAL

The project goal for this Vision Plan is to reconnect people with the Lower Ventura River by providing opportunities for recreation, education, and stewardship while protecting and enhancing hydrological and ecosystem resources.

METHODS

Following guidelines suggested by The Trust for Public Land, the California State Coastal Conservancy, and the faculty of the 606 Studio, this document illustrates a vision plan for the Lower Ventura River Parkway plan using stakeholder input, research, maps, text, sketches, and pictures. Although this document focuses on a six mile segment of the Ventura River, planning and design proposals for the project site were developed within the larger context of the Ventura River Watershed.

The planning team began by conducting an inventory of existing conditions and resources – hydrological, ecosystemic, and cultural – at the regional, watershed, and project area scale. The team then facilitated several public workshops to identify residents' preferences for the future of the Lower Ventura River and its environs. Experts in the fields of stream restoration, biodiversity preservation, and urban planning were consulted in order to identify guiding principles. The team conducted research, including site visits, regarding projects elsewhere that could provide precedents for planning solutions. The team used all of this information to identify the principal issues regarding hydrology, ecosystems, and culture and to formulate objectives for addressing those issues.

The team prepared a parkway vision plan including elements addressing hydrology, ecosystems, circulation and culture. The team also recommended policies and broad approaches that would address the plan objectives throughout the proposed six mile parkway project area, as well as selected regional and watershed-level policies that would directly impact the success of the parkway itself. The team identified clusters of significant opportunities and constraints for addressing their plan objectives. Based upon this analysis, four smaller sites within the project area were selected for a more detailed illustration of plan concepts. Finally, the team evaluated the effectiveness of the plan by the degree to which specific design concepts would meet single or multiple project objectives.

MAJOR FINDINGS AND THEIR IMPLICATIONS

Introduction

As long as people have lived on the coast of what is now Ventura County, they have had a relationship with the Ventura River. However, each successive era of human coexistence with the river, from Chumash to Spanish settlers, to oil developers and industrial workers, to present-day suburban residential developments in the floodplain, has increased demands upon the resources of the lower river, while decreasing the ability of people to experience the river – to walk along the riverside, dangle their feet in the water, fish, or observe wildlife.

Although the mouth of the Ventura River lies just a short walk from downtown Ventura, some residents and visitors are scarcely aware that the river exists. Mid-twentieth century flood control projects and urban development resulted in a two-mile long levee and a parallel four-lane highway forming a physical and visual barrier between the river and the city. "No Trespassing" signs discourage public approaches to the river, while the nature

of the river itself – narrow, braided, shifting channels partially hidden by dense vegetation (both native and invasive) within a broader alluvial floodplain – deters recreational visitors while attracting homeless encampments. These physical and visual barriers, as well as the dramatic floods that periodically scour the river and floodplain, have resulted in a complex and often times estranged relationship between people and the Ventura River. The lack of public awareness and appreciation for the river further threatens the health of this vulnerable resource and limits prospects for future stewardship. Today, the task of fostering new connections between people and the river while balancing public access with protection and enhancement of sensitive ecosystems has become a priority and provides the context for this Vision Plan.

Existing federal, state, and local policies that include limits on urban growth, the preservation of agricultural and open space resources, and the preservation and enhancement of water as a resource, provide the policy framework for the proposed parkway. Both the County of Ventura and the City of Ventura have established a goal of preserving and protecting significant natural resources from incompatible land uses and development in their General Plans. However, existing legislation does not adequately protect the river resource, neither from hydrological impacts that result from the removal of flow from the river and from its groundwater supplies, nor from social and ecological impacts resulting from fragmented development along the river.

Inventory and analysis: the landscape, its hydrological, ecological, and cultural resources

The Ventura River is one of the last remaining wild coastal rivers in Southern California. From headwaters high in the Santa Ynez Mountains, the river flows approximately 32 miles through national forest, farms, rural communities, and industrial and urban developments before meeting the Pacific Ocean in the City of Ventura, California. This project focuses on the lower watershed, where the land transitions from rural to agricultural and industrial, then to urban and residential as the river approaches the sea. The project site is notable for its close juxtaposition of both natural and manmade infrastructure, with undeveloped areas, heavy industrial facilities, farms and residential tracts existing adjacent to each other.

Human activities have impaired the hydrological function of the Ventura River. Both urban developments and flood control measures – including the Army Corps levee in Ventura – have encroached upon the floodplain of the lower river, reducing the space and resources available for natural river channel formation, habitat, groundwater recharge and the conveyance of flood waters. Some structures in the floodplain are at risk for severe damage from foreseeable floods. The impervious concrete surfaces of urban developments exacerbate this risk by increasing surface runoff, allowing storm waters to accumulate more quickly during major storm events. Dams have disturbed the sediment balance in the river, contributing to the erosion of the river-bed, river banks and coastal beaches, while also acting as barriers to wildlife movement in the river. Groundwater pumping and the diversion of surface water for agricultural and domestic consumption have reduced instream flow in a river that even under natural circumstances would tend to run dry on a seasonal basis. In addition, the introduction of urban stormwater runoff and agricultural by-products can bring about a deterioration in the quality of surface and groundwater and the release of untreated contaminants into the marine environment.

The area of the proposed parkway includes at least eight habitat ecosystems: estuary, dune, riparian, scrub, chaparral, marine, river, and wetlands. The river provides important ecosystem services that directly benefit humans and wildlife. Biodiversity is one crucial ecosystem service, impacting both the stability and magnitude of ecosystem processes. The Ventura River Watershed encompasses large areas of intact, quality habitat which supports some of the highest biodiversity of plant and animal species in the Southern California region. However, current agricultural, industrial and urban development practices can threaten biodiversity in the proposed parkway area by reducing the space available for quality habitat, introducing pollutants and invasive species, and fragmenting the wildlife corridors that connect habitat patches. These connecting corridors allow for animal movement and gene flow – the exchange of genetic material between animal populations that encourages biodiversity and survival. This Vision Plan advocates a comprehensive approach to ecosystem-based management, one that is based on the recognition that habitat connectivity is a critical component of ecological processes.

Headwaters and tributaries play a crucial role in river health. Anything that impacts these water bodies affects both hydrological function and ecosystems because the river receives much of its water, nutrients, and sediment from these sources and because tributaries connect the river, the entire floodplain, and the surrounding hillsides. This essential network promotes wildlife movement and the dispersal of genetic material throughout the region.

The Ventura River's value as a cultural resource is based upon a foundation of continuous human contact with the river stretching back thousands of years. The history of that relationship is revealed in historical sites, landmarks, museums, and libraries, in or near the proposed parkway zone. The cultural experience of visitors is also enriched by religious facilities, schools, parks, shopping, restaurants and open space nearby. The parkway planning area has rich sensory resources, including spectacular viewsheds, microclimates, sounds and smells that vary markedly from the rural surroundings of Foster Park to the

vibrant activity of the Estuary, Surfers' Point and Historical Downtown.

At the same time, neighborhoods near the river have been affected by industrial development that has resulted in brownfields and industrial pollutants. The same neighborhoods currently lack adequate recreational open space, exacerbated by the fact that physical and visual access to the Lower Ventura River is generally impeded by the Army Corps levee, Highway 33 and 'No Trespassing' signs.

At community meetings conducted by the project team, older residents expressed a deep sense of connection and fond memories of fishing, swimming, and strolling along the Ventura River, while young families expressed a desire to see such recreational opportunities restored for the benefit of themselves and their children. Stakeholders revealed concerns about ecological values, river access, and river contamination. They also revealed negative perceptions regarding personal safety along some stretches of the river due to the existence of both homeless encampments and dense swaths of invasive plant species which inhibit the ability to clearly see and appraise one's surroundings.

Issues

The design team identified the following issues of concern:

- floodplain development has diminished the space available for natural river function
- hydrological infrastructure has impaired river function
- water consumption diminishes instream flow
- structures and activities adjacent to the Lower Ventura River are at risk of flood damage
- surface water and groundwater quality is impaired
- diminishment and degradation of ecosystems within the project area has resulted in the reduction of the quantity and quality of ecosystem services
- unsustainable practices negatively impact biodiversity
- habitat areas lack connection with each other
- invasive plant species limit native species
- insufficient opportunities for access and recreation along the Lower Ventura River
- many existing land uses degrade the river and reduce its value for visitors
- awareness of the river and its functions is lacking
- increased public stewardship of the river is needed

Objectives

Consideration of the issues listed above led to the identification of the following objectives:

- preserve and expand space for natural river function
- mitigate the impact of hydrological structures on river function
- ensure adequate instream flow
- protect parkway structures and activities from flood damage
- improve the quality of surface water and groundwater
- restore and enhance ecosystems
- enhance biodiversity by reducing harmful impacts
- increase habitat connectivity
- manage invasive species
- improve access to and recreation at the river
- minimize incompatible land uses near the river
- increase cultural awareness of the river through formal and informal education opportunities
- encourage stewardship of the river

PARKWAY VISION PLAN: BROAD STRATEGIES

This Vision Plan proposes many solutions for the achievement of the goals and objectives identified for the river parkway. Some of these solutions consist of general policies and practices for improved land use and stewardship in and around the proposed parkway area (e.g. low impact development methods or ideas for involving the public in creating the parkway), while others are actual designs (e.g. the proposed locations and configuration of trails, mixed-use developments or visitor facilities). Following is a summary of planning and design strategies that the planning team recommends for consideration throughout the proposed parkway area. The success of some recommendations for the parkway will depend on the implementation of improved policies and practices beyond the limits of the proposed parkway area, throughout the entire Ventura River Watershed. Where appropriate, these larger-scale recommendations are also discussed in this Vision Plan.

Hydrology: observing the importance of water

Many features of this plan aim to ensure a supply of abundant, clean water for the ecosystems of the river, for Ventura residents, and for the marine environment including:

- protecting the river floodway from development, and expanding the floodway in

some areas in order to reduce the risk of flood damage and improve river ecosystems

- ensuring adequate instream water through urban and agricultural water conservation, enhancing groundwater recharge, groundwater management, and conjunctive use at the scale of the entire watershed
- minimizing flood risk by designing parkway structures and visitor activities compatible with the occasional movement of flood waters
- mitigating the impacts of the Ventura Levee, the wastewater treatment plant, and other hydrological infrastructure on river function
- envisioning river-friendly neighborhoods that minimize stormwater runoff and enhance groundwater recharge through preserving vegetated open space and using permeable surfaces in built areas
- encouraging river-friendly farming practices including improved monitoring of soil moisture and fertilizer, organic farming, and the biological treatment of contaminants in runoff at the farm
- treating both agricultural and urban runoff first of all at its source, and secondarily near the river's edge, before contaminants are introduced into the river and then the ocean

Ecosystems: following natural form

Key objectives for the ecosystems element of this Vison Plan are to restore and enhance ecosystems, enhance biodiversity, increase the size, frequency and connectivity of high or moderate quality habitat patches and corridors, and manage invasive species. Recommendations for achieving these objectives include:

- letting the alignment of the river and its tributaries guide the design of the proposed parkway; the main stem and its tributaries would form habitat corridors which transition into agricultural patches, and eventually into residential or mixed use developments; tributaries would also connect the ecosystems along the river with the hillsides above
- restoring the ecosystem services provided by tributaries by widening, dechannelizing or daylighting the river where appropriate
- preserving and restoring open space in the floodplain, to include a combination of undeveloped areas, passive and active recreational parks, mixed-uses, and a vegetated greenbelt along the eastern edge of Highway 33
- enhancing the habitat quality of farms through the use of vegetated swales and buffer zones of native vegetation around their edges
- expanding estuary, coastal wetland and coastal dune areas, which are all threatened habitat types in the parkway area and their valuable ecosystem services are constrained
- using California native plants in and around visitor facilities and developed areas along with the continuation and expansion of native plant restoration activities in undeveloped areas; incorporating the collection and propagation of local, native seeds and plants as part of these efforts would also strenghten local ecoystems and increase survival rates
- maintaining the undeveloped characteristic of the western bank of the Lower Ventura River by limiting visitor activities primarily to hiking and low-impact activities
- promoting the preservation of open space in the adjacent hillsides to the east and west of the parkway, in accordance with the efforts of the Ventura Hillsides Conservancy

Culture: reinforcing stewardship

Given the adjacency of the Lower Ventura River to a densely populated urban area, increased public appreciation and stewardship for the river are prerequisites for the long-term sustainability of the river and its associated ecosystems. Opportunities for intimate contact with the river corridor in a safe context can increase understanding of the natural processes of this unique landscape, foster stewardship and volunteer opportunities, and build a charismatic connection between humans and land. Features that will address these objectives include:

- creating an appropriate circulation pattern
- providing interpretive and educational features to focus visitors' attention on natural processes, current and future efforts to restore the environment, and the historical richness of the area
- employing the north and south entry points to the parkway as gateways – places that announce the parkway to travelers on Highways 101 and 33 – and demarcating them with appropriate signage and interpretive strategies
- using appropriate wayfinding features such as path alignments, signs and trail markers
- siting visitor facilities and trails to take advantage of attractive viewsheds

Increased access must be balanced with the protection of sensitive ecosystems in a manner that respects the carrying capacity of the land. Recommendations for achieving this balance include:

- designating the west side of the lower river valley as primarily undeveloped in character, with limited visitor facilities that reinforce that designation
- creating walking trails with characteristics that are appropriate for the degree of sensitivity of the landscape that they cross. Trails would be aligned in a manner that

avoids overcrowding of especially sensitive areas, and trails that approach especially sensitive areas such as the riverbed would be few in number, with a higher degree of difficulty and a softer footprint.

- limiting of vehicle access and parking facilities in sensitive areas
- using signage and interpretive materials that emphasize the sensitivity of river ecosystems and encourage appropriate behavior

This Plan recommends five strategies for reinforcing stewardship for the Ventura River and its environs:

- bringing people closer to the river through improved access and circulation
- finding opportunities for people to participate in the construction and maintenance of the parkway; for example, local seed collection and propagation would provide a safe, supervised context for the presence of volunteers in and around the river floodway and would result in a supply of native plant material for parkway restoration – plants that are best adapted to climate conditions and the needs of local ecosystems
- educating people about the natural and cultural features of the river and its environs
- involving people in a continuing relationship with the environment through volunteer activities that focus on monitoring environmental conditions, or through environmentally-sound community farming activities near the river that preserve floodplain compatible open space while involving volunteers in an exploration of river-friendly agricultural practices
- at the governmental level, fostering stewardship means minimizing land uses such as heavy industry that are incompatible with river and ecosystem restoration, valuing open space in the floodplain, preserving agriculture, siting residential developments carefully and employing low impact development practices in their construction, and mitigating the sometimes harmful impacts of homeless individuals in or near the river floodway.

Circulation

Circulation patterns that bring people closer to the river and its associated habitat without unduly disturbing sensitive ecosystems and nearby landowners will help achieve all of the objectives identified for the Lower Ventura River Parkway. The planning team recommends a hierarchy of roads, trails and bridges with levels of infrastructure that are appropriate for their context:

- opening the west bank of the river and adjacent hillsides to recreational use through a variety of pedestrian trails that emphasize a experience in an undeveloped natural environment
- creating opportunities on both banks of the river for walkers, and in some cases cyclists, to view the river more closely
- combining trails with both existing and proposed bridges to create loops that would provide flexibility in both distance and the quality of experience for parkway visitors
- developing multi-use trails, including the existing Ventura River Trail, would accommodate cyclists and many types of walkers, and would be sited primarily along the east bank of the river
- creating nature trails on the west side of the river with permanent alignments, appropriate signage, and occasional interpretive displays for educational purposes
- creating one or two short ephemeral trails – marked trails with temporary alignments, periodically changed by parkway staff in order to minimize the impact of hikers. The purpose of an ephemeral trail would be to allow a limited number of visitors to enter the river floodway and observe riverine ecosystems and flowing river channels that are usually obscured by dense vegetation, in a safe and sensitive manner. Such trails would be strictly limited in number and approximately 200 yards or less in length.
- preserving existing vehicular and pedestrian bridges at Main Street, Shell Road and Casitas Vista, while exploring a means of improving the value of those bridges to pedestrians.
- constructing new pedestrian bridges across the river floodway would help to form loops for a flexible walking experience along both banks of the river. Elevated pedestrian crossings would also complement ephemeral trails or serve as an alternative for those trails in some areas in that they would provide a relatively low-impact opportunity for close observation of flowing river channels and sensitive riverine ecosystems that are usually obscured by the broad floodway with its dense riverside vegetation.
- elevated pedestrian crossings across Highway 33 would provide pedestrian access from Westside Ventura to the river.
- trails that approach or enter the river floodway or adjacent riparian areas would exclude equestrian activity in accordance with ongoing efforts to control cowbird nest-parisitism that threatens native bird species.

SITE DESIGNS

The design team analyzed the entire parkway planning site by mapping the location of opportunities and constraints that exist for the achievement of plan objectives. Identifying clusters or concentrations of these opportunities and constraints within the proposed parkway area resulted in the selection of four smaller sites for site-specific designs and recommendations that implement the broad strategies described above.

Foster Park

Located at the northern tip of the proposed parkway, this century-old park provides an opportunity to create a visible gateway to the river and the proposed parkway while enhancing existing riverside day-use facilities and attracting more visitors. The team recommends:

- improving an existing informal swimming hole at this site that dates back to the early twentieth century, with complementary recreational facilities that would make the pool an important attraction for parkway visitors. Although Foster Park would be an ideal location for the pool from the standpoint of visitor access and historical meaning, the pool would need to be sited in a manner that does not negatively impact wildlife, a pending bank restoration project, or the quality of drinking water which the city extracts at Foster Park. In the event that implementation is not consistent with these constraints, locating the swimming hole at another site downstream from Foster Park, or the construction of an off-stream pool adjacent to the riverside at Foster Park should be considered.
- improving the connection between the day-use area and the existing Ventura River Trail for cyclists and pedestrians
- making the parkway visible at this northern gateway with signage on Highway 33 and an informational kiosk in the day-use area to orient visitors to the lower river and its recreational features
- increasing activity generators, visibility, and entry and exit points in order to attract more visitors and improve the perception of safety

Cañada Confluence

Approximately one mile downstream from Foster Park, the confluence of the Cañada Larga with the Ventura River features rich riparian habitat and a relatively easy approach to the riverside. The existing campus of the Brooks Institute and a remnant of the 18th century Spanish mission aqueduct add architectural and cultural interest, and the growth of suburban housing developments nearby makes this site significant as a potential proving ground for river-friendly, low impact urban development. However, the area also presents a combination of hydrological impairments, dilapidated or abandoned industrial facilities, and "No Trespassing" signs that make it uninviting, and the brownfield area in the southern portion of the site contains chemical pollutants and asbestos that may render portions of it unsafe for public use in the near term. Proposals for this site include:

- relocating some existing structures outside of the 100-year floodplain in order to relieve the constriction of the river floodway and reduce the risk of flood damage
- augmenting the existing wastewater treatment plant with biological treatment ponds and forming a public arboretum around the ponds
- increasing flood protection using environmentally sensitive vegetated bioengineering techniques along the lowest reach of the Cañada Larga in order to reduce the risk to the historical Spanish aqueduct remnant that lies within its floodplain, while enhancing that historical landmark with improved facilities for public viewing and providing improved flood protection for the Brooks campus and other structures in the area
- widening and daylighting portions of the lower Cañada Larga in order to enhance the wildlife corridor and other ecosystems services provided by the tributary
- developing a public park near the confluence of the Cañada Larga with the Ventura River. The park could include a promenade along the lowest reach of the Cañada, an improved access stairway and observation platform where the Cañada meets the river, a community farm, and a night market – a program in which local vendors set up kiosks at dusk, providing the community with a unique opportunity to get outside and socialize after dark. These features would provide improved public access to both waterways and recreational open space, particularly for residents who live nearby in the North Avenue area.
- creating a remediation plan for the old refinery site (a brownfield) that would maximize public education and support for phytoremediation and other regenerative technologies, while preserving the visual forms of some refinery structures as an homage to the industrial heritage of the lower river

Cottonwood Junction

Located along the western bank of the river upstream from the estuary, this relatively undeveloped site would be the focal point for themes of agricultural and undeveloped nature experiences that would define the west side of the proposed parkway corridor. In this area, the team recommends:

- the preservation and restoration of wildlife habitat, including the expansion of native plant restoration activities currently underway

- preservation of existing agriculture and a trail to give members of the public a safe, non-intrusive opportunity to view farming areas
- a network of new nature trails that would connect the Ventura River Estuary with Foster Park along the western bank of the river
- Cottonwood Junction, an informal rest stop and gathering space located at the junction of several nature trails
- educational experiences that emphasize observation of nature and respectful interactions between humans and natural communities. These could include signage and other interpretative materials and, when feasible, walks or talks with volunteer docents.

Downtown Delta

The broadest portion of the Ventura River Valley is an area with considerable urbanization and relatively flat terrain that is quartered by Highway 101 and Highway 33. It encompasses existing portions of the Westside community, the downtown historical corridor, the Ventura River Estuary, the western beach area, and the Ventura County Fairgrounds. Objectives for this area of the proposed parkway include improved access to open space for Westside residents, a strong pedestrian connection between the vibrant downtown historical corridor and the river, economic revitalization, and the enhancement of estuary, wetland, and dune ecosystems. Proposals for the attainment of these objectives include:

- an elevated freeway crossing providing pedestrian access from the Westpark Community Center to a public trail atop the Army Corps of Engineers levee, along with the addition of plant material to the levee; in this manner, a visual and physical barrier to river access could instead become an opportunity for viewing the river
- strengthening the pedestrian connection between Ventura's historical downtown area and the river mouth by creating a mixed-use development and improved streetscape between Ventura Avenue and the Main Street Bridge. These features would spur economic growth while also attracting the attention of visitors west toward the river and its undeveloped features
- returning part of the oceanfront fairgrounds site to its historical wetland/estuary character – a feature that would form an exciting, active new edge for Ventura's downtown while also expanding natural water treatment and quality habitat; this would include the removal of an approximately 500 feet portion at the southern end of the levee, and the realignment of part of the Omer Rains Trail
- investigating the feasibility of an elevated pedestrian crossing over the estuary as an alternative to crossing via the existing railroad trestle. Use of the trestle by many members of the public is both illegal and dangerous
- implementation of the Surfers' Point Managed Shoreline Retreat project in order to restore dune habitat and prevent shoreline erosion
- employing low impact development techniques in a redesign of the fairground parking lot to both reduce and treat polluted surface runoff, reduce thermal pollution from asphalt surfaces, and improve the aesthetic experience of the area
- improvements to the Emma Woods Group Camp and restoration of a fresh/brackish water seasonal lagoon habitat at the second mouth of the river, consistent with the Wetlands Research Associates 1994 plan
- replacement of the high-flood-risk RV Resort with restored wetlands and a Ventura River Interpretive Center to welcome visitors to the southern gateway to the proposed parkway

CONCLUSION

This Vision Plan includes features that would simultaneously enhance the hydrological function of the river, the health of ecosystems throughout the proposed parkway (including the marine environment offshore), economic development, and a vital community connection to the river. Each element of the proposed designs reinforces the others.

The inventory of resources in the proposed parkway project area revealed that many existing features of floodplain and urban development have negative impacts on the river and its associated ecosystems or hinder human enjoyment and appreciation of the river. However, some of these infrastructure features also perform functions such as flood protection or wastewater treatment that the community values. This Vision Plan seeks solutions that find synergies between natural processes and human infrastructure, so that structures and activities designed to meet human needs will simultaneously preserve and restore ecosystems. Additionally, this plan explores many opportunities for increasing human contact with the river in a manner that respects sensitive ecosystems and builds stewardship, and - where appropriate - to employ improved connections between the city and the river as a keystone for economic development.

A successful river parkway project on the Lower Ventura River can serve as the backbone of environmental infrastructure for the lower watershed for the next century, inspiring the community to value river restoration, protection of ecosystems, access, stewardship, and economic development.

FIGURE ii *The Lower Ventura River, looking south from its confluence with the Canada Larga.*

CONTENTS

PART 1: INTRODUCTION

PART 2: INVENTORY AND ANALYSIS

PART 3: DESIGN FORMULATION

PART 4: VISION PLAN

PART 5: ADDITIONAL CONSIDERATIONS

LIST OF ILLUSTRATIONS

CULTURAL ELEMENTS

FORMULATION

PARKWAY PLAN

CIRCULATION

FOSTER PARK

CAÑADA CONFLUENCE

COTTONWOOD JUNCTION

DOWNTOWN DELTA

EVALUATION AND CONCLUSION

ACKNOWLEDGEMENTS

A Vision Plan for the Lower Ventura River Parkway could not have been created without guidance and insight from many people. We have been extremely fortunate to work on a project that requires the collaboration of so many individuals and which takes place in such an inspiring landscape. Creating this Vision Plan has given us the opportunity to learn from those in Ventura who possess local knowledge and from professionals working in across many fields.

For academic guidance and support, we are grateful to California State Polytechnic University, Pomona faculty members Dr. Susan Mulley, Gerry Taylor, Phil Pregill, and Doug Delgado. We thank you for your indispensable insights, encouragement, and patience. Additional gratitude is due to Dr. Mulley for facilitating two community workshops and aiding us in the development of stakeholder involvement as an inclusive part of the design process. We are also grateful to all of our Cal Poly Pomona faculty including Budd Sutton, Ken Nakaba, Ken McCown, Joan Woodward, and Andy Wilcox who provided the educational foundation for this project, and to Jessica Hall and Jia Ning for introducing us to the fascinating subject of urban rivers and stream restoration.

For the genesis and the continual championing of the Lower Ventura River Parkway concept, we are indebted to Elise Holland, formerly of the Trust for Public Land, Barbara Harrison formerly of the Ventura Hillside Conservancy, and Bob Thiel of the California Coastal Conservancy. We are also grateful to Marc Landgraf, formerly of the Trust for Public Land and now with the Peninsula Open Space Trust, for taking the time to introduce the parkway concept to us and for persevering through the complexities of the funding process.

The people of the Ventura area have aided this project in many ways. We extend our gratitude jointly to Dr. Al Leydecker and Ben Pitterle of the Ventura Stream Team (a project of Santa Barbara Channelkeeper) for invaluable assistance in understanding the hydrology of the Ventura River. Paul Jenkin, Surfrider Foundation, provided a wealth of information regarding historical and current efforts to restore the Ventura River. David Salter, Ventura County Environmental Health Department, Leaking Underground Fuel Tank (LUFT) program graciously provided information regarding the refinery. The research of Gretchen Coffman, PhD. D., Wetland Research Ecologist and Instructor, UC Santa Barbara Marine Sciences Institute, was invaluable to this project, and her patient response to our ecological questions is much appreciated. We thank Joe Lampara, Ventura County Watershed Protection District, for a generous and insightful guided tour of the Ventura Levee. Joanne Zivich, coordinator for the Bell Arts Factory, graciously made that facility available for community workshops.

Roger Adams, City of Ventura Geographic Information Systems (GIS), provided GIS data which was critical to the success of this project. Similarly, the Channel Islands Geographic Information System (CIRGIS) has earned our admiration for championing the availability of high quality GIS data to the public.

We thank Marci Boudreau, Picnic Design, who presented us with an extraordinarily designed book template and continued to adapt and refine the template as this book evolved, and Sarah Barnes, who copy edited this material.

Finally, we thank our families and friends for providing support, encouragement and understanding that have enabled us to reach for our dreams.

This project has been greatly aided by sponsorship and cooperation from The Trust for Public Land, the Ventura Hillsides Conservancy, and the California Coastal Conservancy. The funding for this project originated with a resource enhancement grant from the California Coastal Conservancy.

PART 1: INTRODUCTION

River parkways directly improve the quality of life in California by providing important recreational, open space, wildlife, flood management, water quality, and urban waterfront revitalization benefits to communities in the state.

California River Parkways Act of 2004
California Public Resources Code §5751(a)

CHAPTER 1: ELEMENTS

Overview

PURPOSE

This Vision Plan is a conceptual plan, intended to promote a vision for a parkway on the Lower Ventura River, located in Ventura County, California. The proposed Lower Ventura River Parkway is approximately six miles in length beginning at the Pacific Ocean and ending upstream at Foster Park. Following guidelines suggested by the Trust for Public Land and the Coastal Conservancy (CCC 2007), this plan uses stakeholder input, research, pictures, maps, sketches, and text to provide a conceptual idea for the Lower Ventura River Parkway.

GOAL

The project goal for this Vision Plan is to reconnect people with the Lower Ventura River by providing opportunities for recreation, education, and stewardship while protecting and enhancing hydrological and wildlife resources.

WHAT IS A RIVER PARKWAY?

The California River Parkways Act of 2004 and related legislation provides for the establishment of river parkways on lands along rivers or streams. The purposes of river parkways include the protection, improvement and restoration of riverine and riparian open space and wildlife habitat, the provision of opportunities to the public for recreation as well as awareness regarding the conservation and restoration of rivers and streams, and the conversion of existing developed riverfront land uses into uses consistent with river parkways.

[FACING PAGE] FIGURE 1.1 *Traveling along the Main Street Bridge.*

WHY THIS VISION PLAN

The Ventura River is a beautiful river and one of the last remaining wild rivers in Southern California. Much of the river runs through a thickly vegetated landscape seldom visited by people and is home to thousands of species of wildlife. Unlike most rivers in Southern California, the Ventura River is mostly untouched by the concrete channels and dense development that have degraded so many other rivers in the region.

The Ventura River Watershed still has large areas of intact, quality habitat. As a result, restoring impacted ecological systems would allow both Venturans and their visitors to reap a multitude of ecosystem services with greater ease and success than in the more heavily developed and densely populated areas of Southern California.

The Ventura River Valley is located within the California Floristic Province, one of the world's biodiversity hotspots: a rich but threatened reservoir of plants and animals found nowhere else in the world. Steep and rugged topography, a relatively low population count, and a national forest along the northern border have helped to preserve the diversity of biological resources within the Ventura River Watershed.

Despite the richness of its remaining habitat, the Ventura River Watershed has been heavily impacted by human activity. Today, the Ventura River is in a stage of transition; dam removal, increasing development, and a new movement towards watershed management are all pressures on the river. Meanwhile, many human activities such as agriculture, and industrial and urban development have not employed sustainable practices in their operations, resulting in loss or degradation to the ecosystems of the watershed. Contaminated runoff from urban, agricultural, and oil and mineral extraction sites enter the Ventura River untreated and little is done to curb these pollutant levels. These negative impacts led to an overall reduction of biodiversity that threatens the ecological health of the region.

Among other benefits discussed in this Vision Plan, river parkway projects are ideal for reconnecting people with rivers through a combination of improved access, passive recreational opportunities, and education. The people of Ventura have experienced a profound degree of separation from this river in the last half-century. This Vision Plan is about ending that separation.

HOW TO USE THIS BOOK

This Vision Plan is divided into five sections. *Part 1: Introduction* describes the historical and planning context for the parkway concept. *Part 2: Inventory and Analysis* provides an understanding of the geological, hydrological,

ecological, and cultural resources existing in and around the proposed parkway area. *Part 3: Design Formulation* lays out the issues and objectives, opportunities and constraints, and the working process used to generate this Vision Plan. *Part 4: Vision Plan* provides an overview of the entire six-mile proposed parkway concept and a closer look at four design sites that are opportunities for illustrating that concept at a smaller scale. *Part 5: Additional Considerations* concludes this vision plan with recommendations for actions at the watershed and regional scale that will further the parkway concept, implementation, evaluation, and appendices with a more detailed discussion of several subjects that are raised in this document.

The authors hope that this Vision Plan can be used as a guide in overcoming the many challenges that lie ahead in the planning and execution of a parkway. The rich and unique character of Ventura's resources, both cultural and natural, have provided the most important questions and many potential solutions in this effort.

LOCATION

This proposed parkway for the Lower Ventura River is located in Southern California, in Ventura County, in the watershed of the Ventura River. The project site spans the southernmost six miles along the main stem of the Ventura River, encompassing areas under either Ventura County or the city of San Buenaventura jurisdiction. The northern tip of the project site begins at Foster Park and continues south, concluding at the Ventura River Estuary. Though this Vision Plan focuses on this six mile segment, planning and design proposals consider the project site within the larger context of the Ventura River Watershed.

PLANNING SCALES

This Vision Plan has determined three scales at which to plan for the Ventura River project area: the regional scale based on the jurisdictional boundary of Ventura County; the watershed scale, based on the Ventura River Watershed; and the project area scale, based on the Lower Ventura River segment as identified by The Trust for Public Land.

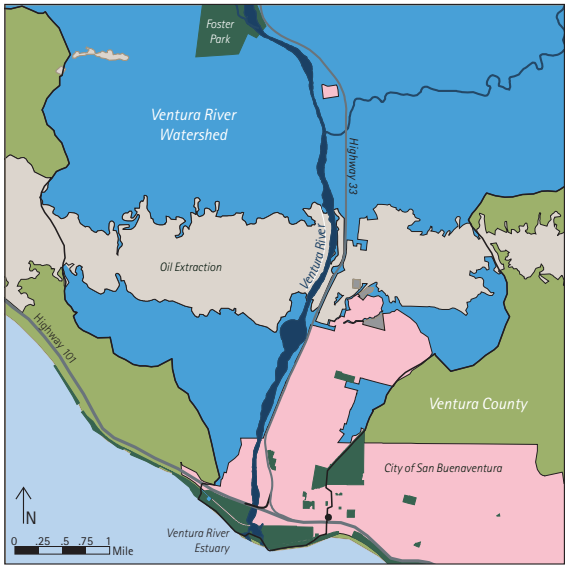


FIGURE 1.2 *The locational context of the Ventura River Watershed and the Lower Ventura River. Data from ESRI; City of San Buenaventura.*

Planning and Policy Context

EXISTING POLICIES

The Ventura River Watershed is located almost entirely within the County of Ventura and the lowest six miles of its primary waterway runs through the jurisdictions of both the city and County of Ventura. The character of the Ventura River, both in its natural and developed aspects, is in part a reflection of policies of these local governments as well as those of the State of California, and they have created a favorable environment for the emerging parkway concept. The policies discussed below have focused on three objectives: limits on urban growth, the preservation of agricultural and open space resources, and the preservation and enhancement of water as a resource.

A regulatory framework for achieving these objectives at the state and county level began to develop in 1963, when concern over the irregular boundaries forming within rapidly expanding urban areas led the California Legislature to establish quasi-legislative bodies known as Local Agency Formation Commissions (LAFCO). LAFCOs are charged with controlling the boundaries of cities and special districts (Ventura LAFCO 2003). Two years later, the Ventura County LAFCO proposed the forming of special districts known as greenbelts (Ventura County Star 2004). These districts are protected by policy statements in which the county pledges not to permit any development that is not agricultural or open space; at the same time, cities promise not to annex these areas (Ventura LAFCO 2003). The first such greenbelt

FIGURE 1.3 *Guidelines for Orderly Development and SOAR areas. Produced by: Ventura County, Resource Management Agency, GIS Development and Mapping Services. Ventura County Resource Management Agency.*

was established in 1967 by the Cities of Santa Paula and Ventura in conjunction with the County.

Ventura County followed up the greenbelt concept in 1969 with the establishment of Guidelines for Orderly Development (Ventura LAFCO 2003). The only regulations of their type in California (Ventura LAFCO 2003), these provide that development should in general occur within the boundaries of incorporated cities (Ventura County 2006). They have the effect of preventing the county from developing in unincorporated areas while requiring cities to annex any area outside their boundaries that they wish to develop (Ventura LAFCO 2003). Further, they delineate the areas within which each city may potentially annex land.

Figure 1.3, taken from the Ventura County General Plan, shows two types of boundaries included in Guidelines for Orderly Development that clarify which governing bodies are responsible for a given geographic region. Areas of interest (shown in red), are defined partly by topography and community identity. Each of these areas is influenced by one incorporated city although each also includes unincorporated county land; they have the effect of encouraging the county to focus on regional rather than local functions. Spheres of influence (shown in magenta) show the anticipated future boundaries of cities, including areas currently unincorporated; any expansion of services in unincorporated areas within a sphere of influence is taken

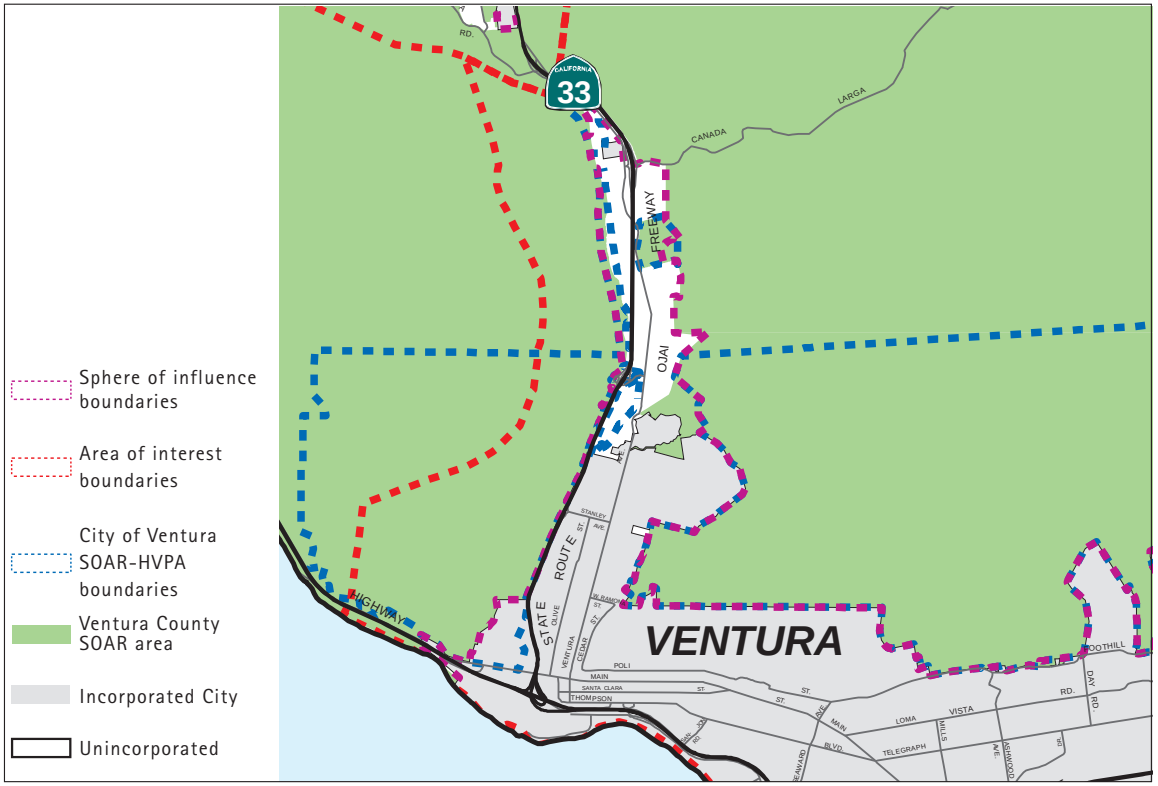


FIGURE 1.4 *This zoomed in view of the diagram in Figure 1.3 illustrates the extensive, yet incomplete, development restrictions currently in place in the proposed parkway corridor. The area in white is unincorporated county and falls within the City of Ventura's Sphere of Influence, but on close examination is not encompassed by the city's SOAR-HVPA boundary, which is represented by the dashed blue line. Produced by: Ventura County, Resource Management Agency, GIS Development and Mapping Services. Ventura County Resource Management Agency.*

on by the applicable city as part of a process of annexation (Ventura LAFCO 2003, Ventura County 2006).

Guidelines for Orderly Development and Ventura County Greenbelts provided context for the next major policy initiative, SOAR, an acronym for Save Our Agricultural Resources in the city of Ventura and for Save Openspace and Agricultural Resources at the county level (Ventura County Star 2004). SOAR measures, by establishing areas that are precluded from development except through voter approval, tend to discourage development outside of urban boundaries. The first SOAR measure was passed in 1995 by voter initiative in the city of Ventura (VC Star 2004). The county's SOAR measure passed three years later and is set to expire in 2020. Seven other cities Ventura County cities also passed SOAR measures between 1998 and 2000 (Watersheds Coalition of Ventura County (WCVC) 2006). Figure 1.4 illustrates that almost half of the proposed parkway corridor, the project site, is currently protected from development by SOAR, but the legislation will expire in 2030 unless extended (City of Ventura General Plan 2008).

Figure 1.4 (a zoomed-in portion of figure 1.3) shows how the combination of areas of interest, spheres of influence, SOAR, and a third measure, the Hillsides Voter Participation Act (HVPA) impact on the proposed Lower Ventura River Parkway corridor. Most of the east side of the proposed parkway corridor is either within the City of Ventura or within its sphere of influence; the North Avenues area (shown in white) is likely to be annexed by the city in the future. The west bank of the river and the hillsides above have overlapping coverage by city and county SOAR areas, but SOAR and HVPA narrowly miss most of the land within the city's sphere of influence. Taken as a whole, the map shows that a significant portion of the parkway corridor is slated for future annexation, and not protected from development by SOAR or HVPA. Furthermore, SOAR measures will expire unless extended by voters.

Despite incomplete coverage of the lower river, SOAR and HVPA are significant for the future of the proposed parkway. The implementation of HVPA has already led to the formation of a crucial stakeholder group, the Ventura Hillsides Conservancy. And, if voters continue to support HVPA, the measure will help to ensure that hillside developments do not negatively impact on the Lower Ventura River by introducing sediment and pollutants into the river.

Proposition 50

A state policy initiative has led to increased focus on river systems and on natural water resources, with a significant potential impact on the future of the Lower Ventura River. In 2002, California voters passed Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, with the stated purpose of protecting the state's water supply (CA Resources Agency 2007). The act authorized the issuance of general obligation bonds to provide funding to thirteen state departments for projects that include the maintenance of water infrastructure, coordination of water management and the enhancement of natural water resources (CA Resources Agency 2006).

The most significant provisions of Proposition 50 for this Vision Plan are those which authorized the Legislature to appropriate one hundred million dollars in funding for river parkway projects (CA Resources Agency 2007). Such projects are aimed at:

- providing opportunities for recreation, including trails along rivers and streams
- protecting and improving riverine or riparian habitat
- flood management through the maintenance or restoration of open space along rivers and streams
- conversion of existing developed riverfront land to parkway use
- facilities to support or interpret river or stream restoration and other conservation activities

In order to be eligible, proposed projects must meet at least two of the above-stated purposes (CA Resources Agency 2007). With the California River Parkways Act of 2004, the Legislature further implemented this program by establishing the California River Parkways Program under

the State Resources Agency. During the fiscal years ending in June 2006, 2007, and 2008, the agency has conducted three rounds of grant funding, awarding a total of over ninety-one million dollars for ninety-two parkway projects. These projects, when completed, will create 139 miles of trail and acquire or develop 7,564 acres of habitat for restoration. Proposition 84, approved by California voters in 2007, provides for sixty-six million dollars in additional funding that will be awarded over three years starting with the fiscal year ending June 2009 (CA Resources Agency 2006, 2007, 2008).

Proposition 50 also authorized the appropriation of funds for planning grants to local governments for the preparation of Integrated Regional Water Management (IRWM) Plans. In 2002, twenty-seven water-related agencies in Ventura County formed a coalition that was successful in obtaining funds for a county-wide IRWM Plan – in essence, a watershed plan for the three major watersheds in the County. This effort led in 2006 to the formation of the Watersheds Coalition of Ventura County (WCVC) and the outset of ongoing watershed planning for the Ventura River Watershed (see Existing Plans, below) (WCVC 2006).

EXISTING PLANS AND PROJECTS

In addition to the policy and legislation framework, numerous plans exist that will affect the future of the

MATILIJA DAM ECOSYSTEM RESTORATION PROJECT

The future of the Ventura River and watershed policy for the United States has been changed by an initiative that originated with non-governmental organizations and individual environmental activists in the Ventura Watershed. In the late 1990s, eight organizations including the Ventura County chapter of the Surfrider Foundation, the Friends of the Ventura River, and the Environmental Coalition of Ventura County, joined with individuals to form the Matilija Coalition for the purpose of promoting the ecological restoration of the Ventura River Watershed. The coalition's initial goal was to press for the removal of Matilija Dam in order to assist the return of steelhead trout to the watershed above the dam and to restore the natural sand supply to Ventura's beaches (Matilija Coalition 2008a). The coalition eventually included more than twenty-five organizations representing river restorationists, fly fisherman, whitewater enthusiasts, and wilderness preservationists, as well as corporate sponsors (Matilija Coalition 2008b).

Initiatives for the removal of the dam began at least as early as the 1970s, when Ed Henke, a lifelong Ventura resident and former steelhead trout fisherman on the river, individually lobbied many public organizations for restoration of the river to pre-dam conditions; Henke eventually formed the Friends of the Ventura River (Gustkey 1985). By 1999, the city and County of Ventura as well as a host of other governmental organizations had endorsed the idea (Jenkin 2002).

In 2001, after many years of discussion and planning, these efforts resulted in a cost-sharing agreement between the county and the United States Army Corps of Engineers for the Matilija Dam Ecosystem Restoration Feasibility Study (Jenkin 2002), and in funding for further plans and studies under Proposition 50 (discussed under Existing Policies, above). Finally, in September 2007, Congress approved (but did not appropriate) $143 million in funding (Collins 2007) for what will soon be the largest dam removal to date (Jenkin 2002), as part of the Water Resources Development Act of 2007. The dam removal project is currently in its design phase.

The Matilija project is the joint effort of many agencies under the auspices of the Ventura County Watershed Protection District. The project includes another feature of particular relevance to the Lower Ventura River: a program for the eradication of *Arundo donax* and other invasive plant species from the river. Eradication attempts have already begun in the upper watershed, with impacts that will eventually reach the lower river in the proposed parkway zone (VCWPD 2006).

These two efforts are interdependent. Dam removal will help to restore sediment balance in the river, restore some sand to the beaches downstream, and will restore the passage of steelhead trout into critical upstream spawning areas. However, the passage of steelhead trout and the movement of sediment in the river are also partly dependent upon removing the physical barrier imposed by *Arundo donax* and ensuring proper river flow by regulating surface water diversion and groundwater pumping.

Ventura River Watershed and provide context for the development of a plan for the Lower Ventura River Parkway. The first of these, the General Plans for Ventura County and the city of Ventura, has the broadest reach, encompassing land use planning around the proposed parkway area but also far beyond. A second category of plans, consisting of the Integrated Regional Water Management Plan and the Matilija Dam Ecosystem Restoration Project, address aspects of the Ventura River Watershed related to water resources and riverine and riparian habitat. A third category, including the Ventura River Estuary Enhancement Plan, the Ventura River Trail project, and the 1994 Biological Assessment, directly address habitat restoration and public access within the proposed parkway area. Finally, the last category consists of urban development plans that specifically address communities adjacent to the proposed parkway area.

General Plans

The Ventura County General Plan and the city of San Buenaventura 2005 General Plan both address future plans for growth and development in accordance with California law that requires that all local governments have a plan to guide development over a twenty year time span. Both plans have specific goals for the preservation and management of natural resources, goals that are in keeping with the concept of a parkway on the Lower Ventura River:

Protecting Ventura's fragile natural resources is a fundamental focus of the 2005 Ventura General Plan. Policies and actions in this chapter intend to ensure that coastal, hillside, and watershed features are preserved, remain visible and accessible, and demarcate boundaries for urban development to define and enhance the city's identity (City Of San Buenaventura 2005).

Watershed Planning

Watershed-based planning is based upon the concept, developed through the work of naturalist Aldo Leopold, poet Gary Snyder and many others, that an ecologically-sustainable human culture requires resource management based on planning units that cross traditional political boundary lines to encompass areas with common water drainages and ecological communities. Watershed-based planning, given formal support through Proposition 50, has the potential to improve resource allocation and water quality by giving decision makers both the authority and the responsibility to consider both the sources (headwaters) and the downstream areas of the waters impacted by their policies. The IRWM Plan in its latest version effective 2006 is a comprehensive look at the three major watersheds of Ventura County, with the goals of conserving and enhancing water supply, improving water quality, reducing injury and damage from flooding, protecting and enhancement of habitat and ecosystems and improvement of public recreation, access and education regarding water resources (Watersheds Coalition of Ventura County 2006). One critical component of the plan for the Ventura River Watershed incorporated into the IRWM Plan is the Matilija Dam Ecosystem Restoration Project, described in the sidebar in this section.

Project Area Plans and Projects

The Ventura River Estuary Enhancement and Management Final Plan (1994) is an assessment of habitat and a plan for improved public access to the estuary and surrounding wetlands at the mouth of the Ventura River. It includes proposals for the reconfiguring of the railroad trestle at the river mouth to allow river flow and sediment transport to occur more naturally, and for a system of carefully designed trails that would allow better visitor access to the estuary while respecting its sensitive habitat and private property.

The Ventura River Trail, constructed in 1999, was a first step in providing improved public recreational access near the Lower Ventura River. With the trail being located primarily on a former railroad right of way separated from the river by a levee and highway, it provides no direct access, and very little visual access, to the river within the six miles of the parkway corridor. Nevertheless, the trail has provided many cyclists, and the occasional walker, with a much more intimate familiarity with the urban and industrial communities along the lower river, and at Foster County Park it connects with the Ojai Valley Trail, connecting the proposed parkway area with upstream areas of the watershed.

The separation between the River Trail and the river itself is partly the result of implementation of many of the recommendations of the Biological Assessment for the trail, prepared in 1994. In consideration of the sensitivity of riverine habitat, the consulting biologist recommended measures specifically to keep trail users away from the Lower Ventura River. Partly, this resulted from initial proposals for equestrian use of the trail downstream from Shell Road (Hunt 1994b). However, this general concern for the impact of human visitors on ecosystems in the river floodway significantly affects the ideas presented in this Vision Plan.

Finally, with much of the proposed parkway area within the sphere of influence of the city of Ventura, the urban planning and economic development plans of the city will have an impact on the development of a parkway.

The Economic Development Strategy 2005-2010 (EDS), prepared by the city of Ventura's Economic Development and Revitalization Division, identifies six focus areas for economic development within the city. Notably, three of those communities – Downtown, Westside and North Avenue – are partially or wholly adjacent to the proposed parkway area. The focus on revitalization for the riverside areas of the city is reflected in the city's General Plan and in the Specific Plans for those communities. These areas are discussed more fully in chapter 5, Cultural Elements.

Downtown and Westside

The focus of the EDS and the city's Specific Plan (March 2007) on revitalization is accompanied by a concern for preservation and celebration of the unique historic resources of the historic downtown core that dates back to the founding of the Mission of San Buenaventura in 1782. The emphasis on historic features is an important factor in envisioning concepts for connecting downtown to the proposed river parkway.

The communities of Westside and North Avenue have particular relevance for the parkway concept because both of these residential/industrial neighborhoods extend to the east bank of the Ventura River within the project area. The Westside community, part of the city of Ventura, lies along the river immediately upstream from the historic downtown area, and is further discussed in chapter 12 of this Vision Plan. North Avenue is unincorporated but within the city's sphere of influence; it lies further upstream, adjacent to the Canada Confluence site envisioned in chapter 10. Since 1998 both of these communities have been the subject of an ongoing discussion in the city regarding revitalization.

The 1999 Westside Urban Design Plan advocates the greening of city streets in that neighborhood, while the 2002 Westside Revitalization Plan calls for mixed-use developments. No Specific Plan has been developed by the city for this neighborhood. With regard to North Avenue, a notable feature of the EDS is its recommendation for City annexation of this community.

One goal that emerges from these plans with regard to both the Downtown and Westside communities is the remediation and redevelopment of brownfield properties, a subject further discussed in chapter 10. An example of the issues that this poses for the proposed river parkway is found in the recommendation of the EDS for the redevelopment of a highly visible brownfield site in the North Avenue area into an urban village that will function as an economic driver for the city. The proposed site has aging infrastructure, is likely to be contaminated, has a high risk of flooding, is on land that appears to have been part of the riverbed before development and is located at the confluence of the river and one of its tributaries. As discussed in Part 3, Design, these factors may argue for permanent open space with passive recreational opportunities rather than urban development.

Students in the City and Regional Planning Department at California State Polytechnic University, San Luis Obispo carried these development proposals forward to a more advanced stage of visualization with their comprehensive urban design, Ventura Avenue to the Future, in 2002. Of the plans discussed above, only this one acknowledges the existence of the Ventura River just footsteps away from Westside and North Avenue. With that exception, the plans discussed above have an emphasis on redevelopment that reflects the economic priorities of residents of these urban areas, but fall short of the spirit of the General Plan by omitting any consideration of the ecosystem services provided to those communities by the nearby Ventura River, and the role that the river should play in the future of those communities.

Conclusion

The policies, plans and projects discussed above provide a context for approaching the river parkway concept that is philosophically supportive. Many of their goals, such as river restoration, water conservation, improved public access, limits on growth and revitalization of riverside communities, are consistent with the purposes of river parkways expressed by the Legislature in Proposition 50. However, these initiatives will not eliminate several of the greatest threats to the Lower Ventura River without additional input. One of those threats occurs with every glass of water that a watershed resident drinks and every toilet flushed, since those daily actions contribute to the removal of flow from the river and from its groundwater supplies. Another threat is the existing potential for piecemeal development of property along the riverside. Hence, this Vision Plan envisions a river parkway as an essential next step in order to tie together all of the protections afforded by activists and regulators in the past into an integrated plan for the future of the lower river itself.

History

SETTLEMENT

This Vision Plan has the goal of strengthening the relationship between people and the Ventura River. As long as people have lived on the coast of what is now Ventura County, they have had a relationship with the river, but that relationship has changed many times, and in each instance, the change has had an impact on the river itself. An understanding of these changes provides an important context for the re-envisioning of the Lower Ventura River and the planning of the parkway.

First Dwellers

Evidence exists of the occupation on Santa Rosa Island by humans as early as thirteen thousand years ago. Ancestors of the people who are now commonly called Chumash probably lived on the Channel Islands and the mainland by nine thousand years ago (Timbrook 2007).

People had every reason to settle in this locale. An abundant variety of ecosystem resources providing food, medicine, tools, building materials, and ritual objects – was available to the coastal Chumash. Chaparral covered hills rose sharply to 3,500 feet in elevation within several miles of the coast. Hillside streams flowed into a broad river valley and then into lagoons and wetlands. Northern and southern ocean waters met in what is now the Santa Barbara Channel, producing an upwelling of nutrient-rich water and supporting rich marine life (Timbrook 2007).

THREE PLANTS: EXAMPLES OF DEPENDENCE ON THE RIVER

Tule, also called Bulrush (*Scirpus* ssp.) grew thickly in the marsh at the mouth of the Ventura River, and also grew along streams in the watershed. Tule was the most common material used by Chumash for thatching houses and making mats. Venturenos tied together bundles of tule to construct light canoes designed for calm waters. One early twentieth century Ventureno, Simplicio Pico, described having seen these boats in the Ventura River estuary (Timbrook 2007). Red Willow (*Salix laevigata*) and Arroyo Willow (*Salix lasiolepis*) grew in riparian zones along rivers and streams. Red willow was the main construction material for Ventureno dwellings, and was the only firewood used for sweathouses, while arroyo willow had medicinal uses. Various rushes (*Juncus* ssp.) grew on the sand dunes at the mouth of the Ventura River and in riparian areas, and were the source material for both twined and coiled basketry (Timbrook 2007). An outstanding coiled Juncus basket (figure 1.5) is now displayed at the County of Ventura Museum; it is believed to have been made by Petra Pico, a Ventura Chumash woman, in about the year 1900 (Museum of Ventura County 2008).

FIGURE 1.5 *Juncus basket circa 1900.*

Approximately five hundred years ago, there were about twenty thousand people speaking various Chumash dialects, and they had one of the highest population densities in North America. Chumash lands were centered on the Santa Barbara Channel, and extended from Paso Robles to Malibu and from the Northern Channel Islands to the edge of the Great Central Valley, including much of what is today Santa Barbara, San Luis Obispo, and Ventura Counties (Timbrook 2007). They were divided into distinct groups geographically and by language (Museum of Ventura County 2008).

The Spanish mission founders in 1782 found between 2,500 and 4,200 people who spoke a distinct dialect in at least thirty-five villages in the Ventura region – they called them Ventureños. One of the largest Chumash villages, Shishalop ("in the mud"), was located near the mouth of the Ventura River in present-day Ventura (Museum of Ventura County 2008).

Chumash life was based on fishing, hunting and gathering wild plants (Timbrook 2007). The biodiversity of the Southern California coast served them in this regard; at least fifteen hundred species of plants were native to the region, and one contemporary researcher has identified more than one hundred and thirty of them that were used by Chumash (Timbrook 2007).

Spanish Settlers

The relationship of indigenous peoples to the land and their settlement of Shishalop near the mouth of the Ventura River, had an impact on the Spanish decision to locate a mission at the river mouth in 1782. Spanish settlers tended to locate their Missions and Pueblos near existing Native American villages, partly in order to exploit them as a source of labor (Rochlin 1999). The Spanish quickly employed the Ventura River as a lifeline to their settlement, and from 1792 to 1815, started the two-century-long process of "re-plumbing" the river by constructing a system of open ditches and aqueducts to carry fresh water by gravity flow from a site near the confluence of Coyote Creek with the Ventura River (at present-day Foster Park, the northern end of the proposed parkway) to a cistern with charcoal filtration on the hill above the mission. More than two hundred years later, the city of San Buenaventura still draws some of its drinking water from the same approximate location. A portion of the water was diverted prior to that point and used, unfiltered, for crops, bathing, and washing (Museum of Ventura County 2008).

FIGURE 1.6 *South view of the town, with the church and mission buildings of San Buenaventura. Date: May 1865. Source: The Bancroft Library. University of California, Berkeley.*

Farmers

In the mid-1860s, several decades after the Treaty of Guadalupe Hidalgo ceded California to the United States, the combination of a Ventura River flood followed by years of drought devastated the Spanish ranching economy in the area. The communal agricultural style of the ranchos began to give way to intensive, market-based family farms owned by immigrants from the American East, Midwest, and Europe who began growing wheat and barley (Museum of Ventura County 2008). Later, orchards of apricots, walnuts, avocados, and citrus became a feature of the Ventura River Valley. At first, ranches and farms grew crops well-suited to the arid region and employed a limited amount of surface water from the Ventura River. By the late 1800s, however, both agriculture and residential growth taxed water supplies. Farmers turned increasingly to pumping well water from the aquifers of the watershed, and numerous small water companies sprang up (Museum of Ventura County 2008).

Emergence of San Buenaventura as a City, E.P. Foster, and the Embrace of the River as a Cultural Asset

During the second half of the nineteenth century, San Buenaventura grew from a small mission settlement to a thriving commercial center, assisted by the arrival of the Southern Pacific railroad in 1887 and the establishment of the County of Ventura (with San Buenaventura as its county seat) in 1879 (Museum of Ventura County 2008). Where prosperity and stature increased, "good works" for the betterment of the city were sure to follow. One problem to be solved was the inconvenience experienced by coastal travelers to and from the north, who had to wait for low tide to ford the Ventura River. On July 4, 1913, an Independence Day parade marched down Main Street and across the new Ventura River Bridge, celebrating the opening of a new, convenient connection with the city of Santa Barbara to the north.

FIGURE 1.7 *Picnic in Seaside Park, 1928. The two "bookends" of the proposed parkway corridor, Seaside Park at the river mouth and Foster County Park upstream, were popular for civic events such as this. Photo: Ventura County Star; Museum of Ventura County.*

One prominent philanthropist, E. P. Foster, and his family attempted to redefine the city's relationship with the Lower Ventura River by calling attention to the value of the river and its environs as a beautiful natural asset. In 1909, Foster donated land for what is now Seaside Wilderness Park and Emma Woods State Park at the mouth of the Ventura River to Ventura County. (In 1969 Seaside Wilderness Park was given by Ventura County to the city of San Buenaventura.) Local tradition holds that Foster planted Monterrey pine trees (*Pinus radiata*) in an effort to beautify the coastal marsh; several of the struggling trees remain today.

In the early 1900s, Foster effectively bracketed the present-day parkway concept with cultural assets by donating what is now Foster County Park on the Ventura River, six miles from the estuary. The Park entrance was adorned with carved stone lions, and later, a depression-era public amphitheater built by the Works Progress Administration (WPA). In addition to these notable contributions, E.P. Foster was the first chairman of the Forestry Service, built San Buenaventura City Hall, the city's first library and hospital, and strongly supported his wife in the championship of women's rights.

Oil

The Lower Ventura River Valley was redefined as an economic resource in 1914 when Ralph Lloyd converted his family's ranchland and established the Ventura Avenue oil field. Within a few years, the Shell Oil Company purchased 13,000 acres from Lloyd, and the company's improved drilling methods produced a large oil strike in 1925. By 1950, Ventura Avenue was one of the highest producing oil fields in the United States (Museum of Ventura County 2008).

Oil production eventually impinged on sections of both the east and west banks of the Lower Ventura River channel, and resulted in the establishment of an industrial zone and a residential community for oil workers in an active flood zone on the eastern side of the river valley. Production on Ventura Avenue peaked in 1954, and a steady decline since that time in the production of land-based Ventura County oil wells led the major oil companies to shift to offshore and international production, although smaller oil companies continue to drill in Ventura County using more efficient technologies (Museum of Ventura County 2008).

FIGURE 1.8 *View of the Ventura Avenue oil field, 1935. Photo: Ventura County Star; Museum of Ventura County.*

Oil production and the likelihood of associated soil and water contamination from related industries eventually led to the public's perception of sections of West Ventura as brownfield areas.

The growth of Ventura Avenue and the river valley as an industrial asset coincided with the era of hydraulic engineering by the Bureau of Reclamation and the Army Corps of Engineers. In 1947, the Bureau completed the Matilija Dam sixteen miles upstream from the river mouth. The following year, the Army Corps effectively walled off the Ventura River from the city of Ventura by building the flood-control levee that constrains the lower 2.6 miles of the Ventura River. The river, however, was still a destination of choice for many Ventura residents.

CONCLUSION: IMPLICATIONS FOR THIS VISION PLAN

The relationship between people and the river has changed over time, and each change has reflected the course of Ventura County and Southern California. Once, the relationship was an intimate one, of people living at the river mouth, drawing their life and sustenance from the resources of the river and the sea, and celebrating their unity with the land as a religious tradition and an organic fact of life. Later, the relationship was primarily exploitative – using the river's water as the basis for settlement and agriculture – but people still lived at the side of the river or traveled to it, acknowledged it as an important feature of the land, and celebrated it. Later still, Venturans walled themselves off from the river in order to protect their city from its floods, and increasingly came to view it merely as an adjunct to (or an impediment to) industrial land uses in the river valley, a convenient but unseen water tap, and a receiving body for wastes. Eventually, many Venturans practically forgot that the river was there. Today, re-connection has become a priority, providing the context for this Vision Plan.

FIGURE 1.9 *Ventura River steelhead trout, 1946. Photo: Tortilla Flats Project.*

"River parkways provide communities with safe places for recreation including family picnics; bicycling and hiking; areas for river access for swimming, canoeing, and fishing; and many other activities."

California River Parkways Act of 2004: California Public Resources Code 5751(b)

PART 2: INVENTORY AND ANALYSIS

"River parkways help revitalize deteriorated urban neighborhoods and provide an anchor for economic development by providing important recreational and scenic amenities"

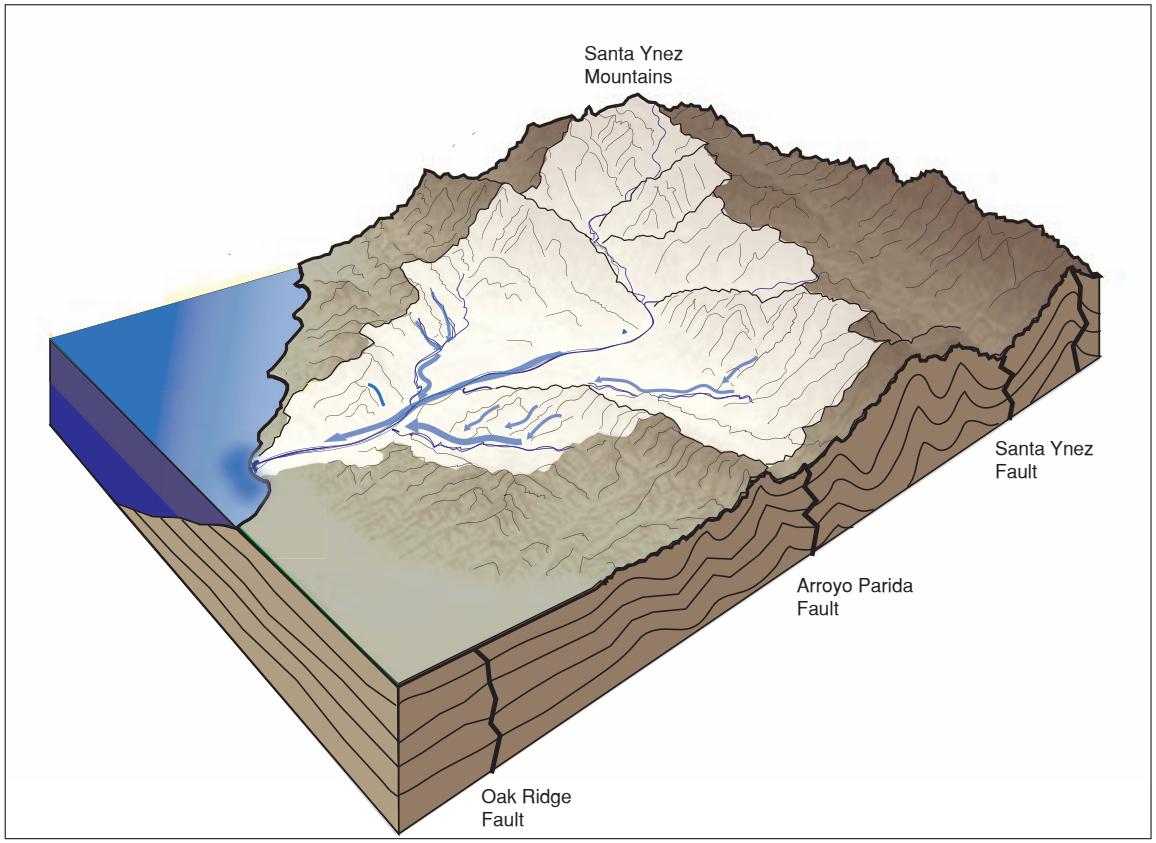
California River Parkways Act of 2004
California Public Resources Code §5751(c)

CHAPTER 2: FOUNDATIONS

Geomorphology

THE WATERSHED

The watershed which is drained by the Ventura River is fan-shaped, wide at the headwaters and narrow at the river mouth, occupying approximately 228 square miles and ranging in elevation from approximately 6,000 feet to sea level. The watershed is characterized by the transition from steep mountain slopes at the headwaters of its streams to a flat, alluvial river valley where the Lower Ventura River runs to the sea. Nearly forty-five percent of the watershed is classified as mountainous, forty percent as foothill, and fifteen percent as valley. More than 90% of the watershed has vegetative cover, either shrub and brush (75%) or forest (20%) (Greimann 2006). Approximately one-half of the watershed, the upper portion, is undeveloped lands lying within Los Padres National Forest. The lower half of the watershed contains a combination of land uses, including the semi-rural City of Ojai, the urban City of San Buenaventura, numerous agricultural and industrial operations, and some pristine hillsides of coastal sage scrub.



[FACING PAGE] FIGURE 2.1 *The Ventura River Watershed.*

FIGURE 2.2 *The Ventura River Watershed was formed by marine sedimentary layers that were uplifted, folded and faulted by tectonic processes (vertically exaggerated). Data from USGS , Norris and Webb 1990, Bing Yen Assoc. 2000.*

FORMATION OF THE LAND

Geomorphology is the science dealing with the nature and origin of the earth's topographic features (Webster's 1980).

The Ventura Watershed lies within two larger geologic structures. The first of these is the Ventura Basin, a depression approximately 120 miles long that includes the area between the Channel Islands (including the Santa Barbara Channel) and the Santa Ynez Mountains. The Basin, in turn, lies within the Transverse Range geomorphic province which consists of many overlapping east-west mountain ranges with intervening valleys, reaching across Southern California from the seacoast nearly to the Colorado River (Norris and Webb 1990).

The land that underlies this region was formed from flat layers of marine sediment – now more than 58,000 feet thick – while seas repeatedly advanced and receded across much of what is now California between the Cretaceous Period (144 million years ago) and the Pleistocene Epoch (1.4 million years ago). At a relatively recent time in geological history, perhaps as late as 29 million years ago, these layers were uplifted, folded and faulted by tectonic forces, forming the Santa Ynez Mountains (Norris and Webb 1990).

Thus, in geologic terms, the mountains of the watershed are young and the ongoing folding and faulting produces uplift that has been estimated at up to 0.59 inches per year (Rockwell et al. 1984). The relative youth of these mountains is manifested in steep slopes throughout the upper watershed. The combination of steep slopes, unconsolidated marine sediments (sandstone), and active uplift produces one of the highest rates of debris and sediment production in North America (Greimann 2006). For a discussion of the impacts of heavy sediment production on the form and function of the Ventura River, see chapter 4, Hydrology.

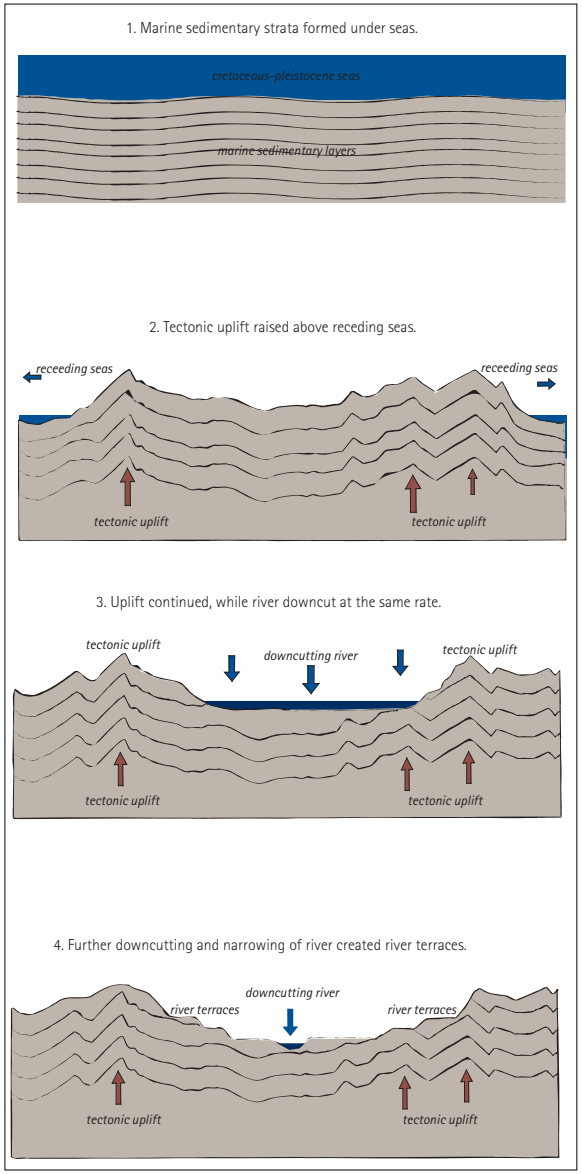


FIGURE 2.3 *This series of schematic diagrams suggests the geomorphic processes that resulted, in the project area, in the formation of a river valley with abandoned floodplain terraces.*

THE VENTURA RIVER VALLEY

The valley that encloses the Lower Ventura River acquired its form through a combination of tectonic uplift and the downcutting of the river itself which took place at approximately the same rate. Floodplain terraces along the sides of the valley today hint at the former levels of the river, as shown in figure 2.3 (Rockwell et al. 1984).

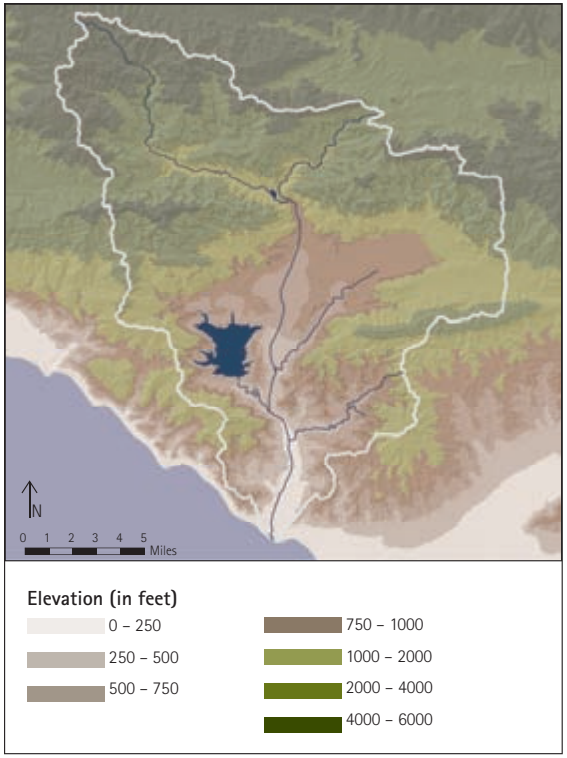


FIGURE 2.4 *Elevation in the Ventura River Watershed. Data from USGS National Elevation Dataset .*

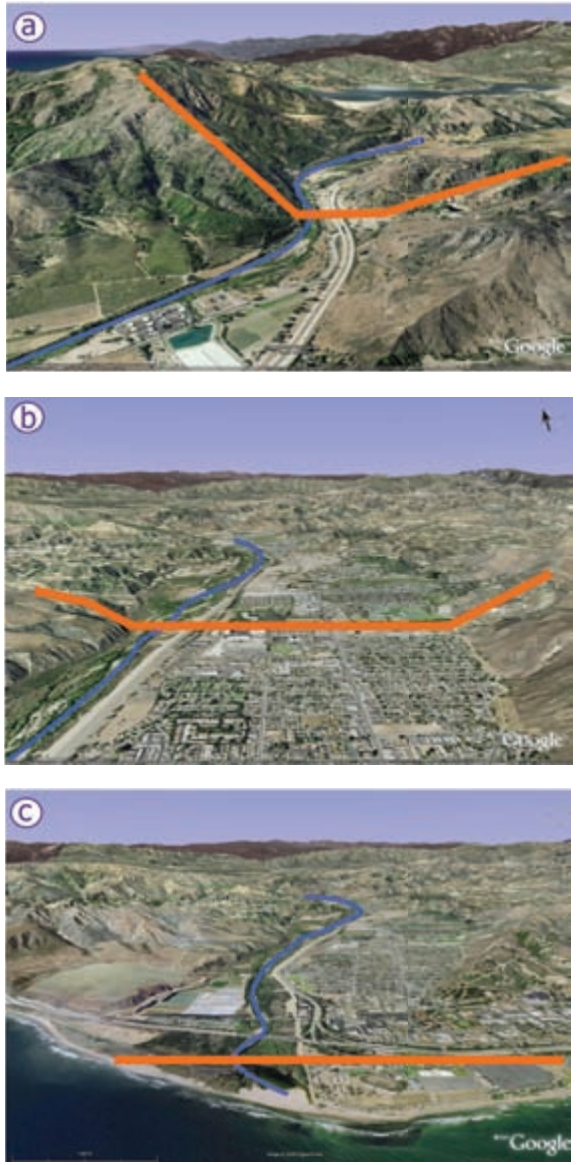


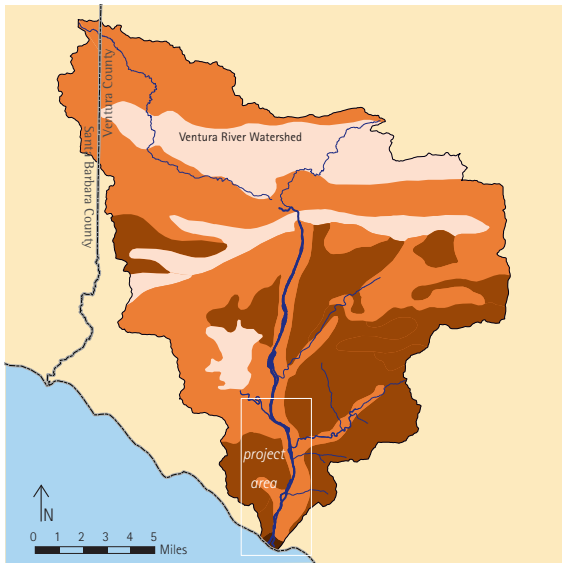
FIGURE 2.5 *Three sections through the Lower Ventura River Valley show the wide variety of topography in the Vision Plan area. Photo from Google Earth.*

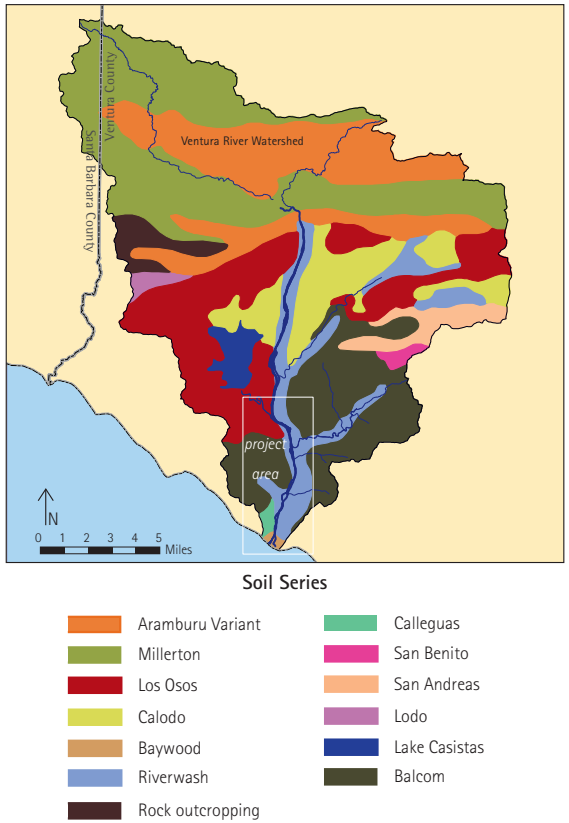
Soils

The most prominent soils in the Ventura River Watershed are loams, clay loams, fine sandy loam, and fine sand (USDA, NRCS 2008). Loam soil is well suited for agriculture because it retains nutrients well and retains water while still allowing the water to flow freely. Much of the soil underlying the proposed parkway area is riverwash, consisting of coarse sediments.

The soils of the watershed are well-drained, with permeability ranging from slow to rapid. Soil permeability describes the rate at which water moves through it. Soils with slow permeability are fine textured, like clays, that permit only slow water movement. Moderately or highly permeable soils are coarse-textured, like sands, and permit rapid water movement.

For slow permeability soils, rainwater will either accumulate on or flow across the surface, while in highly permeable soils rainwater will easily soak into the soil. The permeability of soils is the most important factor for determining the characteristics and frequency of landslides (ACOE 2004). Along the Lower Ventura River in the proposed parkway zone, soils are primarily permeable, with infiltration rates ranging from 0.2 to 6 inches per hour (figure 2.6).





[ABOVE] FIGURE 2.6 *Soil permeability in the Ventura River Watershed. Data from U.S.D.A. NRCS STATSGO Soil Data.*
[RIGHT] FIGURE 2.7 *Soil series in the Ventura River Watershed. Data from U.S.D.A. NRCS STATSGO Soil Data.*

SOIL TYPE	DRAINAGE	RUNOFF	PERMEABILITY
Millerton Fine Sandy Loam Series	well to somewhat excessively drained	medium to rapid runoff	moderately rapid permeability
Aramburu Clay Loam Series	well drained	low to high runoff	moderate permeability
Calodo Clay Loam Series	well drained	medium to very rapid runoff	moderately slow permeability
Los Osos Loam Series	well drained	very high runoff	slow permeability
Balcom Loam Series	well drained	low to high runoff	moderate to moderately slow permeability
Calleguas Clay Loam Series	well drained	medium or high runoff	moderate permeability
Baywood Fine Sand Series	somewhat excessively drained	slow runoff	rapid permeability

Natural hazards

FAULTS

Multiple fault zones cross the Ventura River Watershed. The largest active fault is the Santa Ynez Fault, which is over ninety miles long (ACOE 2004). Other active faults of the watershed include the Tule Creek Fault, the Red Mountain Fault, the Arroyo Parida Fault, and the Ventura Fault.

LIQUEFACTION

The steep and highly erodible Santa Ynez Mountains contribute alluvial soils to the Ventura River Valley. Alluvial soils are highly susceptible to liquefaction-related hazards when saturated (Hitchcock 2000). Liquefaction, the process in which loose soils temporarily lose strength due to strong ground shaking, can cause considerable damage to structures and utilities during a major earthquake. The highest rates of liquefaction hazards in the Ventura River Watershed are along the floodplain of the Ventura River.

LANDSLIDES

A landslide is defined as the movement of a mass of rock, debris, or earth down a slope (Cruden 1991). Landslides commonly occur in connection with other major natural disasters such as earthquakes, wildfires, and floods the primary cause of a landslide is gravity acting on an over-steepened slope. Other factors that contribute to landslides include earthquakes and steep slopes that are saturated by heavy rains (USGS 2008).

FIGURE 2.8 *Major faults of the Ventura River Watershed. Data from Norris and Webb, 1990; Bing Yen Associates, 2000.*

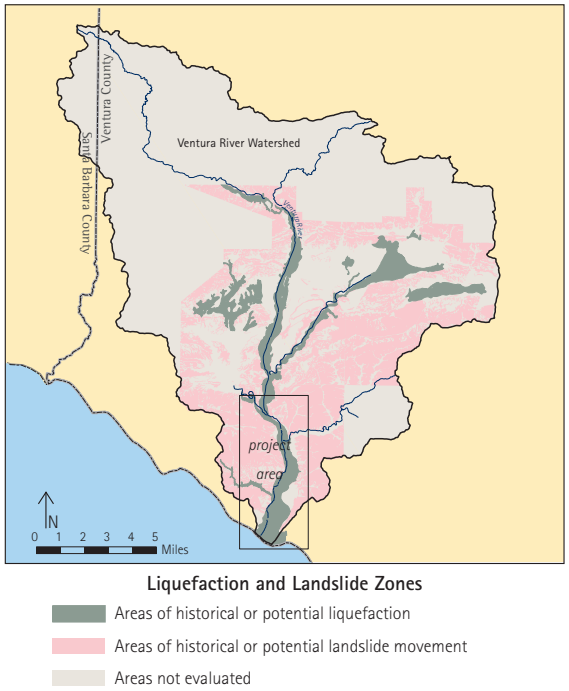


FIGURE 2.9 *Seismic Hazard Zones within the watershed. Data from California Geological Survey Seismic Hazard Mapping Program.*

FIRE

In Southern California, wildland fires are a common occurrence and have been for thousands of years, as a result of both human and natural factors. Most of the project area along the Lower Ventura River is on a wildland/urban interface with moderate to very high fire hazard (figure 2.10) The recurrent pattern of fire in a particular place is called a fire regime. Fire regimes are often an essential feature of plant and animal ecosystems, which have adapted to and benefit from fire disturbances. (For more on ecosystems of the Ventura River Watershed, see chapter 4.) Wildfires occur most often during the driest time of the year, late summer and early fall (Quinn and Keeley 2006).

On the sea floor of the Santa Barbara Channel, sediment deposits carried from the Santa Ynez Mountains reveal patterns of fire and floods that go back several centuries. These sediment deposits, known as varves, show that in the Santa Ynez Mountains, two very large fire-flood episodes occurred in the period between 1400 and 1550 CE. The varves also reveal the occurrence of large fires approximately once every sixty-five years over the past six hundred years (Quinn and Keeley 2006).

Areas burned by wildfires are particularly susceptible to landslides, since wildfires increase the erodibility of land surfaces by clearing away vegetation, and transforming soil properties, which alters the permeability of soil and increases vulnerability to raveling. The largest wildfire of 1985 in the State of California occurred in the Ventura River Watershed, burning 90,000 acres (U.S. Bureau of Reclamation 1995).

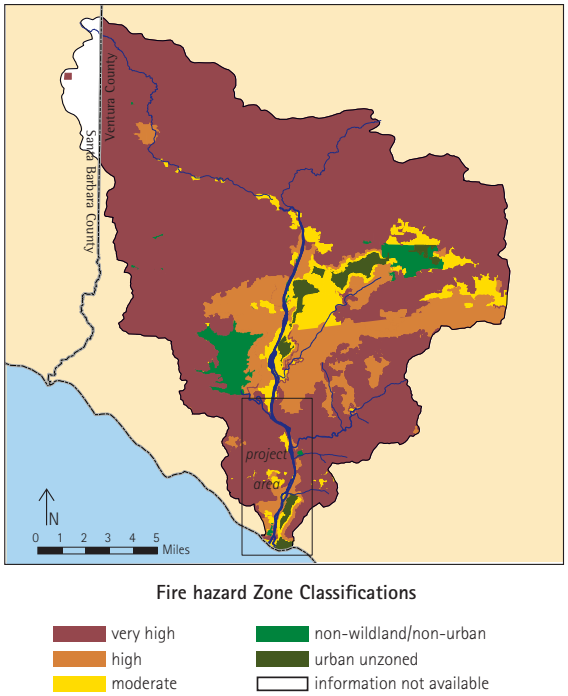


FIGURE 2.10 *Wildfire risk in the Ventura River Watershed. Data from California Department of Forestry and Fire Protection.*

Climate

The Ventura River Watershed has a Mediterranean climate with mild winters and generally rainless summers (ACOE 2004). Figure 2.13 shows the average annual and monthly high and low temperatures, which hover in the range between 50 and 70 degrees Fahrenheit (Western Regional Climate Center 2008). Among the watersheds of Ventura County, the Ventura River Watershed has the highest amount of rain (Watersheds Coalition of Ventura County 2008).

In an average year, the project area receives approximately nineteen inches of rain, although drier than average years are also common. Cooler than normal ocean temperatures, dubbed La Niña, lead to a decrease in evaporation and rain, which contributes to drier years. Despite arid to semi-arid conditions being the norm, warm ocean temperatures, known as El Niño, bring wet winters when the maximum average rainfall year approaches forty-six inches of precipitation (Watershed Protection District, 2008). The heaviest rain falls in the upper watershed, and it is not uncommon for winter storm events and their cumulative impact to be quite dramatic, causing flooding and erosion. (For a detailed discussion of flooding, see chapter 3, Hydrology.)

In addition to rain, the climate of the Ventura River Watershed is also influenced by fog. Low clouds and fog are most prevalent from mid-May to mid-July, particularly during the night and morning hours. Drizzle frequently falls in the morning when the low clouds and fog are the thickest. Fog begins to decrease in intensity and duration from mid-July through mid-September. August and September are typically the hottest months with only occasional low clouds and fog during the early morning hours (Ventura County Air Pollution Control Board 1998).

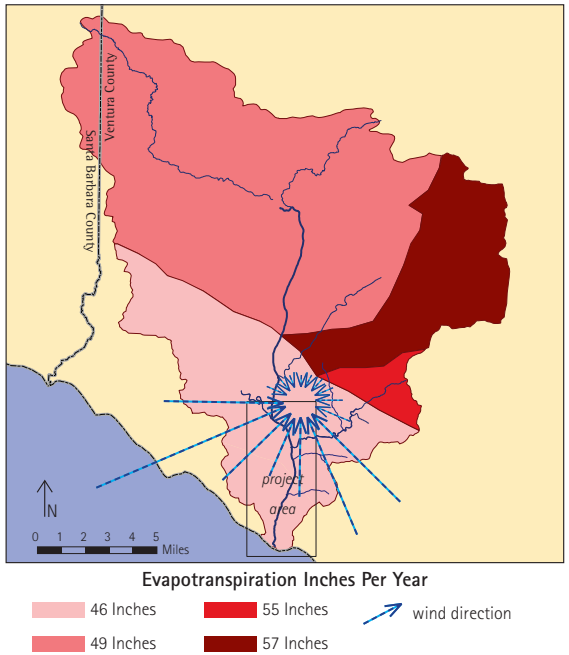


FIGURE 2.11 *Evapotranspiration and prevailing wind direction in the Ventura River Watershed. Data from Western Regional Climate Center and California Irrigation Management Information System.*

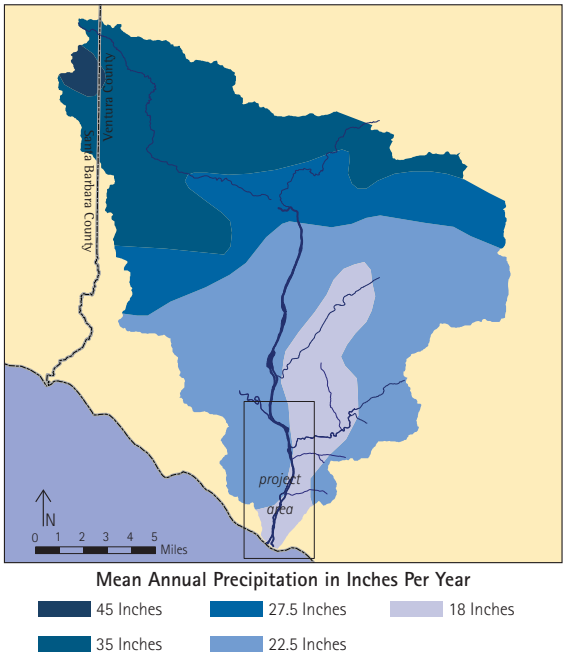


FIGURE 2.12. *Mean annual precipitation in the Ventura River Watershed. Data from California Fire Resource Assessment Program.*

The Ventura River valley acts as a corridor through which moisture-laden marine air moves inland. As ocean temperatures increase during the summer, the occurrence of fog decreases (Ferren Jr. et al1990).

Figure 2.11 illustrates wind inputs, evaporation from soils and other surfaces, and moisture inputs to the atmosphere through the transpiration of plants, a process known collectively as evapotranspiration. In comparing the distribution of precipitation with evapotranspiration, a direct correlation between areas with the highest rainfall and the highest evapotranspiration rates is apparent. In general, these areas also tend to have the highest temperatures.

Climatic considerations, temperature, sun and shade, the availability of water through rain and fog, wind speeds and frequency, and evapotranspiration paint a particular picture for the parkway area in terms of design opportunities and considerations. For humans, the dominant weather pattern of warm, sunny days with offshore winds provides a prime opportunity for outdoor recreation and education. Though less frequent than sunny days, foggy and rainy days provide additional opportunities for observation of natural processes and outdoor recreation with an experiential quality that is distinct from sunny days.

Climatic conditions are also an important indicator of the planting palette best suited for this region. Plants which are able to utilize fog, are not overly sensitive to wind, do not need regular rain, and are also able to tolerate and even thrive in years of inundation are best suited for this area.

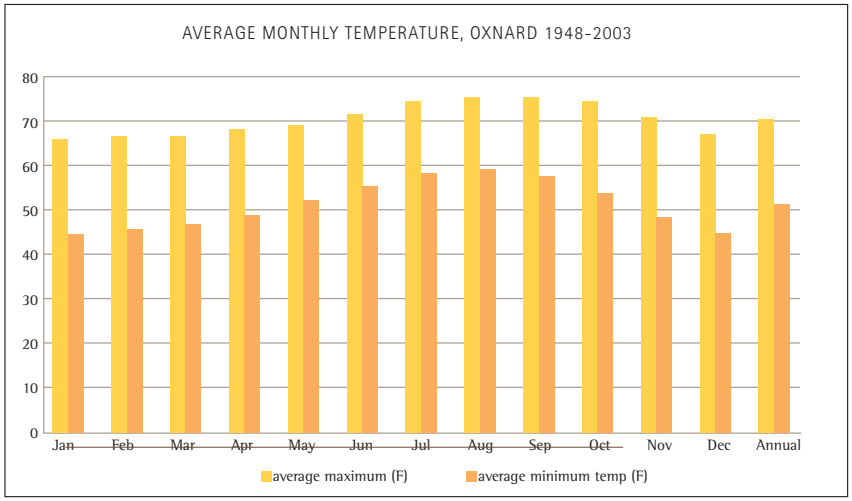


FIGURE 2.13 *Average monthly temperature, 1948-2003*
Data from WRCC 2008.

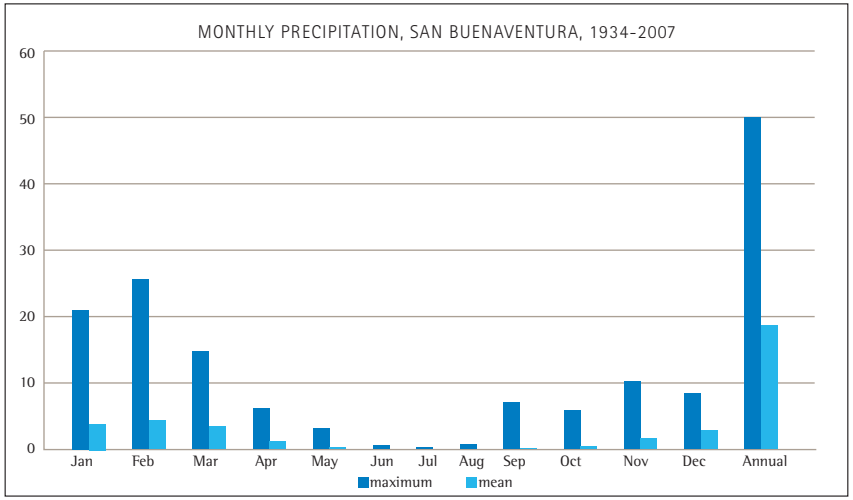


FIGURE 2.14 *Monthly precipitation, San Buenaventura, 1934-2007.*
Data from Ventura County Watershed Protection District, 2008.

CHAPTER 3: HYDROLOGY

Hydrology Overview

This chapter is about water – the supplies of water that exist in and around the Parkway Vision Plan area, the ways that water moves between the earth's atmosphere, surface, and subsurface, the demands that people have placed on this resource, and finally, the impacts that those demands have had on the Lower Ventura River, the site of this Vision Plan.

Water is addressed at four scales in this Vision Plan:

- The County of Ventura is the political unit that encloses nearly all of the Ventura River Watershed. Although it is not a geographical unit for looking at the physical behavior of water in and around the Ventura River, the County is significant for the important impacts that its planning decisions will have on the Parkway Vision Plan area.
- The watershed is the most important geographical unit for studying the physical properties and behavior of water as a resource for this Vision Plan, and a discussion of the movement of water through the watershed is a prelude to consideration of the parkway area.
- The Lower Ventura River, comprising the core of the Parkway Vision Plan area, is the overall site of this project and in this chapter, the focus for discussion of the impacts that development has had on the quantity and quality of water in and around the river.
- Finally, each of the four smaller design sites that are addressed in the Design section of this plan pose specific challenges and opportunities, addressed in that section, for utilizing the Parkway as a means for restoring the flow and the quality of water in the river and enhancing peoples' appreciation for and understanding of the river.

The sequence of this chapter is as follows:

- A discussion of water resources and hydrological processes in the watershed
- An introduction to the Ventura River as a whole
- A discussion of the Lower Ventura River, the site of this Vision Plan, with particular regard to the developments that have changed the functioning of the lower river
- Finally, a discussion of water quality and issues arising from pollution in the Lower Ventura River

[FACING PAGE] FIGURE 3.1 *A channel of the Lower Ventura River meandering over nearly flat ground north of the Main Street Bridge, near downtown Ventura. In this reach, the river runs in multiple channels within a floodway (riverbed) that is much wider than the single channel shown in this photo.*

FIGURE 3.2 *Looking upstream from the top of the proposed parkway corridor.*

Ventura River Watershed Hydrology

EXCHANGES: HOW WATER MOVES IN AND AROUND THE WATERSHED

The river that forms the backbone of this Vision Plan originates in hydrologic processes at the watershed scale. The land and ocean surface continuously interact with the atmosphere, receiving water in the form of precipitation, humidity, and fog. The fact that precipitation is concentrated in the upper, mountainous portion of the Ventura River Watershed (see chapter 2, Foundations) means that most watershed water originates there. The area's Mediterranean climate pattern with wet winters and dry summers corresponds with seasonal variation in the levels of water in streams and groundwater basins.

However, the spatial and seasonal pattern of precipitation is counteracted to a limited degree by fog, which is concentrated in the lower watershed near the coast and is heavy on summer mornings as well as during winter Santa Ana conditions (Noonkester 1979). Fog is perhaps under appreciated as a significant source of water; in one area of Northern California, fog delivers the equivalent of ten annual inches of precipitation to coastal watersheds (Gilliam 1962; Bakker 1971).

The land also returns water to the atmosphere through the processes of evaporation and transpiration, collectively referred to as evapotranspiration. Transpiration is the evaporation of water from plant surfaces and tissues. Transpiration is a significant factor in the Ventura River Watershed, where a majority of the land surface has vegetative cover, either wildland or agricultural. One large oak tree delivers approximately 40,000 gallons of water to the atmosphere annually, and an acre of corn gives up 3,000 to 4,000 gallons per day (Leopold 1974).

The two engines that drive all of these processes are the heat from the sun, which not only evaporates water but also drives the air and ocean currents that result in precipitation, humidity, and fog; and the force of gravity (Leopold 1974). (See figure 3.3: Watershed Hydrological Processes)

There are also constant exchanges of water between the surface and the subsurface. Groundwater basins are recharged by surface waters running over portions of the watershed with permeable soils. Surface waters, in turn, receive a large portion of their water from the flow of groundwater, called base flow. Exchanges of water also occur between the surface and the sub-surface; these are referenced in the "Groundwater" section of this chapter.

Finally, where a watershed meets the sea, there are exchanges of water between the ocean and the land. When ample river water is flowing, freshwater and river sediment flowing into the ocean can mix with saltwater in a plume that can reach far offshore. In addition, tidal action may naturally bring seawater into the river mouth forming a brackish condition in lagoons at the river's mouth (Leydecker and Grabowski 2006).

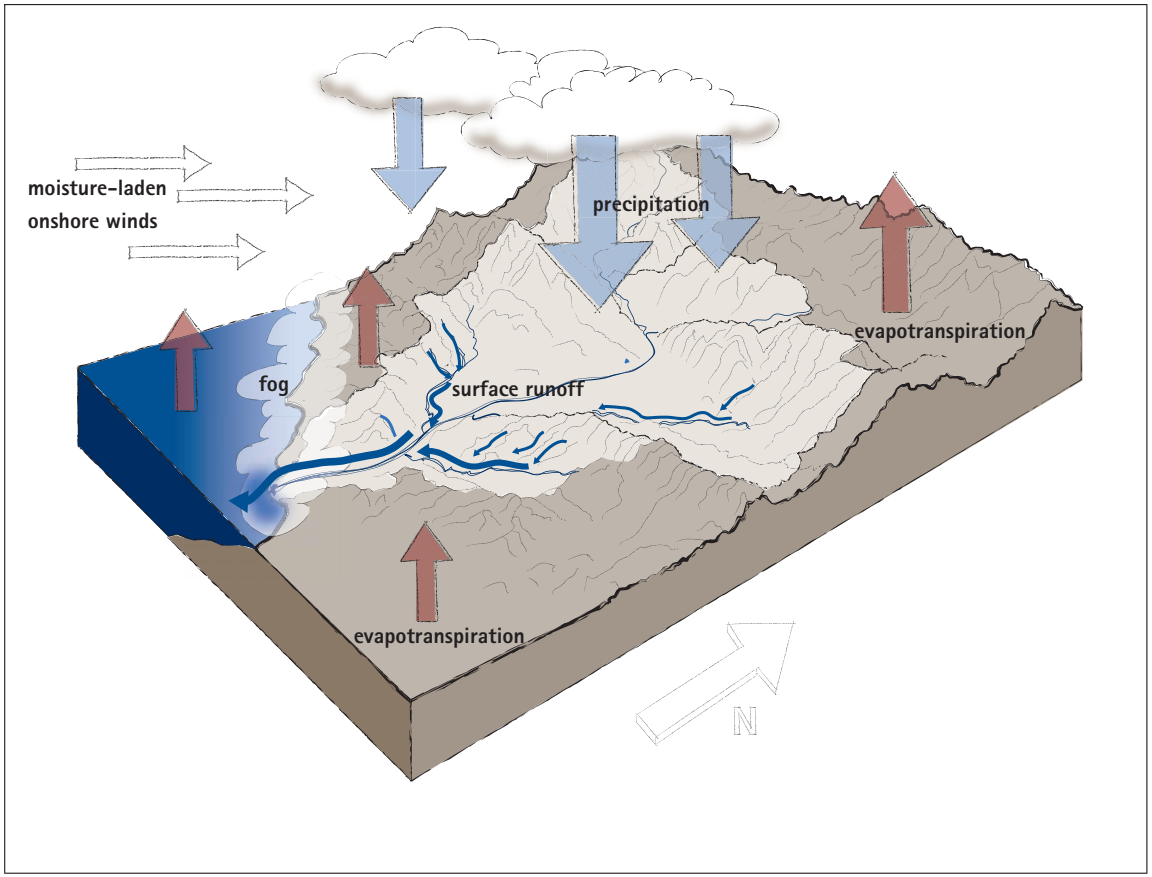


FIGURE 3.3 *Exchanges of water between the surface , atmosphere and ocean in the Ventura River Watershed. For an illustration of water exchanges between the surface and the sub-surface, see the Groundwater section of this chapter.*

HYDROLOGY IS . . .

"Hydrology is the science that treats the waters of the earth, their occurrence, circulation and distribution, their chemical and physical properties and their reaction with their environment including their relation to living things. The domain of hydrology embraces the full life history of water on the earth" (Federal Council for Science and Technology 1962, quoted in Chow 1964).

Who uses this science? This Vision Plan envisions a process in which individuals from many related disciplines will work together to fulfill multiple objectives, including stream and floodplain restoration and flood risk management. Some of these individuals will be water scientists from several fields. River or fluvial morphologists measure and predict the flows of water and study the formation and the restoration of streams according to long-term, natural geomorphic processes. Hydraulic engineers design structures for the diversion or control of water for urban design, agricultural, or flood control purposes (Riley 1998). Occasionally seen as antagonistic, these disciplines have successfully worked together on innovative projects designed for both stream and habitat restoration and flood control (Riley 1998).

SURFACE WATER RESOURCES

The entire Ventura River Watershed is drained by the Ventura River and by streams that are tributary to the river. The river is formed by the convergence of the main fork of Matilija Creek with the North Fork of the same creek in the upper watershed, and from that point it flows about sixteen miles to the Pacific Coast. Along the way, the river receives the waters of three other main tributaries. One of those, San Antonio Creek, joins the main stem approximately one and one-half miles upstream from the parkway vision plan area. The other two, Coyote Creek and the Cañada Larga, converge with the main stem of the river within the parkway area (See figure 3.4, Surface Water).

The Ventura River varies widely in its slope and its form from the top of the watershed to the sea (figure 3.5: The Ventura River: From top to bottom). Near the highest ridges in the watershed, at nearly 5,500 feet in elevation, the waters of Matilija Creek and North Fork Matilija roll over bedrock and boulders that fall from the steep, relatively unconsolidated sandstone slopes. In the middle elevations of the watershed about five miles upstream from the top of the parkway vision plan area (about 500-600 feet elevation), the river runs frequently in shallow braids over alluvial soil and stone cobbles. Under low-flow conditions, the river often disappears from the surface in this area, running underground as base flow (see figure 3.24), only to reemerge further downstream.

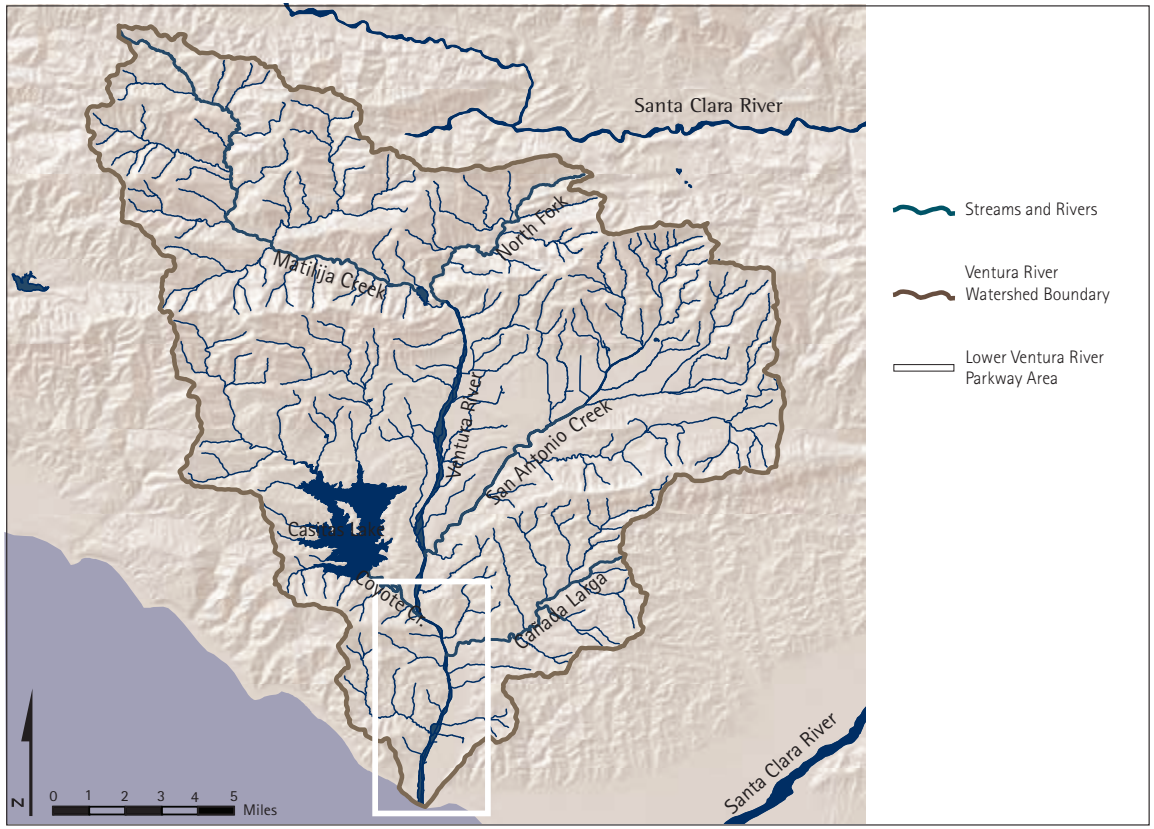


FIGURE 3.4 *Surface water in the Ventura River Watershed. The entire watershed is drained by the Ventura River and its tributaries. One major surface water feature, Lake Casitas, is a man made reservoir. Data from Ventura County Watershed Coalition; USGS.*

At the top of the Vision Plan area at Foster County Park, sections of the river channel are hidden behind dense stands of invasive giant reed (*Arundo donax*) competing with native mulefat (*Baccharis salicifolia*), and stone cobbles still abound. Just above the estuary at the river mouth, the river runs in several deeper channels over finer sediment, and the stands of *Arundo donax* and *Baccharis salicifolia* are still thick. The Ventura River is notable for the extreme variability of annual rainfall in its watershed, leading to a corresponding variability in river flow from one year to the next (mean annual flows from 5 – 3,400 cubic feet per second (cfs), with an extremely wet year having potentially almost 700 times more flow than an extremely dry year (Leydecker and Grabowsky 2006).

THE VENTURA RIVER AND ITS HEADWATERS: FROM TOP TO BOTTOM

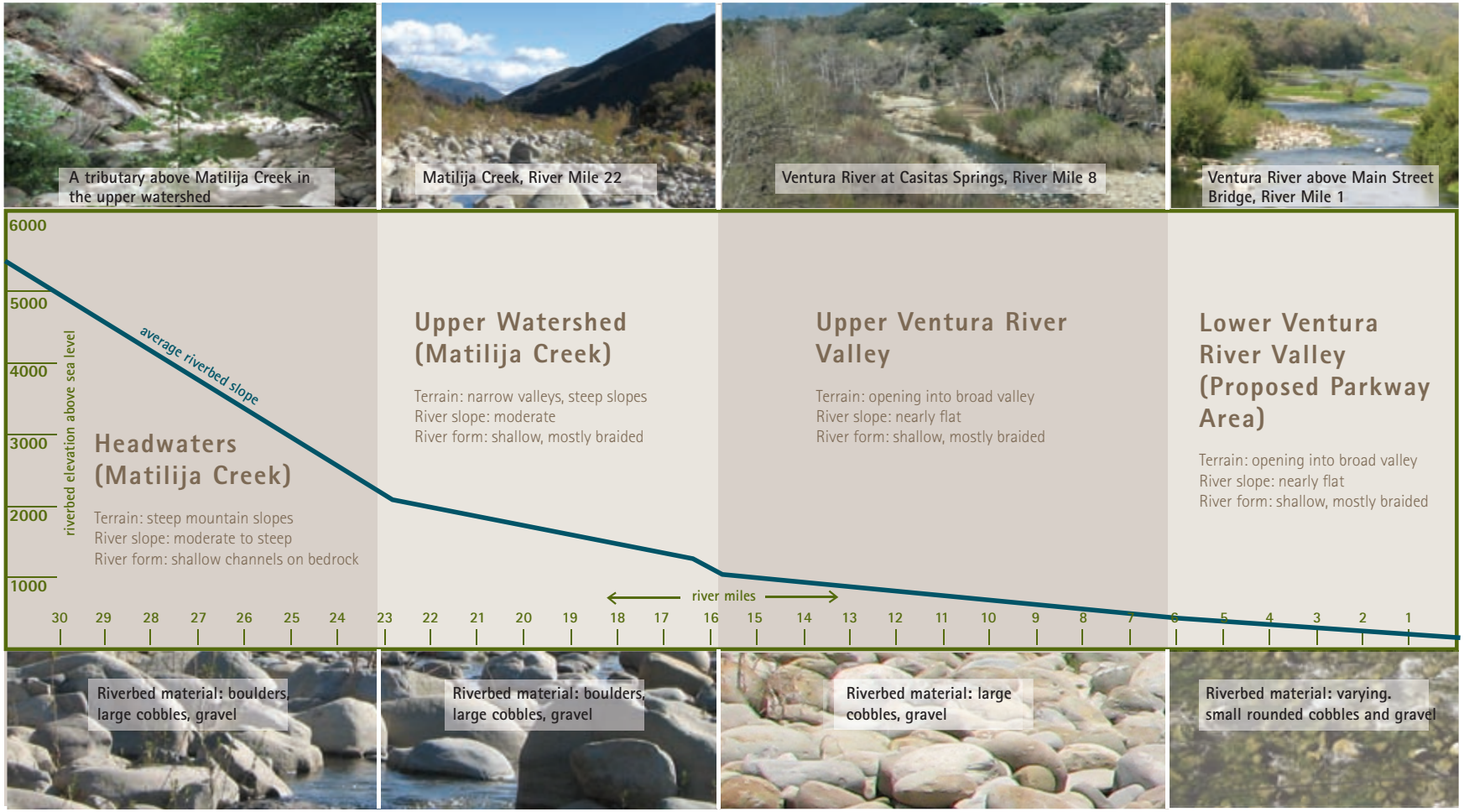


FIGURE 3.5 *Some characteristics of the Ventura River and its headwaters at Matilija Creek and North Fork Matilija. This illustration incorporates a graph (not to scale) displaying the average stream gradients along the Ventura River from RM (river mile) 0 at the river mouth to RM 16 (confluence with Matilija Creek), and continuing upstream along Matilija Creek to the creek's headwaters (RM 31)above 5000 feet in the Santa Ynez mountains. Elevation data from USGS Digital Elevation Model.*

WATERSHED GROUNDWATER RESOURCES

The three significant groundwater basins, Upper Ojai, Ojai Valley, and Ventura River (the latter divided into the Upper Ventura River and Lower Ventura River sub-basins) are confined to the lower half of the watershed, and generally follow the major water courses. All of these basins consist of alluvium and are unconfined (i.e. have their upper boundary at the water table near the ground surface). None of these basins are adjudicated – that is, there is no strict regulatory oversight over the amounts withdrawn by consumers. Natural sources of recharge include precipitation, infiltration from surface water bodies and inter-basin water movement (of which the Lower Ventura sub-basin is the most significant recipient). Artificial sources of recharge include excess irrigation water in all of the basins, intentional recharge through groundwater spreading basins in the Ojai Basin, and effluent from the Ojai Wastewater Treatment Plant (discussed later in this chapter). Although some Ventura County aquifers have been seriously over drafted, a 2003 State of California inventory concluded that the four basins in the Ventura River Watershed had shown stable levels without significant overdraft in recent years (California Department of Water Resources 2003).

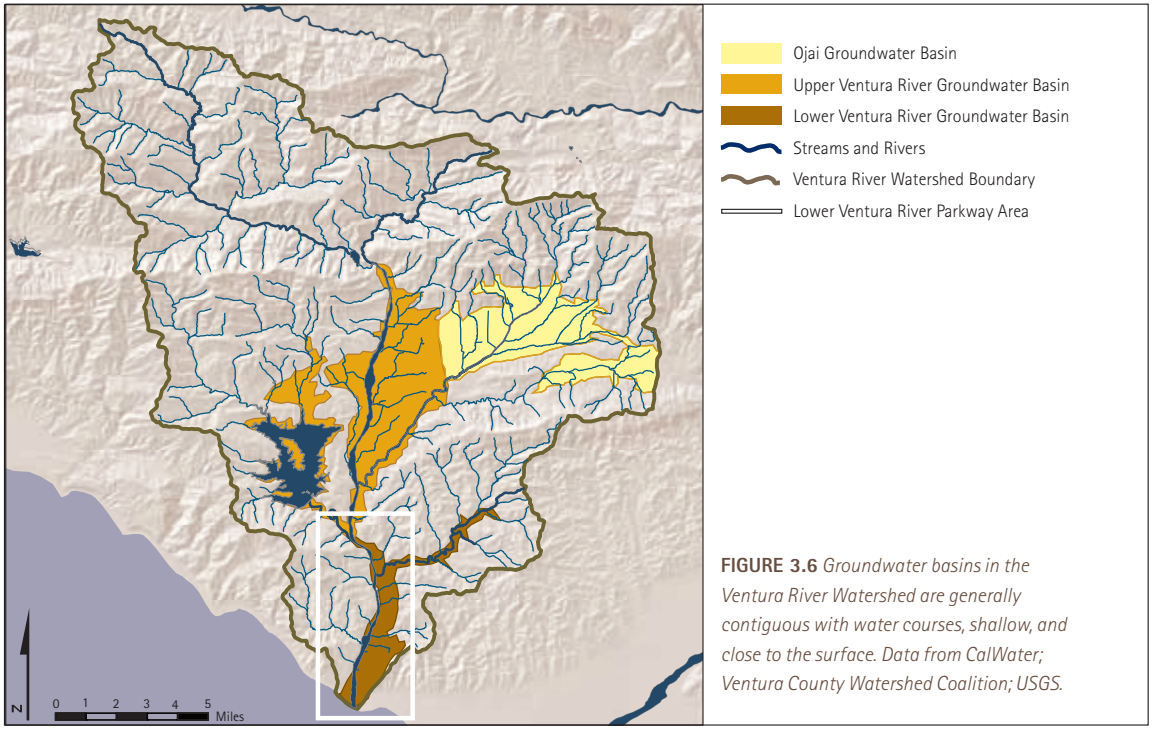


FIGURE 3.6 *Groundwater basins in the Ventura River Watershed are generally contiguous with water courses, shallow, and close to the surface. Data from CalWater; Ventura County Watershed Coalition; USGS.*

The Lower Ventura River in the Parkway Vision Plan area runs over nearly flat ground with permeable alluvial soils and a high water table. Under these conditions, streams and groundwater basins quickly pass water back and forth, and can quickly replenish or deplete one another (Watersheds Coalition of Ventura County (WCVC) 2006). Between rainy periods, the river receives much of its natural water from groundwater flowing directly into its banks and bottom.

In the Oxnard area of Ventura County, in the Calleguas Creek, saltwater intrusion in the coastal plain has been greatly accelerated by the overdraft of groundwater basins, with the result that potable water supplies have been threatened. Since 1982, this condition has been partially ameliorated through extensive regulation of groundwater pumping, desalination, and through wells that inject freshwater into the coastal groundwater basin. However, this phenomenon has not been an issue in the Ventura River Watershed, where, although some overdraft has occurred, groundwater levels are normally at 70% capacity or better (WCVC 2006; California Watershed Council 2003).

Ventura River: Form and Function

FLUVIAL MORPHOLOGY: THE FORM OF THE RIVER

Like all rivers, the Ventura River has taken its form from the landscape that it runs through. The steepness or slope of the terrain, the surface or drainage area of the watershed, the bedrock type, and the degree to which the watershed captures precipitation are all landscape characteristics that have an influence on the quantity and velocity of water flow, the amount and type of sediment entering a stream, and the composition and smoothness or roughness of the stream's bed. Those factors, in turn, determine the width, depth, and shape of a stream channel as well as the degree to which it bends or meanders, i.e. its sinuosity (Riley 1998).

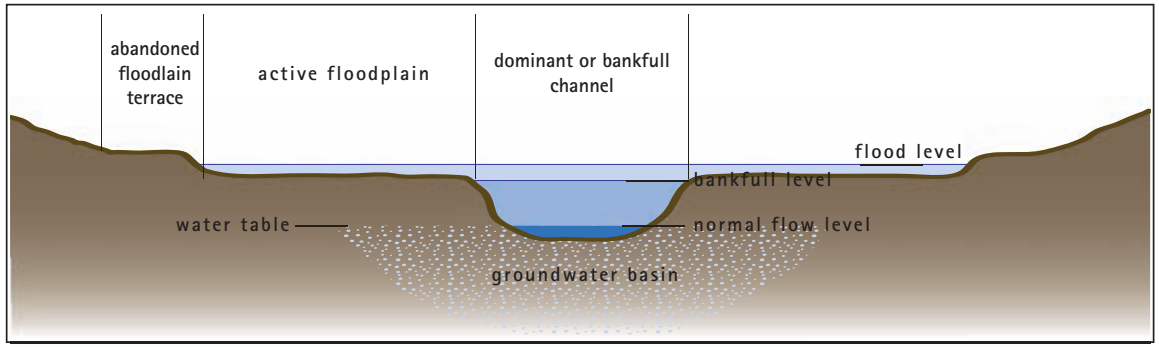


FIGURE 3.7 *A river is not just a flowing channel, it is a unit consisting of a dominant or active channel along with the surrounding floodplain.*

Streams also give form *to* the landscape. Rather than being a simple channel with water running in it, a stream is actually a system comprised of a dominant channel (also called the active or bankfull channel) combined with a wider floodplain. Under natural conditions, a stream periodically overflows the banks of its dominant channel, causing a flood that runs over an area determined by water quantity, velocity and land topography. Over time, the deepening of the stream channel combined with the action of periodic flooding influences the shape of a river valley, often leaving abandoned floodplain terraces at the valley edges (Riley 1998) (figure 3.7).

Following is a discussion of some relevant aspects of river morphology, and of the way in which the Ventura River reflects the unique characteristics of its landscape.

THE CONCEPT OF THE BANKFULL CHANNEL

A prevalent theory in geomorphology holds that land is given its form not primarily by extreme or catastrophic events but by unusual events that have intermediate recurrence. Applied to river formation, this suggests that a river channel is formed not by extreme floods and not by daily normal flows, but by higher-than-normal flows that occur relatively frequently. Empirical studies of stream channel shape and size in comparison with flows show that a dominant channel is formed by the action of flow events that have an average recurrence of one to two years, with an average of one and one-half years. The dominant or *bankfull* channel is the channel that will hold the bankfull discharge, the amount of water that flows in a storm event on the average of every one-and-one-half years. The bankfull channel is a way of expressing what the characteristic form of a river channel is, and a combination of a bankfull channel and an adequate adjacent floodplain is the target of planners who seek to restore a stream to more natural conditions (Leopold 1974; Riley 1998).

SEDIMENT AND STREAM EQUILIBRIUM

A river is much more than water; it conveys massive quantities of rock and soil collectively termed sediment, breaking down large, rocky boulders into smooth stones, gravel, and finally sand and silt. A river constantly forms and reforms its own banks and bottom by capturing and releasing the sediment that flows through it. Sediment is captured through the process of deposition, and released through the process of erosion.

Coarse particles of sediment that are pushed down steep, high velocity streams in the upper watershed settle out into the stream banks and bottom when the water reaches flatter, lower velocity terrain in a river valley (figure 3.8). Under certain conditions, the gradual deposition of such sediment in the valley will eventually block the course of the stream, causing a lateral movement to another section of the floodplain and forming a bend or meander. In stream bends, sediment is deposited on the inner bank of the curve, while the outer bank erodes, resulting in even more lateral movement (Riley 1998) (figure 3.9).

Thus, a stream channel under natural conditions is subject to constant change due to deposition and erosion, variances in flow, and changes in sediment load. It will constantly undergo adjustments in size, shape, sinuosity and elevation in order to continue to convey the rock and water that is flowing in it. The theoretical balance point between deposition and erosion is the point where the amount of sediment entering a section (reach) of the stream is equal to the amount of sediment leaving it. The tendency of a stream to seek this balance point under changing conditions, through the processes of deposition and erosion, is termed dynamic equilibrium (Riley 1998).

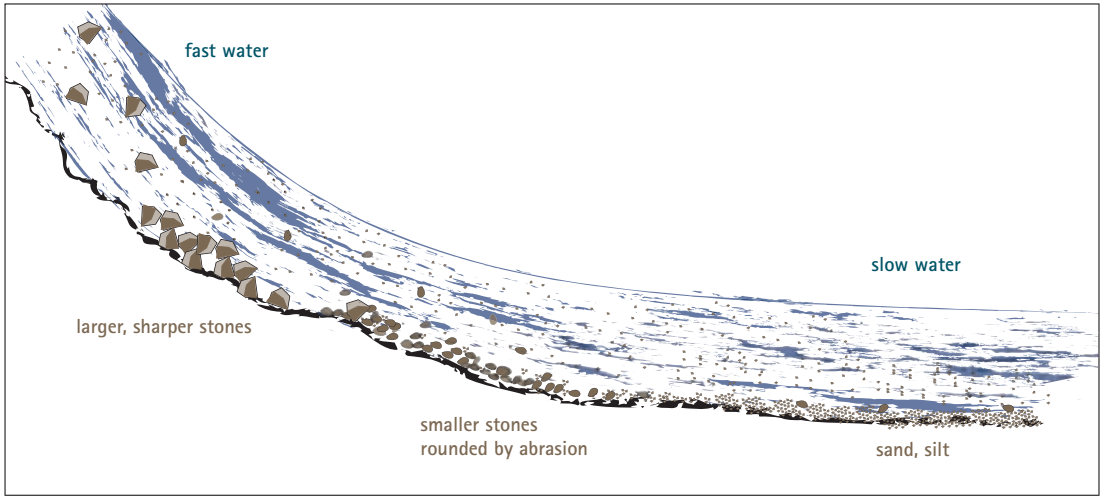


FIGURE 3.8 *Sediment composition of the river's flow, and riverbed composition, are partly determined by stream gradient or slope. Finer sediments remain suspended until the flow slows down on flatter ground near the river's mouth, where they settle out.*

A UNIQUE SOUTHWESTERN RIVER

The Lower Ventura River is a particular variation on the general concepts discussed above, an example of what happens when a steep, geologically active terrain composed of soft rock interacts with arid Southwestern climate. The result is unusually high sediment production, unstable channel formation, and flooding.

The Upper Ventura River Watershed is a giant generator of loose rock and sediment. As described above, the land that forms the Ventura River Watershed was originally formed under ancient seas, then uplifted to mountainous heights. Through the processes of weathering and erosion accelerated by the constant upward movement of these young, geologically active mountains, soft sandstones gradually break up on the mountain slopes. The relatively steep slopes of the upper watershed make it easy for these rocks to detach from the slopes (Scott and Wouldiams 1978, cited in Greimann 2006) (figure 3.10).

This combination of factors produces one of the highest rates of debris and sediment production in North America (Greimann 2006). One study based on data from 1933 to 1975 estimated that the watershed, prior to the construction of dams that trapped sediment (discussed later in this chapter), produced 2.1 acre feet of sediment per square mile per year (figure 3.11), for a total of 468 acre feet (Brownlie and Taylor 1981, cited in Greimann 2006).

How does all of this rock find its way to the river? Rock falls and landslides bring boulders to the bottom of the slopes while less dramatic rock fragment flows and dry slides bring fragments up to two and one-half inches in diameter down; all of these form deposits at the base of the slopes and along or in streams. This material is enough to fill up or entrench the streambeds of tributaries in the upper watershed until periodic floods move the sediment downstream and scour the streambed back down to bedrock (Scott and Wouldiams 1978, cited in Greimann 2006).

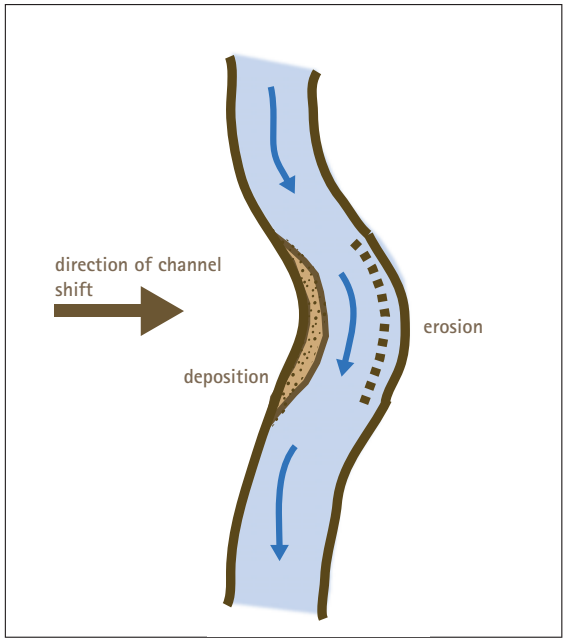


FIGURE 3.9 *Deposition and erosion combine to cause lateral movement of a stream channel across the floodplain.*

FIGURE 3.10 *Tectonic uplift, steep slopes and soft sandstone bedrock result in a lot of rock moving in the upper watershed. This boulder appeared overnight in the road above Matilija Dam.*

Once sediment accumulates at the bottom of the slopes, further movement is through the water of the river, and most of the material is moved during relatively infrequent floods. Ninety-eight percent of the sediment is moved in the form of small sand particles up to 0.08 inch suspended in the flowing water (Hill and McConaughy 1988, cited in Greimann 2006). Coarser material consisting of gravel and cobbles is moved only by floods; while it makes up a small percentage of the total sediment, there is enough of it to make up the dominant material on the riverbed and to play an important role in forming the shape and size of the Ventura River (Greimann 2006; Scott and Wouldiams 1978, cited in Greimann 2006).

The Ventura River bed consists predominantly of stones with sands interspersed between. Riverbed material generally decreases in size as the river proceeds downstream. Where the slope of the river itself is steep in the upper watershed, cobbles averaging 12 inches diameter or larger collect on the bed while the swift-flowing water carries smaller stones and sediments downstream. Where the river slope flattens on the lower river, the flow slows down, allowing smaller stones and suspended sediments to fall to the bottom (figure 3.8). In the area of the proposed parkway, riverbed cobbles are, on the average, about the size of a softball (Greimann 2006). These cobbles are also deposited at the river mouth, where they help to form one of the best surfing breaks in California (Jenkin 2002).

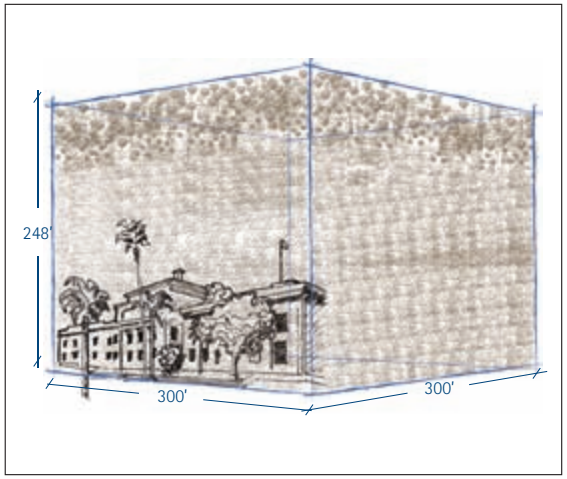


FIGURE 3.11 *What would 468 acre feet of sediment look like? That is one researcher's estimate of the amount of sediment produced annually by the Ventura River Watershed. It would fill a box larger than the city of Ventura City Hall, 248 feet deep.*

BRAIDING AND UNSTABLE CHANNEL FORMATION ON THE LOWER VENTURA RIVER

A combination of high sediment production, extreme variability in peak and low flows, and a river gradient that nearly flattens in the lower portion of the watershed, results in the Lower Ventura River, in the proposed parkway area, being a notable Southwestern exception to the general model of river channel formation. Under normal low-flow conditions, the river does not have high enough water velocity to convey all of the sediment that enters it. Instead of tending to form a single, relatively stable, wide and deep meandering river channel, it forms into multiple shallow channels, or braids, that change location relatively frequently under non-flood conditions (Keller and Capelli 1992). Then, during the occasional extreme flood event, the sediment is blasted out of the channels and the river is radically reformed (see Flood Scouring).

FIGURE 3.12 *This 1855 map of approximately the lowest mile of the Ventura River shows its naturally braided character. Map: Museum of Ventura County (highlighting added).*

FLOODING: A NATURAL RIVER FUNCTION

Flooding has been a frequent and dramatic event on the Lower Ventura River, aggravated in modern times by the effects of human development.

A flood is a natural event, defined by the river morphologist as any event in which water overflows the banks of a stream's dominant or bankfull channel.

> *The river cannot form a channel that would convey without overflow all possible flood events. In fact, the channel can contain within its banks only a discharge of modest size. The greater discharges must overflow the valley floor within which the channel occurs. For this reason the flat valley floor or flood plain is indeed part of the channel during unusual storm events (Leopold 1974).*

The Ventura River Watershed is a natural generator of huge floods. In the upper watershed, high variations in the rate of precipitation, that is, drought interspersed with occasional torrential rains, produce a dramatic variability in water flow in the river, with peak flows that can be *seven hundred* times the amount of the lowest flows (Keller and Capelli 1992; Greimann 2006). Combined with steep slopes, these peak flows produce fast-moving water. At the same time, the high rate of sediment production amplifies this effect by leaving stream beds that are often choked with rock and gravel, constricting water channels and speeding the flow, until a flood clears the material out. All of this makes the Ventura River a "flashy" river: during a storm, water levels in the river and its tributaries rise quickly in response to the level of rain (figure 3.13).

Flooding can have positive impacts on wildlife and human culture. It assists groundwater storage by temporarily increasing the surface area for recharge in periods of surplus surface water, and deposits sediment on the floodplain that builds good plant habitat or agricultural soils.

However, when an overflow of the river channel due to periodic rains encounters incompatible human land uses, the results can be death, destruction of communities, and displacement of thousands of people.

A FLASHY RIVER

A hydrograph is a way of showing visually how long it takes for floods to build up in response to rain. The example below compares the intensity of rainfall (in red) with the flood stage (water height, in blue) in the Ventura River at Foster Park during the December 2004-January 2005 flood event. Once watershed soils were saturated by the earliest stages of the rainstorm, dramatic changes in flood height followed almost immediately after corresponding changes in rainfall. This illustrates the flashy character of the river. Urban development, with its increase in storm water runoff, can aggravate this effect. However, this data was recorded at Foster County Park, upstream from most urban development in the watershed, and it illustrates a natural condition.

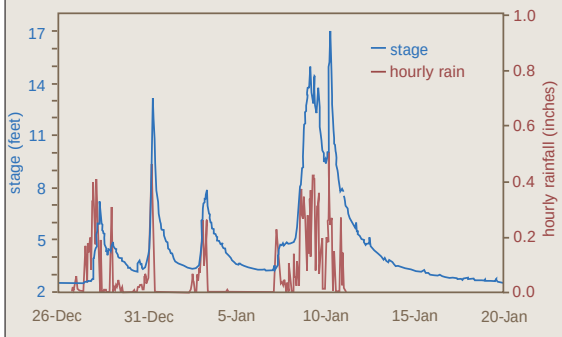


FIGURE 3.13 *Flood hydrograph at Foster Park, December 2004 – January 2005. Adapted from Leydecker 2006.*

SEVENTY-FIVE YEARS OF FLOODING

The graph below depicts the largest peak flood event for each of the years from 1933 through 2006. The five largest events, all in the last thirty-five years of the period, are highlighted below. The most recent event, in 2005, was comparable in size to the 1938 flood that inundated Ventura Avenue and left marks that are visible today on the Lower River.

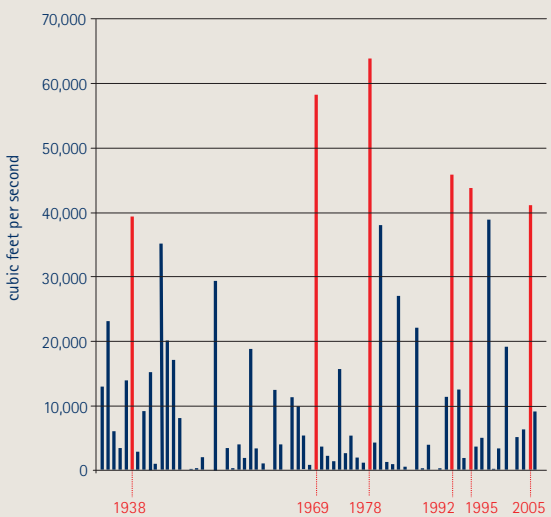


FIGURE 3.14 *Largest peak flow event for each year from 1933 through 2006. Data source: Ventura County Watershed Protection District.*

FLOOD SCOURING – – DRAMATIC CHANGES ON THE RIVER

Frequent high-energy flood events – the result of extreme rainfall variability in the watershed – have a dramatic cyclical effect on the form of the Lower Ventura River and its habitat. On an average of every seven years (the actual historical interval has varied from three to thirty years), a flood event occurs that is forceful enough to scour the banks and beds of the channels and the floodplain around them, removing gravel, fine sediment, and aquatic life from the river bottom and also removing most riparian vegetation from the banks and sections of the floodplain. The result is a combination of higher water temperature (due to absence of canopy), the release of high concentrations of nutrients (nitrogen and phosphorus) that have accumulated in groundwater prior to the wet season, and the disappearance of gravel and sediment exposing larger stones and bedrock.

All of this favors the growth of filamentous algae, just when aquatic plants that compete with algae have been removed. With the passage of drier years afterward, stream bank vegetation, aquatic plants and sediment re-establish, excess nutrients are absorbed, and algae recedes, until another large flood event starts the cycle anew (Leydecker 2006; Leydecker, Simpson et al. 2003). Most recently, a flood event in early 2005 caused these scoured conditions – sections of the Lower Ventura River are currently bright green with filamentous algae, mature plants are missing from many sections, and bedrock can be seen on the river bottom.

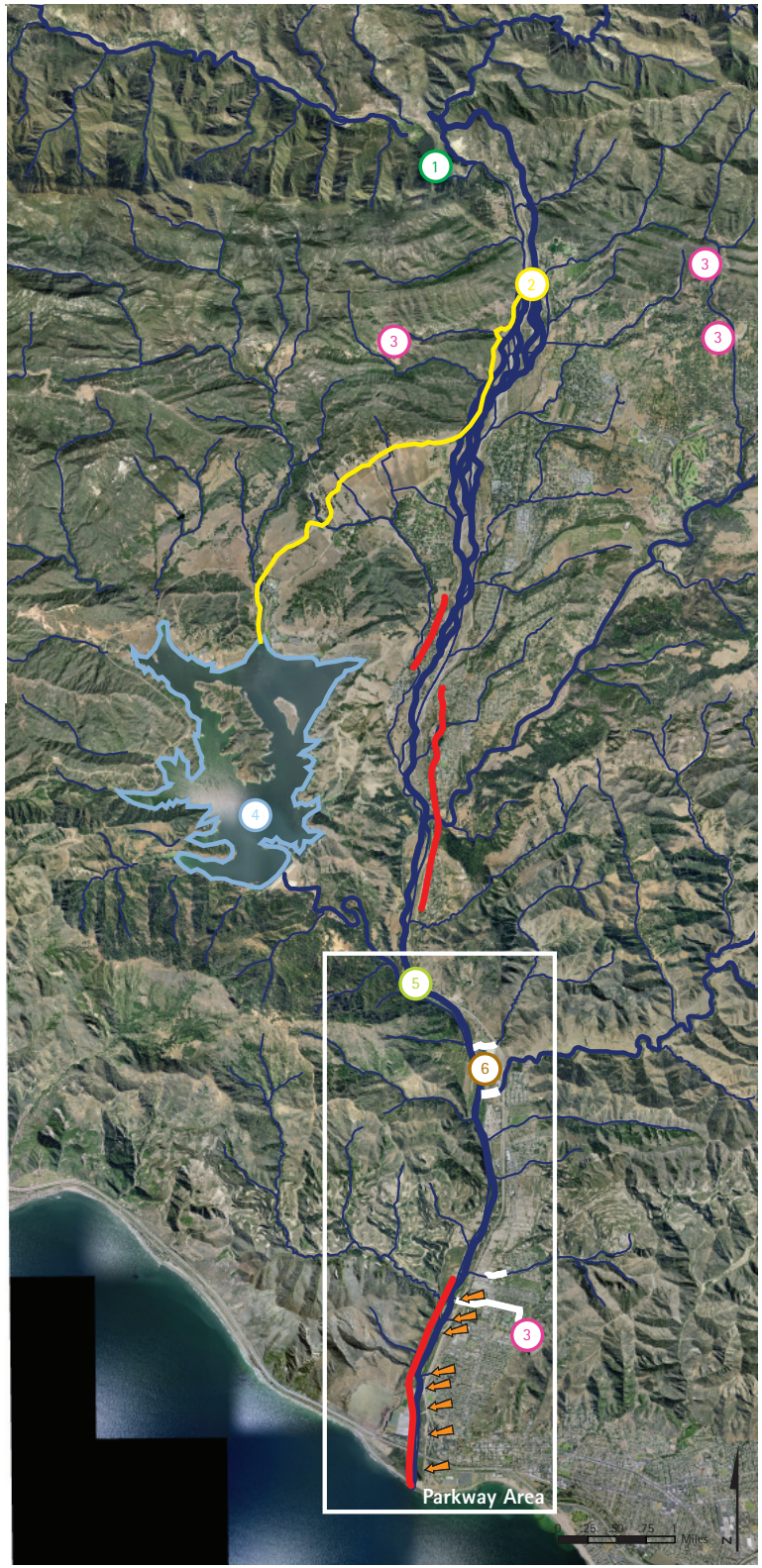
FIGURE 3.15 *Flood scouring. Looking downstream at the Ventura River from Shell Road on October 2, 2004 and February 2, 2005, before and after the flood event in early 2005. Photo source: Leydecker 2006.*

Development and Change

SUPPLY AND DEMAND

Urban development in and around the Ventura River floodplain has brought demands for hydrological engineering for two purposes. First of all, humans need water for drinking, agriculture, and industry. Ventura County residents currently use the majority of their water (68%) for agriculture but significant amounts also go for residential (22%) and industrial/commercial (10%) use. Twenty-five percent of that water is imported from outside the county through the State water project, and nearly all of the remainder comes from a combination of surface (8.5%) and groundwater (65%) from the County's three major watersheds, including the Ventura River Watershed. Less than two percent of the County's water is reclaimed (WCVC 2006).

The City of Ventura, the largest user of water from the Ventura River, plans to derive 49% of its water, an annual average of nearly 15,000 acre feet per year, from the river for the immediate future (figure 3.17). This water is derived both from wells and surface diversions at Foster County Park and from water that is diverted from the river and its tributaries into storage at Casitas Lake. In contrast to the county with its dominance of agricultural demand, the city needs 65% of its water for residential uses and none for agriculture (figure 3.17) (City of Ventura Department of Public Works 2005). The city is not the only user of Ventura River water, some is also pumped from wells by farmers and



1 Matilija Dam
2 Robles Diversion Dam
3 Debris Basins (approximate locations)
4 Casitas Lake and Dam
5 Foster Park Wells/Groundwater Dam
6 Ventura Water Plant and Ojai Valley Wastewater Plant
Storm Drains into Ventura River
Levees
Robles Diversion Canal
Concrete Channel or Culvert

other individual property owners outside the city.

The other demand of hydrological engineering is for protection from the flood risk that inevitably follows urban development in the floodplain. Floods causing injury or property damage in Ventura County have occurred on average every five years, at least since the first report of such an event in 1862 (URS 2004). The greatest damage was from the 1969 event that cost thirteen lives and $60 million in damage in the Ventura and Santa Clara watersheds (URS 2004).

These two demands have led to the construction of hydrologic structures, described below, that have changed and to some extent impaired the natural function of the Ventura River, primarily during the past 70 years (figure 3.16).

[FACING PAGE AND ABOVE] FIGURE 3.16 *The illustration on the facing page shows major structures altering the function of the Ventura River. The diagram above locates the illustration within the watershed. Orthophotography from CIRGIS.*

Located approximately ten miles upstream from Foster Park (the northern end of the proposed parkway corridor), **Matilija Dam** was built in 1947 primarily for flood control purposes. It was designed for a reservoir capacity of 7,018 acre feet, but sediment has built up to the point that reservoir capacity is less than five hundred acre feet, with the result that the dam has negligible effect on peak water flows in the Ventura River. However, the dam does hold back approximately 45% of the sediment that enters from upstream. The dam has the potential to release 250 cubic feet of sediment per second, and under ordinary operating conditions, water releases are adjusted to produce the optimal capture of water at the Robles diversion (Greimann 2006). In 2007, the United States Congress approved the first stage of funding for a program to remove the dam.

The **Robles Diversion Dam (figure 3.16)**, located approximately eight miles upstream from Foster Park, was built in 1958 for the purpose of diverting water from the Ventura River through a canal to Casitas Lake, where it is stored for agricultural, industrial, and municipal use by the Casitas Municipal Water District. The dam can divert a maximum 500 cubic feet per second, but the rate of diversion is highly variable and occurs primarily during the wet season from December through March. The dam operates under restrictions which generally provide that a flow of at least 20 cubic feet per second will be passed down river. The dam effectively blocked steelhead trout from passage to optimal spawning grounds in the upper watershed until 2005, when an effective fish passage facility was built. Current proposals provide for water passed through the facility to be increased to 50 cubic feet per second during optimal periods for steelhead trout passage and spawning from January through June each year. The period of increased flow for these purposes will be opened earlier if the sand bar breaks at the mouth of the river before January (Greimann 2006). The dam does not trap suspended sediments (clays, silts and sands) but it does trap a significant portion of gravels, cobbles, and boulders coming down river, with the result that debris removal by the Water District is necessary after every major flood (Greimann 2006).

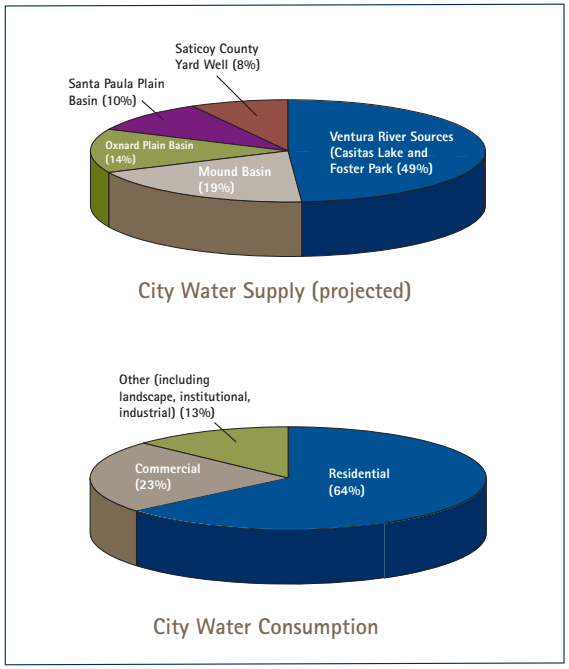


FIGURE 3.17 *[From top to bottom] City of Ventura, projected sources of water, fiscal years 2005-2020 and average water consumption by user group, fiscal years 2000-2005. Data: City of Ventura Department of Public Works.*

Casitas Dam (figure 3.16, and figure 3.21) was built the same year as the Robles Diversion dam for the purpose of creating a 250,000 acre foot reservoir to store water from the Ventura River (via the Robles facility) as well as from the Coyote Creek sub-watershed. Construction of the dam reduced the contribution of Coyote Creek to the Ventura River flow from 18% to 5%. The dam traps all sediment that enters the reservoir, and has no fish passage facility (Greimann 2006).

City of Ventura Diversions at Foster Park (figure 3.16) Ventura currently removes an average of approximately 6000 acre feet of surface and groundwater annually at this location. The city operates a shallow intake pipe in the river, as well as a concrete surface diversion dam (often called a groundwater dam) that forces subsurface water flow near to the surface where it can be collected (a shift in the river channel in 2000 rendered the groundwater dam inoperable). The city also operates several wells at this location, and plans to construct several more in conjunction with the removal of Matilija Dam. (Greimann 2006) (figure 3.24).

Numerous wells are operated by water companies and owners along the Ventura River. No comprehensive water budget has been prepared for the watershed, and the amount of groundwater removed is undetermined.

The Ojai Valley Sanitary District Wastewater Treatment Plant (figure 3.16) was constructed in 1963 for secondary treatment of sewage from the city of Ojai. During the 1990's, the plant was upgraded to tertiary treatment; the resulting effluent is released into the Ventura River in the proposed parkway corridor at a rate of 2.31 cubic feet per second (average from 1990 to 2001). During dry periods, the effluent often comprises two-thirds of the water in the lower four and a half miles of the river (Leydecker and Grabowski 2006; California Regional Water Quality Control Board, Los Angeles Region (CRWQCB-LA) 2003).

Three major **levees (figure 3.16)**, at the community of Live Oak, the community of Casitas Springs, and the city of Ventura, are designed to protect those communities from flood. The Ventura levee was built by the United States Army Corps of Engineers in 1947 and constrains the eastern bank of the Ventura River from the river mouth to a point near Stanley Road, 2.3 miles upstream (Greimann 2006). The levee is constructed of compacted earth armored by grouted or ungrouted rock (in different sections). The Ventura County Watershed Protection District has constructed terraces at the foot of the levee in locations where the shifting Ventura River channel threatened to erode the levee. (Interview with Joe Lampara, Ventura County Watershed Protection District, April 29, 2008). Numerous smaller levees exist along the Lower Ventura River, some of them constructed by landowners.

FIGURE 3.18. *The 1938 flood was smaller than several events that have occurred during the past twenty years. However, it caused over one million dollars in damage (URS 2004) and inundated oil fields along Ventura Avenue. Nine years later, the Army Corps of Engineers completed construction of a levee to protect structures that intruded on the floodplain in this area and in the city of Ventura to the south. Photos: Museum of Ventura County; Ventura County Star.*

Four **debris basins (figure 3.16)** exist along the Ventura River. One of them, the 80-foot wide by 3-feet high Dent Debris Basin, is located adjacent to the proposed parkway corridor. This basin is designed to capture 928 cubic yards of sediment and debris in a 25-year flood event (Greimann 2006).

IMPACTS OF DEVELOPMENT ON VENTURA RIVER HYDROLOGY: FLOODING

Human development does not cause flooding, and even the most progressive urban development practices such as reduction of impervious surfaces (discussed in chapter 7) will not prevent a catastrophic flood resulting from extended rainstorms (Leopold 1974). The main cause of human and property damage in these events is not flooding itself, but the clash between inevitable flooding and incompatible human structures and land uses in the floodplain. The objective of contemporary hydrologists and hydraulic engineers is not flood control, but flood damage

reduction (Riley 1998).

Urban development in the Ventura River Watershed has increased the risk of flood damage in three ways:

First, the construction of urban industrial facilities and residential neighborhoods on the West side of Ventura, in the historic floodplain of the river, has long presented a risk of damage to those developments, a fact illustrated by the floods that rolled across the Ventura Avenue area prior to construction of the Army Corps of Engineers levee (figure 3.18). With much of the city otherwise in harm's way, the continued existence of the levee is a likely feature of future watershed plans.

Second, development in the floodplain has constricted the path available for floods. When flood waters cannot spread out, it follows that the depth and velocity of flood waters will increase in the narrowed floodway that remains (figure 3.19).

The Ventura River would be flashy in any major storm, even without urban development. However, development aggravates the extent of flooding by increasing the amount of surface runoff, since water cannot infiltrate into impervious surfaces such as concrete. And, it increases the speed with which runoff travels across the land surface, accumulating downstream into floodwaters because water runs more quickly across smooth constructed surfaces. All of this alters the storm hydrograph (figure 3.13) by shortening the time period between the onset of a storm and the accumulation of life-threatening floodwaters.

ARRESTED DEVELOPMENT: IMPACTS OF DEVELOPMENT ON RIVER FORMATION

As discussed earlier in this chapter, many factors influence the width, depth, sinuosity, and channel geometry of a natural river, including topography, bedrock geology, and sediment supply. In its natural state, the Lower Ventura River once spread across a broad alluvial valley in numerous, shallow braids (figure 3.12). By the 1940s, oil production and farming in the floodplain had pushed the river channels into a narrower corridor against the hills to the west (figure 3.19). Then, the construction of the Army Corps levee and adjacent Highway 33 constricted the river still further and created a hard edge to its eastern bank (figure 3.19). Among the impacts of this constriction are reduced habitat, a reduced floodway leading to faster, deeper floods in the remaining corridor, and a vastly altered sensory experience for human visitors.

IMPACTS OF DEVELOPMENT: A CONSTRICTED RIVER

FIGURE 3.19 *Arrested Development. These two aerial photographs compare the same section of the Lower Ventura River in 1946 (left) and 2004 (right). The floodway available to the river (light blue) and the river channels (dark blue) are highlighted on each photo based on the author's estimate. With the passage of time, a river will move laterally back and forth across its floodplain and will develop meander or sinuosity, a rhythm of bend determined by the river's slope and the velocity of its water. However, most of the Lower Ventura River floodway is now constricted by levees and other encroachments that alter this development. Orthophotography: City of Ventura (1946); Channel Islands Regional Geographic Information Systems (2004).*

REDUCED SEDIMENT FLOW AND EROSION

River formation is greatly affected by the amount and type of sediment being supplied to the river and moving through it. The construction of Matilija Dam (figure 3.16 and figure 3.20) held back much of the sediment that had previously been supplied to the river by the upper watershed. Casitas Dam holds back sediment previously supplied by the watershed of Coyote Creek.

A radical reduction in sediment flowing in the river creates "hungry water" that washes away more earth than it supplies to the river banks and bottom (Riley 1998). The result can be increased erosion. Some reaches of the Lower Ventura River in the proposed parkway area have experienced so much erosion during the past half century that the base elevation of the river has been lowered by 10 or more feet in elevation, exposing bedrock on a river bottom once covered with alluvial soils. This is partly due to unusually high water flow in the river between 1975 and 1999, but hungry water continues to play a major part in this problem (Greimann 2006).

An additional effect of sediment reduction in the river is the starving of beaches on Ventura's coast, where the shoreline of the river delta has been receding approximately one and one-half feet per year for the last 50 years (Jenkin 2002). Matilija Dam is slated for removal during the next several decades (see chapter 13, Beyond the Parkway). One anticipated result is the gradual rebuilding of riverbanks and river bottom and the return of a limited amount of sand to the beaches. This recovery will be limited, however, by the continued trapping of sediment by the Casitas and Robles Dams.

BARRIERS TO WILDLIFE

The construction of Matilija Dam and Casitas Dam cut off the passage of steelhead trout to the upper watershed where they once spawned (see chapter 5, Ecosystems), greatly contributing to the decline of this species in the Ventura River Watershed. The attempted restoration of this species is one major motivation behind the anticipated removal of Matilija Dam. The Los Robles Diversion Dam (figure 3.16 and figure 3.21) also blocked the passage of steelhead trout until a fish passage facility was built in the mid-1990s.

INSTREAM FLOW

During the dry months in late summer and fall, the Lower Ventura River often runs dry on the surface in some areas downstream from the Robles diversion dam. Under these conditions, some groundwater still flows under the surface. Low flows are related to both natural and man-made factors. and it is difficult to determine the relative contribution of those factors. Without human interference, seasonal low flows would still occur due to the dry Mediterranean climate and the permeability of the alluvial soils that transmit water quickly to groundwater basins. However, removals of both surface water and groundwater for domestic and agricultural uses also play a significant role. The impact of diversions from the Robles dam is mitigated by policies, discussed above, that restrict diversions during low flow periods. However, it is clear that every drop removed for domestic use at the Robles facility or by the city at Foster Park reduces the amount that is left to flow in the lower river.

FIGURE 3.20 *Matilija Dam, approximately ten miles upstream from the top of the proposed parkway area, holds back approximately 53% of the sediment that would otherwise flow in the Ventura River. Photo: Greimann 2006.*

FIGURE 3.21 *The Robles Diversion Dam removes up to 500 cubic feet per second of surface water from the Ventura River approximately eight miles upstream from the proposed parkway area. The canal to Casitas Lake can be seen leading from the diversion structure on the left. To the right of that diversion is a fish passage facility constructed in the mid-1990s . Photo: Greimann 2006.*

Groundwater withdrawals through well pumping in the watershed also effectively hold back water from the river. The lower river throughout the proposed parkway area flows over coarse gravelly sediments (alluvium) with a high water table. Under these conditions, groundwater easily flows in and out of the river through the riverbed and the sides of its channels. The river naturally depends on groundwater for much of its flow during frequent dry spells. Figure 3.23 shows a diagram of groundwater basins and municipal water withdrawals between the Robles Diversion Dam and the city wells at Foster Park. During dry summer conditions, surface flow often disappears in the area of the Robles Diversion. However, an underground barrier forces groundwater flow to the surface at Casitas Springs, just above the top of the proposed parkway area, and the Ventura River once again runs on the surface.

FIGURE 3.22 *During dry months, the Lower Ventura River often runs dry on the surface in some areas downstream from the Los Robles diversion dam. Some groundwater still flows under the surface.*

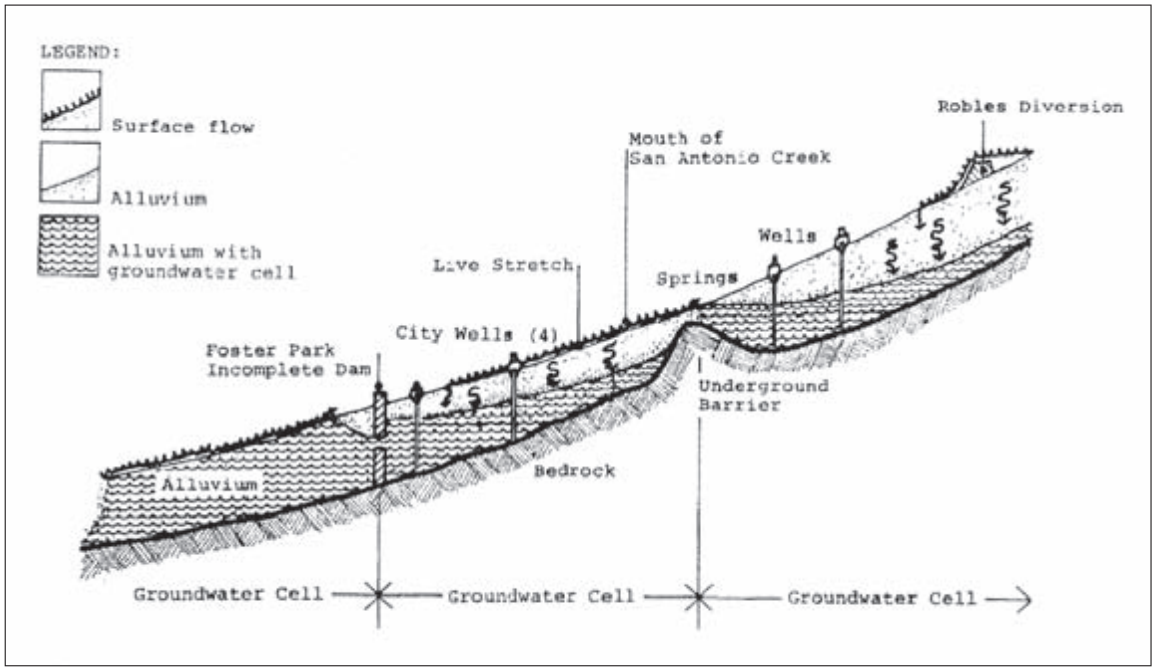


FIGURE 3.23 *Schematic diagram of groundwater basins and municipal water withdrawals between the Robles Diversion Dam and the city wells at Foster Park. Illustration: Turner 1971.*

GROUNDWATER: AN IMPORTANT SOURCE FOR INSTREAM WATER

Groundwater withdrawals by both agricultural and municipal users have an important impact on the health of the Ventura River because the river derives instream flow from groundwater as well as surface water.

The Lower Ventura River is an alluvial stream that flows through a relatively high water table. In this type of stream, during dry periods much water comes from base flow of groundwater, rather than from surface runoff. The diversion of surface water from the Ventura River has a great impact on how much instream flow remains, but groundwater pumping from wells also reduces instream flow. The significance of this factor for the health of riverine species is difficult to assess in a watershed where the quantity of water pumped from private wells is not legally monitored. Furthermore, not all groundwater in the watershed is connected to the river, thus instream flow in the river is not affected by all wells.

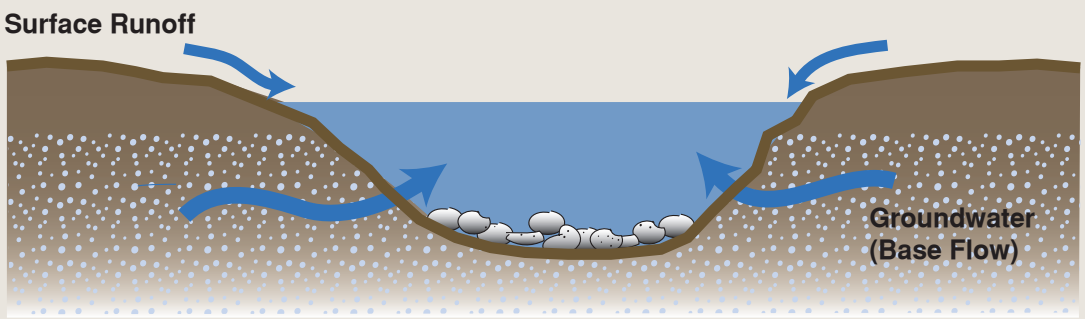


FIGURE 3.24 *The relationship between groundwater and instream flow.*

Water Quality

SURFACE WATER QUALITY

The quality of water is critically important for human users in the Lower Ventura River Watershed. Water for domestic users in the western portion of Ventura comes primarily from Lake Casitas via the Casitas Water District, and most of that water comes from the Ventura River, Matilija Creek, and North Fork Matilija. However, surface water quality is even more critical for wildlife, particularly steelhead trout and other fish which are sensitive to contaminants and temperature changes. Steelhead trout are an important indicator species for water quality in the Lower Ventura River, because the return of this species to viability in the river is an important habitat objective of this Vision Plan, and because "water good enough for steelhead trout is very good water indeed" (Leydecker and Grabowsky 2006).

Section 303(d) of the Federal Clean Water Act requires states to create lists of water bodies that are impaired, or are threatened with impairment, meaning that they do not meet water quality standards for one or more pollutants. The Section 303(d) list has the specific purpose of identifying water bodies that have priority for the establishment of total daily maximum load (TMDL) regulations, and is not intended to serve as a comprehensive survey of all water quality conditions. Impairments requiring mitigating action can be structural and mechanical conditions that affect wildlife health (e.g. water diversions or fish barriers) as well as those caused by organic or inorganic substances.

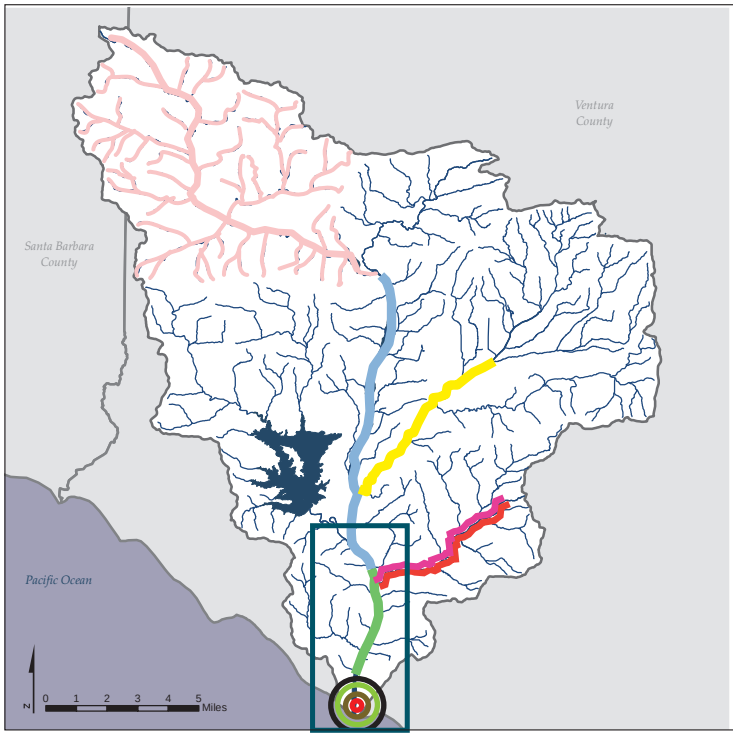


FIGURE 3.25 *Ventura River Watershed: Bodies of water listed as impaired under Section 303(d) of the Clean Water Act. Data from CRWQCB-LA 2006.*

The most recent Section 303(d) list prepared by the State Regional Water Quality Board in 2006 lists impairments within the Ventura River Watershed that are illustrated in figure 3.25. Most of the upper watershed is considered impaired for the purposes of Section 303(d) as the result of the fact that the Matilija Dam acts as a physical barrier to the passage of fish up and downstream. The middle reaches of the Ventura River, including the upper mile of the Parkway Vision Plan area, are impaired by groundwater pumping and surface water diversions that reduce instream flow and thereby reduce the quality of remaining water.

A CLOSER LOOK –THE LOWER RIVER

The watershed benefits from the efforts of citizen monitoring that provides a much more detailed supplement to the broad brush of Section 303(d). Since 2001, the Ventura Stream Team, a joint program of Santa Barbara Channelkeeper and the Ventura Chapter of the Surfrider Foundation, has monitored critical water quality indicators on the Ventura River and Cañada Larga on a monthly basis and has published comprehensive reports of the results. The Stream Team identifies significant water quality conditions, discussed below, that are important for the health of humans and wildlife.

Nutrient Pollution

The Ventura Stream Team concluded that nutrient pollution was the most serious problem encountered in the Lower Ventura River, with nitrate and phosphate levels far exceeding EPA suggested limits for wildlife health (Leydecker and Grabowsky 2006) (figure 3.26).

Temperature

Water temperature has a direct impact on sensitive species such as steelhead trout, and also acts in combination with other conditions to affect wildlife. During the monitoring period 2001 through 2005, temperatures often approached the lethal level for steelhead (figure 3.27).

Water temperatures can rise as the result of periodic flood events that "scour" the riverbed and adjacent floodplain with an average frequency of five to ten years, removing much of the vegetative canopy (Capelli 1997). Shallow, low-velocity water is more susceptible to solar heating, especially when vegetative cover is absent. The Ventura River frequently experiences low-flow conditions that raise water temperature during dry months, partly as a result of the ambient Mediterranean climate but also as the result of withdrawals and diversions of instream water for human consumption.

Some researchers have suggested that steelhead in Southern California waters have evolved some tolerance to higher temperatures, and that like most fish, they can actively seek out the most favorable conditions (Mathews and Berg 1997; Stoecker 2002). However, it is clear that temperature remains an important consideration for steelhead revival (RWQCB 2003; Leydecker and Grabowski 2006). Any unnecessary environmental stress would seem to be unwarranted in the Ventura River, where conservation

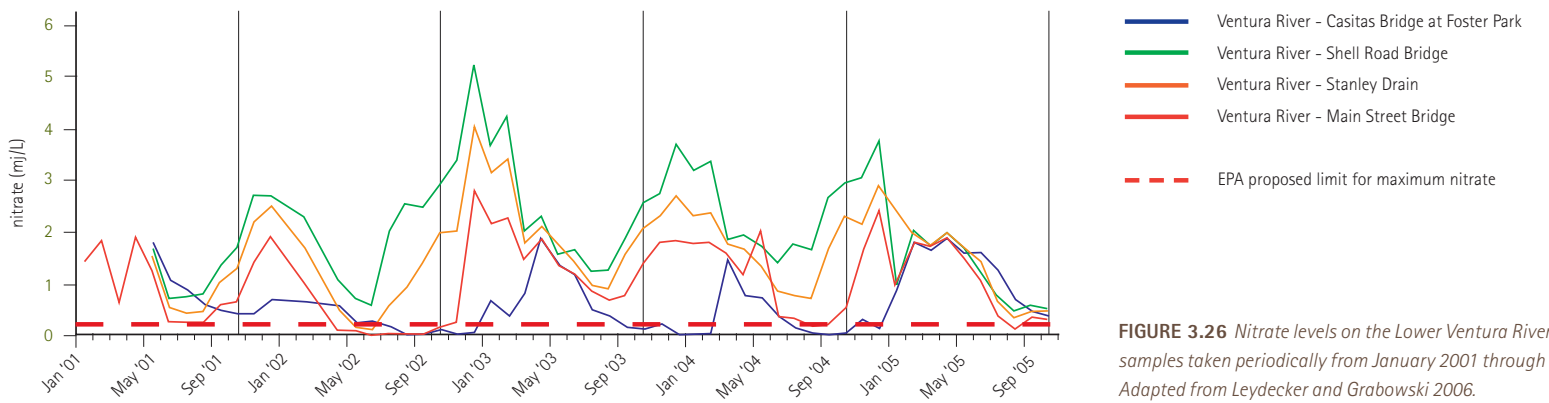


FIGURE 3.26 *Nitrate levels on the Lower Ventura River. Data from samples taken periodically from January 2001 through October 2005. Adapted from Leydecker and Grabowski 2006.*

biologists are seeking the return of a species that has nearly disappeared from the river.

Three temperature requirements are critical for steelhead: Temperatures below 52°F in the winter are ideal for spawning, temperatures at 61°F or below are healthy dry season conditions. As temperatures rise, the amount of oxygen dissolved in water decreases and fish have increasing difficulty extracting it. For steelhead, temperatures above 75°F can lead to death. Seasonally low winter temperatures are important for the creation of ideal spawning conditions, while diurnal fluctuations have an important impact on the amount of dissolved oxygen in the water, such oxygen being necessary for aquatic life (Leydecker and Grabowsky 2006, 32).

Impacts from the Wastewater Treatment Plant

The Ojai Valley Wastewater Treatment Plant provides tertiary treatment of wastewater for approximately 23,000 Ojai residents, discharging an average 2.17 million gallons of treated effluent per day into the Ventura River, a significant augmentation of instream flow (CRWQCB-LA 2003). The effluent discharged provides benefit to wildlife by replacing water that has been removed from the river upstream for domestic uses and agriculture (figure 3.28).

The Regional Water Quality Control Board (CRWQCB-LA) concluded in 2003 that an upgrade to the treatment plant facilities had reduced nitrates in its effluent to an average 5.3 milligrams per liter (mg/L) (CRWQCB-LA 2003). While this level is well below the EPA's maximum contaminant limitation (MCL) for human safety, it far exceeds a tentative limit of 0.16 mg/L for the purposes of ecosystem health that has been suggested by the EPA. Nitrate in the effluent is added to that which is already present in the river, with the result that nitrate levels are measurably higher downstream from the plant (Leydecker and Grabowski 2006). The graph in figure 3.28 compares nitrate levels in the river at Foster Park (one mile upstream from the treatment plant outfall) with the nearest downstream sampling site at Shell road (approximately 1.8 miles downstream from the outfall) for a representative period. While the upstream curve is close to the EPA's suggested nitrate limit of .16 mg/L for ecosystem health for much of the year, the samples downstream from the water treatment plant are significantly higher than the EPA guideline (figure 3.29).

The wastewater treatment plant shows how human development can alter the seasonal and diurnal changes in water temperature that are discussed above, in ways that are both helpful and potentially harmful. On the one hand,

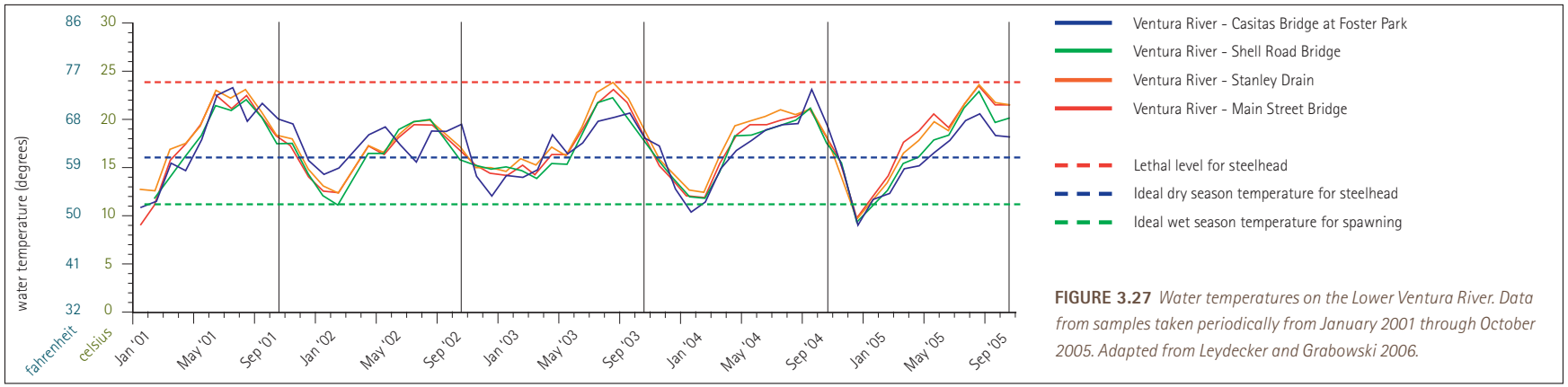


FIGURE 3.27 *Water temperatures on the Lower Ventura River. Data from samples taken periodically from January 2001 through October 2005. Adapted from Leydecker and Grabowski 2006.*

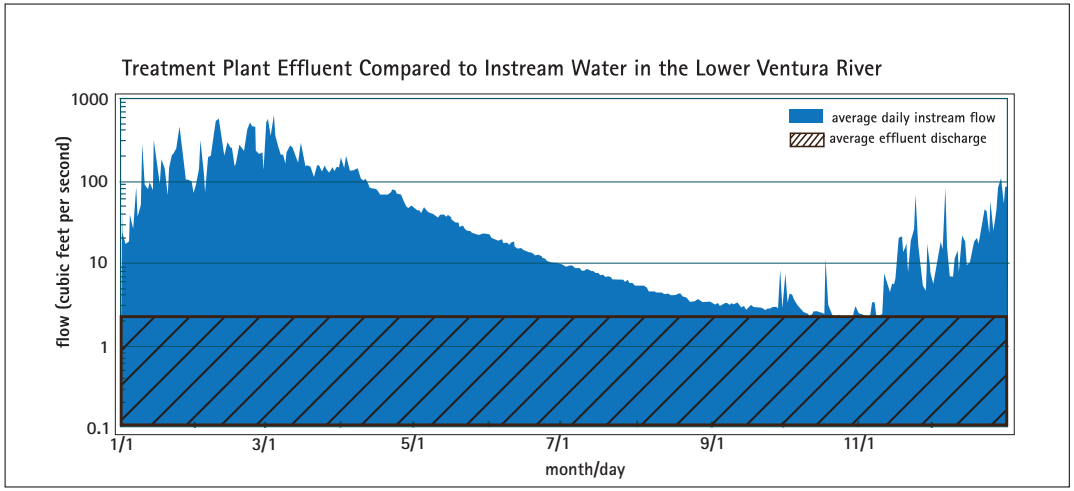


FIGURE 3.28 *Comparison of average wastewater treatment plant effluent and and average instream flow. During dry periods, effluent may make up a large percentage of the water in the lower river. Adapted from Cappelli 1997; RWQCB 2003; Ventura County Watershed Protection District.*

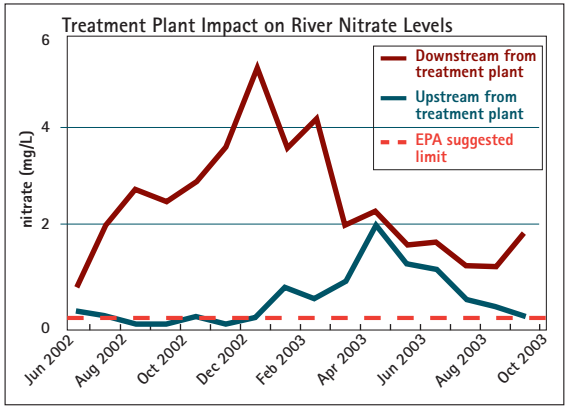


FIGURE 3.29 *Comparison of nitrate levels above and below treatment plant. Adapted from Leydecker and Grabowski 2006.*

the large quantity of effluent released by the treatment plant increases instream flow in the lower river and this deeper flow can result, at times, in water temperatures that are lower than those in the upper reaches of the river (Leydecker and Grabowski 2006). On the other hand, the daily fluctuations in temperature and dissolved oxygen that naturally exist upstream from the treatment plant have been "flattened" downstream from the plant, and temperature increases of five degrees Fahrenheit or more have been measured immediately downstream from the treatment plant, triggering regulatory concern (CRWQCB-LA 2003).

Effluent from the Ojai Sanitation District Water Treatment Plant makes up two-thirds or more of water in most of the Lower River during dry summer and fall conditions, making the temperature of that effluent a critical factor for water quality during the dry season. When the discharge permit for the Plant was renewed in 2003 by the Regional Water Quality Control Board (CRWQCB-LA), the Board found that despite a major engineering upgrade during the 1990's, "the data from the downstream station showed much less of the diurnal character" of natural stream water for both dissolved oxygen and temperature, and the temperature difference between water upstream and downstream of the Plant exceeded five degrees Fahrenheit. The Board concluded that the temperature differential could be resolved by addressing the excessive withdrawals and diversions of freshwater upstream (i.e. mixing more cold river water with the warmer water from the Plant) (CRWQCB 2003).

Testing of the treatment plant effluent between 1997 and 2002 indicated that effluent temperature fluctuated between a minimum 63 degrees Celsius and a maximum 78 degrees, with an average 70 degrees. Both the minimum and the average were in excess of the ideal temperature for steelhead in both dry and wet seasons, and the maximum exceeded the lethal limit for the fish (CRWQCB-LA 2003). In a forty-eight hour continuous study of diurnal temperature and dissolved oxygen levels in the river, Ojai Valley Sanitation District staff found that the difference in water upstream and downstream from the water treatment plant exceeded five degrees Fahrenheit.

Algae and Eutrophication

The Section 303(d) listing identifies algae as an impairment that impacts the entire Lower Ventura River. Algae is a naturally present organism, not necessarily an impairment. Excessive algae is the result of a combination of conditions that can include high temperature, excessive nutrients, low water flow and erosion from natural or man made causes, and algae combined with these other conditions can lead to eutrophication that harms wildlife.

Although the Environmental Protection Agency lists algae as a pollutant in the Lower Ventura River under Section 301 of the Clean Water Act , experts disagree on whether algae itself is a contaminant -- under the conditions described above, explosive algal growth occurs even in pristine streams in the upper watershed (Leydecker 2008). However, algal "bloom" may be seen as a symptom of conditions -- such as high water temperature and absence of riverbed gravel -- that discourage steelhead spawning, and the periodic removal of riparian vegetation may be a serious impediment to the restoration of riparian wildlife habitat.

Brownfield Contamination

Industrial and agricultural byproducts such as volatile organic compounds and heavy metals have not been sampled in the Ventura River at levels that would cause concern. However, chapter 10 discusses the fact that at brownfield sites in the proposed parkway area, groundwater has been contaminated by petroleum compounds and by the gasoline additive MTBE. Because groundwater in these areas moves toward the Ventura River, the possibility exists that these pollutants have reached the river and will do so in the future, perhaps in greater amounts.

Trash

Although most of the Lower Ventura River is surrounded by private property and off limits to recreational visitors, the river is frequently visited by homeless dwellers and by other casual visitors who leave trash. Although the EPA has listed only the river mouth as impaired by trash under Section 303(d), this pollutant can be seen by any observer along the river throughout the proposed parkway zone.

A CLOSER LOOK AT CAÑADA LARGA

Cañada Larga, a tributary that figures significantly in this Vision Plan, is Section 303(d) listed for low dissolved oxygen and fecal coliform (bacteria). The Stream Team found that the stream was unsuitable for public water contact due to excessive bacteria, and that it contained excessive phosphorus, conductivity (a measure of dissolved solids), and algal growth leading to low dissolved oxygen, probably the result of ranching and agriculture upstream, and possible metals contamination near the confluence, possibly resulting from past industrial activities nearby (Leydecker and Grabowski 2006).

A CLOSER LOOK AT THE RIVER MOUTH

The estuary at the mouth of the Lower Ventura River is Section 303(d) listed for excessive trash, total coliform (bacteria), algae, and eutrophication. Many pollutants in the upper part of the Parkway Vision Plan area are reduced by natural processes before they reach the river mouth (Leydecker and Grabowski 2006). However, storm drains deliver polluted storm water runoff from sections of urban Ventura directly to the estuary, and unauthorized campers at the river mouth leave human waste and trash there.

GROUNDWATER QUALITY

The quality of groundwater is a critical consideration for users in the Ventura River Watershed. Groundwater is used to meet 67% of all water needs county wide. Groundwater pumping is a major source of domestic drinking water for the Cities of Ojai and Ventura (WCVC 2006). Agricultural users in the watershed rely on groundwater pumping – mostly from their own private wells – for most of their irrigation water (WCVC 2006), and, as discussed below, the quality of that water can impact crop production.

River morphologist Luna Leopold emphasized that surface water and groundwater are the same water, simply moving through the watershed's hydrological system (Leopold 1974). This is especially true in the Ventura River Watershed, where shallow groundwater basins in the watershed trade water readily with surface water bodies, rapidly replenishing or depleting each other (Watersheds Coalition of Ventura County 2006). This suggests that surface water quality – including urban and agricultural runoff – can have an immediate impact on groundwater quality, and vice versa.

Groundwater quality issues in the Ventura River Watershed are similar to those that confront the State of California generally. Statewide, the single largest cause of well closures is elevated levels of nitrates in groundwater (Watersheds Coalition of Ventura County 2006). Nitrates, a form of dissolved nitrogen, find their principal sources in agricultural fertilizer, animal waste, and leakage from septic tanks, and are a known short-term health risk in drinking water with a federal and state public health (drinking water) limit of 10 milligrams per liter (mg/L) (USEPA 2006). Groundwater is susceptible to nitrate contamination because these substances are easily soluble in water, do not bind to soils, and do not evaporate from water (USEPA 2006). Although levels of groundwater nitrate in the Ventura River Watershed generally do not exceed state and federal maximum contaminant levels (MCL's), elevated nitrate is present in all of the groundwater basins of the watershed, and several well closures have resulted (California Department of Water Resources 2003).

Enforceable federal maximum contaminant levels (MCLs) are set for pollutants such as nitrates, but secondary maximum contaminant levels or (SMCL's) guidelines which are not federally enforceable are also set for nuisance chemicals which are not considered health threatening but which affect the aesthetic qualities of water or its practical usability in industry, agriculture, and plumbing systems (USEPA 1992). One significant measure of secondary contaminants in groundwater is total dissolved solids (TDS), representing all inorganic and organic substances dissolved in a volume of water. Total dissolved solids have an impact on taste and odor, and color, corrosion, and scaling on plumbing fixtures. For these purposes, the federal guideline or secondary maximum contaminant level for TDS is 500 mg/L (USEPA 1992). All groundwater basins in the Ventura River Watershed exceed this level, but the Lower Ventura River sub-basin, which underlies most of the Parkway Vision Plan area, is especially significant in this regard, with average TDS of 900 mg/L and peaks that can reach 3,000 mg/L during extended dry spells (California Department of Water Resources 2003).

Total dissolved solids also have an impact on agriculture. Increasing salinity (TDS) in irrigation water can inhibit plant growth by reducing the uptake of water through plant roots (California Department of Water Resources 2003) (Ayers and Westcot 1985). The San Joaquin Valley Drainage Program recommends slight restrictions on irrigation use of water with TDS of greater than 500 mg/L, moderate restrictions above 1,250 mg/L, and severe restrictions above 2,500 mg/L (California Department of Water Resources 2003), indicating a cause for concern for agricultural groundwater use from the Lower Ventura River basin.

To some extent, total dissolved solids in groundwater have natural sources such as the elevated levels of phosphate that exist in bedrock underlying the Lower Ventura River Watershed (Leydecker and Grabowsky 2006). However, they also have significant man made sources such as sewage, urban storm water runoff, agricultural runoff, and point sources (Wilkes University Center for Environmental Studies).

In the project area, groundwater in basins downstream from Foster Park is not used for human drinking. This is partly due to concerns over nitrates and TDS. However, it is also important to note that industrial by-products, the remnant of the Valley's petroleum production history, have been detected in the groundwater in large enough concentrations to cause concern.

River parkways provide accessible open space that helps remedy the severe shortage of park and open-space areas that plague many urban and suburban communities, small towns, and rural areas.

California River Parkways Act of 2004
California Public Resources Code §5751(d)

CHAPTER 4: ECOSYSTEMS

Ecosystem Services

Natural ecosystems provide a multitude of services to humankind. Ecosystem services, often referred to as green infrastructure, are the processes by which the environment produces resources such as clean water and pollination of agricultural plants (Ecological Society of America 2008). Traditionally, resource conservation has been directed towards conserving resources solely for their economic use and human consumption (Meffe 2000). Today, the understanding of resource conservation has broadened to include a broader understanding of the ecosystems which produce these resources. Caring for these resources has led to a new management and planning approach known as ecosystem-based management. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive, and resilient condition so that it can provide the services humans want and need (Communication Partnership for Science and the Sea 2006).

The services that an ecosystem provides are difficult to impossible for humankind to duplicate. Operating on a grand scale and in such intricate and little understood ways, most ecosystem services could not be replaced by technology (Daily 2008). Calculating the financial value of these services is also difficult. The following are examples of just two services that would be difficult or extremely costly to replicate.

[OPPOSITE] FIGURE 4.1 *The Ventura River Estuary.*

- Medicinal Services: Eighty percent of the world's population relies upon natural medicinal products. Of the top 150 prescription drugs used in the U.S., 118 originate from natural sources: 74% from plants, 18% from fungi, 5% from bacteria, and 3% from one vertebrate (snake species). Nine of the top 10 drugs originate from natural plant products.
- Pollination: One third of human food comes from plants pollinated by wild pollinators. Over 100,000 different animal species – including bats, bees, flies, moths, beetles, birds, and butterflies – provide free pollination. The value of pollination services from wild pollinators in the U.S. alone is estimated at four to six billion dollars per year (Ecological Society of America 2008)

The improved scientific understanding of ecosystems, together with increased public involvement in environmental issues, has lead to the development and implementation of ecosystem-based management strategies (Ecological Society of America 2008). Ecosystem-based management considers the composition, structure, functioning, and key processes of whole ecosystems, including humans, rather than looking at individual issues or resources as has been common practice.

This Vision Plan advocates the comprehensive approach of ecosystem-based management. Eight habitat ecosystems have been identified within the Lower Ventura River project area: estuary, dune, riparian, scrub, chaparral, marine, river, and wetlands and are covered in further detail in this plan. Because ecosystem services directly contribute to a sustainable human well-being, conserving ecosystem services is of utmost importance. Understanding, protecting, and enhancing these valuable systems is considered throughout this plan.

ECOSYSTEM SERVICES

- moderate weather extremes and their impacts
- disperse seeds
- mitigate drought and floods
- protect people from the sun's harmful ultraviolet rays
- cycle and move nutrients
- protect stream and river channels and coastal shores from erosion
- detoxify and decompose wastes
- control agricultural pests
- maintain biodiversity
- generate and preserve soils and renew their fertility
- contribute to climate stability
- purify the air and water
- regulate disease carrying organisms
- pollinate crops and natural vegetation

(Ecological Society of America, 2008)

Biodiversity

Biodiversity is a key component of functioning ecosystems. In order to conserve ecosystem services, it is essential to conserve biodiversity (Noss and Cooperrider 1994). Biodiversity is the variety of life forms (including both the number of species and the genetic variation among species) and the ecosystems they form (Noss and Cooperrider 1994; Forman 1995; Wilson 1988). The variety of organisms that exist today is the result of millions of years of evolutionary processes.

Historically, the rate at which species have been created has exceeded the rate of extinction, but that trend has been reversed today. Conservative estimates put today's extinction rate at 100 to 1,000 times higher than the expected natural extinction rate (International Union for Conservation of Nature 2004). Species and ecosystems are disappearing and this disappearance is irreversible (Wilson 1988). When new species, new genetic variation, or new ecosystems are formed, biodiversity increases. Biodiversity decreases when genetic variation decreases, a species becomes extinct, or when an ecosystem complex is lost (Gallo et al. 2005). Energy flows, nutrient and hydrological cycles, natural disturbance regimes, and feedback mechanisms all contribute to the production and maintenance of biodiversity. Understanding these processes is critical for planning decisions as well as for conservation and restoration efforts.

Biodiversity is not distributed evenly on Earth. In temperate environments, biodiversity is richer, while polar regions have fewer species. California is one of the most biodiverse regions in the world, with a great diversity of plants and animals that are found nowhere else in the world. This biodiversity, however, is seriously threatened. In California, threats to biodiversity include habitat conversion, overuse of biological resources (e.g. logging and grazing), pollution, and climate change (Jensen et al. 1993). Maintaining biodiversity is a crucial component of maintaining ecosystemic functions, and this Vision Plan incorporates planning and design strategies that seek to protect or increase biodiversity.

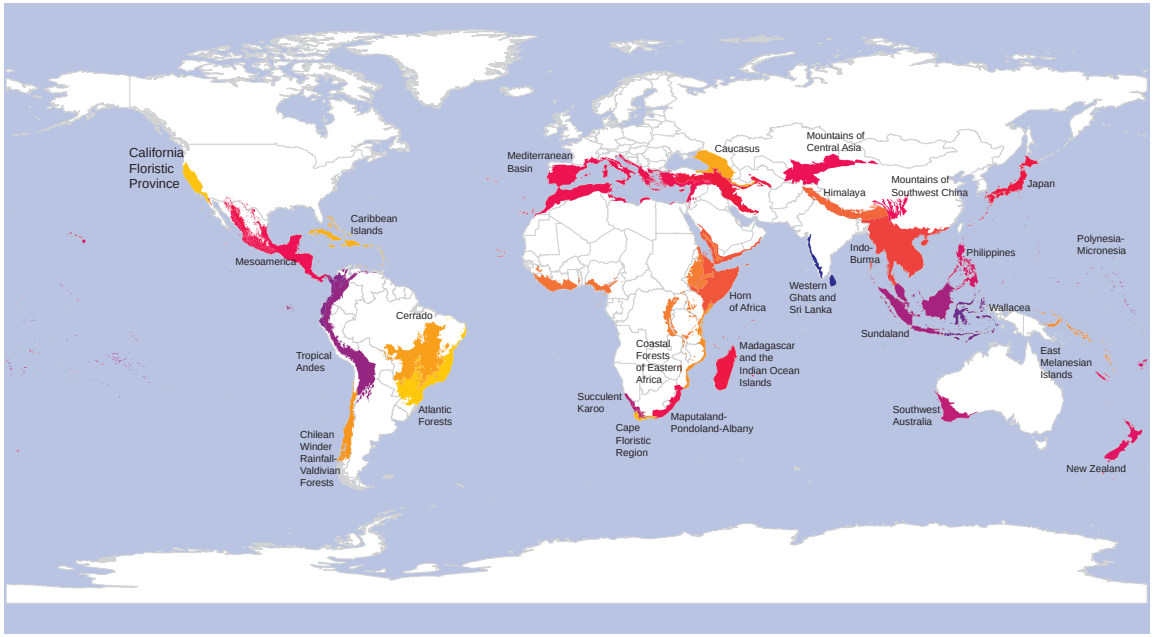


FIGURE 4.2 *Biodiversity hotspots throughout the world. Source: Conservation International.*

California Floristic Province

California is home to an extremely high number of endemic plant species (species found nowhere else on earth). In order to create manageable units for plant research, botanists have divided the continent into geographic units called floristic provinces. California has been divided into three floristic provinces: the California Floristic Province, the Great Basin Province, and the Desert Province. The largest of these provinces is the California Floristic Province (Ornduff et al. 2003). The area extends beyond California into Oregon, Nevada, and Baja California (California Academy of Sciences 2008). Before massive urbanization, many endemic species existed here. According to the California Academy of Sciences, which has been collecting and documenting species for over 100 years, at least 75% of the original habitat of California has already been lost.

The California Floristic Province also provides valuable bird habitat. Although there are fewer than 10 endemic bird species found in the California Floristic Province, more species of birds breed in this region than anywhere else in the United States.

CALIFORNIA: A BIODIVERSITY HOTSPOT

Due to a high number of endemic species, the California Floristic Province is a world biodiversity hotspot. The number of vascular plant species found in the California Floristic Province is greater than the total number of species from the central and northeastern United States and adjacent parts of Canada, an area 10 times larger than the California hotspot (Conservation International 2008). Current tallies of plant life in California reveal:

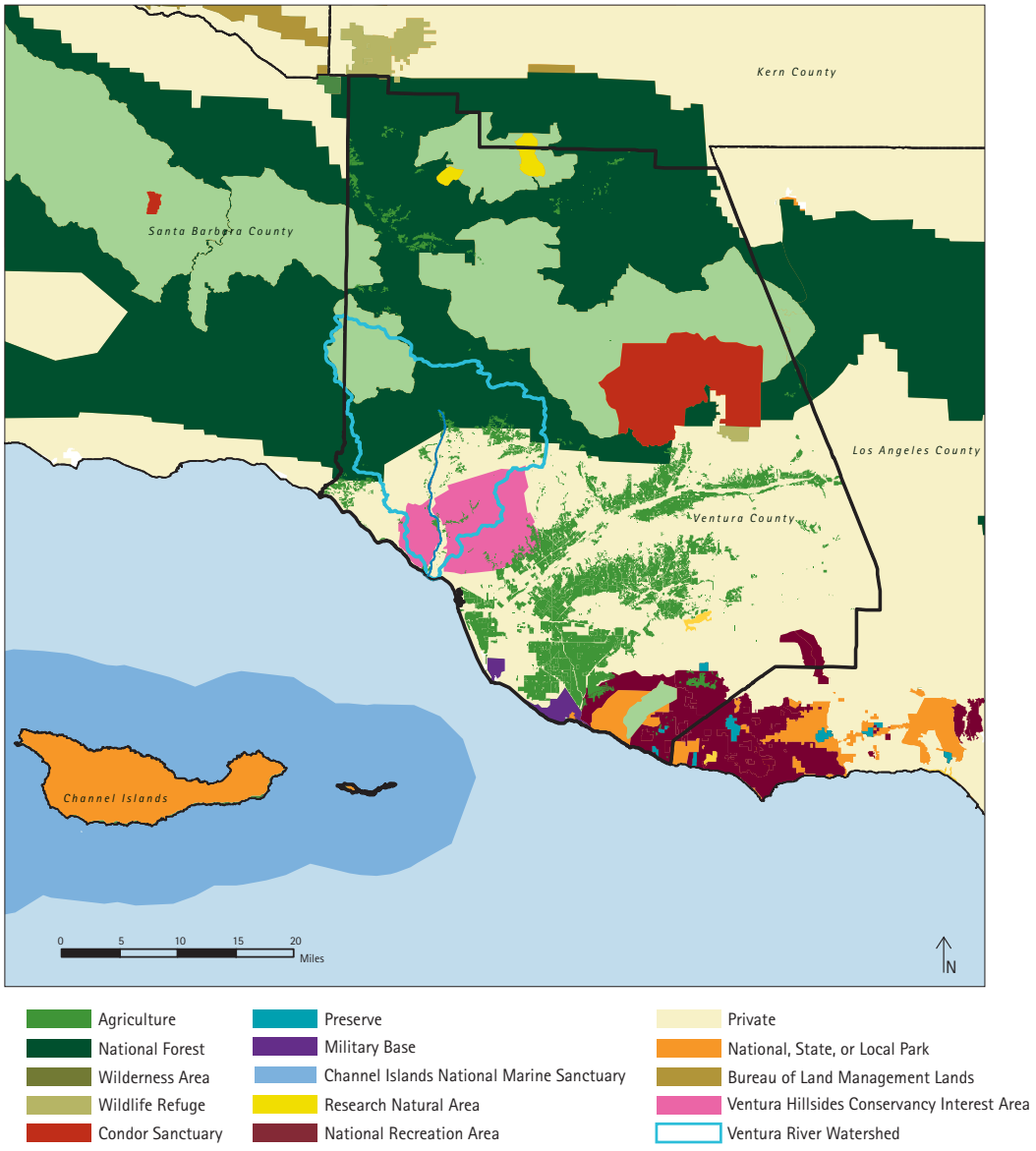
- 6,300 native taxa
- 565 taxa threatened or endangered
- 4,693 distinct species
- 1,169 sub-species
- 1,416 species endemic
- 26 species presumed extinct

(Bittman 2003; California Native Plant Society 2001; Ornduff et al. 2003)

FIGURE 4.3 *The California Floristic Province (shown in red) extends beyond the state of California into Oregon to the north, and Mexico to the south. Data from CA-GAP Project.*

Planning Scales

REGIONAL SCALE: LAND MOSAIC



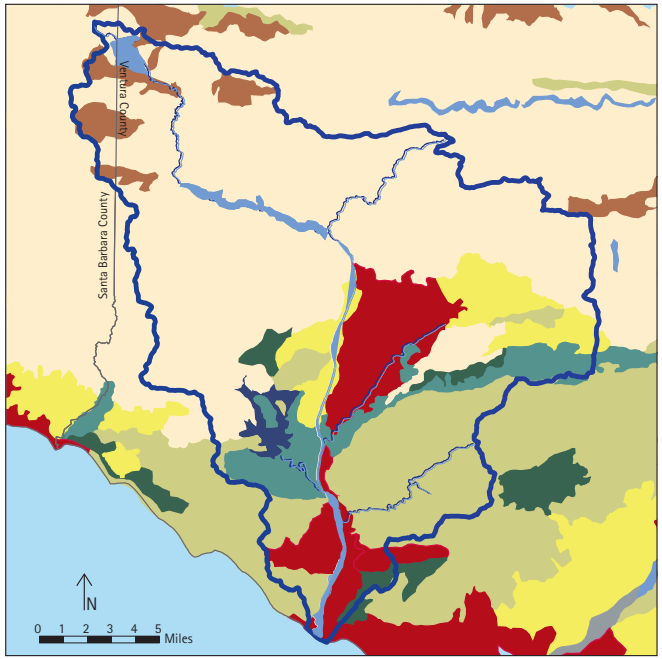
According to the principles of landscape ecology, land patterns and their spatial arrangement affect the way species exist and interact with each other. Landscape patches, corridors, and matrix combine to create the pattern of the landscape mosaic (Forman 1995) and are a means of determining overall ecological health. The quantity and size of landscape patches play a critical role in determining the genetic makeup and abundance of an area. Movement corridors facilitate the movement of organisms and energy, which determine the extent of connectivity in a landscape. Landscapes with low connectivity are considered fragmented. As fragmentation increases in a landscape, it alters the equilibrium of species diversity, increases the vulnerability of patches to disturbances and invasive species, and decreases species viability.

At the regional scale, the ecological mosaic of the Ventura River area includes national parks and wilderness areas, the island ecosystems and marine sanctuary of the Channel Islands, beaches, and agriculture. Due in part to steep topography, habitat within the northern portion of the region is intact and stable with little disturbance. Due to urbanization, the southern portion of Ventura County shows a large degree of habitat fragmentation, with low levels of movement corridors for terrestrial species. This condition of habitat fragmentation in southern Ventura County threatens the overall ecological health of the region.

FIGURE 4.4 *Managed lands and the ecological matrix. Data from California GAP Biodiversity Atlas; Southern California Association of Governments.*

WATERSHED SCALE: VEGETATION COMMUNITIES

The combination of soil types, topography, Mediterranean climate, and fire cycles all contribute to shaping the vegetation communities in the Ventura River Watershed. The dominant vegetation patterns at the watershed scale include chaparral, coastal sage scrub, woodlands, riparian, wetlands, and agriculture. A relatively high presence of native vegetation continues to exist in the Ventura watershed due to steep topography and limited development on the surrounding hillsides. These vegetation communities provide habitat for a wide variety of native wildlife. In order to protect and enhance native biological resources, existing native vegetation communities must be managed and preserved.



Vegetation Communities

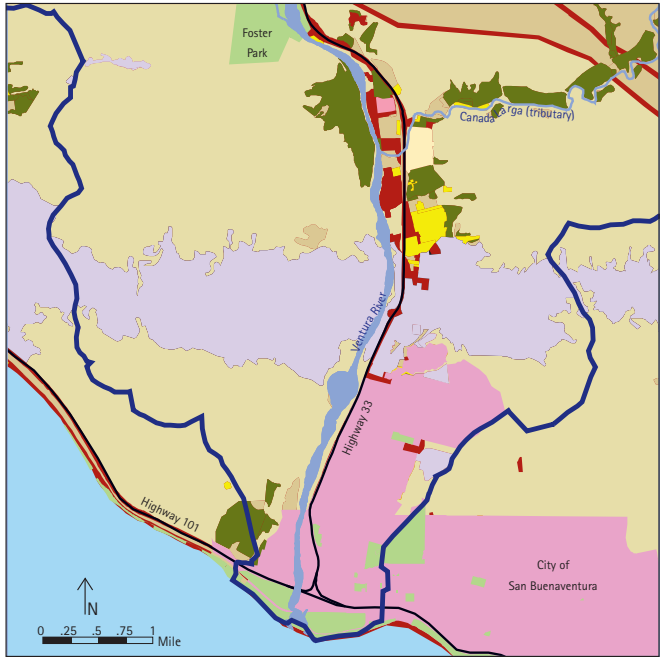
- Chaparral
- Coastal Scrub
- Annual Grassland
- Agriculture
- Conifer
- Coastal Oak Woodland
- Riparian
- Urban
- Waterbody
- Barren
- Ventura River Watershed

FIGURE 4.5 *Existing vegetation in the Ventura River Watershed. Data from California GAP Biodiversity Atlas.*

SITE SCALE: URBAN AND RIVER INTERFACE

At the site scale, the Lower Ventura River lies west of the city of San Buenaventura and comprises multiple habitat types. Landscape patches include parks, agriculture, estuary and riparian habitat, undeveloped hillsides, urban development, and oil extraction.

The landscape mosaic at this scale is fragmented. Existing urban development, stream channelization, and roadway patterns contribute to habitat fragmentation by impeding wildlife movement to ecosystem destination areas such as the Ventura River, the estuary, and the surrounding hillsides.

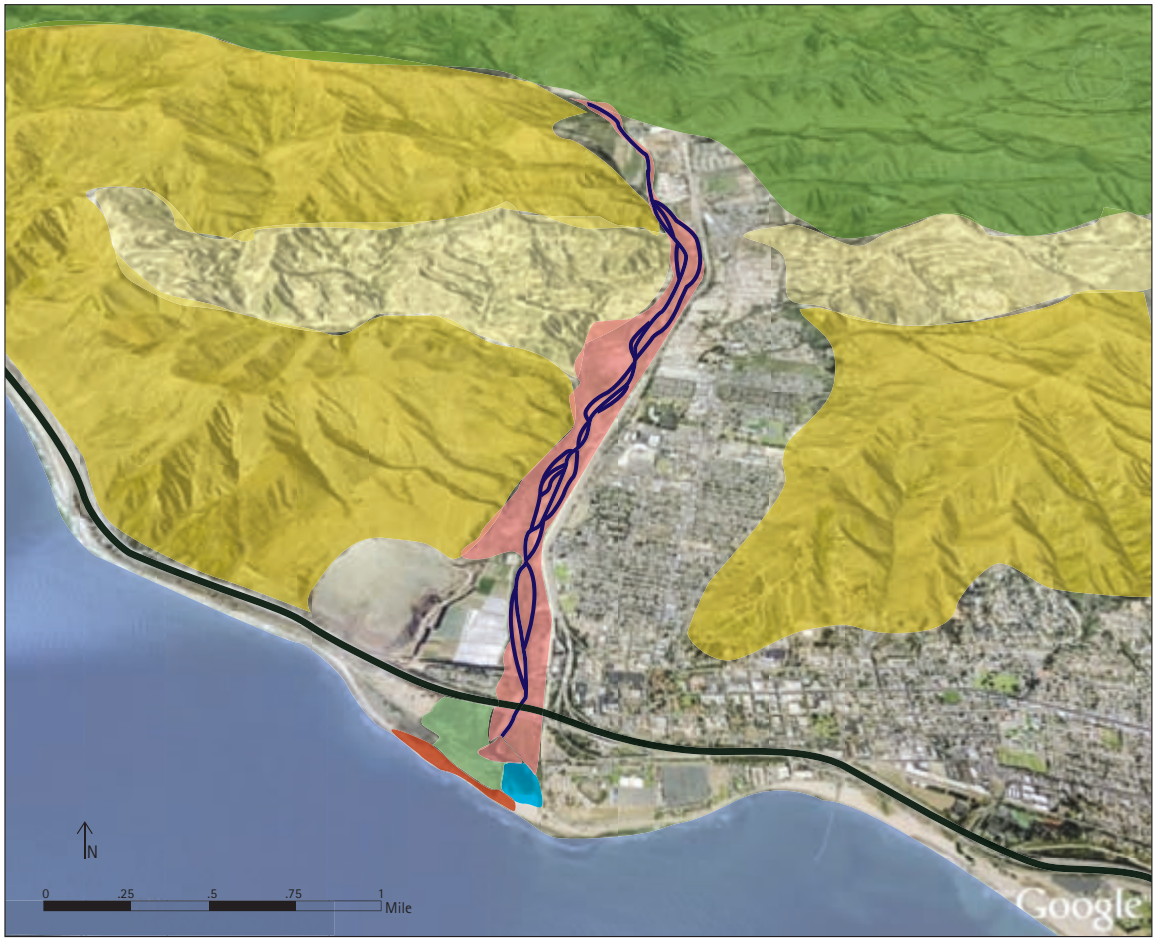


Land uses

- Parks
- Residential
- Agriculture
- Vacant Land
- Ventura River
- Oil and Gas Extraction
- Commercial/Industrial
- City of San Buenaventura
- Ventura River Watershed

FIGURE 4.6 *Urban/wildlands interface. Data from City of Buenaventura; Watershed Coalition.*

Ecosystem Based Management



Ecosystems within or adjacent to the Lower Ventura River

Chaparral	Riparian	Dune
Coastal Scrub	Wetlands	Marine
Coastal Scrub impaired	Estuary	Ventura River

FIGURE 4.7 *Approximate locations of ecosystems within the Lower Ventura River project area. Photo from Google Earth.*

Citizens of Ventura recognize the presence and importance of biological resources. The General Plans of both Ventura County and the City of Ventura include the goal of preserving and protecting significant biological resources from incompatible land uses and development. Ventura County defines significant biological resources as endangered, threatened, or rare species and their habitats, wetland habitats, coastal habitats, wildlife migration corridors, and locally important species and communities (City of San Buenaventura General Plan 2005; Ventura County General Plan 2010).

Like many coastal and riverine areas in California, the Lower Ventura River is under threat from past and current land use practices and the prospect of future development. Because much of the river corridor has retained its rural character, a number of habitats remain intact. Habitats around the Ventura River area sustain some of the highest diversity of vertebrate species in Southern California; nearly 300 vertebrate species are known in the lower reaches of the Ventura River alone. At least 26 special status species inhabit or utilize the aquatic, riparian, and wetland habitats in the watershed, including 13 listed species (endangered, threatened, or fully protected) and 13 California species of special concern (California Coastal Conservancy 2007).

This Parkway Vision Plan begins by looking at eight ecosystems including and adjacent to the Lower Ventura River. Each ecosystem is reviewed according to three aspects: biological resource for habitat species, impacts affecting the health and vulnerability of the ecosystem, and the natural infrastructure services provided by each ecosystem. Beginning at the northern point of the Vision Plan, the eight ecosystems identified here are: chaparral, coastal sage scrub, river, riparian, wetlands, estuary, dune, and marine ecosystems.

Ecosystems Within the Parkway

CHAPARRAL

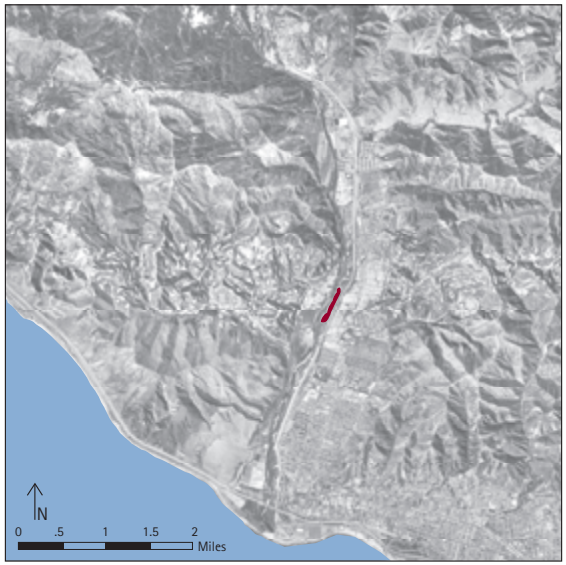


FIGURE 4.8 *Approximate location remnant chaparral stand. Data from California GAP Biodiversity Atlas.*

Chaparral is California's most extensive native plant community. This distinct plant community provides habitat for a multitude of native plant and wildlife species while also contributing a characteristic sense of place to California landscape. Chaparral is a critical biological resource for species adapted to this environment. Seeds from native chaparral plants are eaten by many kinds of insects, birds, and mammals, but with few exceptions, animals do not move seeds long distances from this community (Quinn and Keeley 2006). Because native seeds are not regularly dispersed far away from the parent plants, chaparral is essential for the survival of plant and wildlife species that depend on this habitat. Human encroachment, and the related increase in fire frequencies that development brings, threaten the chaparral ecosystem. In addition to habitat value, chaparral provides additional ecosystem services by providing erosion control on hillsides, allowing for the recharge of underground water supplies, and provides habitat for wild bee populations that can pollinate nearby agricultural lands.

Historical accounts of 1793 describe chaparral stands in Ventura as continuous and heavy. Though chaparral is primarily outside the floodplain, one remnant of this formerly widespread habitat type occurs in the floodplain. A relatively undisturbed remnant stand exists at the north end of the Ventura River Levee, west of Highway 33. Plant species at this location include lemonade berry, laurel sumac, mountain mahogany, black sage, and greenbark ceanothus (United States Army Corps of Engineers 2004). The chaparral plant community was probably more common in the floodplain prior to agriculture. The two major chaparral series within the study area include chamise and sumac.

COASTAL SCRUB

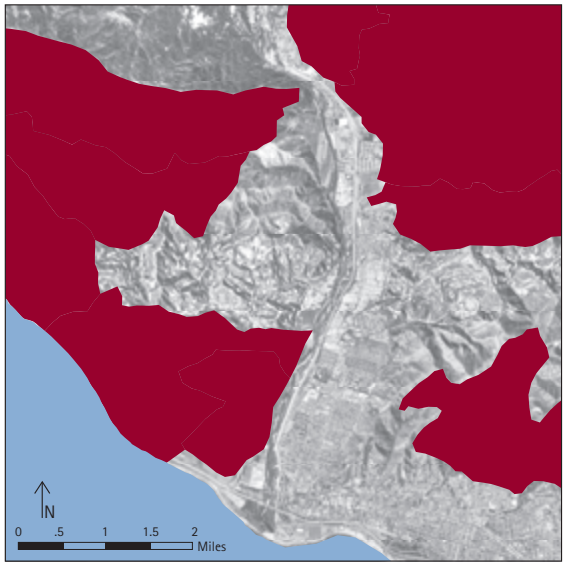


FIGURE 4.9 *Coastal scrub throughout the project area. Data from California GAP Biodiversity Atlas.*

Coastal scrub once dominated Southern California's coastline. Today this habitat is rapidly disappearing, and only scattered pockets remain. As an ecosystem, coastal sage scrub has extremely high levels of species diversity and endemism and supports a number of endangered species including the California gnat catcher (*Polioptila californica*).

Coastal scrub is characterized by drought-deciduous shrubs dominated by black sage (*Salvia mellifera*), white sage (*Salvia apiana*), California sage (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), bush sunflower (*Encelia californica*), toyon (*Heteromeles arbutifolia*), lemonadeberry (*Rhus integrifolia*), and a diversity of other shrubs, herbaceous plants, cacti, and succulents. Threats to the coastal sage scrub community include human encroachment and habitat fragmentation, invasion by non-native species, altered fire cycles, and air pollution (Allen et al. 2005).

Impacts to coastal scrub ecosystem can result in diminished plant diversity. As plant diversity decreases, the diversity of leaf litter also decreases which may lead to a decline in the diversity of fungi in soil. As a result, ecosystem services such as decomposition, soil respiration, and nutrient cycling might slow (Treseder 2006). The loss of these functions may limit the sustainability of coastal sage scrub habitat, as plants and animals depend on these processes, and is currently under study.

RIVER

FIGURE 4.10 *The main channel of the Ventura River. Data from California GAP Biodiversity Atlas.*

Habitat quality in the main channel of the Ventura River is determined by multiple factors. The extent and condition of canopy coverage, degree of embeddedness of cobbles and gravel, and the stream flow conditions of pools, riffles, runs, and glides directly affect the quality of the river as a biological resource. Within the stream channel, the presence of pools, riffles, runs, and glides provide habitat opportunities for a multitude of species, including the endangered species Southern California steelhead trout. The smooth-flowing deep water sections of the river channel, referred to as glides, have minimal suspended or deposited sediment, thereby protecting steelhead trout fish eggs and alevin from suffocation. Riffles, the swifter, turbulent flows over gravel or cobble substrate, help to oxygenate the water and provide navigation clues for spawning steelhead trout. Pools, the deep and slow-moving waters with canopy coverage, provide refuge and cooler water temperatures that are beneficial to young steelhead trout during the warm summer months.

In addition to the ecosystem services that biological resources provide, the shifting Ventura River channel also performs ecosystem services that benefit people's cultural, spiritual, and lifestyle needs in the form of fishing, swimming, and wildlife viewing opportunities.

The health of Ventura River faces numerous threats, including urban runoff, detrimental land use activities, and invasive species. Urban runoff is a significant threat to the Ventura River, as it introduces contaminants to the river and modifies water flow patterns. Land use activities, including agricultural and grazing development, mining and extraction, and extensively developed slopes and paved surfaces, have altered the natural sediment loads of the Ventura River affecting habitat quality and natural flow patterns. Invasive species such as tamarisk and giant

reed have reduced the amount of available water, woody debris, and shading, further impacting water quality and temperature in the river channel. Higher water temperatures and reduced shading also contribute to algal growth, furthering negative impacts upon the Ventura River and limiting the ecosystem services the river can provide.

RIPARIAN

FIGURE 4.11 *Riparian resources along the Ventura River. Data from California GAP Biodiversity Atlas.*

Riparian vegetation occurs within the Ventura River's floodplain. The general pattern of riparian vegetation is to exist in a state of constant succession. Flashy rain events erode the river's steep banks, producing sediment-laden flows that dislodge riparian vegetation and alter the stream channel. When the sediment carried by the river is dropped, this alluvial material provides areas where emergent vegetation can become established. When the interval between intense rain events is several years, rapidly growing riparian vegetation can become mature and well-established (U.S. Army Corps of Engineers 2004). Because the riparian vegetation grows within active portions of the floodplain, plant growth is affected by the dynamic floodplain regimes of sediment scour and deposition and by varying levels of moisture (U.S. Army Corps of Engineers 2004). Floodplain riparian vegetation includes cottonwoods, willows, California black walnut, California sycamores, herbs, and mulefat.

The riparian zone of the Ventura River contributes multiple ecosystem services that both enrich and protect the ecosystem environment. Vegetative canopies (which may be intermittent as described above) provide cooling shade, which aids in maintaining appropriate water temperature and productivity within the river channel. Vegetative canopies also act as a nutrient source by providing detritus in the form of leaf litter and invertebrate fall. In addition, the riparian zone acts as a buffer to the river by preventing erosion, filtering pollutants, and cleaning the stream. Riparian vegetation provides habitat to a multitude of riparian species in the project area.

Riparian vegetation along the Ventura River has been impacted and continues to be threatened by agricultural expansion on the floodplains, urban developments, public works (i.e. the Ventura River Levee and Highway 33), and recreational park developments (Warner and Hendrix 1984).

WETLANDS

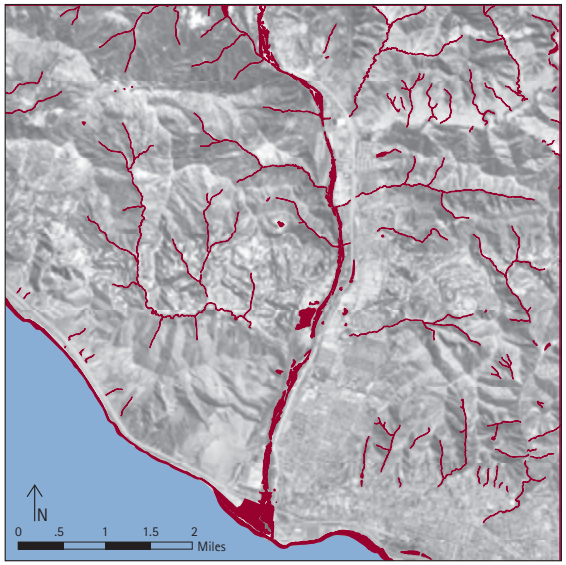


FIGURE 4.12 *Associated wetlands of the Ventura River. Data from California GAP Biodiversity Atlas.*

Wetlands are lands saturated with water, either periodically or all year round. Saturation results from either a water table that is at or near the soil surface and/or as the result of inundation from tidal or freshwater sources. Wetlands are transitional zones, or ecotones, between terrestrial and aquatic systems. Because ecotones are the interface between multiple ecosystems, ecotones have greater than usual diversity of species.

The remaining wetlands habitat of the Ventura River is extremely valuable, providing multiple ecosystem services. The natural vegetation in the Ventura River area consists of all five of the major wetland systems as classified by the United States Fish and Wildlife Service: lacustrine, riverine, palustrine, estuarine, and marine. Wetland habitats provide wildlife with shade, protection from predators, foraging habitat, and nesting and breeding sites, thereby contributing to biological conservation and sustainability. Additional valuable ecosystem services include pollutant reduction by processing sediment, nutrient and pesticides; flood mitigation through floodwater storage and reduction; greenhouse gas emissions reduction through carbon sequestration via soils and vegetation; and water quality sustainability through groundwater recharge.

Although much of the river corridor has retained its rural character (California Coastal Conservancy 2007), wetlands ecosystems of the Ventura River have been degraded. Existing wetlands in the Ventura River area have been degraded by encroachment, habitat fragmentation, water quality degradation, and the introduction of invasive plants and wildlife (United States Army Corps of Engineers 2004).

WETLANDS: ECOSYSTEM SERVICES AND CLASSIFICATIONS

Wetlands have long been regarded as wastelands, but are now recognized for the numerous benefits they provide. Wetlands support more wildlife and plants than any other type of habitat and provide extremely valuable ecosystem services. Some of these services include:

- surface water detention
- coastal storm surge detention
- steamflow maintenance
- nutrient transformation
- sediment and other particulate retention
- shoreline stabilization
- fish, waterbird and other wildlife habitat
- biodiversity conservation
- cultural and recreational opportunities

(Tiner 2003)

In 1979, a comprehensive classification system of wetlands and deepwater habitats was developed for the U.S. Fish and Wildlife Service (Cowardin et al. 1979). Under this system, five major wetlands systems were identified and continue to be used today. The systems are: lacustrine wetlands, which are associated with lakes; riverine wetlands, which are found along rivers and streams; palustrine wetlands, which may be isolated or connected wet areas and include marshes, swamps, and bogs; and marine and estuarine wetlands which are associa¿ted with the ocean and include coastal wetlands, such as tidal marshes (CERES 2008).

VENTURA RIVER ESTUARY AND SECOND MOUTH ESTUARY

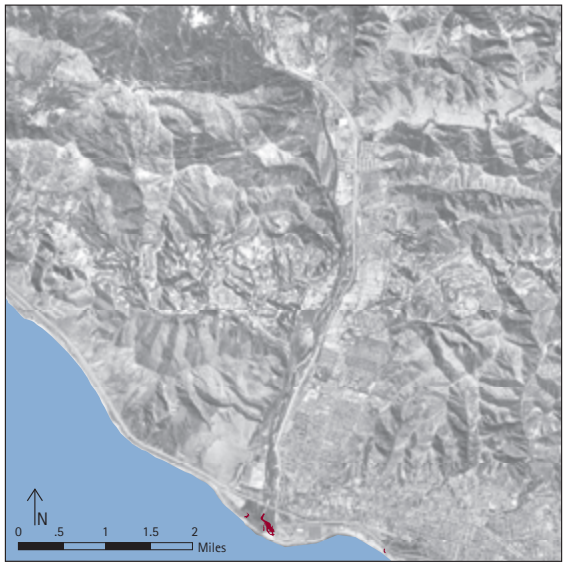


FIGURE 4.13 *The Ventura River Estuary and Second Mouth Estuary. Data from California GAP Biodiversity Atlas.*

The Ventura River Estuary lies directly west of the City of Ventura, at the mouth of the Ventura River. The estuary is bordered on the east by a levee wall, the Omer Rains Trail, and the Ventura County Fairgrounds and on the west by Emma Wood State Beach and Group Campground, the Seaside Wilderness Park, and the Ventura Beach R.V. Resort. The estuary is fed by the Ventura River from the north and borders the Pacific Ocean to the south. Multiple public and private infrastructure projects also cross the estuary, including Highway 101, Main Street, Southern Pacific Railroad tracks, oil and gas pipelines, and electrical transmission lines. These structures have served to impact the estuary by filling in and eliminating portions of the estuary and altering natural regime cycles. In addition, according to the 303(d) list mandated by the Clean Water Act, the water of the Ventura River Estuary has been identified as being impaired by trash with elevated levels of DDT in fish and mussel tissue (State Water Resources Control Board 2007; CERES 1997).

Encompassing approximately 100 acres, the Ventura River Estuary is one of the largest on the southern coast of California (Stoecker 2007). The estuary provides a diverse mix of habitat as well as acclimation opportunities for migrating steelhead trout between fresh and saltwater. The estuary is characterized by short periods of tidal flushing when the mouth is open and longer periods of ponding and lagoon formation when the mouth is closed by sand bar. Water is also supplied to the estuary in the form of freshwater from upstream surface flows, rising groundwater, and effluent from the Ojai Valley Sanitary District (Ferren 1990). The contributions from each of these sources vary from year to year.

The Ventura River Estuary is often contained by a sandbar, which is formed at the point where the estuary meets the ocean. Intense winter storm events send rushing waters along the Ventura River, which periodically remove the sandbar and open the estuary to tidal influence. During times of low-flow runoff, the sand bar re-forms, and fresh water begins to displace saltwater, thereby gradually altering the salinity level of the estuary. The tidal/freshwater regime and the high/low salinity regime have profound effects on the biota of the estuary ecosystem (Ferren 1990).

A smaller estuary, referred to as Second Mouth Estuary exists west of the Ventura River Estuary. The Second Mouth Estuary is an active distributary channel of the river that is currently only flushed by runoff during major floods (Ferren 1990). Prior to the 1970s, the Second Mouth Estuary supported fresh/brackish lagoon and associated wetland and riparian habitat. As a result of construction of a new Southern Pacific Railroad bridge and the laying of oil and gas pipelines along the railroad right-of-way, a majority of the Second Mouth Estuary has been filled in. However, due to a high persistent water table, the estuary does not dry out (Ferren 1990).

Estuaries provide a range of ecosystem services. Estuarine services contribute to biological conservation and sustainability by providing habitat for many fish, shellfish, and birds. Estuaries also improve water quality by acting as natural silt traps, which reduce the amount of sediment and other contaminants that reach coastal waters. Estuaries also build up deposits of mud, silt, and sand, which act as

natural barriers that help to dissipate the energy of storms and large waves that can otherwise threaten shorelines and coastal areas, inland habitats and human communities. When flooding does occur, estuaries act like huge sponges, soaking up excess water. Lastly, the Ventura River Estuary provides wildlife viewing opportunities that serve both local and tourist populations.

VALUABLE ESTUARIES

Estuaries are extremely productive ecosystems in part because the water that is filtering through them brings in nutrients from the surrounding watershed. This same water, however, often brings all of the pollutants that were applied to the lands in the watershed. Therefore, some of the most fertile ecosystems on earth may also be some of the most polluted. Estuaries, like their surrounding wetlands, provide a variety of ecosystem services. Estuaries act as buffer zones, stabilizing shorelines and protecting coastal areas, inland habitats, and human communities from floods and storm surges. When flooding does occur, estuaries often act like huge sponges, soaking up the excess water. Estuarine habitats also protect streams, river channels and coastal shores from excessive erosion caused by wind and water (National Oceanic and Atmospheric Administration 2003).

DUNE

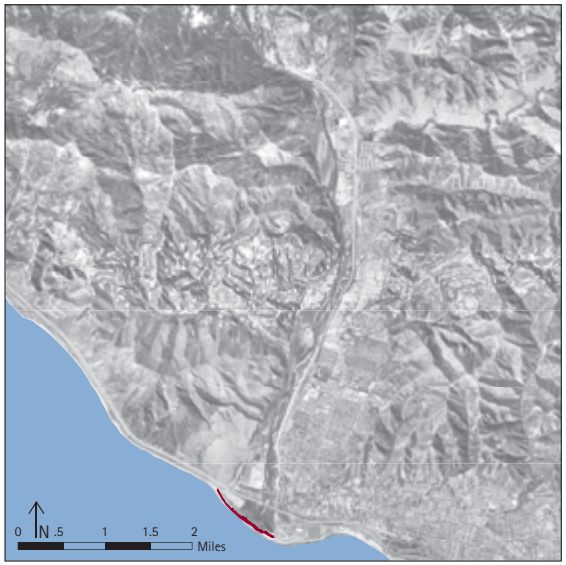


FIGURE 4.14 *Dune habitat along the coast. Data from California GAP Biodiversity Atlas.*

Coastal dunes are one of the most fragile and dynamic natural landforms (Engel and Lortie 2008). Coastal dune habitats in Southern California are considered environmentally sensitive habitat (ESHA) because both the dune habitat and the associated natural community are rare and easily disturbed by human activities. Coastal dune ecosystems are a rare, fragile, and threatened habitat type in California.

Ecosystem services that dune habitats provide include biological conservation and shoreline protection. Dunes support an array of plants and animals that are uniquely adapted to the ecotone between land and sea. Invertebrates dwell in wet or dry sand, shorebirds forage on invertebrates and nest in the dunes, and vegetation provide habitat and stabilizes the structure of the dunes. In addition to habitat value, dune ecosystems are recognized for their aesthetic value and for providing important protection to public infrastructure and private homes from storm events (California Coastal Sediment Management Workgroup 2006).

Because the California coast is a desirable area for industry, tourism, recreation, and residential development, dune ecosystems have been heavily impacted by humans (Pickart, 1998). The cobble and sand that form the dune beach areas adjacent to the Ventura River are created in part by alluvial deposits from the Ventura River and in part by eastward moving littoral drift from up coast rivers and beaches. In the region, dams, impaired rivers, and paved surfaces have altered sediment supply while built coastal structures such as breakwaters, have altered sediment transport. This combination has reduced alluvial deposits and resulted in loss of coastal dune habitat (California Coastal Sediment Management Workgroup 2006).

MARINE

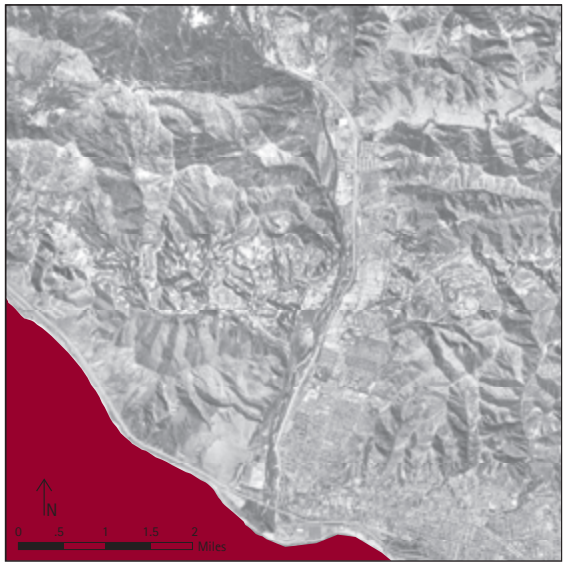


FIGURE 4.15 *The marine ecosystem. Data from California GAP Biodiversity Atlas.*

The marine ecosystem provides a multitude of essential ecosystem services. Marine ecosystem services include the provision of seafood- and fishery-related employment; filtration of terrestrial sediments, pollutants and nutrients; provision of elements of pharmaceutical compounds; nutrient cycling; protection of coasts from erosion; and recreational opportunities. In addition, the marine ecosystem plays a crucial role in the global carbon cycle. Oceanic algae help to fix atmospheric carbon, and, combined with the eventual carbon deposition in deep water, the marine ecosystem directly influences climate trends.

During large storm events, the Ventura River breaches the sandbar that separates the estuary from the ocean and discharges its water into the marine environment. These discharges form plumes as they enter ocean. Plumes contain important sediments and nutrients necessary for the marine ecosystem. Upon entering the sea, ocean currents disperse these terrestrial materials throughout the water column, providing an important base of the marine food chain.

Because the Ventura River is an impaired waterbody, its plumes also introduce pollutants and high bacteria concentrations into the marine environment of the Santa Barbara Channel, while additional sediments block sunlight, impairing photosynthesis. (See Appendix B for further reading on the relationship between river plumes and the marine environment.) The Santa Barbara Channel is a biologically rich ecotone where the cool Northern California Current and warm Southern California Countercurrent come together. The channel supports a large diversity of marine species and habitats, and includes the Channel Islands National Marine Sanctuary, approximately 25 miles from the mainland. Introducing contaminated and sediment-laden waters into the marine environment threatens both biological and chemical processes in the ocean.

Invasive Plant Species

FIGURE 4.16 Arundo donax *near the Ventura River.*

.

Invasive plant species are introduced plants that thrive in areas outside their natural home range. Without the natural enemies that normally limit the spread of such species in their native home range, these plants adapt and aggressively thrive in new environments (United States Department of Agriculture 2008). Invasive species grow and reproduce more rapidly than native species, while consuming more local resources including nutrients, light, physical space, water, and/or food. The usurping of local resources by invasive species directly affects the equilibrium of an entire ecosystem.

The Ventura River riparian ecosystem is threatened by a number of invasive plant species. Non-native invasive plants include giant reed (*Arundo donax)*, periwinkle (*Vinca major*), cape ivy (*Delairea odorata*), fennel (*Foeniculum vulgare)*, and tamarisk (*Tamarix aphylla*). The most threatening, due to volume and growth habits, is *Arundo donax. Arundo donax* is easily spread. Flood events break ups existing stands and redistribute fragments downstream, which then root and begin new stands.

Although introduced several hundred years ago, *Arundo donax* has rapidly expanded in Southern Californian riparian areas in the last 35 years. Ecosystem degradation by *Arundo donax* is manifested in many ways along the Ventura River. During floods, *Arundo donax* increases stream roughness, creates debris dams, and contributes to bank erosion and instability that alter the shape of the river. During the hot summer months, *Arundo donax* dries out and creates an increased fire hazard. As a non-native species, *Arundo donax* offers little wildlife habitat value to native species while altering canopy coverage for stream habitat (Coffman 2007).

Currently, efforts are underway to remove *Arundo donax* from the Ventura River. Efforts are being concentrated upstream from the Lower Ventura River Parkway planning area. Led by the Ventura County Watershed Protection District, if successful, removal techniques will be applied further down river.

FIGURE 4.17 [ABOVE] AND 4.18 [BELOW] Arundo donax *at Foster Park during the winter and again in the spring.*

Design Species

As an indicator of ecological health, design species representing each of the eight identified ecosystems were chosen to guide the design for this Vision Plan. Some species are relatively specialized in their roles within an specific ecosystem, while others utilize multiple ecosystems for their survival. The loss of any species would compromise the performance of the ecosystem. The design species chosen for this Vision Plan are southern steelhead trout, the California red-legged frog, southwestern willow flycatcher, California least tern, Ventura marsh milkvetch, bobcat, Cooper's hawk, and giant kelp.

Although not an exact measure, design species can begin to indicate the overall health and functioning of each of the eight ecosystems identified. Because the health and population of each species is dependent on ecosystem processes such as disturbance regimes, hydrological cycles, and connectivity, impacts to these ecosystems can manifest as impacts to species.

SOUTHERN STEELHEAD TROUT

Oncorhynchus mykiss irideus

Ecosystem: Estuary, River, Riparian

FIGURE 4.19 *Steelhead trout. Source: Wikimedia Commons.*

Southern California steelhead trout (*Oncorhynchus mykiss irideus*) are anadromous fish, hatching in streams, migrating to the ocean as adults, and returning to streams to spawn. When drought events or damming of rivers blocks steelhead trout access to the ocean, steelhead trout can convert to non-migrating resident fish.

Southern California steelhead trout are an excellent design species for the Ventura River. Listed as a federally endangered species, steelhead trout are an indicator of river condition because the steelhead trout population is dependent on a healthy, functioning river. Steelhead trout require cool and clean water, use all parts of the river during their life cycle, and are dependent on healthy river processes. Increased water flow during winter rains coincide with steelhead trout spawning season. This increased river current creates the attraction flow which steelhead trout seek to swim against on their way to spawning grounds. Increased water flow also creates periodic "flushing flows" (Noss 1994) that help to clean and maintain the gravelly cobble beds used by adult steelhead trout for spawning and by young fry for escape cover. Riparian canopy cover aids in maintaining water temperature while detritus from plant and invertebrate litter provides nutrients. In the Ventura River Estuary, smolting steelhead trout develop characteristics which enable them to acclimate to seafaring conditions before moving on to the ocean.

Before the construction of the Matilija Dam in 1948, the Ventura River supported a large and consistent steelhead trout run (National Oceanic and Atmospheric Administration 2008). In 1946, the Department of Fish and Game estimated there were between 4,000 and 5,000 fish. By 1996, the most recent estimate placed the steelhead trout run size at fewer than 200 adults (Busby et al. 1996). Major contributors to steelhead trout decline include inadequate stream flows, temperature change in the river, impeded access to historic spawning and rearing area, and human activities that alter sediment regimes. In addition, hatchery practices and rainbow trout planting may have led to genetic introgression (U.S. Army Corps of Engineers 2004).

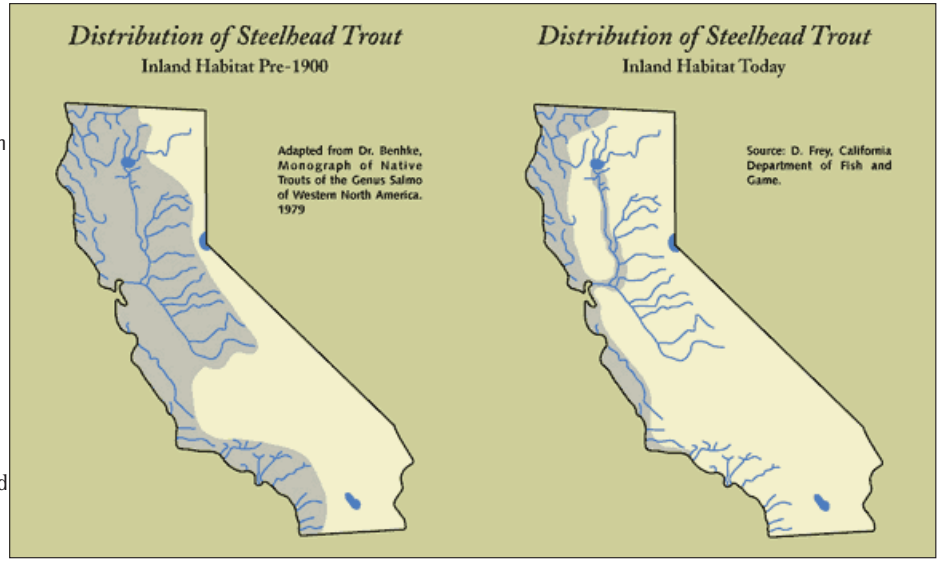


FIGURE 4.20 *Steelhead trout distribution. Source: Caltrout.org*

CALIFORNIA RED-LEGGED FROG

Rana aurora draytonii

Ecosystem: River, Riparian

FIGURE 4.21 *California red-legged frog. Photo: Chris Brown, Wikimedia Commons.*

The U.S. Fish and Wildlife Service has listed the California red-legged frog as a threatened species since June 1996. Historically, the red-legged frog used to exist from Marin County on southward to Baja California. Today, more than 70% of their historic habitat has been eliminated and the California red-legged frog can be found from Sonoma to Riverside. In addition to loss of habitat, the California red-legged frog is also threatened by the introduced and much larger bullfrogs (*Rana catesbiana*), which prey on the red-legged frog.

Habitat requirements for the California red-legged frog include deep pools with dense stands of overhanging willows and cattails. Frog eggs are attached to emergent vegetation, young frogs inhabit slow-moving, shallow riffles, and older frogs can be found close to deep pools with riparian cover that offers shelter from predators (United States Fish and Wildlife Service 2005). Arroyo willow habitat is essential to the red-legged frogs survival: vibrations transmitted along willow branch are used to detect approaching predators and prey (California Department of Fish and Game 1994).

The red-legged frog occurs upstream of Matilija Dam, but there are few recent records of its occurrence in the Lower Ventura River. However, suitable habitat occurs along the Lower Ventura River. Suitable habitat has been identified from the Main Street bridge to the confluence with San Antonio Creek, where there are shaded pools and well developed riparian woodland. Potential sites include upstream of the Main Street Bridge, downstream of Shell Road in a large stand of willows on the right side of the river, and several sites between the Ojai Valley treatment plant and Foster Park, where large established trees provide shade, rootwads, and undercut banks (URS Corporation 2000).

CALIFORNIA RED-LEGGED FROG

During the late 1800s and early 1900s, the California red-legged frog was harvested for food in the San Francisco Bay area and the Central Valley, with approximately 80,000 frogs harvested annually. As the frogs became more rare, market demand for them increased. Bullfrogs (*Rana catesbiana*) were introduced in California around 1896 to help satisfy the demand for frog legs as the red-legged frog population dwindled. Ironically, the native red-legged frog soon become prey for the much larger bullfrog, a threat to the red-legged frog's existence that continues today (United States Fish and Wildlife Service).

SOUTHWESTERN WILLOW FLYCATCHER

Empidonax trallii extimus

Ecosystem: Riparian, Wetlands

FIGURE 4.22 *Southwestern willow flycatcher. Photo: United States Fish and Wildlife Service.*

The Southwestern willow flycatcher is a small, migratory bird that forages and breeds in dense riparian habitats along rivers, streams, and wetlands, and migrates along riparian corridors. The historic range of the Southwestern willow flycatcher includes Southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico.

Since 1995, the Southwestern willow flycatcher has been a federally listed endangered species. Decline and vulnerability of the flycatcher include habitat fragmentation and low numbers of current population, predation by cowbirds, and habitation loss and degradation due to invasive species and degraded hydrological regimes.

One of the most important habitat characteristics for the willow flycatcher is the presence of dense vegetation, from understory to canopy. The willow flycatcher prefers shade and slow-moving water. Because the river channel is relatively narrow with faster flowing water, the Ventura River does not provide ideal habitat for the willow flycatcher. However, the riparian corridor of the Ventura River may provide a migration path for the willow flycatcher to and from populations in northern Santa Barbara County.

CALIFORNIA LEAST TERN

Sterna antillarum browni

Ecosystem: Dune, Estuary

FIGURE 4.23 *California Least Tern. Photo: United State Fish and Wildlife Service.*

The California least tern is a state and federally listed endangered species. The historic breeding range of the California least tern extended along the coast from San Francisco Bay to southern Baja California, and it was once common along the coast. Today, the breeding range of the terns is limited to the San Francisco Bay and a few areas along the coast from San Luis Obispo County to San Diego County, including a breeding population in Oxnard at Ormond Beach and Point Mugu. The decline of the California least tern is attributed to the disappearance of nesting and foraging habitats, predation by feral and exotic species, increased overwash as a result of degraded dune systems, and increasing human disturbance to breeding colonies (United States Fish and Wildlife Service 2005).

The California least tern is a migratory species that arrives in California by late April to breed and begins to depart by August. It nests on coastal dunes and forages in estuaries and dunes. Though suitable breeding habitat occurs at the Ventura River Estuary, California least terns have not been known to breed there, possibly due to extensive beach erosion (Wetlands Research Associates, Inc. 1992). During the post-breeding season, least terns have been observed at the Ventura River mouth and at nearby beaches. Young California least terns often use the estuary at the Ventura River for foraging and loafing before beginning their journey south (Hunt and Lehman 1992).

VENTURA MARSH MILKVETCH

Astragalus pycnostachyus var. lanosissimus

Ecosystem: Dune

FIGURE 4.24 *Ventura marsh milkvetch. Photo: California Department of Fish and Game.*

The Ventura marsh milkvetch is a state and federally listed endangered species. Once thought to be extinct, the only known population of the plant exists on a one-acre portion of an abandoned oil-field waste site near the city of Oxnard. The milkvetch's historic range included coastal Ventura, Los Angeles, and possibly Orange County. It was once found in the Ballona wetlands and in Santa Monica, but it has not been found at these locations for nearly a century (U.S. Fish and Wildlife Service, 2001).

Ventura marsh milkvetch habitat is the well-drained soils of open sites along the coast, often on bluffs or flats near bodies of brackish water or with a relatively high water table, in association with dune or coastal shrub vegetation. Five major threats to the milkvetch have been identified:

- herbivory of seedlings and shoots by nonnative milk snails
- herbivory of seeds by weevils
- infestation by cucumber mosaic virus, which is spread by aphids
- alien weed competition (primarily ice plant and white sweet clover)
- catastrophic loss of the last remaining population (Center for Plant Conservation 2008)

Within the project area, opportunities exist for creating a potential Ventura marsh milkvetch restoration site. The dune and wetland habitat west of the Ventura River offers natural barrier protection through landscape features and so could be considered for restoration.

BOBCAT

Lynx rufus californicus

Ecosystem: Chaparral, Coastal Sage Scrub, Riparian

FIGURE 4.25 *Bobcat. Source: Wikimedia Commons.*

The California bobcat ranges from southern Canada to southern Mexico. The bobcat inhabits rocky and brushy areas near springs or other perennial water sources, primarily in foothills of chaparral and scrub habitats.

Bobcat home range estimates start at .23 square miles for California, with females generally having smaller home ranges than males. The home ranges of male and female bobcats may overlap, but home ranges of females rarely overlap with each other (Tesky 1995). For denning and resting cover, bobcats utilize rock piles, brush piles, hollow trees, and logs. Even in the harsh climate of the Mojave Desert, bobcats have been observed resting next to fallen Joshua Trees.

The loss of large, relatively undisturbed habitat and adequate linkages between habitats (habitat fragmentation) are a serious threat to the persistence of bobcats, as is disturbance from human recreation and vehicle collisions. Bobcats are solitary and active both day and night, though generally are more nocturnal. For bobcats, preserving open space of sufficient quantity and quality for adult females is necessary for population viability (Riley et al. 2003). The hillsides of Ventura are a critical habitat link for bobcats to the Los Padres National Forest in the northern part of the Ventura River Watershed and to the Santa Monica Mountains.

COOPER'S HAWK

Accipiter cooperii

Ecosystem: Riparian, Woodlands

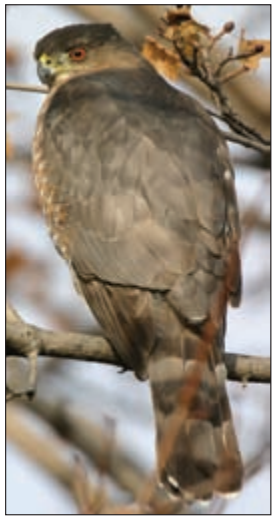


FIGURE 4.26 *Cooper's Hawk. Source: Wikimedia Commons.*

The Cooper's hawk is a species in decline (Remsen 1978) and is deemed a species of special concern by the California Department of Fish and Game. Reduction in the sighting of breeding pairs of Cooper's hawk have been reported throughout Southern California.

Cooper's hawks nest and breed in riparian and oak woodlands, preferring older, less dense canopy coverage. The loss of riparian habitat, including the loss of nest trees from depletion of the water source and invasion of exotic species is a major threat to breeding hawks.

Cooper's hawks have been sighted north of the Main Street bridge, and in the riparian corridor between the Shell Road Bridge and Foster Park. Nesting for the hawk likely occurs upstream in the Ventura River riparian corridor and adjacent oak woodlands, beginning near the Canada Larga area (Hunt 1994).

GIANT KELP

Macrocystis pyrifera

Ecosystem: Marine

FIGURE 4.27 *Giant kelp. Source: Wikimedia Commons.*

Giant kelp forests are among the most productive communities in the world. They are comparable to tropical rain forests. Kelp forests provide food and shelter for many other species. In Southern California, giant kelp grows in the Southern California Coastal Bight, from Pt. Conception to northwestern Baja California.

Kelp favors nutrient-rich, cool waters with rocky bottoms that are supplied by freshwater delivery and ocean currents (see Appendix B When the River Meets the Sea: River Plumes, the Marine Environment, and Low Impact Development for more information on marine ecology). Giant kelp is considered a good indicator of climate and ocean conditions due to its sensitivity to temperature change.

The health of kelp forests faces many threats: harvesting, grazing by sea urchins, sedimentations and pollution. Currently, kelp forests exist west of the Ventura River, along the less developed coastal areas. Kelp forests may have existed in the ocean where the Ventura River discharges to the sea, but currently do not. This is possibly due to the degraded state of sediment and nutrient delivery of the Ventura River.

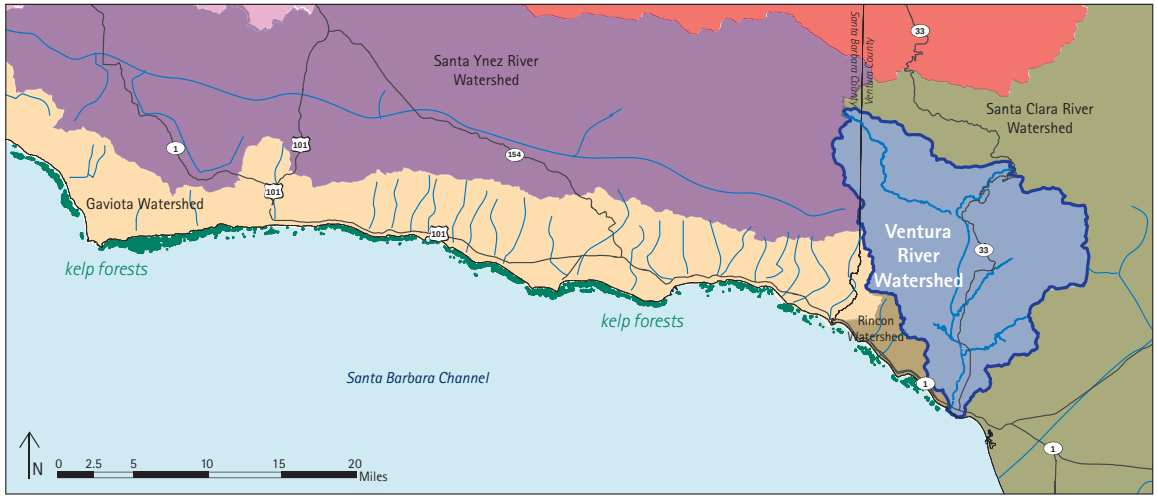


FIGURE 4.28 *Kelp forests along the Ventura and Santa Barbara Coast. Data from Channel Islands National Marine Sanctuary.*

River parkways provide flood protection benefits for communities by providing wider corridors along our waterways that help store, and provide safe corridors for the passage of, storm waters.

California River Parkways Act of 2004
California Public Resources Code §5751(e)

CHAPTER 5: CULTURE

Overview

One of six entries in Merriam-Webster's on-line dictionary defines the word "culture" as

> *the characteristic features of everyday existence shared by people in a place or time.*

Explored through the lens of place, this definition is the first in which the word "culture" is applied. The second is conveyed by Encyclopedia Britannica which states that the most quoted definition of culture was developed in 1871 by English Anthropologist, Edward Burnett Taylor, who said

> *Culture or Civilization, taken in its wide ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society.*

Given the breadth of everyday existence and the habits of society, this chapter explores the culture surrounding the lower Ventura River in two parts: Part I is titled Cultural Resources; Part II is entitled Community of Stakeholders. Cultural Resources (Part 1) are features which have static physical components associated with them. They provide settings for the community and opportunities for visitors of the proposed Lower Ventura River Parkway to draw literal and figurative connections to the river and its environs. The Community of Stakeholders (Part II) includes the community; the people, their sources of income, and the challenges that face them.

Compartmentalized for inventory purposes, the community and its resources are interwoven to form the culture of Ventura, a fabric with both strengths and weaknesses. Identifying the weave of this fabric was greatly aided by Ventura residents. Local knowledge of issues and their implications guided many of the discussions in Part II of this chapter. Metaphorically speaking, strong fibers exist within the weave; however, as in any community some fibers are frayed or overburdened. These threads together create a tapestry whose overall scene is one of both bucolic respite and urban plenty, but one that is not without environmental inequities.

[FACING PAGE] FIGURE 5.1 *Mission Plaza Fountain, City of Ventura.*

Part I: Cultural Resources

The area surrounding the proposed parkway is graced with a rich variety of resources. As identified here these resources fall into three types; land use and circulation, community resources, and sensory resources. The context in which the proposed parkway may be placed is defined by the attributes of these resources, and their relationship to members of the population and the Ventura River. Additionally, these resources and their distribution patterns present challenges and significant potential for community members and the proposed parkway.

LAND USE AND CIRCULATION

The Region

Characteristic features of everyday existence, such as shelter or transportation, are organized by land use, creating patterns which allow for resource provision and become resources in and of themselves. Figure 5.2 provides an overview of rural and urban landuse elements across the region. According to planning research conducted by the University of Southern California (USC) for The Green Visions Plan for the 21st Century, Ventura County boasts approximately 603,574 acres of recreational open space (Sister 2007a). Open space includes both city and county parks and state and federal lands, such as Ventura County's 550,000 acre Los Padres National Forest. (Sister 2007a). Figure 5.2 also indicates that the distribution of recreational open space is predominately located within the northern portion of the county, much of it held in Los Padres National Forest, while other landuses dominate the southern half of the county. According to the California Department of Conservation, as of 2004 there were 326,148 acres of agricultural land, 124,023 acres of land categorized as undifferentiated wildlands, and 101,841 acres of urbanized lands in Ventura County (California Department of Conservation 2006).

Circulation across the county is largely dependent on the network of regional and local streets seen in figure 5.2, only one of which cuts into Los Padres' expanse of open space. This network of roads is primarily accessed by private vehicles. In 2005 80.2 percent of working Venturans drove to work alone, while only 1.1 percent used public transportation (Ventura County Civic Alliance 2007). However, thirteen transit services do utilize the county's network of roads (Ventura County Transportation Commission 2008, Chapter 5). Most providers concentrate services in one of the nine cities within the county. However their regional capacity to reach the majority of the county's recreational open space is limited in that only two providers offer intercity bus routes, and of the three northern cities only one has fixed route service available to the general public. In addition to street based services, rail service is also available with Amtrak providing commuter and long distance service lines, while two shorter lines provide freight service near the harbor. However, these services are also not organized to bring urban residents into the remote areas closest to the majority of the county's open space acreage. Figure 5.2 illustrates the narrow integration of recreational open space and transportation at the regional scale.

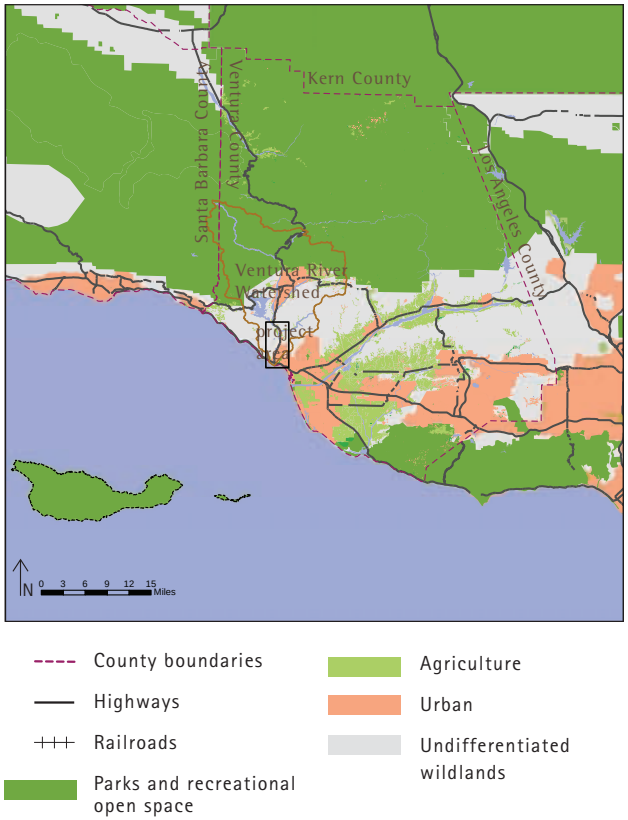
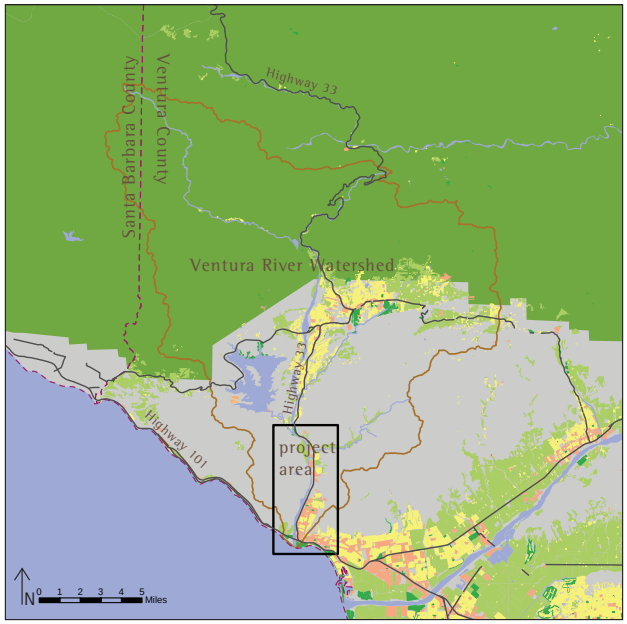


FIGURE 5.2 *Regional Land Use and Circulation. Data source: SCAG.*



County boundaries
Highways
Railroad
Parks and Recreational open space
Agriculture
Residential
Commercial
Undifferentiated wildlands

FIGURE 5.3 *Watershed Land Use and Circulation. Data source: SCAG.*

The Watershed

Figure 5.3 further illustrates segregation between recreational open space and the human population. Showing a pattern of agricultural and urbanized land uses congregating around the Ventura and Santa Clara rivers, and their tributaries, figure 5.3 also emphasizes human attraction and dependence on rivers. The proposed parkway project will serve residents living in the urbanized area adjacent to the lower Ventura River, providing them with a greater integration of recreational open space and cultural resources.

Major transportation routes seen at the watershed scale are Highway 33 and Highway 101. Highway 33 runs down the watershed alongside the Ventura River and through the heart of the parkway project area. It is a state registered scenic highway, making it a motorized recreational opportunity. Highway 101 passes through the southern ends of both the Ventura River and Santa Clara Watersheds. Additionally, a railroad is located between Highway 101 and the coast.

Project Area

While urbanization represents only a small percentage of land area at the county and watershed scales, in the project area there is a significant amount of urban development. Figure 5.5 delineates these land uses. In addition to the amount of space dedicated to each land use, the relationships between them are significant for the proposed parkway. While current and past economic activities have largely contributed to these characteristics, the greatest use of developed land within the project area is housing. Recreational open space represents the least usage, and the designation with the greatest proximity to these parks is commercial, rather than residential. This configuration indicates a high number of potential park users in proximity to relatively few park acres, an open space to housing imbalance. This imbalance is particularly significant for residents of multi-family units, which typically afford limited private outdoor space. Nearest the river the adverse affects of such an imbalance appear to

FIGURE 5.4 *Agricultural lands and undifferentiated wildlands in the project area.*

be compounded by the side-by-side relationship of industrial land uses to multi-family designations.

Site visits provided a detailed perspective on the conditions which exist within the area's land use designations. Industrial areas are populated by; stone yards, scrap and recycling yards, auto-repair, furniture and other types of heavy and light manufacturing, and extraction related businesses. As is visible from the street, many properties are populated by dirt and asphalt parking lots filled with trucks, cargo containers, and single story administrative and warehouse type buildings. Commercial areas at the southern end of the project can be described as thriving, while those to the north appear to be struggling. Orchards populate the agricultural lands located in the northwestern corner of the project area, the southwestern corner supports strawberries and other row crops. Hundreds of inactive and active oil wells dot the hillsides on both sides of the river in the central section of the project area (California Department of Conservation 2002).

The current pattern of land use in the parkway project area points to a need for recreational open space in the central and north-central portions of the project area, specifically in the Westside and North Avenue communities. While the urbanized character of the southeastern quarter of the parkway project area presents a limited number of opportunities to meet this need, a significant amount of land in the western and northern portions holds promise. The open and minimally developed lands adjacent to the lower Ventura River in these areas may provide opportunities for recreation, education, and stewardship. Additionally, open space improvements can enhance wildlife habitat and natural processes.

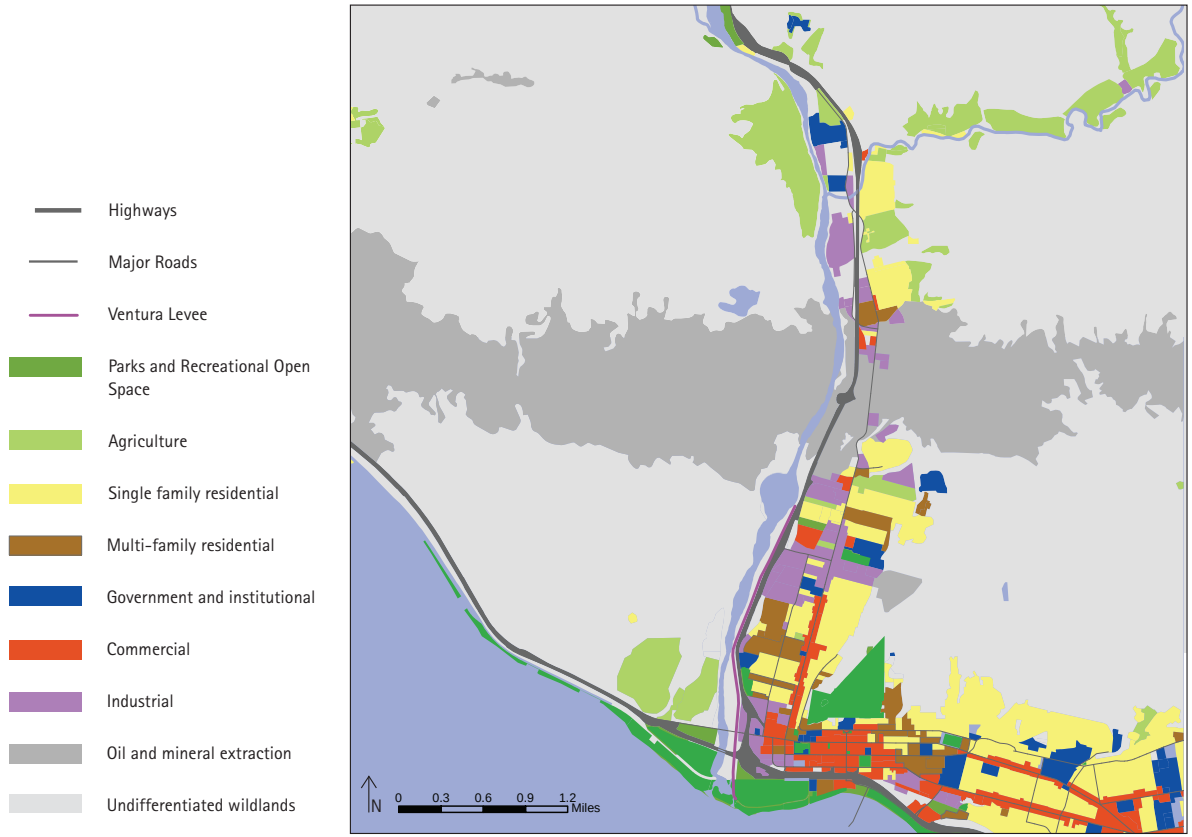


FIGURE 5.5 *Project Area Land Use. Data source: City of Ventura. Source: SCAG.*

Circulation

The parkway project area's circulation patterns are represented in figure 5.6. In addition to two highways, one railroad line, a number of rural roads and a network of collector and local roads, there are several bicycle and pedestrian paths. The California Department of Transportation's (Caltrans) Annual Average Daily Traffic (AADT) reports 42,000 vehicles on Highway 33 between Highway 101 and Stanley Avenue. At Casitas Vista Road the AADT indicates 27,000 vehicles (Caltrans 2007). In the south, exiting vehicles utilize a grid of surface streets that stretches east beyond the project area and north into the hills. In the northern three-quarters of the parkway project area the average width of the grid equals only two to three east-west blocks that, with one southern exception, do not extend into the hills. Public access westward across the Ventura River is limited to Main Street Bridge to the south and Casitas Vista Bridge in the north. Another bridge located at Shell Road, in the middle of the project area, provides only private access across the river.

Gold Coast Transit operates two routes that run the length of the parkway, one of which goes into Ojai, and several routes serving coastal areas (Ventura County Transportation Commission 2008). Long haul carriers utilize Highway 101 and Amtrak provides commuter and long distance service along the coast (Ventura County Transportation Commission 2008, Chapter 5). Bicycle routes share surface streets and are primarily identified by signage. However, some routes do have painted lanes that identify bicycle right-of-ways.

Main thoroughfares and most streets in the downtown area are flanked by wide sidewalks with frequent pedestrian crossing provisions. However, many of the smaller side streets in the Westside and North Avenue communities tend to favor automobile use. These streets typically have narrow sidewalks or no sidewalks at all and lack pedestrian crossing provisions.

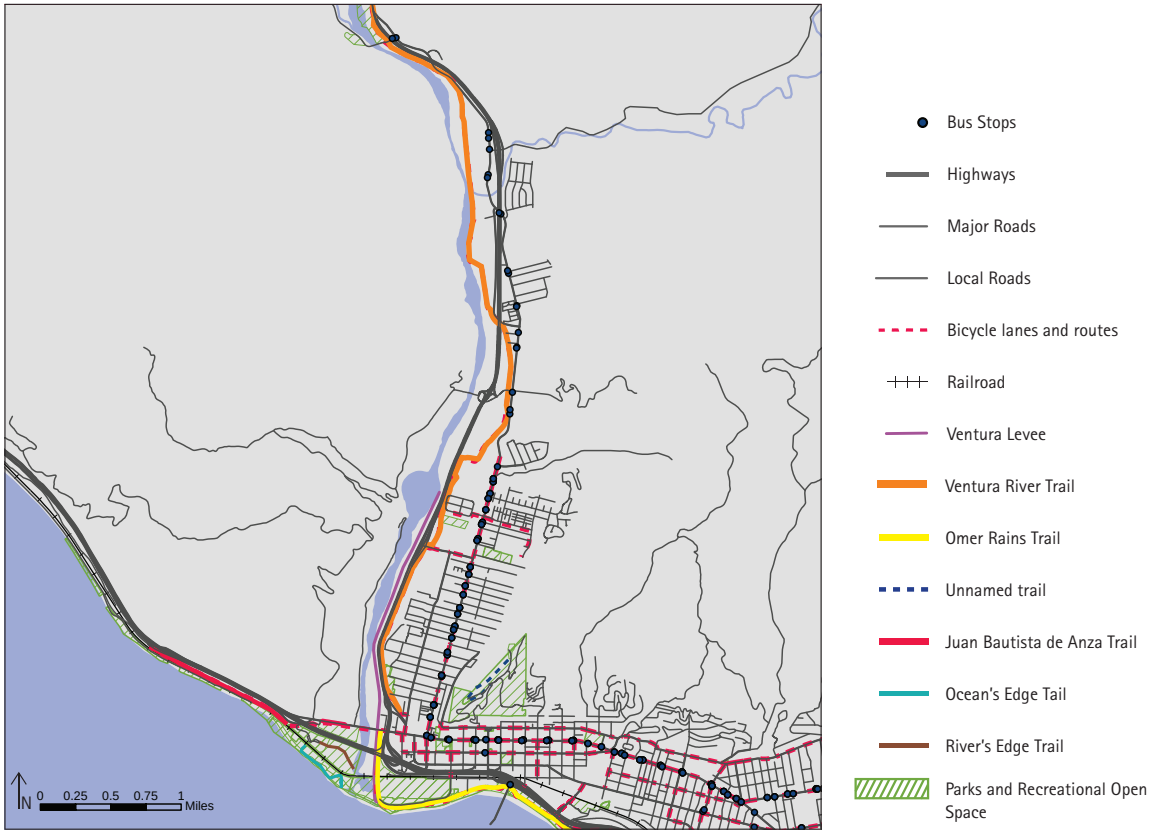


FIGURE 5.6 *Project Area Circulation. Data source: Ventura Hillsides Conservancy: City of Ventura; SCAG; California State Parks.*

Discreet bicycle and pedestrian trails include the Ventura River Trail, unnamed trails in Grant Park, Ocean's Edge Trail, River's Edge Trail, and Juan Bautista de Anza Trail.

The Ventura River Trail shown in figure 5.6 could provide critical access for the proposed parkway. It runs parallel to the Ventura River along a former railroad right-of-way between Dubbers Street at the south end of the project area, and Foster Park at the north end. The official trail head is marked by a sign located at the intersection of Omer Rains Trail and Main Street Bridge. However individuals not familiar with the area quickly find that the southernmost entrance to the trail is not located here. In fact, this trail's path begins several blocks to the north. Once pedestrians and bicyclists locate the entrance amidst industrial land uses and alongside a freeway entrance, they find that the trail passes through a number of settings.

The southern portion of the trail is primarily industrial and at times very narrow. This is especially true where the trail is sandwiched between Highway 33 and several large industrial buildings. Along the northern section the trail corridor opens to reveal a more agrarian and natural setting, but it is important to note that this does not indicate multiple views of an idyllic rushing river. The views of the river can only be seen from the Ventura River Trail at the river's confluence with Cañada Larga. Finally, the Ventura River Trail meets the Ojai Valley Trail at Foster Park.

At and near the beaches of the project's southern most limit, several trails converge and provide users with a variety of recreational experiences. Juan Bautista de Anza Trail is over 1,200 miles long, stretching from Arizona to San Francisco, and includes a driving route and separate paths for pedestrians and cyclists (National Park Service n.d.). The section which passes through the Emma Wood State Beach campground was part of Bautista de Anza and his companion's original travel route. Omer Rains Trail is a paved eight mile long coastal trail that connects Ventura State Beach with Emma Wood State Beach. Ocean's Edge Tail connects Emma Wood State Beach with Seaside Wilderness Park, providing a walking path and pamphlets for interpretive information. River's Edge Trail is wholly contained in Emma Wood State Beach and guide maps can be requested ahead of time through California State Parks.

FIGURE 5.7 *Southern most entrance to the Ventura River Trail, set alongside an on-ramp to Highway 33.*

SENSORY RESOURCES

Ventura's quality of life, lifestyle options and experiences are created by opportunities allowing for full sensory immersion into a colorful world of viewsheds, microclimates and auditory experiences. These experiential resources provide a rich variety of compelling opportunities for the planning and design of the proposed parkway. Surrounded by an abundance of sensory opportunities, Ventura's hillsides, valleys, and floodplains are staging grounds for all manner of human activity.

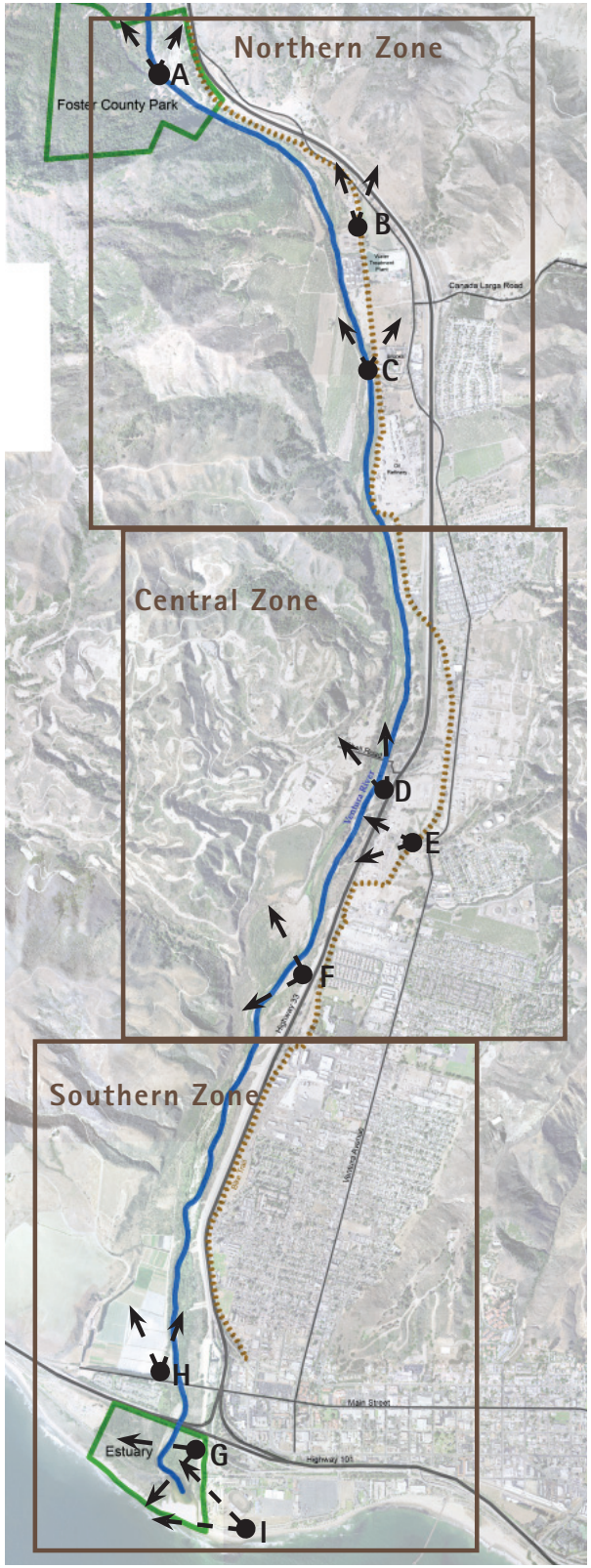
The Los Padres National Forest provides a number of sensory opportunities, such as those found when climbing the 8,831 foot Mount Piños (Murphy 1979), camping in the Smith Wilderness, or visiting the Sespe Condor Sanctuary. Additionally, each of the county's three watersheds provides slightly varied views of California's geology. Some areas reveal sheets of uplifted rock that eventually erode to sand; crumbling boulders are seen in shades of red, brown, and gray. The county's river systems lead to rocky shores, sandy beaches, and steep bluffs. The Channel Islands also provide sensory opportunities through colorful underwater patterns, neutral terrestrial tones, and whistling winds.

FIGURE 5.8 *Matilija Creek in the upper watershed.*

Steep dry hillsides in the Ventura River Watershed consist of dry expanses of coastal sage and chaparral habitats. They are crossed by more than a dozen tributaries that run through canyons and crags shaded by oak woodlands and riparian vegetation. The waters of Matilija Creek, the North Fork, the Ventura River, and their ephemeral tributaries provide plants with moisture, color the surrounding in refreshing gray and green colors, lower ambient temperatures, and contribute bold rushing sounds along with quiet tinkling ones. Surrounding lands are dotted by orderly swaths of orchards and crops, rambling wildlands, rural settlements, and an urban center, all of which provide tantalizing sensory experiences.

To the symphony of experiences available at the regional and watershed scales, the parkway project area contributes its own rich notes. There is a multiplicity of locations which provide both stunning and sublime views of the surrounding landscape. Figure 5.9 introduces some of these viewsheds and identifies the parameters of experiential zones across the parkway scale.

[OPPOSITE] FIGURE 5.9 *Northern, central, and southern experiential zones, with sample viewsheds A-I. Orthophotography: CIRGIS.*



A. *Dry channels at Foster Park looking north.*

B. *The Ventura River Trail.*

C. *The Ventura River south of its confluence with Cañada Larga.*

D. *Shell Bridge.*

E. *Oil wells with western hills in the distance.*

F. *The Ventura River, and hillsides with extraction activities seen from the Ventura Levee.*

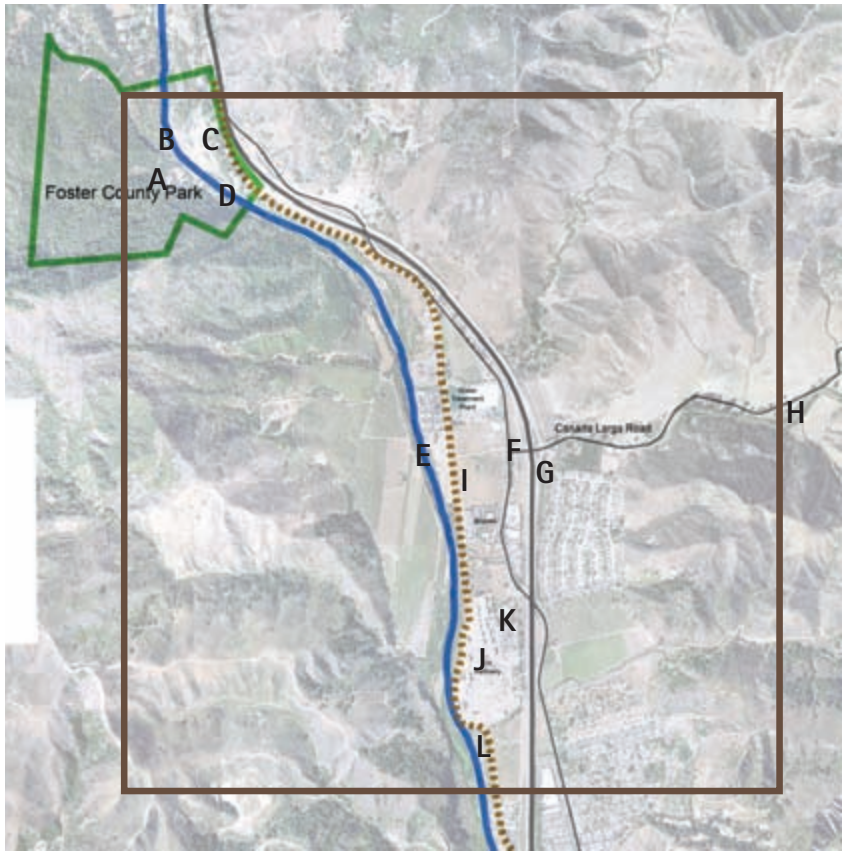
G. *Ventura River estuary, and Pacific Ocean with Channel Islands in the distance.*

H. *Agricultural service road with view of the river valley .*

I. *Seaside Wilderness Park from Omer Rains Trail.*

Northern Experiential Zone

The northern end of the project area offers many tranquil views and settings in shades of deep green, faded gray, and washed out yellow, all set against stunning blue. One location where the public is welcome to enjoy this setting is at Foster Park, which provides overnight camping, an amphitheater and a shady oak woodland. Foster Park's day use area, located just off of Highway 33, is frequently dappled by sunlight filtering through giant California sycamores (*Platanus racemosa*) whose need for wet roots is met by the underlying groundwater that feeds the river. At lowland points within this zone one sees the cobble filled river, feels cool water temperatures and hears the murmur of the gently sweeping river. Agriculture, industry, residential development, and urbanization are also on view within this zone. Sweeping panoramas of orchards and grazing cattle set on hillsides are subtle reminders of food sources. Generous streets flank the houses of a lone development introducing suburban peace. Derelict structures with the appearance of abandonment provide opportunities for illicit works of art, while hard gray concrete reconfigures and impedes the natural flow of sections of the Cañada Larga and other tributaries.



[ABOVE AND RIGHT] FIGURE 5.10 *Northern experiential zone and sample locations A-L.. Orthophotography source: CIRGIS.*

A. *Oak shaded lane in upper Foster Park.*

B. *Dry channel with cobbles, native, and invasive vegetation.*

C. *California sycamore (Plataunus racemosa) in day use area of Foster Park.*

D. *View from Casitas Vista bridge looking south.*

E. *Wildlife resting among rocks at the confluence of Cañada Larga and the Ventura River.*

F. *Looking west from near Ventura Avenue over Cañada Larga.*

G. *Drainage channel running past development near Cañada Larga.*

H. *Bluff overlooking Cañada Larga.*

I. *North of the former USA Petroleum Refinery site.*

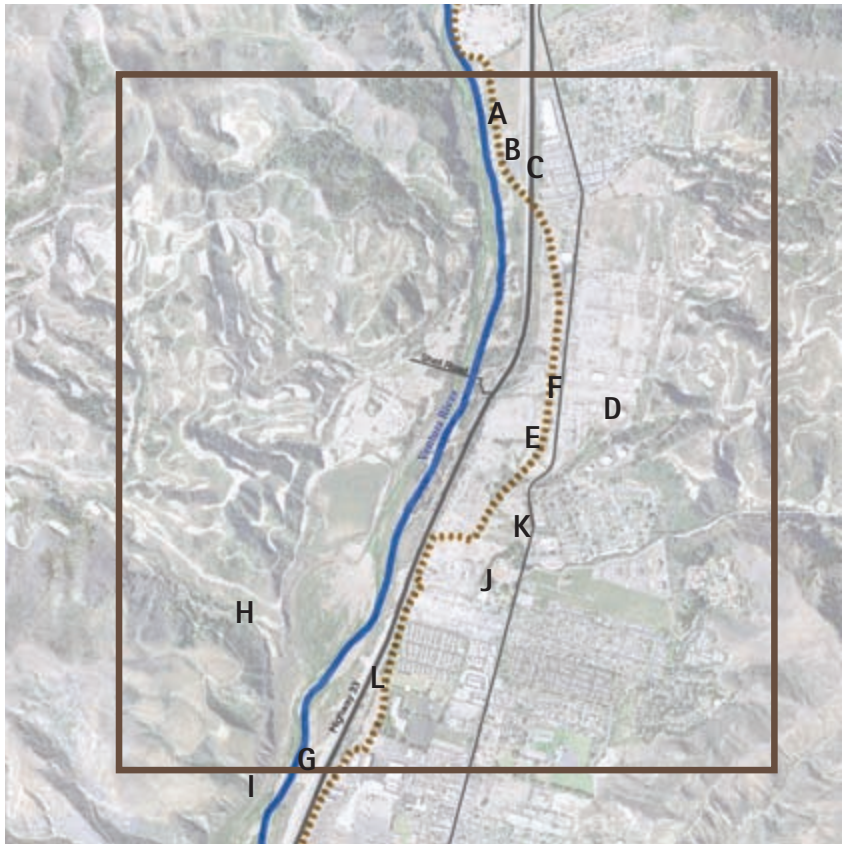
J. *Corroded and vandalized storage tanks on refinery site.*

K. *Cracking towers, and barrels on refinery site.*

L. *Business identified as providing chemical services located in what is apparently a dry river channel.*

Central Experiential Zone

The central zone of the parkway project area is both industrial and rural. Fenced off and guarded, packed gray earth is overlain by steel that is corroded or shiny with enamel paint. It has out of reach views of figures placed on oversized ground: gray earth punctured by blue, white, and red. Colors of bare and eroded earth shift from umber to gray to clay red. The color of vegetation ranges from yellow-brown to light and dark green. Ocean breezes carry moisture, but the sun bakes dry creek beds. Wells extract the accumulation of life lived over millions of years, pumping oil up from underground. Meanwhile, earth's life source--water--is only glimpsed in this landscape.



[ABOVE AND RIGHT] FIGURE 5.11 *Central experiential zone and sample locations A-L . Orthophotography source: CIRGIS.*

A. *Oil wells in the river and on the horizon.*

B . *Oil well in dry river channel with sign reading "Aera Ventura Field..."*

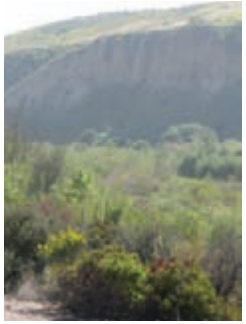
C. *Native and exotic riparian vegetation along the Ventura River Trail.*

D. *Cattails (Typha latifolia) with oil tanks in the mid-ground and on the bluffs above.*

E. *Oil field with associated equipment.*

F. *Oil pipes.*

G. *View of the Ventura River and western hillsides from the Ventura Levee.*



H. *Western bluffs seen from Ventura Levee.*

I. *Service road on western bluffs.*

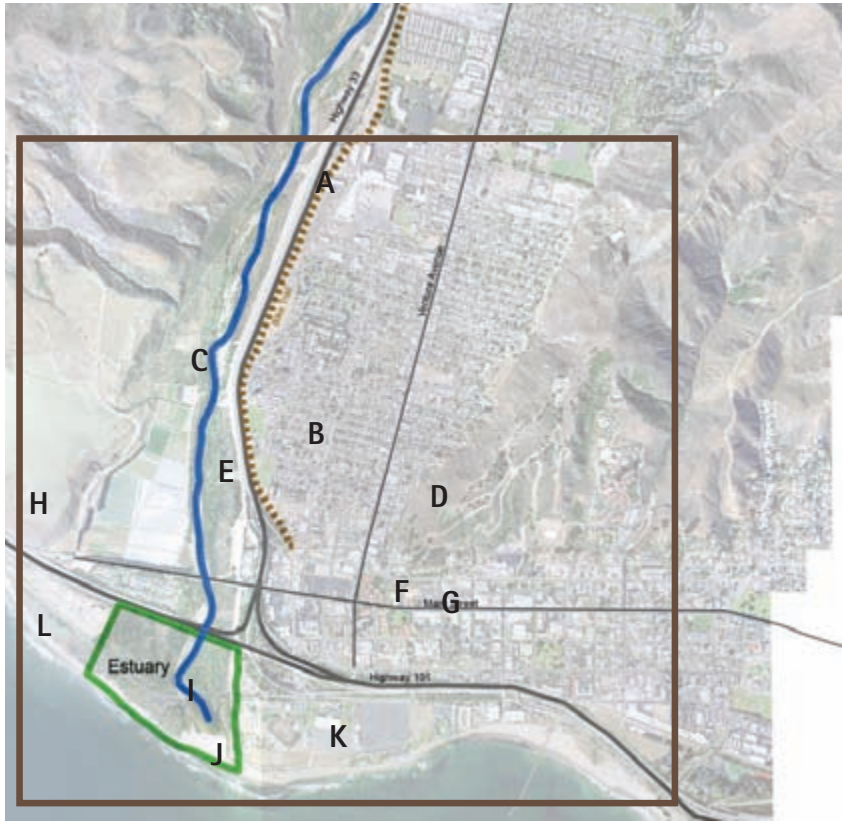
J. *"Oil Country" building.*

K. *Ventura River Trail with overhead pipes.*

L. *Looking north near the end of the Ventura Levee.*

Southern Experiential Zone

Sensory resources of the southern zone provide a distinct combination of rural environments existing alongside dense urban landscapes. Working class neighborhoods, industry, and commerce are surrounded by natural abundance. Urbanized lowlands surrounded by mostly undeveloped hillsides create a sense that urban development and the natural environment are stacked one against the other. On one side the sea collides with the land and on the other human constructs press in. Outdoor recreational opportunities within the southern zone include surfing, bird watching, camping, walking and bicycling along pedestrian trails. The Channel Islands can be seen from the shore line. Experiencing the estuary on a cloudy day, one is shrouded in gray, touched by cool moisture in the air, and surrounded by muffled sounds of seagulls crying. On a sunny day the grays become brilliant blue, cool moisture is a comfortable breeze, and the cries turn to screams. Not far away at an intermittent second mouth the ground plane is colored by yellows and reds punctuated by green. River cobble and drift wood cover the beach with colors of faded grays and reds, and the low roar of the surf is ever present.



[ABOVE AND RIGHT] FIGURE 5.12 *Southern experiential zone and sample locations A-L . Orthophotography source: CIRGIS.*

A. *"Mark". Public art displayed along the Ventura River Trail.*

B. *Street in the Westside Community.*

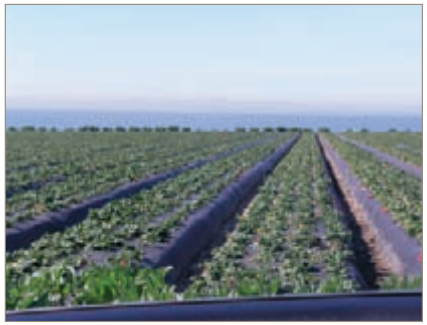
C. *Cottonwoods (Populus fremontii) and service road.*

D. *Grant Park overlooking the Westside Community.*

E. *Stormdrain outfall.*

F. *Albinger Archeological Museum and site, part of the Mission Compound.*

G. *Main street, Downtown Ventura.*



H. *Strawberry fields overlooking the Pacific Ocean with Channel Islands in the distance.*

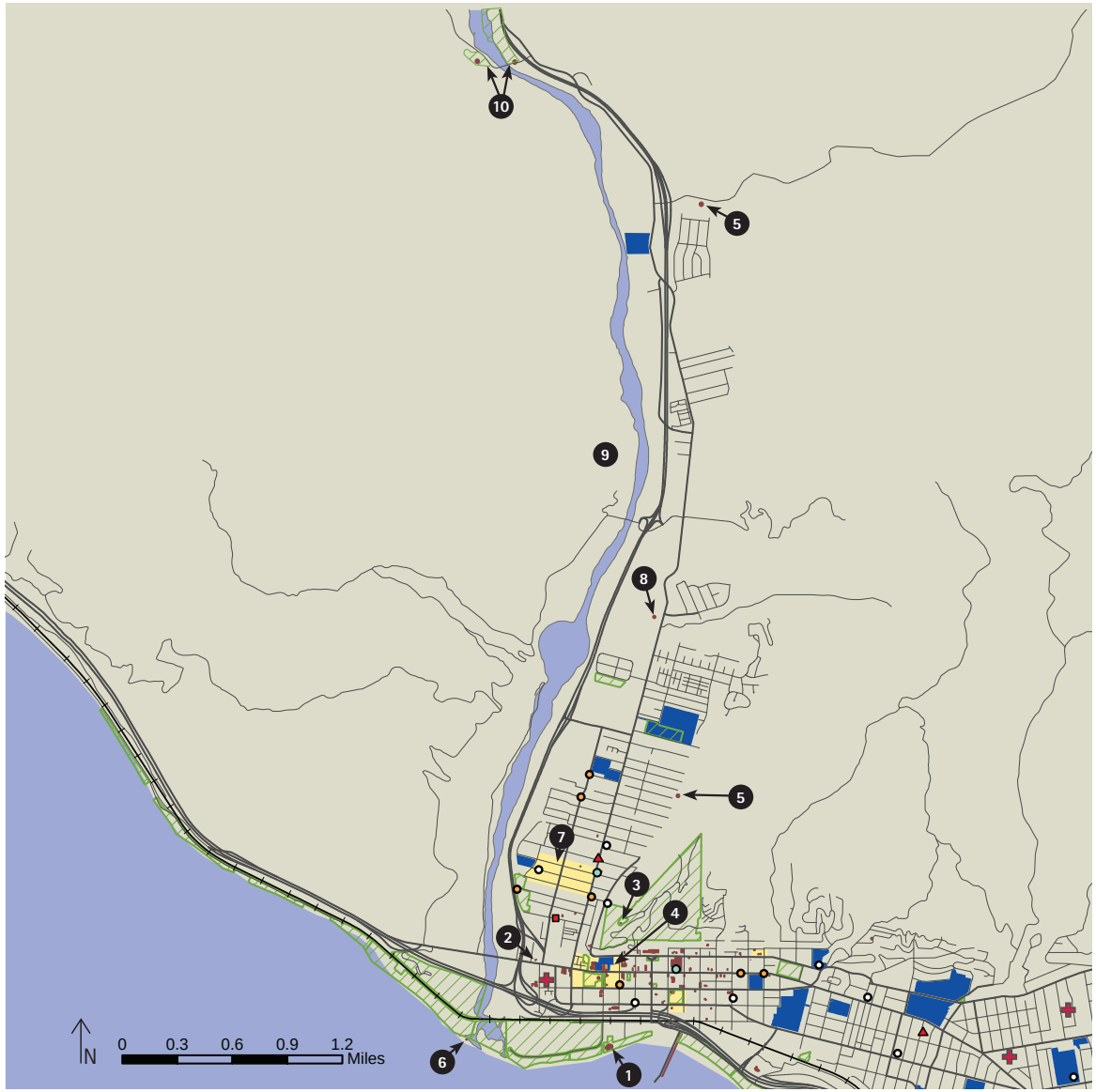
I. *Railroad trestle that crosses the estuary.*

J. *The river's estuary and primary mouth.*

K. *Parking at the Ventura County Fair Grounds.*

L. *Driftwood at Emma Wood State Beach with Seaside Wilderness Park in the distance.*

Figure 5.13 provides locations of a number of the community resources in the project area. Their identification demonstrates some of the available opportunities for reconnecting the Ventura River to the local culture. The resources identified represent the knowledge, beliefs, art, morals, and laws contributing to local culture. Through its function each type of community resource provides opportunities to promote and display interconnections between the culture of Ventura, the Ventura River, and the proposed Lower Ventura River Parkway.



Libraries

Community Centers

Religious Facilities

Medical Facilities

Fire Stations

Law Enforcement Offices

Landmarks

Historic Districts

Schools

Parks and Recreational Open Space

Item number in Figure 5.14

FIGURE 5.13 *Community Resources in the Parkway Project Area. Data source: City of Ventura; SCAG. After: Google Maps .*

Name and map item	Status	Description
Shishalop Village, or Cabrillo's Landing 1	State listed site	This former village was regionally significant to the Chumash when the Spanish arrived in 1542.
Ortega Adobe 2	City Landmark. National Register evaluation, 1988.	Home of the Ortega family Built in 1857 by the father of Emilio, founder of Pioneer Ortega Chili, the first commercial food processing operation in California.
Junipero Serra Cross 3	State listed site	The original wooden cross was erected in 1782 by Father Junipero Serra. The current cross was raised in the 1940's. Located in atop mountainous terrain which overlooks the City of Ventura.
Mission Compound 4	National Register of Historic Places	Includes Mission San Buenaventura, Albinger Archaeological Museum, and the Mission Water Filtration Building which is the oldest standing structure in Ventura County.
Mission Aqueduct remnants 5	National Register of Historic Places (north section) City Landmark	Seven mile aqueduct built 1805-15 by the Chumash for Mission San Buenaventura.
Battery Two and Hobo Jungle 6	Historic site, California Parks and Recreation	The site of a World War Two coastal defense battery including two concrete Panama mount gun emplacements. This area was also used by squatters during the Great Depression.
Simpson housing tract 7	City Historical District	One of Ventura's oldest neighborhoods, includes the histrorical Casa de Anza building which has housed apartments, art galleries, and Avenue Library.
E.P. Foster home and Avenue School 8	San Buenaventura Conservancy Landmark	Seven acre parcel with three household buildings built in 1881, as well as an elementary school. The school was donated by Foster to the Ventura Unified School District and the home donated after his death.
Ventura Avenue oilfield 9	--	Oil extraction began here in 1914, and peaked in 1954. Though greatly reduced it is still a producing oil field.
Foster Park stone gates and amphitheater 10	Ventura County Historical Landmark	Foster Park was first developed in 1906, its stone lion entrance markers are dated 1908.

FIGURE 5.14 *Historical resources with particular significance to the proposed parkway. Sources: City of Ventura; CERES*

Services

Schools, libraries, religious facilities, and community centers are primary locations for education and communal exchange. Community members rely on such facilities for critical information on all aspects of life. They function as resources for information and public gathering spaces and provide educational and social opportunities for re-introducing the Ventura River into daily life. Locations dedicated to health care, law enforcement, and fire safety also present significant opportunities to disseminate information about using the Ventura River as a location that can support health and inspire civic engagement. Collectively these resources represent significant opportunities to act as locations where the community is inspired and engaged in the process of planning and developing the proposed Lower Ventura River Parkway.

Historical Locations

Historical resources remind today's generation of the influence past generations have had on forming present culture and, comparisons can be made from which to measure the effect of the passage of time on quality of life. Organizations identifying significant historical resources

FIGURE 5.15 *Water filtration building, part of the Mission Compound.*

Name	Description
Fragile Sands project and website	Documents the conditions and future plans for Seaside Wilderness Park. Sponsors events and exhibitions in honor of the park, its founder E.P. Foster, and natural environments.
Shellie the Shopping Cart	A narrative told from the point of view of an abandoned shopping cart highlighting riparian species. Part of the Fragile Sands project.
Ventura River Trail public art	Sculptural pieces located intermittently along the trail route reflect the agricultural and industrial history of the area.
Once Upon a Wetland	Students work to restore native plant communities, learning about watersheds and the Ventura River Watershed's connection to the local ocean environment. Collaborates with Fragile Sands.
Tortilla Flats Mural and Reunion Project	Documents early to mid twentieth century working class neighborhoods on Ventura's westside.
Portrait of a Neighborhood	Mural commemorating the history of the Westside including Chumash settlement, agriculture, oil extraction, and suburban neighborhoods.
Ventura Hillsides Music Festival	Annual music event to raise money and awareness for the Ventura Hillsides Conservancy features local, up-and-coming, and top name artists.
Ventura Hillsides Wild & Scenic Film Festival	Film festival in Ventura sponsored by Ventura Hillsides Conservancy featuring films from the national Wild & Scenic Environmental Film Festival. The 2010 festival featured the film *Watershed Revolution* by Ventura filmakers and producers, a documentary that describes efforts to protect the Ventura River.
Municipal Art Acquisition Program and Collection	Artworks of distinctive artistic merit created by residents of Ventura County or individuals who have made significant contributions to the history of Ventura.
Ventura Public Art Program	Incorporates artists' visions into capital improvement projects.
Ventura Hillsides Wild & Scenic Film Festival	Annual program of family friendly environmental films designed to motivate people to make a difference in their communities and around the world.

within and around the proposed parkway project area include the National Park Service, California State Parks Office of Historic Preservation, Ventura County Genealogical Society, San Buenaventura Conservancy, and the City of Ventura. Documents referenced in order to identify historical resources with particular relevance to the proposed parkway included the National Register of Historic Places, the California Register of Historical Resources, Ventura County Genealogical Society's list of Historical Landmarks in Ventura County, the 2007 Historic Resources Survey Update: Downtown Specific Plan Area for the City of Ventura, the San Buenaventura Conservancy's list of landmarks, and *An Introduction to the Ventura River Parkway* produced by The Trust for Public Land. Figure 5.14 identifies historical resources with a high relevance to the proposed parkway based on location and function.

The Arts

Art, in all its forms and mediums, is generally thought of as a reflection of the societies in which they were produced. However, art theory also notes the ability of art to transcend reflection in order shape and inform culture. Community narrative, the stories a culture or sub-culture tells and believes about itself, is one instance in which art is theorized to inform culture (Thomas 1996). Some claim that the sources of transcendence in the arts are their ability to provoke thought, including that derived from strong emotional response, and a work's ability to elicit a collective understanding.

Private citizens, organizations, and City government all promote the arts through sponsorship and participation in the arts and arts programming. Additionally, the arts are both propagated and consumed in the Ventura River area. The arts are therefore demonstrated to be of significance to the culture, identity, and community narrative of the City of Ventura. As a localized communication tool, art- especially publicly available art-has the potential to play an important role in ingraining the proposed Lower Ventura River Parkway into the fabric of Ventura's culture. Figure 5.14 is a partial listing of existing art projects and programs with relevance to the Ventura River and its environs. Furthermore, the Ventura River, including its hydrological and biological processes, and its relationship to current and past cultures, provides opportunities to elicit strong emotional responses. Future works of art may have the ability to enhance the relationship between the Ventura River and the culture of Ventura by utilizing universally recognized themes of interdependence, isolation and separation, loss of innocence, celebration, and food as they relate to the relationship of people with the river.

[OPPOSITE] FIGURE 5.16 *Arts related projects located near or with thematic relevance to the Ventura River and proposed parkway. Sources: websites and publications for each project.*

PART II: COMMUNITY OF STAKEHOLDERS

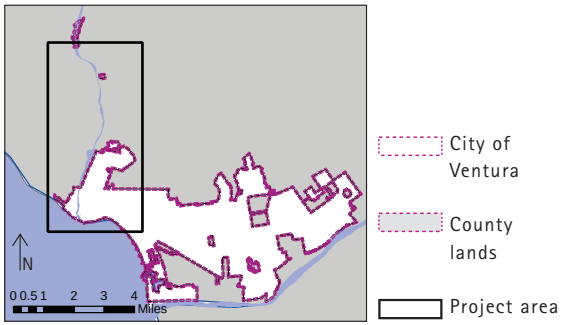


FIGURE 5.17 *City Scale. City and County jurisdictions are examined at this scale. Data source: City of Ventura.*

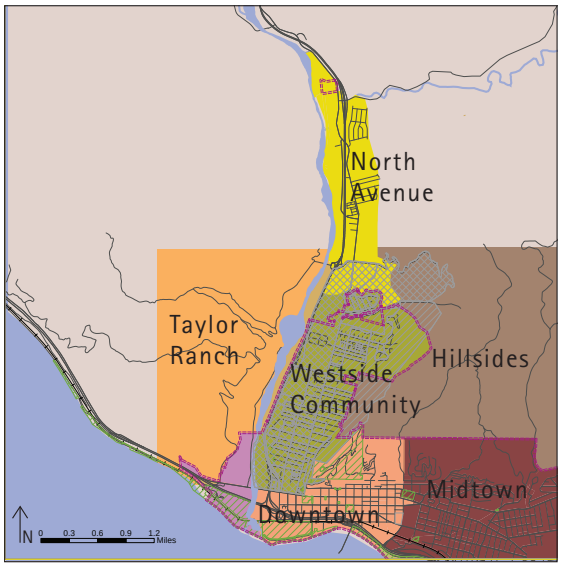


FIGURE 5.18 *Planning Community boundaries as indicated by the City of Ventura are shown here, in addition to the census tract boundaries approximating the Westside Community. All are located within project's site limits. Data source: City of Ventura. After: City of Ventura.*

DEMOGRAPHICS: STAKEHOLDERS AS INDIVIDUALS AND FAMILIES

The proposed parkway's large stretches of publicly accessible open space, proximity to urban amenities, natural experiences, and historical and arts resources will draw local users and visitors from afar. Identifying the needs, desires, habits, and ways in which visitors may utilize such a project is directly linked to its success. Additionally, area residents and enterprises with apparently little relation to the proposed parkway area may also be impacted by its planning, development, and operation. Collectively, potential visitors and individuals interest in the proposed parkway other than its use make up the parkway's community of stakeholders. It includes people of varying ethnicity, socio-economic background, age, experience, values, and perspectives. The community of stakeholder's needs, desires, and abilities to contribute to the planning and development are critical to the creation of the parkway and should be balanced with the necessities for restoring greater stream function and ensuring healthy ecosystems. Part II of this chapter, presents an inventory of the diverse factors influencing this community of stakeholders.

Where appropriate, the regional, watershed, and project area scales introduced in Chapter 1, The Planning Context, are discussed in this section. However, much of the information presented here is defined by jurisdictional and social boundaries, which do not entirely align with the planning scales previously introduced. As such this section makes several modifications to the scope of information presented at the planning scales previously used in this document, and introduces two new scales. The regional scale continues to focus on information within the jurisdictional boundaries of Ventura County but sometimes compares Ventura County to Kern, Los Angeles, and Santa Barbara counties, which border it. Use of the watershed scale is very limited, in its place the City Scale is introduced (figure 5.17). References to this scale present information regarding jurisdictional areas of the City and Ventura County of Ventura. It is also sometimes necessary to present information pertaining to geographical units smaller than the parkway project area. Figure 5.18 identifies city defined planning communities within the parkway project area, and the census tracts that most closely correlate to the neighborhood nearest the river, the Westside Community.

Moving from the discussion of available cultural resources presented in Part I of this chapter, Part II begins by introducing demographic information, continues with a discussion of stakeholder groups, reviews community input gathered by this project, and ends by discussing select community issues arrived at through the guidance of local stakeholders. In addition to the environmental services discussed in chapter 3 Hydrology, and 4 Ecosystems, through these analyses the parkway is shown to have the potential to greatly serve the community by contributing to the equitable distribution of healthy ecological, economic, and social environments in the project area.

Census data paints a generalized picture of individuals and families who are members of the project's community of stakeholders. Comparing demographic information to studies and other indicators provides insight regarding recreational demand and preferences, as well as educational and well being needs of potential users. Such comparisons will inform design proposals for this vision plan. To provide context, selected demographic information is compared against the same information at other planning scales. Additional detail is successively examined at each of the finer scales, allowing for a broader understanding of individual and family stakeholders, who based on proximity, are most likely to frequent the parkway.

Regional Population

Census 2000 found 753,197 residents living in Ventura County (United States Census Bureau [USCB] 2000). The 2006 American Community Survey estimated that the population had grown to 799,720 (USCB 2006). By comparison the 2006 survey estimated a population of 780,117 in Kern County to the north, 9,948,041 in Los Angeles County to the east and 400,335 in Santa Barbara County to the west (USCB 2006). California state wide projections estimate a 37 percent increase in population between 2000 and 2030 (USCB 2004). Based on projections the total population for each of these counties may increase by 1.23 percent annually into 2030. If projections come into being the four counties will have a combined population of 12,515,082 by 2010, indicating an immediate regional need for additional recreational open space. Based on data from the California Department of Forestry and Fire Protection, Figure 5.18 illustrates the density and distribution of populations across the four counties. Figure 5.19 also shows the Ventura River's demarcation of the western urban edge of Ventura and Los Angeles Counties. The Ventura River's western urban edge uniquely positions the proposed parkway as a figurative pressure valve for residents of the surrounding urban region. The abundant acreage of the Ventura River Parkway would provide and support the large regional population with an outdoor recreational resource. The parkway's proximity to various amenities and accommodations will enhance visitor attraction to the area.

The City of Ventura and the Westside Community

The City of Ventura's census data and the data pertaining to the two census tracts which correspond most closely to the Westside Community's boundaries are presented. These census tracts more accurately reflect urban conditions present in the parkway project area than does county census tract data. The 2006 American Community Survey estimated that the City of Ventura had a population of 104,092, whereas Census 2000 data indicated a population of 100,916 (USCB 2006). The two census tracts which comprise the Westside had a combined population of 13,204 at the time of the 2000 census (USCB 2000). The Westside Community therefore accounts for approximately 13 percent of the City of Ventura's population. The similarities and differences between the city's population and the population in closest proximity to the proposed river parkway point to overlapping and diverging needs and preferences. Ultimately all are critical to development of this vision plan and the future parkway.

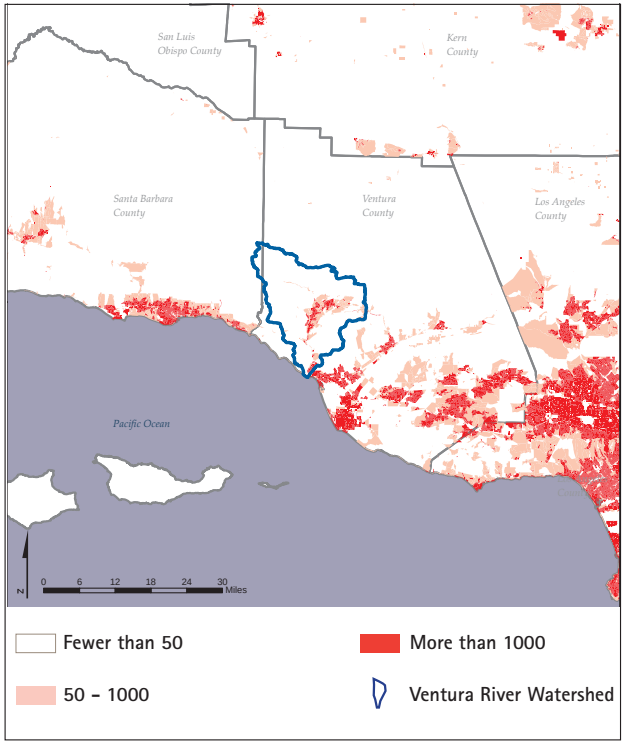


FIGURE 5.19 *Population Density per Square Mile. Regional scale. Data source: California Department of Forestry and Fire Protection.*

Ethnicity and Age

Research has shown that ethnicity and age are good indicators of user needs and behaviors regarding outdoor space. Statistics regarding ethnicity and age reveal a dichotomous relationship between the City of Ventura and the Westside. Figure 5.20 highlights the racial and ethnic balance for the City of Ventura in comparison to

the Westside. Figure 5.21 illustrates age distribution across the Westside and throughout the City of Ventura. Together these charts indicate that potential parkway users living in the City of Ventura and the Westside come from a range of ethnic backgrounds and varying ages. Users living closest to the proposed parkway are likely to be Hispanic and are primarily under the age of sixty. In contrast, the city population is primarily white. Users from the city as a whole are also likely to be older.

The United States Forest Service has identified some preferences in recreational behavior based on race and ethnicity (Dwyer 1992). This research shows that Hispanics frequently use outdoor recreational space to socialize, such as for family picnics. Other common activities associated with Hispanics are swimming and playing soccer. While whites also engage in sport activities, such as such as hiking and individual exercise, they have less of a tendency to engage in purely social activities, such as group gatherings (Dwyer 1992).

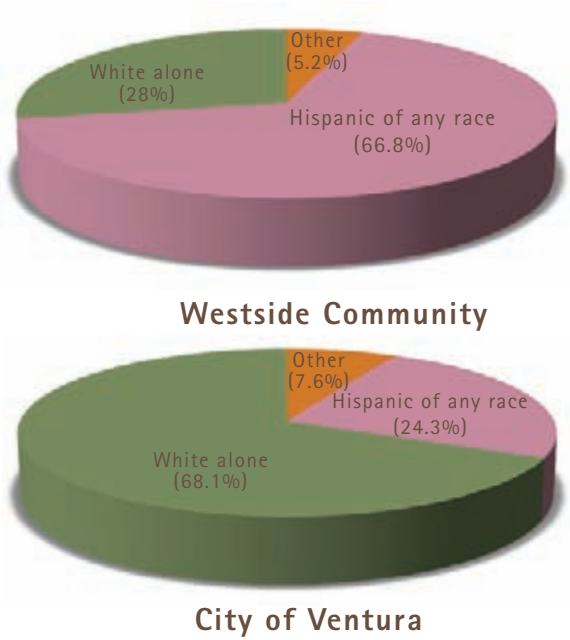


FIGURE 5.20 *Percentage of population by race and ethnicity. Data source: USCB 2000.*

User age also indicates the range of activities that users will engage in as well as design elements needed to support such activities. Cooper Marcus (1998) suggests providing areas where children can meet their need to manipulate and act on their environment, while also providing locations where older users can observe and to some extent be protected from their environment. The broad range of ages and ethnicities in the Ventura area necessitates that this vision plan and subsequent documents meet diverging needs through inclusive planning, design, and programming.

Education and Income

The need for the Ventura River Parkway to be developed as publicly accessible recreational open space that also provides educational opportunities comes into focus with this Vision Plan. In a report on the correlation between educational attainment and income, the California Postsecondary Education Commission (CPEC) found that "On average, just having some college adds 25 percent to earnings" and "Compared to a high school level education, an associate degree increases income by 47 percent, a bachelor's degree by 108 percent, and a graduate or professional degree by 189 percent" (CPEC 2007). This same report further found that when comparing incomes of high school graduates and those holding a bachelor's degree for members of Hispanic, African American, and Asian groups their incomes more than doubled (CPEC 2007).

Figure 5.22 illustrates that for individuals over 25 years old, members of the largest group by educational attainment in the Westside Community, have less than a ninth grade education (USCB 2000). Meanwhile, the largest single group in the City of Ventura is composed of individuals who have completed some college (USCB 2000).

Figure 5.23 compares household income ranges for the Westside Community to the city as a whole. Just over one-third of households throughout the city had an annual income range between $50,000 and $100,000 in

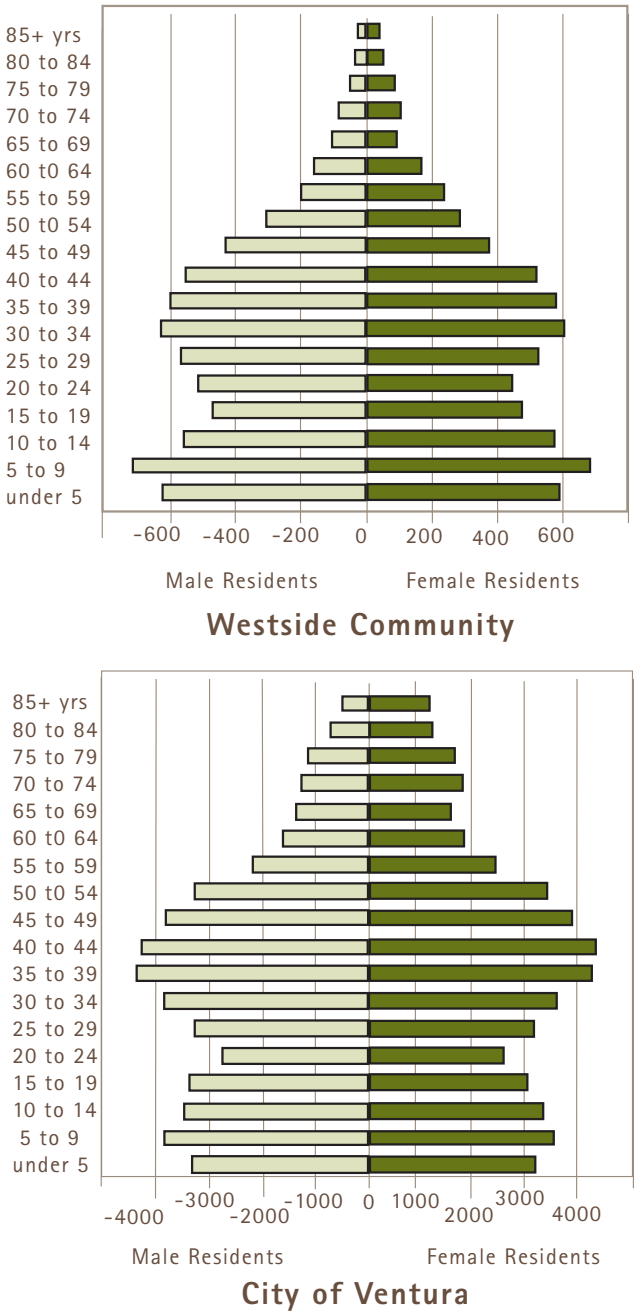


FIGURE 5.21 *Age Distribution for the Westside Community and the City of Ventura. Data source: USCB 2000.*

1999, while nearly the same number of households in the Westside had a range of only $10,000 to $30,000 in that same year (USCB 2000). It is important to note that the average household size for the City of Ventura is two, while the Westside average is four (USCB 2000). On average, lower household incomes in the Westside sustain more people than in the city as a whole. Finally, by combining the two census tracts representing the Westside Community the distribution range of household incomes and educational attainment for the community reflects higher household incomes and education levels than if the census tract nearest the river had been considered alone (USCB 2000).

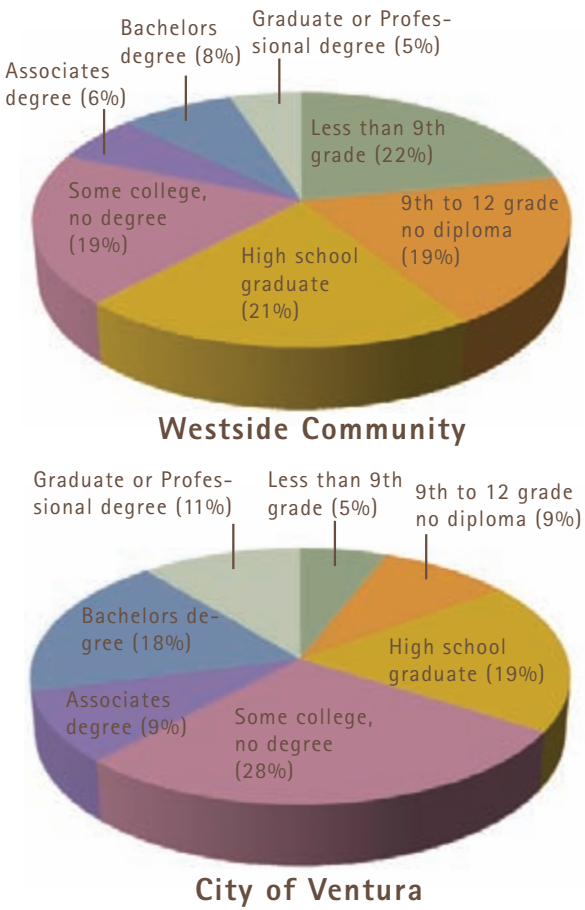


FIGURE 5.22 *Level of Education Attained by those over 25 years of age. Data source: USCB 2000.*

The Office of Educational Research in the United States Department of Education recognizes that a number of studies have identified student engagement as key to attaining advanced levels of education (Rossi 1994). Some of these studies identify factors that contribute to student engagement, including the provision of high quality education (Rossi 1994). The role of the natural world in the provision of quality of education is gaining recognition. According to their official web site the United Nations Education Sciences and Culture Organization (UNESCO) have developed six internationally agreed on education goals through Education for All (UNESCO 1995). Goal number six is improved quality of education. Content further delineating potential components of improved quality of education includes the use of curriculums that provide learning opportunities based on the local environment, while also developing broader knowledge and competencies applicable to student's lives (UNESCO 1995). UNESCO's recognition of local environments as providing opportunities to improve the quality of education supports the creation of the Ventura River Parkway. As an educational tool, the Ventura River Parkway can provide locally based curriculums that develop broader knowledge and inspire engagement, increasing the economic well being of Westside community members and ultimately the broader community.

Examining demographic information in relationship to the Ventura River reveals the need for the proposed Lower Lower Ventura River Parkway across regional, city, and neighborhood boundaries. For the region, a well connected system of open space that creates a balance between wilderness, amenities, and accommodations has the potential to provide much needed respite. For the city, potential visitors represent tourism dollars: an important economic resource. For the Westside Community, easy access and close walking distance to recreational opportunities that include design features which support education and social interaction may ultimately improve quality of life.

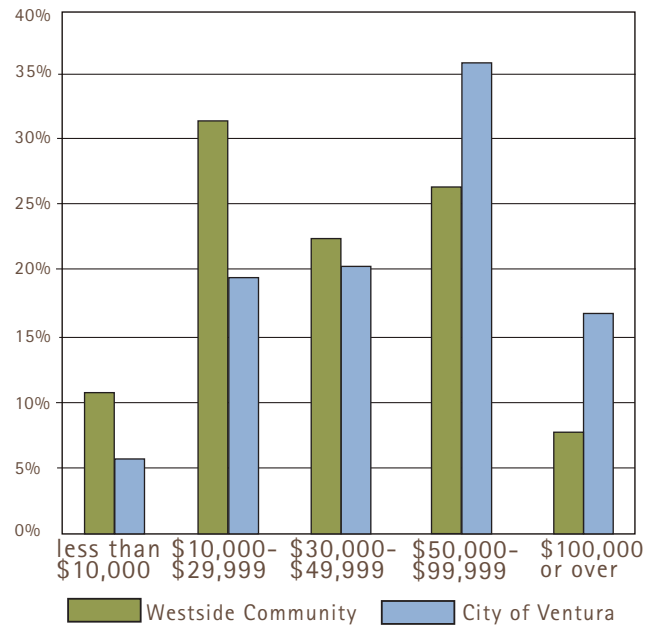


FIGURE 5.23 *Median Household Income for 1999. Data source: USCB 2000.*

Information regarding economic activity and employment sectors at multiple scales provides a picture of the community of stakeholders through their common economic interests. This examination provides insight into the daily lives of potential parkway users and clues as to how the proposed parkway may be received by employers and employees.

Stakeholders as Collective Groups

THE ECONOMY

Economic Stakeholders Beyond the Parkway Project Area

From 2000 to 2005 Ventura County's top three employment sectors were respectively; service based businesses, such as tourism and professional services, retail trade and agriculture (VCCA 2007). Average annual salaries in these sectors were between $20,000 and $32,000, representing the county's lowest average wages (VCCA 2007). As an indicator of the number of jobs represented, in 2000 there were 30,000 agricultural jobs (IRWMP 2006). In contrast, between 2000 and 2005 some of the largest individual employers in the county were Amgen, Countrywide Financial, and the United States Navy, whose average wages were as much as two and a half times higher than for service based and retail trade sectors (California Employment Development Department 2007). Additionally, in 2000 Ventura County had the highest absolute employment in agriculture in southern California. According to the Southern California Association of Governments (SCAG) by 2030 agricultural jobs will decrease by 29 percent compared to 2000. Such a decrease will contribute to the largest anticipated change in the county's economy as well as in land use, from agricultural to urbanized lands (IRWMP 2006).

In their 2004 Labor Force Profile the City of Ventura's top two employment sectors were also services and retail trade, with government in third place (City of Ventura 2008a). Notably, according to the Economic Development Strategy 2005-2010 tourism contributes more than $715 million dollars annually to the local economy (City of Ventura 2005a). As in the rest of the county, large numbers of jobs in these sectors are a result of many employers rather than several large employers. Testament to this fact is that once again the top three individual employers were not entirely within the three largest sectors, those employers were; the County of Ventura, Ventura Unified School District, and the Ventura County Health Care Agency (City of Ventura 2008b).

The consideration of county and city data including average wages, household incomes and the anticipated shift of land use from agricultural open space to urbanized land provides justification for development of a public parkway with low cost access, and also provides clues for gaining potential allies. With government, education and health care making up the largest individual employers in the city, a significant number of city residents may view the Ventura River Parkway as providing material support for objectives they support through their employment. Finally, many employers outside the proposed project area will be watching its planning and development from the perspective of it becoming a regional attraction. If approached without finesse and consideration for stakeholders in outlying areas, the parkway may be viewed as competition for tourism and retail trade dollars. However, collaboration with economically attentive organizations and their members may help alleviate potential for this perceived threat and encourage a perspective market for additional services, retail trade and tourism. Figure 5.24 identifies stakeholder organizations operating beyond the project area.

Organization Name and Internet Address	Activities
Central Coast Tourism Council http://www.centralcoast-tourism.com	Promotion of attractions, services, events, and resources in California's Central Coast region.
Ventura County Civic Alliance http://www.vccf.org/civicalliance	Community issues, engagement, and leadership.
Ventura County Economic Developement Association http://www.vceda.org/	Environmental policy, land use, housing, transportation and workforce education.
Economic Development Collaborative-Ventura County http://www.edc-vc.com/	Public-private partnerships, attraction, retention, and expansion of business in Ventura County.
Ventura Chamber of Commerce http://www.ventura-chamber.org/	Business and community development, public policy.
City of Ventura Community Development Department http://www.cityofventura.net/community_development	Planning, zoning, economic development, housing and redevelopment, special events, regional planning, and open space.
Ventura Visitors and Convention Bureau http://www.ventura-usa.com/	Promotion of attractions, services, events, and resources in the City of Ventura.

FIGURE 5.24 *Stakeholder groups working on economically related issues operating at the regional and city levels. Sources: individual group informational and promotional materials.*

FIGURE 5.25 *A government maintenance yard in the project area.*

Economic Stakeholders in the Parkway Project Area

As with the economic stakeholders in outlying areas, employers and employees in the project area are potential allies for the proposed parkway development. The cultivation of positive relationships may greatly aid in the parkway's reception. Site visits reveal that employment closest to the Ventura River generally fall into three sectors: agriculture, retail trade and industry, including manufacturing and oil extraction. A limited number of professional services, such as health care are also present. Additionally, with many single and multi-family housing units, commercial and residential real estate markets contribute to the local economy. As shown in Figure 5.5, SCAG's land use data supports this breakdown, which is also consistent with the city's overall employment picture. Figure 5.26 indicates some of the individual businesses and government entities operating in the project area.

Despite economically productive operations (Figure 5.26) and ongoing city support for the revitalization of the Westside and North Avenue communities, (City of Ventura 2009; City of Ventura 2005a; City of Ventura 2002) vacant, unkempt lots, and under-stocked retail establishments indicate that revenues and economic activities outside of the beach and historical corridors are insufficient in meeting population needs. The 1980s flight of a significant portion of the oil industry is cited as a primary factor in the economic devaluation of the area (City of Ventura 2005a). Additionally, with the two lowest paying employment sectors providing significant numbers of jobs, opportunities for residents to work locally are likely to be low paying. While higher paying industrial and professional services have fewer job opportunities, they also require higher levels of education which is atypical of Westside Community residents (Figure 5.21).

Business or Agency	Activities
Addison Main Street Trust- Bell Arts Factory	art studios and community space
Von's	retail services
Aera Energy LLC	energy production/oil extraction
Taylor Ranch Partnership	agriculture
Mobile Oil Corp.	energy production/oil extraction
Edison	energy production
Brooks School of Photography	advanced education
Mission Avocado	agriculture
Pepsi Co.	food production
Cabrillio Economic Development Corporation	housing and community services
Arrowhead Water Company	food production
Bilingual Vocational Center	advanced education
Westside Market	retail services
Bike Depot	retail services
Ventura County Medical Center: Women's Health Center	medical services
Pacific Stone Works	retail and wholesale services
CalTrans	transportation services
Division of Fairs and Expositions, California Department of Food and Agriculture	fairgrounds administration
California State Parks	parks administration

FIGURE 5.26 *Businesses and government agencies represented in the project area. Sources: individual group informational and promotional materials.*

COMMUNITY ORGANIZATIONS

The final stakeholder type is composed of individuals who have chosen to actively participate in their community. At all planning scales, community organizations, government entities and a number of grassroots and government sponsored programs and projects exist that focus on the improvement of hydrological, ecological and social systems. Both individuals and organizations have expressed support for a parkway along the lower reaches of the Ventura River. Some have shown willingness to partner and share resources with other agencies and individuals working towards the river's realization. They have offered a considerable amount of information and support for the production of this document and are seen as invaluable resources in future planning, promotion and operation of the Ventura River Parkway. Figure 5.27 provides an overview of community organizations whose missions coincide with the goals and objectives of the Ventura River Parkway. Currently, no entities have stated opposition to the parkway.

Organization Name and Internet Address	Mission Statement
Surfrider Foundation Ventura County Chapter http://www.surfrider.org/ventura/	We recognize that all things are connected and everything we do impacts our coastline. To this end, for the past decade we have been working on integrated solutions to the problems that face our ocean, waves, and beaches.
Ventura Stream Team http://www.sbck.org/index.php?option=content&task=view&id=19	Ventura Stream Team (Santa Barbara Channelkeeper and Surfrider Foundation, Ventura Chapter) has three major goals: to collect scientifically sound, baseline data on the health of the watershed; to recruit and train a force of watershed stewards in the community; and to identify sources of pollution throughout the watershed.
Ventura County Watershed Protection District http://portal.countyofventura.org/portal/page?_pageid=876,1324092&t_dad=portal&t_schema=PORTAL	The District's mission is to protect life, property, watercourses, watersheds, and public infrastructure from the dangers and damages associated with flood and stormwaters. Goals of the District include: Comprehensive, long range watershed planning, collaboration with watershed stakeholders, administration of adopted regulations, policies, and resolutions responsible and accountable use of public resources, and excellence in public service.
Los Padres Forestwatch http://www.lpfw.org/	A community-based nonprofit organization that is leading efforts to protect the Los Padres National Forest and other public lands along California's Central Coast.
Matilija Coalition http://www.matilija-coalition.org/	An alliance of community groups, businesses, and individuals committed to the environmental restoration of the Ventura River Watershed.
Save Open-Space and Agricultural Resources http://www.soarusa.org/	A local nonprofit organization dedicated to making Ventura County a better place to live by limiting urban sprawl, protecting open space and agricultural lands, and promoting livable and sustainable communities in Ventura County.
Ventura Hillsides Conservancy http://www.venturahillsides.org/	A 501(c)(3) nonprofit public benefit corporation working with land owners, conservation organizations, and public agencies to preserve and restore the hillsides and open space resources in the Ventura region.
Boys and Girls Club of Ventura http://www.bgclubventura.org/	A positive place for all youth, and quality programs to help them become healthy, responsible, confident and productive members of our community.

FIGURE 5.27 *Stakeholder organizations representing environmental and social needs with relevance to the proposed parkway. Sources: individual organization informational and promotional materials.*

Local Knowledge

COMMUNITY MEETINGS AND SURVEYS

The authors obtained information for this document through a number of sources. However, information gathered from local residents provided essential understanding and guidance leading to a greater understanding of the social value of the Ventura River during recent history, challenges to its ecological function, and the social pressures which currently impact the river and will likely confront future parkway development. Such local knowledge has often been underutilized compared to expert knowledge provided by planning and design professionals. While expert knowledge in these fields is irreplaceable, there is a growing recognition of the importance of local knowledge that is attained from community participation in the planning, design, implementation, and maintenance of public spaces. In the case of the Ventura River Parkway, the participatory planning process has merely been initiated. Achievement of a truly participatory planning process will require an ongoing effort.

City and county documents produced with a high level of citizen involvement prior to this visioning process provided indirect sources from which to access stakeholder values and to gather local knowledge. Local documents, such as Save Our Agricultural Resources (SOAR) legislation, indicate the citizens' desire to maintain the open space and agricultural character of specified areas that are already associated with such activities and characteristics. Other examples include efforts from the City of Ventura, which has engaged in a number of participatory planning processes. This is true of the 2005 General Plan which identifies preservation of natural resources and well planned communities as key areas of importance for the city.

Direct stakeholder input for this visioning process was gathered through two community meetings, site visits, spontaneous interviews with individuals encountered during site visits, a survey distributed at the Fifth Annual Ventura Hillsides Conservancy Membership Meeting, and the attendance of neighborhood gatherings unrelated to the project. Additionally, local residents who are experts in hydrology, Geographic Imaging Systems (GIS), civil engineering, and environmental cleanup were consulted.

Four questions were asked of stakeholders at community meetings focused on the parkway visioning process and in the survey distributed at the Fifth Annual Ventura Hillsides Conservancy Membership Meeting. These questions were:

1. Please share a personal experience or memory of the Ventura River.

2. On the map provided, please identify your likes and dislikes regarding the river and why.

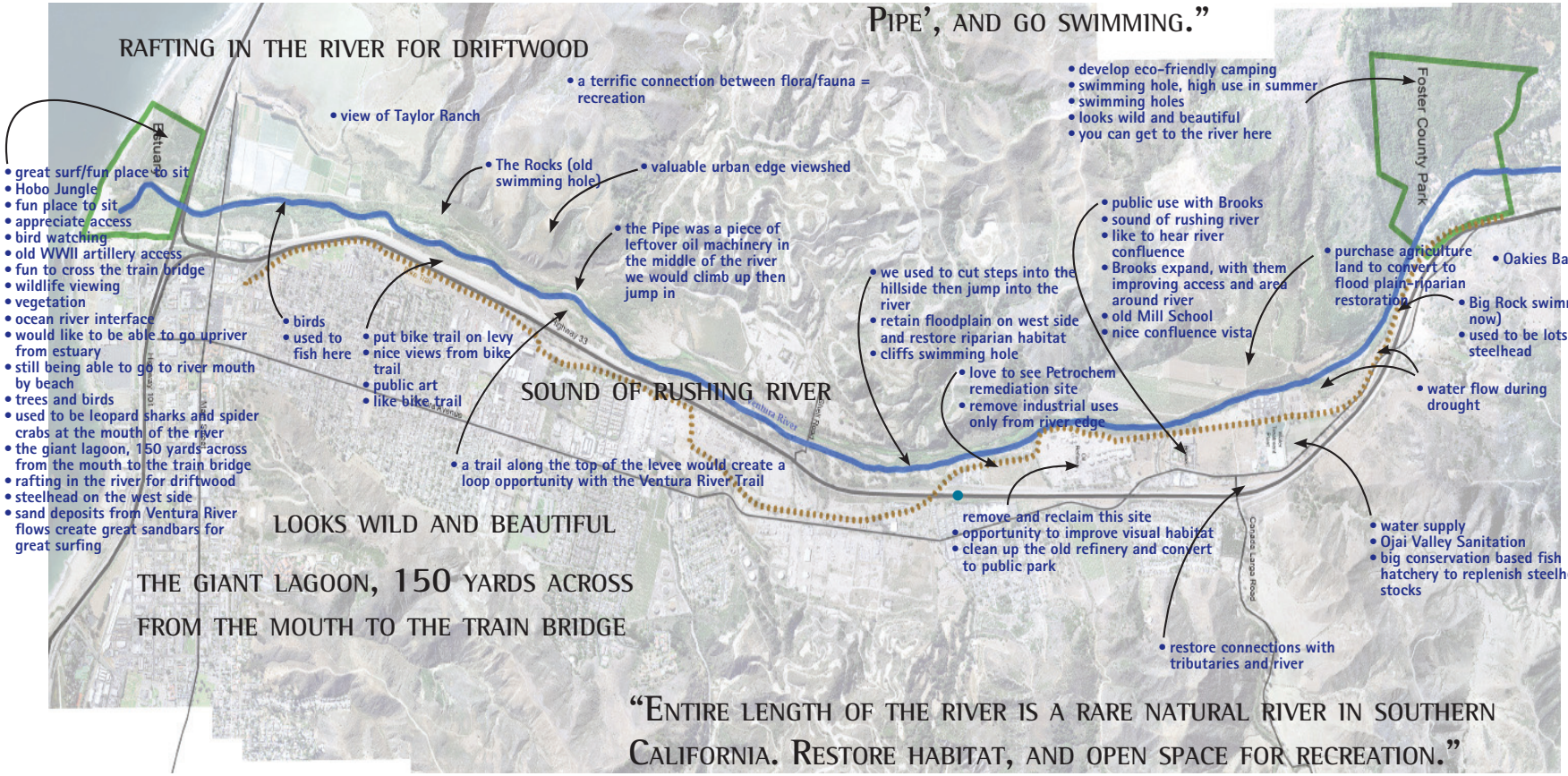
3. What would you like to see happen on the river?

4. Do you have any additional comments you would like to share?

FIGURE 5.28 *Photographs from one of the Community Meetings for Lower Ventura River Parkway Vision Plan. Held at the Bell Arts Factory, February 23, 2008. Photos: Felicia Kelley.*

LIKES

"WE USED TO SAY, 'MEET YOU AT THE ROCKS', OR 'MEET YOU AT THE WILLOWS' OR 'MEET YOU AT THE PIPE', AND GO SWIMMING."

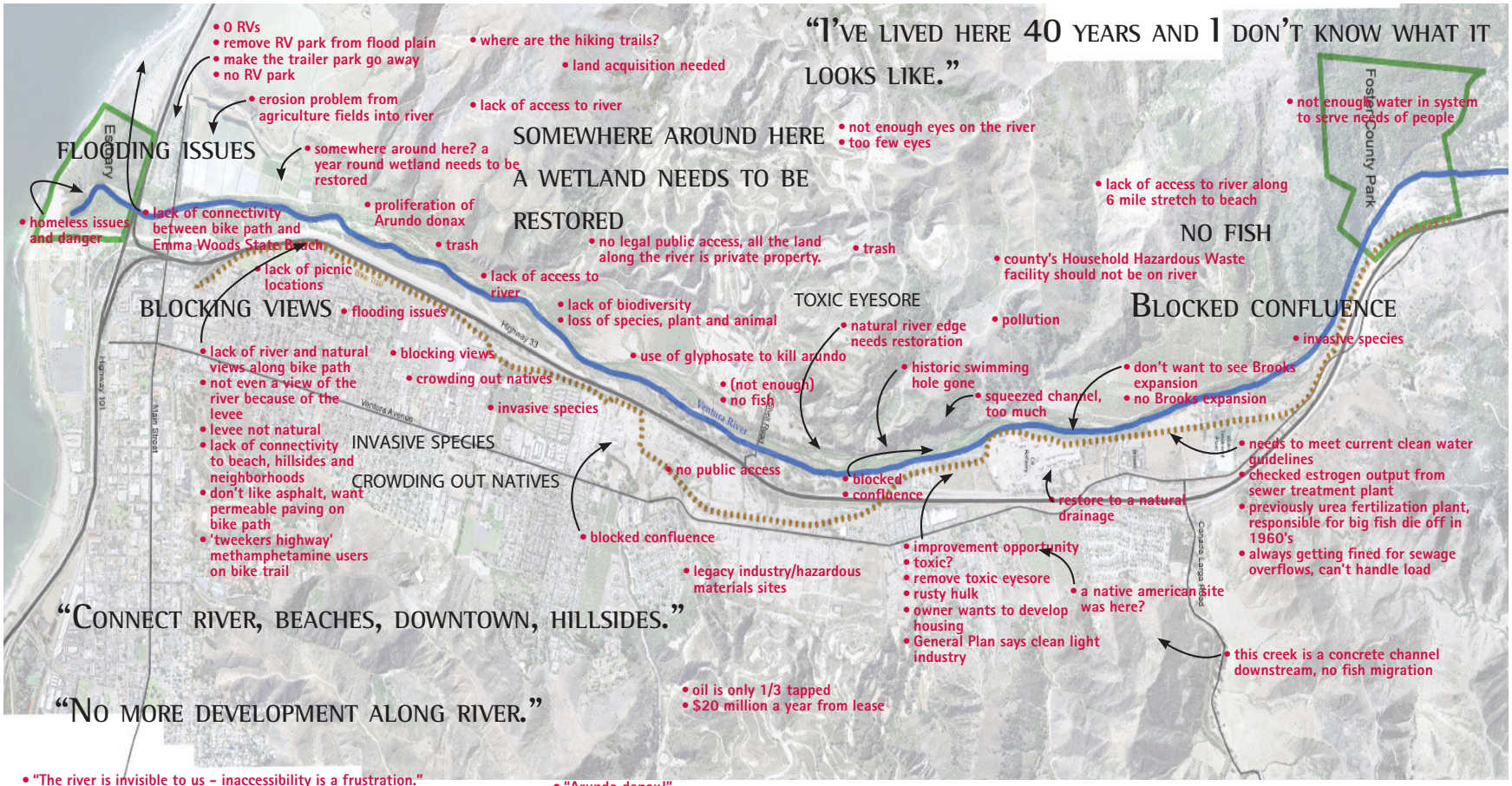


- "I like that the river runs the whole length of "The Avenue" community, making it available (potentially) to kids to be close to nature. Also, I like that it runs the length of the Class 1 bike trail-so that could be a beautiful combo."
- Generally, this group likes that is is not contained, it's "wild."
- "Portions of the land surrounding the estuary were given to the County by E.P. Foster between 1909-1914 with the stipulation that it remain for public use-
- "A mini Golden Gate Park was his vision."
- "More access locations."
- "Access to westside of river."
- "No new development in flood plain."
- "Good memories: growing up in Ventura, walking by the river mouth, seeing it change with season/volume of water-difference in vegetation, birds as a result of this."
- "The parts where there are water."
- "We are independent of outside water sources."
- "[The oil refinery site] was offered to the Chinese [sic] for $1, and they didn't want the it."
- "We used to say, 'meet you at The Rocks', or 'meet you at The Willows'. or 'meet you at The Pipe', and go swimming."
- "[There were so many steelhead] it looked like dolphins swimming in the evening in the golden sunset."
- "Entire length of the river is a rare natural river in southern California. Restore habitat, and open space fore recreation."

"GOOD MEMORIES: GROWING UP IN VENTURA, WALKING BY THE RIVER MOUTH, SEEING IT CHANGE WITH SEASON/VOLUME OF WATER-DIFFERENCE IN VEGETATION, BIRDS AS A RESULT OF THIS."

FIGURE 5.29 *Community Members' Likes.*

DISLIKES



- "The river is invisible to us – inaccessibility is a frustration."
- "I've lived here 40 years and I don't know what it looks like."
- "The river is trashy, dirty and not inviting."
- "Safety issue, don't know who's there. Not open to community, so people there feel threatened."
- "Remove farming and industry from 100 year flood plain."
- "Get rid of oil activities in area."
- "Make lower look more like upper."
- "Needs a couple of swimming holes, with a rope swing from a tree."
- "No access, or very limited in lower."
- "No more developemnt along river."
- "Connect river, beaches, downtown, hillsides."
- "Bike path should be closer to the river."
- "Homeless encampments create safety issues and trash on the river."

- "Arundo donax!"
- "No good access for kids."
- "Steelhead recovery plan should be priority #1."
- "Lack of defined access. Need a path all along and protective screens for sensitive areas."
- "Need watershed wide plan."

"The river is invisible to us – inaccessibility is a frustration."

"Safety issue, don't know who's there. Not open to community, so people there feel threatened."

FIGURE 5.30 *Community Members' Dislikes.*

Figures 5.29 and 5.30 highlight some of the likes and dislikes identified by community members.

It is important to note that during introductions approximately 60 percent of community meeting attendees identified themselves as members of a community organization or government body whose purpose has at least a minimal concern for the Ventura River's functionality. Active and engaged community members are invaluable to the Ventura River Parkway project whose focus is the preservation of natural resources for public good. However, a truly inclusive participatory process must strive to include harder-to-reach community members. Case studies indicate that long term efforts in conjunction with dedicated community liaisons have some of the highest rates of engaging disaffiliated persons with community projects (Butcher 2008; Spirn 2005). The in depth and extensive nature of such efforts is beyond the scope of this study, however, initial efforts were made to reach disaffiliated, disadvantaged, or otherwise unengaged individuals. Such efforts included neighborhood canvassing in the Westside Community, distribution of flyers to agricultural field workers near the river, distribution of flyers to church groups, and posting on internet bulletin boards of local Spanish and English language radio stations. Additionally, press releases were published in the Ventura County Star and Ventura County Reporter.

OUTCOMES

Information gathered at the community meetings, from surveys, and by other resident generated materials, such as the *2005 Ventura General Plan,* has provided a wealth of local knowledge that enhanced this visioning process and provided invaluable guidance. Such knowledge and guidance led to the identification of shared local histories and of several ongoing community concerns with significance for the proposed parkway. Identification of these topics by stakeholders led to the authors' efforts to secure greater understanding of their dynamics and how these issues might affect the planning and future of the Lower Ventura River Parkway. Figure 5.31 quantifies questionnaire responses by graphing the number of times a particular topic was identified, regardless of negative or positive context. This graph illustrates that stakeholders who attended one of the two community meetings or completed the survey were most concerned with ecological value and preservation of the river. The second and third most frequently cited topics were access to or contamination of the river. While not largely reflected through the meetings or survey, the issue of homelessness was inevitably referenced in consultations with local experts. Homelessness and its perceived relationship to personal safety was a central topic in casual conversations with individuals encountered on site visits.

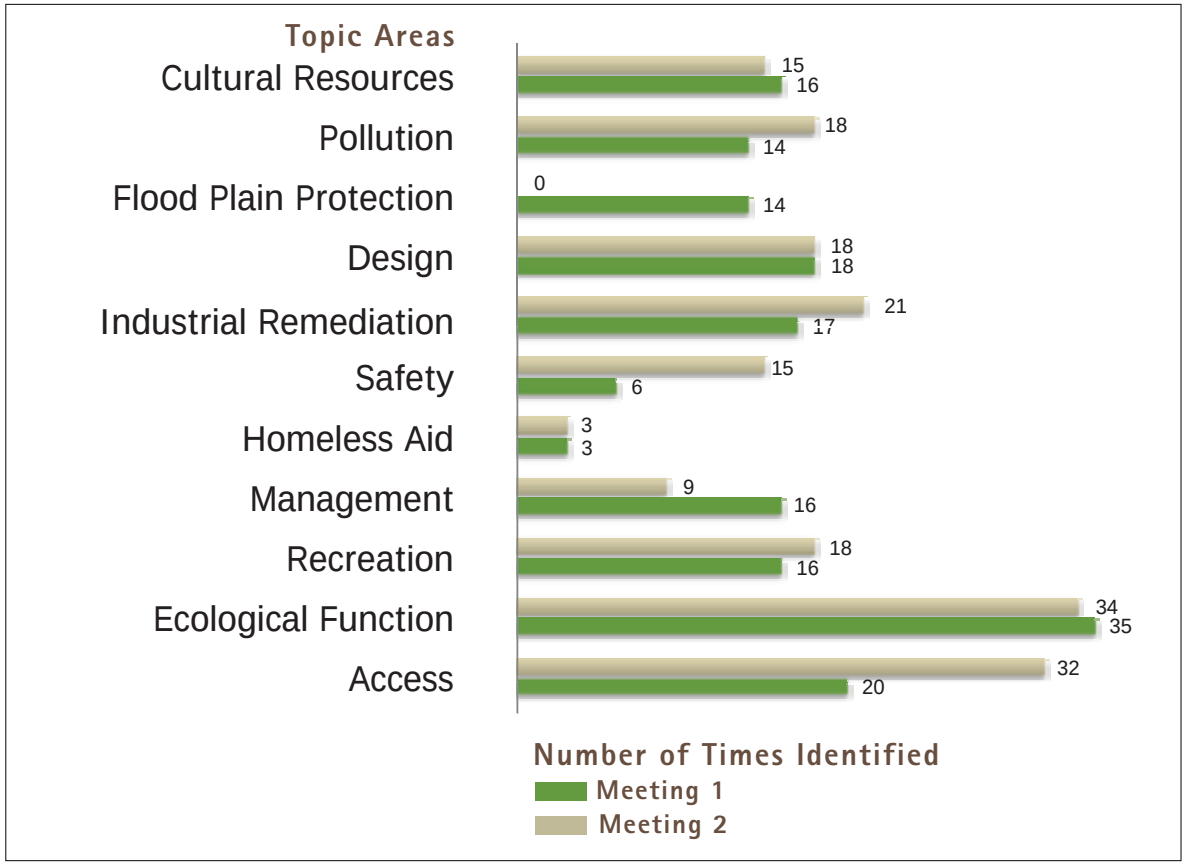


FIGURE 5.31 *Topic areas cited by Community Meeting attendees and survey takers.*

Community Experiences and Memories

Memories and experiences local residents shared during the visioning process provided insight upon personal relationships with the Ventura River and adjacent lands. These interactions included stories of Foster Park providing occasional respite for community members, the Ventura River Trail providing cyclists and pedestrians with a much used recreational resource, and the estuary as favorite location for bird watchers. In addition, Surfer's Point, located at the river's eastern outwash, draws local and regional surfers and kite-boarders and meeting participants identified Surfer's Point and the estuary as providing good kayaking opportunities. In general, community meeting participants conveyed a sense that they enjoy currently available recreational resources at and near the Ventura River, however, they see a potential for this area to be much more.

Those who experienced the Ventura River before the Matilija and Casitas Dams were built shared memories of fishing for steelhead and having ample catches. One resident recalled that winter catches were an important food supplement for his family. Another resident was able to share a list of the names of former swimming holes up and down the river. He described how he and his friends would pass

FIGURE 5.33 *Ventura River Steelhead Catch, 1946. Source: Tortilla Flats Mural and Reunion project.*

FIGURE 5.32 *Wheeler Springs swimming hole, 1936. Source: Ventura County Star; Ventura County Museum.*

FIGURE 5.34 *The Omer Rains Trail along the Ventura River Estuary, 2008.*

FIGURE 5.35 *Litter and abandoned personal possessions near the Ventura River.*

summer days walking and hitchhiking from one swimming hole to the next. In sharing memories residents conveyed deep pleasure and satisfaction at having had experiences that connected them to local nature and the river. Sadly there was a sense of wistfulness among residents who were reminded that, to a great extent, these opportunities have been lost.

Community Concerns

Topics identified by stakeholders provided insight on important opportunities for drawing connections to the community. Some of these opportunities may currently or potentially have negative implications for the proposed parkway. The following pages address community concerns by presenting them in an order that reflects the number of times they were identified by individuals in written form. Concerns were brought forward regarding the river's ecological value and preservation of its natural form, lack of access, contamination, personal safety, and homelessness. Further investigation into these topics reveals broader community concerns which will significantly impact the proposed Lower Ventura River Parkway.

FIGURE 5.36 *Site perceived to be abandoned and contaminated.*

FIGURE 5.37 *Culverted and vandalized section of the Cañada Larga.*

Urbanization and Loss of Open Space

Chapters 3 (Hydrology) and 4 (Ecosystems) discuss the importance of ensuring that rivers and their related habitats are preserved and that they function in a healthy manner. When considering ecological preservation from a cultural standpoint, concerns arise regarding the urban development of natural lands. The imperative need for open space retention leads to an examination of the forces which threaten this as well as some of those which protect the natural resources found near the Ventura River.

STATE AND REGIONAL FACTORS

Population growth and public policy have been two major factors influencing the balance of urbanization and open space across the state. With population growth projections of 37 percent by 2030, it is reasonable to expect that the process of urbanization will continue. At the regional scale, limits on urban growth were set by national and state policies, which lead to the creation of Los Padres National Forest and the Santa Monica Mountains Recreation Area. Figure 5.2 illustrates that the majority of Ventura County's urbanization exists in its southern extents. Here, county, state and local policy combine with population growth and market forces to form a distinct land mosaic.

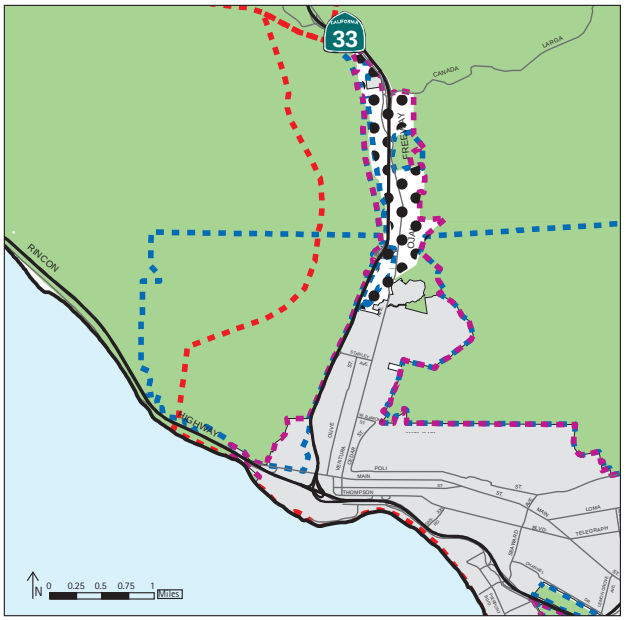
According to the Ventura County Civic Alliance (VCCA), Ventura County's population grew by 1.5 percent annually between 1990 and 2004; an increase of 21 percent in 14 years (VCCA 2007). While the county's growth of urbanized land varied from just under one percent to almost 1.6 percent annually between 1984 and 2004; a 31.2 percent increase of urban and developed land occurred throughout a 20 year period. Development during this time accounted for a 3.3 percent loss of agricultural acreage (VCCA 2007). Averaging the 20 year rate of urbanization and applying the resulting 1.56 percent annual increase of developed land to a 14 year time span reveals a 21.84 percent increase. This rate of urbanization was slightly greater than the population growth.

THE PROJECT AREA

The expectation that population growth will impact the City of Ventura and affect the parkway project area is derived from state projections, the county's growth history, and the awareness that open space in developed areas is difficult to retrofit. Further discussion of SOAR and Hillside Voter Participation Area (HVPA) measures (chapter 1. Policy Context) illustrates the potential for loss of open space in the parkway project area and the greater City of Ventura. SOAR guarantees citizens the opportunity to vote for or against development in the areas they constrain (Ventura County 2008). It does not guarantee that voters will choose to preserve open space rather than allow development. Additionally SOAR measures are set to expire in 2020 and 2030 (Ventura County 2008). Considering the vast pressures for development, it is perhaps overly optimistic to believe that county SOAR and city SOAR-HVPA measures will preserve open space in the parkway project area. Recently voters have tended to favor preservation of open space, yet it is still imperative that the citizenry understand the value of open space before a vote regarding development is put forth.

North Avenue Neighborhood

Figure 5.38 maps the SOAR measures in order to demonstrate the significance of local policy formulation for the proposed parkway project area. Approximately one quarter of the parkway project area falls under the jurisdiction of the City of Ventura's SOAR (Save Our Agricultural Resources). Some of this same property, as well as large portions of the local hillsides, fall under the umbrella of the Hillside Voter Participation Area (HPVA). Most of the northern third of the parkway project area falls into the county's zoning designations for agriculture, open space, or rural land use, qualifying much of the parkway area that is within county jurisdiction for a pre-development vote under county SOAR (Save Open space and Agricultural Resources). However, the dotted area falls into the county zoning classification of existing community (Ventura County 2005). There is housing and industry in this area, however site visits show that it also includes large areas of underutilized and undeveloped land, much of it adjacent to the Ventura River. With the county designation of Existing Community these parcels are not recognized as open spaces. Further, while this existing community is not part



Sphere of influence boundaries

Area of interest boundaries

City of Ventura SOAR-HVPA boundaries

Ventura County SOAR area

City of Ventura

Existing Community (North Avenue neighborhood)

of the incorporated City of Ventura it is within the city's sphere of influence, making this area of the proposed Ventura River parkway eligible for annexation and development by the City of Ventura and its private partners. As of the release of the 2005 to 2010 Economic Strategy Plan the City of Ventura was very interested in promoting the development of this area into a commercial and multifamily development, and subsequent plans have also supported this idea (City of Ventura 2005a; City of Ventura 2005b; California State Polytechnic University, San Luis Obispo 2006).

A recreational resource that is publicly accessible, inviting, and responds to a wide range of users can provide opportunities for the public to understand the value of the Ventura River. Based on responses provided for this project's visioning process and language in the City's *2005 Ventura General Plan* the community of Ventura has placed a high value on the preservation of their natural resources, however pressures to urbanize are present. For the value of the Ventura River to be understood by the electorate and for its resources to be preserved, consciousness of the river must be elevated. This is an important role for the proposed Lower Ventura River Parkway.

[LEFT] FIGURE 5.38 *City and County SOAR-HPV Boundaries along with existing community designations illustrate those areas currently ensured a pre-development vote as well as those areas without this protection. Original illustration produced by Ventura County, Resource Management Agency, GIS Development and Mapping Services. Modifications after: Ventura County 2005.*

Access

After preservation of the river system in a natural and healthy state, access to it was the topic area most cited by meeting attendees and survey takers. The prevention of the public from legal physical and visual access to the river impacts the vast majority of areas that interface with the river. The only locations from which the public can physically access the river within the parkway project area, are at the north and south ends of the six mile stretch. This restricted condition raises significant concerns and provokes questions regarding equity of recreational open space distribution in the project area and the larger context in which it is placed.

ACCESSIBILITY OF RECREATIONAL OPEN SPACE

Regional Accessibility

Environmental justice and inequity are terms often associated with the assignment of locally undesirable land uses in politically and otherwise disadvantaged neighborhoods. However, there is growing recognition that access to healthful environments is a significant counterpart to the disproportionate distribution of risk-laden environments in the struggle for environmental equity. The Sustainable Site Initiative (SSI) identifies physiological function (including stress response and physical fitness), cognitive function, and social dynamics as three areas in which natural environments contribute to human well being (SSI 2007). Additionally, the Access to Parks and Park Facilities report in *The Green Visions Plan for the 21st Century* (GVP 2007) identifies equitable access to recreational open space and healthy outdoor environments as equally as important as the prevention of exposure to contaminated and unhealthful environments (Sister 2008).

As a joint venture between USC, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC), Santa Monica Mountains Conservancy, Coastal Conservancy and Baldwin Hills Conservancy, the GVP utilizes rigorous research methods and tools to protect and restore natural resources and provide equitable access to open space resources in southern California (Sister 2007b). The GVP (2007) study area does not include the Ventura River Watershed, rather it encompasses the adjacent Santa Clara Watershed and four watersheds to the east (Sister 2007b). None the less, research conducted by the GVP provides both regional context and tools that can be applied to the lower Ventura River parkway project area.

The GVP (2007) report identifies ten sub-regions, including areas identified as the east and west Ventura County sub-regions (GVP 2007a). This report found that, excluding National Forest land due to its remoteness, in west Ventura County less than one percent (.6) of the land is dedicated to recreational open space, including parks, golf courses, and sport fields. By comparison, 27 percent of land in east Ventura County is dedicated as recreational open space (GVP 2007a). Utilizing GIS data available through the GVP, figure 5.39 illustrates this distribution. City of Ventura and SCAG GIS data illustrate the distribution of comparable open space in the area of the Ventura River Watershed on the left of the figure.

In Access to Parks and Park Facilities, the GVP tested the theory that access to parks and open space resources are not equitably distributed among low income and minority groups when compared to other groups within the GVP region (Sister 2008). The GVP determined that equitable access to recreational open space is predicated on a combination of four criteria; pedestrian accessibility, park acres per capita, compatibility of facilities with user group preference, and the condition of recreational open spaces, including maintenance and safety levels (Sister 2008).

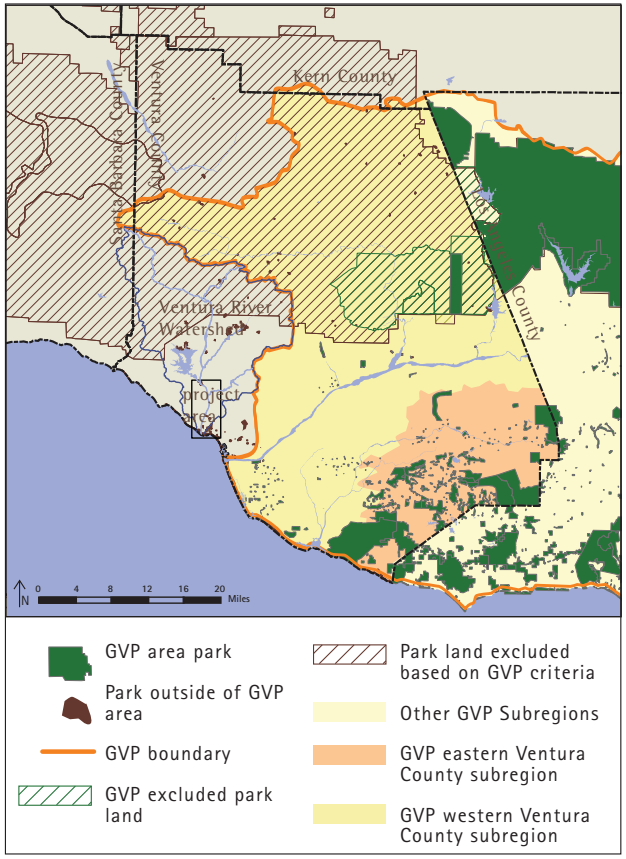


FIGURE 5.39 *Distribution of Open Space Resources. Regional scale. Data sources: GVP; SCAG; City of Ventura.*

After completing several preliminary analyses, including reviews of demographic information and route simulation at several distance thresholds, the number of park acres per capita for populations within one-quarter mile access across the four largest groups by race or ethnicity in the GVP region were identified. One race or ethnic grouping was then assigned to each park and distance threshold, based

on the areas dominant race or ethnic group. The GVP found that predominately white neighborhoods have access to greater park acreage when compared to Hispanic, African American and Asian American dominated neighborhoods. The GVP emphasizes that this disparity is particularity significant for children who tend to be a greater percentage of the population in areas with fewer park acres per capita (Sister 2008).

In addition to creating models comparing park acreage, distance thresholds, and demographics, the GVP conducted internet searches and sample field audits of recreational open space resources (Sister 2008). Both types of searches were used to identify the same criteria for available facilities, parks conditions and to assess safety levels. Criteria were then compared among racial and ethnic groups. Seven facility types; play equipment, basketball courts, baseball diamonds, soccer fields, walking and jogging paths, bench, and barbecue areas were identified. Results for the facilities category were mixed, with varied patterns that in some instances favored one group over the other. For example, whites had higher incidence of walking and jogging paths than other groups, but fewer incidence of active recreational facilities, such as soccer fields. The presence of litter, graffiti, freeway noise and overgrown vegetation were used as markers of facility condition. Here, predominately white areas had the lowest incidence. Three indicators were established and identified for park safety levels, including emergency phones, on site staff and security. No clear pattern was identified when analyzing park safety (Sister 2008).

City Scale and Project Area Accessibility

Figures 5.40 through 5.43 illustrate the distribution of recreational open space across the city scale, using most of the GVP's criteria for determining access patterns. Figure 5.40 identifies children ages five to 17 as the critical user group. Light colored census tracts have the lowest

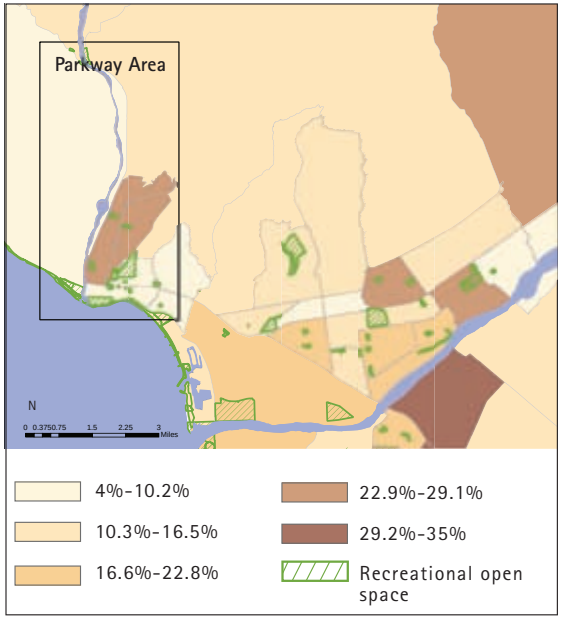


FIGURE 5.40 *Children ages five to 17 as a percentage of each census tract with lightest shade representing the lowest percentage. Data sources: USCB 2000; City of Ventura; SCAG.*

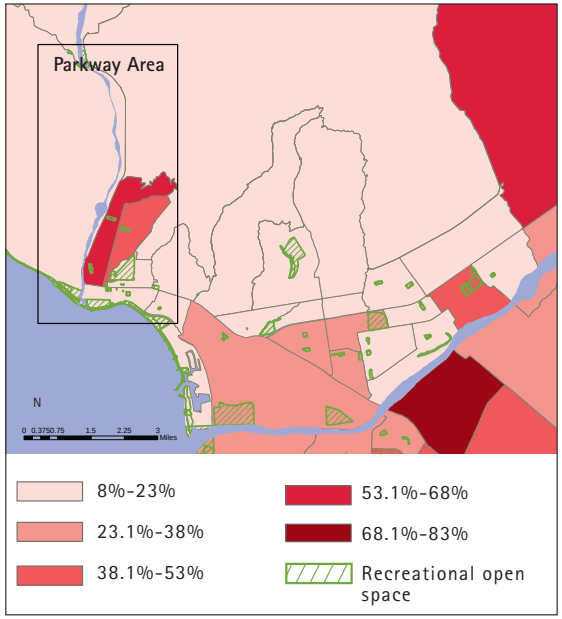


FIGURE 5.41 *Hispanic percentage of population with the lightest shade representing the lowest percent. Data sources: USCB 2000; City of Ventura; SCAG.*

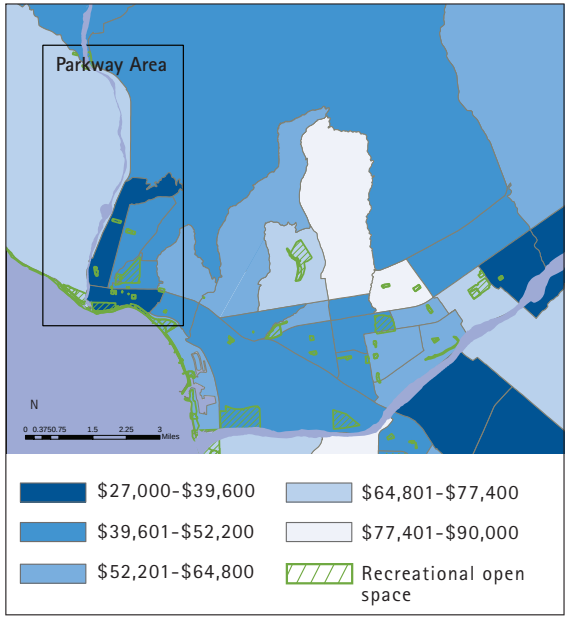


FIGURE 5.42 *Median household income with the lightest shade representing the highest income range. Data sources: USCB 2000; City of Ventura; SCAG.*

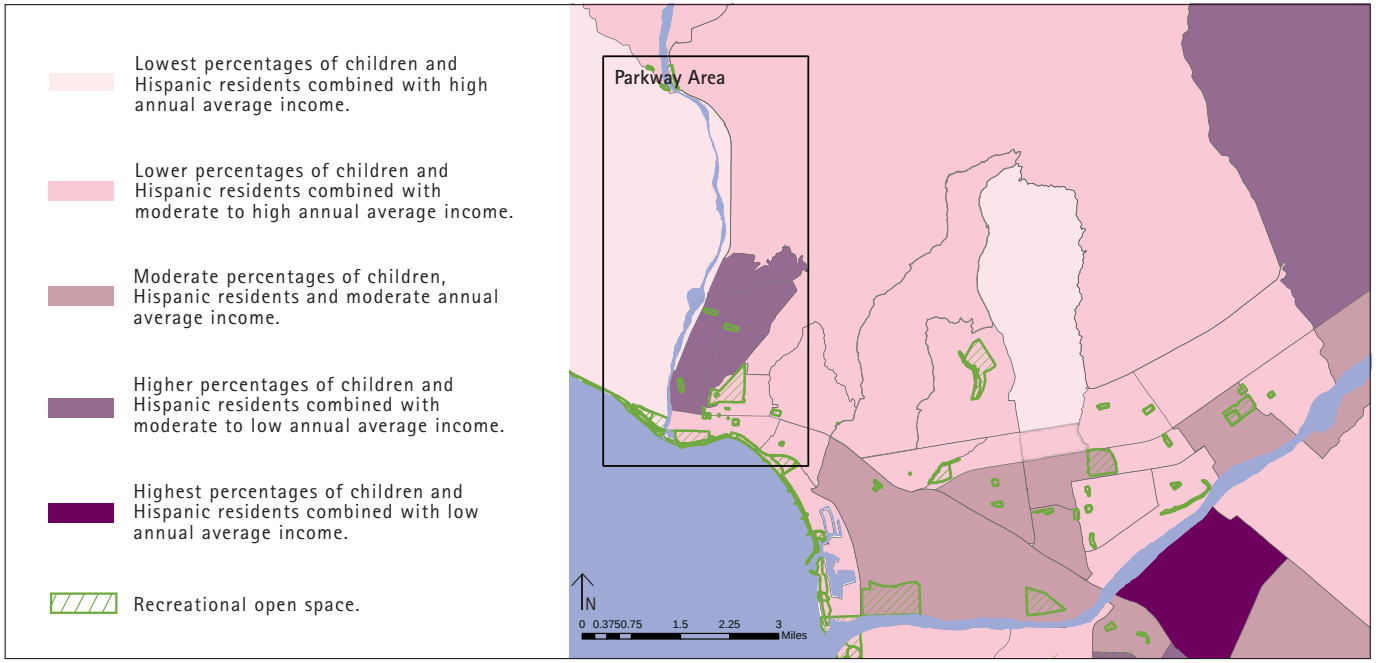


FIGURE 5.43 *Figures 5.40-5.42 are combined revealing fewer park acres in tracts with higher percentages of children and Hispanics with low median income. Data sources: USCB 2000; City of Ventura; SCAG.*

percentage of children, with increasing numbers as the shade darkens. Figure 5.41 also uses a color scale from light to dark, in this case to indicate percentage of Hispanic population for each tract. In figure 5.42 the darkest shade identifies tracts in the lowest median income range. Figure 5.43 combines these layers. Color density indicates tracts with the highest numbers of children, highest percentages of Hispanic residents, and lowest median incomes in the darkest shades.

A comparison of these demographic factors to the presence of recreational open spaces across the city scale indicates that tracts with low to moderate percentages of children and Hispanics and moderate to higher income have the greatest amount of park acreage. In the darkest tracts which represent low income and higher percentages of Hispanic residents and children the number of parks and their size dwindles considerably.

The pattern is the same in the parkway area. Areas with higher percentages of Hispanic residents and children and lower average income have fewer park acres locally available to them than those of moderate to higher means. This is most strongly indicated by comparing the size and frequency of parks and recreational open space available in the tracts representing the Westside Community to those located directly south. Note that within the parkway area, the single tract which lies west of the Ventura River is not significant for this analysis due to very low population.

Using benchmarks established by GVP, accessibility of recreational open spaces across the city scale was reviewed. Figure 5.44 illustrates the results for pedestrian accessibility. Here a quarter mile distance threshold was established around each recreational open space. Next six parks from across the city scale were randomly selected. Then street grid routes were identified from an intersection at the quarter mile threshold, to a park entrance. This sample indicates that the distances traveled to reach a park entrance by those living within the quarter mile of the park are consistently greater than one-quarter mile, with the largest parks having the longest distances between entrance points. Across the city scale pedestrian accessibility is available, but limited.

Finally, field audits were conducted at all parks and recreational open spaces at the city scale. Facilities, conditions, and safety features identified by GVP were identified. These audits reiterated the comparative lack of park acreage in areas that are both predominantly minority and low income. However, other distinctions were

also revealed. The most notable difference was that parks located within Hispanic dominated census tracts had greater incidence of litter and graffiti, compared to the almost complete absence of these indicators in parks in other tracts. In general there were fewer and smaller facilities, including barbecue amenities and soccer fields, in the parkway project area than those found elsewhere. The presence of freeway noise and a lack of safety features were found consistently throughout the city scale.

The preliminary finding regarding park access in the parkway project area for the census tracts representing the Westside Community indicates reduced ease of access for this predominately low-income and Hispanic area compared to access across the larger city scale. As a whole the parkway project area has a number of parks and recreational resources, however the distribution of these resources is weighted toward the north and south of the project area with the fewest total park acres servicing the project area's highest density of children.

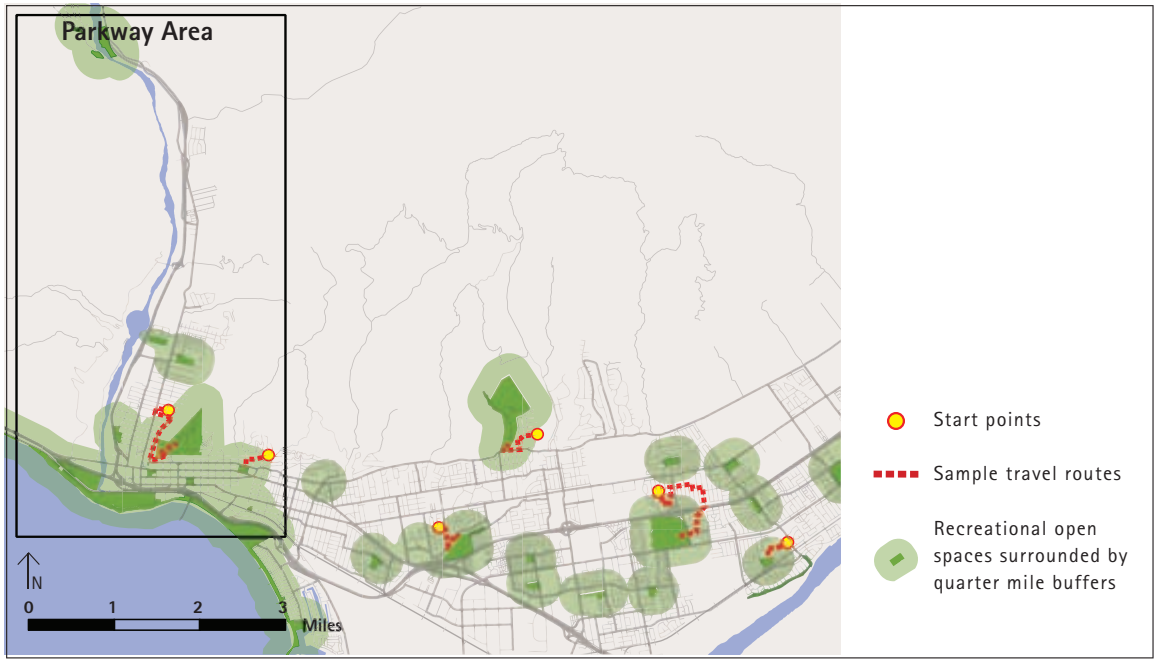


FIGURE 5.44 *Distance for pedestrian access to parks as sampled by manually identifying the shortest route from a sample residence to a park entrance following the street grid. These routes demonstrate that across the city scale within buffers of one-quarter mile, actual travel distances to recreational open space are frequently greater than one-quarter mile. Data sources: USCB 2000; City of Ventura; SCAG.*

Accessibility of the Ventura River

Set within the Westside Community's larger context of limited park access, the historical loss of the Ventura River as an accessible recreational resource and its continuing unfulfilled potential is a matter of both considerable concern and opportunity. The California State Constitution, Section 1., Article 10 Water, Sec. 4. reads:

> *No individual, partnership, or corporation, claiming or possessing the frontage or tidal lands of a harbor, bay, inlet, estuary, or other navigable water in this State, shall be permitted to exclude the right of way to such water whenever it is required for any public purpose, nor to destroy or obstruct the free navigation of such water; and the Legislature shall enact such laws as will give the most liberal construction to this provision, so that access to the navigable waters of this State shall be always attainable for the people thereof.*

(http://www.leginfo.ca.gov/.const/.article_10)

Despite this provision for public access to waters such as the Ventura River, physical and legal impediments prevent the public from accessing much of its lower reaches. Some of these are beyond human control and are not reasonably expected to be within the purview of Article 10. However, other impediments do raise cause for mitigation. Currently the cumulative effect of vehicles, Highway 33 infrastructure, and the Ventura River Levee create the greatest physical barriers to access the river at its urban edge. In some cases topography is another significant barrier for river access. At rural interfaces for instance, steep bluffs line much of the river's western side. Yet, it is the dearth of easements between the far north and south ends of the lower reach that significantly limits access in rural and urban settings. In addition to these impediments "no trespassing" signs and fences block passage to the river. Signs are posted at a variety of locations; some of which cite city or county ordinances and appear to have been posted by one of these governments, while others appear to have been posted by property owners. Cursory investigation into grounds for posting "no trespassing" signs indicate protection of public safety and private property rights. Figure 5.45 illustrates routes which 12 hypothetical resident living one-quarter of a mile east of the river would travel in order to gain visual or physical access to the river. As illustrated, the effect is an almost inaccessible and unseen river.

Removing the current barriers to access on the Ventura River will require the development of alternative solutions for protecting the interests currently served by limited access to the river, and the cultivation of positive relationships between individuals traditionally viewed as adversaries. Addressing public safety, limiting liability, and arrangements for the protection of property holders' security are likely to need resolution before additional access is allowed. For private property owners, solutions may entail public passage

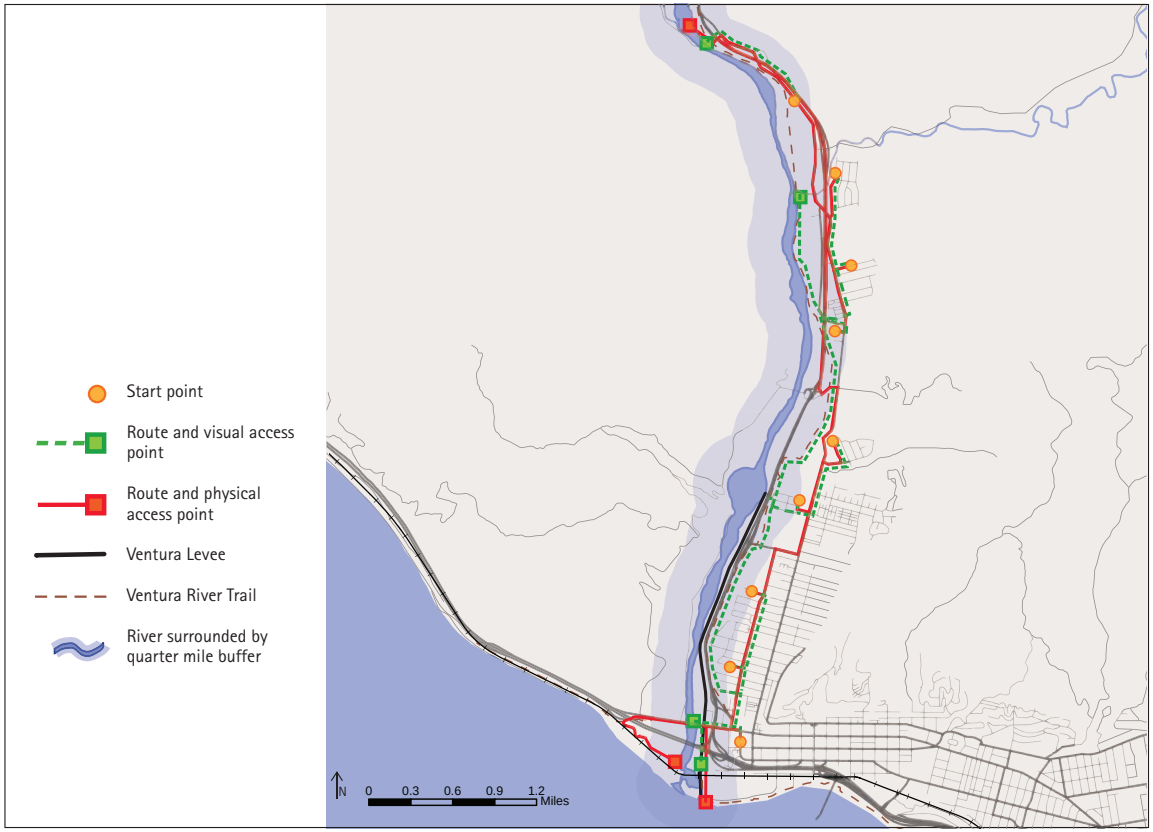


FIGURE 5.45 *The shortest available route for visual or physical access to the Ventura River is identified for twelve locations one quarter of a mile east of the river. Data source: City of Ventura.*

easements in which specific prohibitions and surveillance is required. The creation of larger conservation easements which perpetually preserve privately held open space as a condition of ownership may result in improved access. Shielding critical habitat from human interference is another important concern, requiring the development of specific programming and design elements. In the broader context, developing legal parameters to guide public access to the Ventura River may be the first steps for ensuring greater equity in the distribution of recreational open space.

FIGURE 5.46 *One of many posted "No Trespassing" signs along the Ventura River.*

ENVIRONMENTAL JUSTICE

Under Title VI of the Civil Rights Act of 1964, funding from the Federal Government to any agency or contractor can be discontinued if discrimination to minority populations has been found to occur in the application of programs (United States Department of Justice 2003). In 1990 the Congressional Black Caucus presented evidence that indicated unequal application of enforcement inspections by the United States Environmental Protection Agency for minority and low-income populations and, the Caucus asserted that minority and low-income populations bore a disproportionate share of risk laden environments. As a result Executive Order 12898; Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed by President Bill Clinton in1994. It directed all federal agencies to identify and address the effects of all programs on minority and low-income populations. With enforcement rooted in Title VI, Executive Order 12898 elevated environmental justice and the distribution of environmental risk burden to a national priority (EPA 2009).

Contamination

PARKWAY PROJECT AREA

After preservation and access, concern about contamination by toxic substances near the river was the most cited topic in the community meetings. The Old Refinery site was most frequently identified. However, there are a significant number of sites in the parkway project area which have either the perception, reality, or past history of contamination. In order to assess the scope of contamination in the project area multiple sources were reviewed. Those sources included *The Historical Overview: The Ventura Brownfield Project, A Look at the Environmental History of Ventura's Westside* (Brownfield Project), and the California Environmental Protection Agency's (Cal EPA) *Cortese List Data Resources.* Extensive searches of the databases EnviroStor, through the United States Environmental Protection Agency (EPA) and Cal EPA, and GeoTracker through the California Sate Water Resources Control Board (SWRCB) were conducted. Due to the complicated network of regulatory and clean-up programs there are both overlap and exclusions to sites identified by these sources and to sites which local resident stakeholders may perceive to be contaminated. Figure 5.47 illustrates: 1. brownfields identified by the city's Brownfield Project, 2. investigation, clean-up or monitoring sites identified by various regulatory agencies, and 3. sites which may potentially be perceived by the public as contaminated.

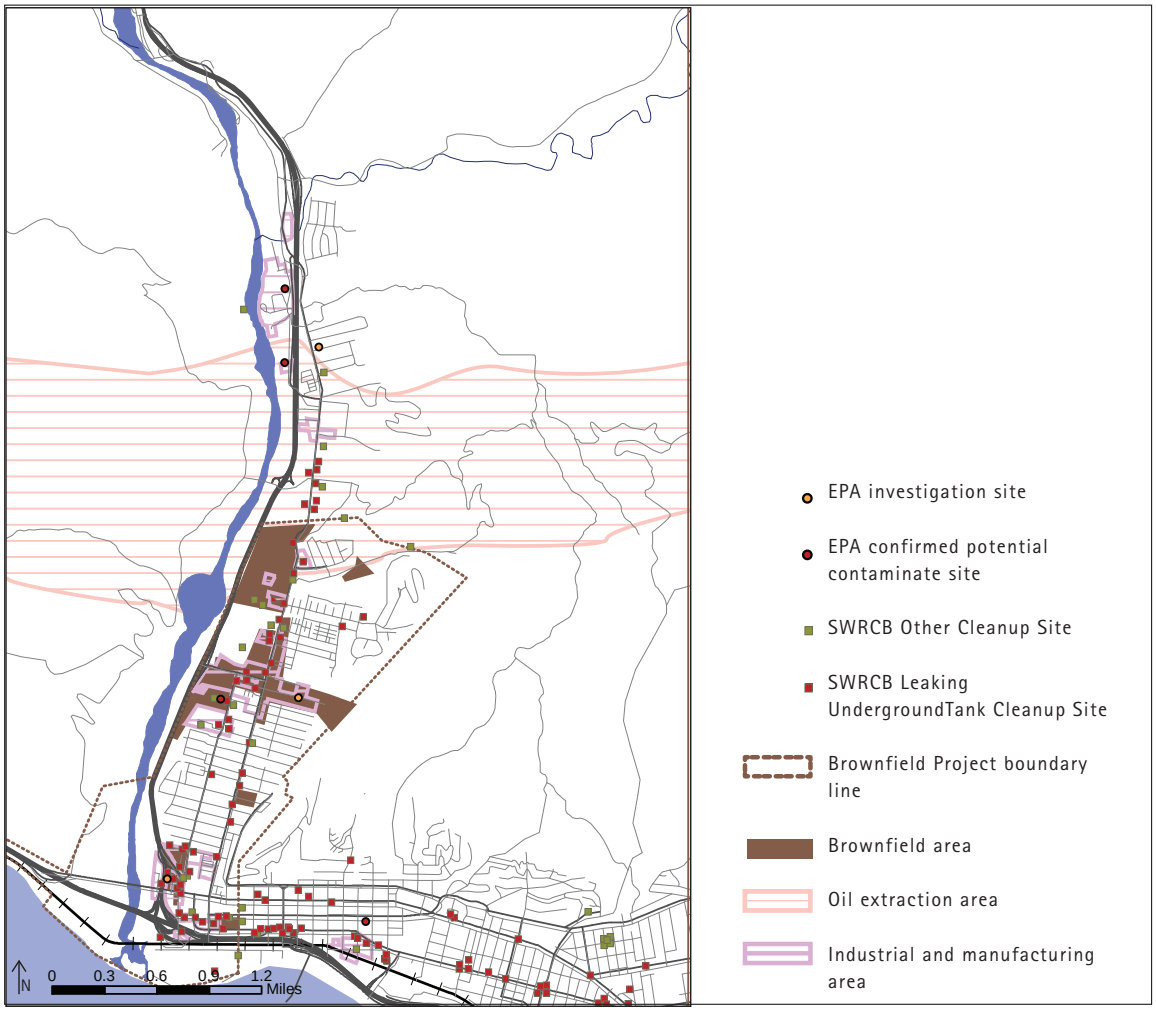


FIGURE 5.47 *The purpose of this map is to provide a visual reference for the extent of toxic substance contamination which may affect the project area. The extraction area identified by the California Department of Conservation and the industrial land use areas identified by SCAG are shown here as indicators of potential land areas that may contain sites perceived to be contaminated. Unless otherwise indicated, they are not currently identified by the Brownfield Project or any oversight agency as having contaminated sites and may or may not contain sites perceived as contaminated. Data source: City of Ventura. After: Westcoast Environmental and Engineering; GeoTracker; EnviroStor; California Department of Energy.*

Westside Brownfields

The Small Business Liability Relief and Brownfields Revitalization Act of 2002 defines a brownfield as any real property which is underutilized due to the perception or reality of contamination (EPA 2008a). In June, 1999 the EPA estimated that the City of Ventura had 30 brownfields spread over 1.68 square miles of the Westside (an area slightly larger than the census tracts corresponding to the Westside Community). This number is nearly twice the average number of brownfields in the City of Ventura (EPA 2008b). Through the EPA's Brownfields Demonstration Pilot Program (2001), the city published the Brownfield Project. By researching historical city directories and Sanborn Fire Insurance Maps, and conducting drive by site reconnaissance and data base searches, the Brownfield Project identified 11 areas where hazardous substances were historically handled. The 30 brownfield sites identified by the EPA are located within those areas.

The Brownfield Project's findings concluded that most brownfields in the project area are primarily the result of oil production and oil service industries (City of Ventura 2001). One aspect of this conclusion was found in Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Known as the petroleum exclusion, the EPA interpreted this section to mean that crude oil and its gasoline and benzene derivatives are excluded from the definition of hazardous substances (EPA 2007). For this reason, sites contaminated by crude oil and its derivatives did not qualify for Brownfield Project funding and were therefore not assessed (City Ventura 2001). The Brownfields Revitalization Act, Section 101(k) later amended this exclusion. Potential contaminates associated with local industries are identified in Figure 5.48.

The Brownfield Project further concluded that "...perception of contamination is the primary factor" resulting in the underutilization of the majority of the 30 sites identified as brownfields (City of Ventura 2001 37). One factor in this conclusion was that none of the Westside sites were considered high priority by regulatory agencies. The Brownfield Project also concluded that some of these sites may be significantly impacted by contamination. In accordance with existing legislation, it was recommended that the Westside Community Council encourage property owners to participate in voluntary clean-up. Finally, the study emphasized that none of the brownfield properties would be assessed without voluntary involvement of property owners (City of Ventura 2001 37).

Type of Industry and Typical Operations	Associated Type of Potential Contaminate
Oilfields and Oilfield Servies • extraction • welding • machine shops • vacuum truck services • equipment storage • waste disposal	toxic metals, petroleum solvents, chlorinated solvents, semivolatile hydrocarbons, polychlorinated biphenyls (PCBs)
Scrap Metal and Salvage Yards • metal recycling • equipment/vehicle recycling • equipment/vehicle salvage • vehicle/vehicle scrapping	toxic metals, petroleum solvents, chlorinated solvents, semivolatile hydrocarbons, PCBs
Chemical Facilities • chemical supply • oil refining • natural gas processing • natural gas compression • bulk fuel storage	toxic metals, petroleum solvents, chlorinated solvents, semivolatile hydrocarbons, caustics and acids, PCBs
Quarry Sites • rock quarries • mining • processing • mixing	toxic metals, petroleum solvents, chlorinated solvents, semivolatile hydrocarbons, explosive charges
Manufacturing and Light Manufacturing • metal fabrication • smithing	toxic metals, petroleum solvents, chlorinated solvents, semivolatile hydrocarbons, PCBs
Agriculture • pesticide use • disinfection • machinery maintenance • welding	neuro-toxic organophosphates, organochlorides, cresol-based compounds, formaldehyde, chlorine, petroleum solvents, semi volatile hydrocarbons

FIGURE 5.48 *Area industries, associated operations, and types of potential contaminates. Sources: Westcoast Environmental and Engineering; OSHA.*

North Avenue

In addition to sites excluded from review by the Brownfields Project other sites within the parkway project area may, for one reason or another, be excluded from brownfield funding, but are perceived by residents as abandoned and contaminated. One site not considered in the Brownfields Project but which is broadly perceived as a brownfield is the Old Refinery which was widely identified by community meeting attendees and survey respondents. The Old Refinery, or USA Petroleum, is located north of the Brownfield Project study area and was identified as both abandoned and contaminated. However, monitoring documents available through GeoTracker indicate that the property holder is known, holds a conditional use permit, and is participating in voluntary site clean-up and monitoring (Stratus Environmental 2008). Figure 5.47 shows remediation status of this and other sites identified by EnviroStor and GeoTracker.

In the parkway project area there are sites in the Voluntary Cleanup (the type of action which would apply to any of the brownfield sites identified by the Brownfield Project), State Response, Leaking Underground Tank, and other cleanup programs. Further information including potential contaminates of concern, potential effects, and in some cases investigative and monitoring documents are also available through EnviroStor and GeoTracker. This information enabled the compilation of potential contaminates in the parkway project area as seen in Figure 5.49. Cross referencing potential contaminates identified by data bases with Public Health Statements and ToxFaqs available through the Agency for Toxic Substance and Disease Registry's web site identified human and ecosystem health impacts.

All of the sites with real and perceived contamination concerns in the parkway project area pose implications for the proposed Ventura River Parkway. Many of the contamination and investigation sites are supervised under the jurisdiction of the SWRCB, pointing to concern that groundwater and/or surface water could potentially become contaminated by substances found on these properties. Groundwater and surface water contamination could potentially affect human and ecosystem health, raising issues of environmental inequity and justice. As shown by Census 2000 data, the parkway project area has a large population of minority and low income persons. Environmental inequity is described by the EPA as the distribution of environmental public health exposures and risks that disproportionately affect minority and low income populations (EPA 2009). Environmental justice ensures that people of all socioeconomic backgrounds live, work and play in healthy environments (EPA 2009). Limited access to recreational open space and a high number of contaminated sites indicates a challenge to create greater environmental equity exist within the parkway project area.

While brownfield sites in the parkway project area may or may not pose unhealthy environments through the presence of contamination, their impact on economic conditions, their proclivity to attract illicit activities, and their potential as alternatives to developing agricultural and other open lands have been established at the national level. In his introduction to *Recycling America's Land 2008; Brownfields Survey*, produced by the United States Conference of Mayors President Douglas A. Palmer writes:

> *The redevelopment of these sites often relieves cities and suburbs of the burden of having to build new infrastructure to meet the burgeoning demands of affordable housing, retail, and commercial or mixed-use location space. We know that the future economic vitality of our cities lies in our ability to reuse the land, which currently has roads and sewers already in existence.*

He further writes:

> *Brownfields are too costly to ignore, not only from the environmental standpoint of contamination, but also from the social aspect of decayed properties and the potential they hold.*

With appropriate corrective action, including bioremediation and sustainable planning and development, underutilized and contaminated sites in close proximity to the Ventura River could provide a variety of uses. A vibrant urban environment connected to enriching recreational open space in natural settings can begin to stitch together an equitable distribution of healthy environments.

FIGURE 5.49 *Asbestos warning posted near vandalized storage tank on the Old Refinery property.*

Contaminate of Potential Concern	Media of Potential Concern	Human Health Concern	Behavior in the Environment
benzene	• groundwater • soil • soil vapor	• fatal when inhaled at high levels • nervous system distress when inhaled at low levels • carcinogenic with long term exposure	• most active in air • can pass through soil into groundwater • does not accumulate in plants or animals
ethylbenzene	• groundwater • soil • soil vapor	• may be carcinogenic • damage to inner ear • nervous system distress • eye and throat irritation	• most common in air • moves easily from water and soil to air
toluene	• groundwater • soil • soil vapor	• may effect nervous system and kidneys • not likely to be carcinogenic	• passes through soil into groundwater • does not accumulate to high levels in animals
polycyclic aromatic hydro-carbons (PAHs)	• soil • soil vapor	• some are carcinogenic	• generally low water solubility • attach to solid particles • accumulate in plants and animals
polychlorinated biphenyls (PCBs)	• soil	• likely to be carcinogenic • nose and lung irritation • blood and liver changes • fatigue and depression	• easily cycles between air, water , and soil • accumulate in plants and animals
methyl tert-butyl ether (MTBE)	• groundwater	• nausea, nose and throat irritation • nervous system effects	• water soluable • easily passes through soil into ground-water • does not accumulate to high levels in plants and animals
lead	• soil	associated with • kidney failure, • learning disabilities • mental retardation • coma and death • other adverse health effects	• attaches strongly to soil • accumulates in plants and animals
chromium III and VI	• indoor air • soil	• carcinogenic when inhaled • respiratory distress • male reproductive harm	• shifts form easily in soil and water • does not accumulate to high levels in plants and animals.
dichlorodiphenyltrichloro-ethane (DDT)	• soil	• affects nervous system • premature birth • reproductive harm	• low water solubility • attaches strongly to soil • accumulates in plants and animals

FIGURE 5.50 *Potential contaminates in the Parkway Project area. Sources: EnviroStor; GeoTracker; ATSDR.*

DUMPING, FIRES, AND THE PERCEPTION OF SAFETY

FIGURE 5.51 *Burnt vegetation and denuded patches in the river bottom near Main Street.*

THE RIVER

Dumping, out-of-control campfires, and the perception of a lack of safety are issues that affect the Ventura River and proposed parkway. While this project team found no documented cases of dumping, the size of some refuse piles and the nature of their contents indicate that informal dumping sites have been established in the river. In addition to trash and personal possessions, sooty spots of burned vegetation and charred trees can be viewed along the river near Main Street Bridge. A conversation with a firefighter from Station 1, which is responsible for responding to river calls within city boundaries, indicated that individuals lose control of campfires approximately twice a month. He further stated that the burning of camping materials, such as bedding, emits chemicals, requiring firefighters to utilize extra protective gear. Fires are primarily attributed to the homeless population. However, there is a tradition of informal gatherings near the river mouths and in Seaside Wilderness Park, which according to community member recollections are attended by many types of people.

CRIME

The perception of crime and a lack of safety at the river was a concern raised by a limited number of community meeting attendees, local residents during casual conversations, and by state park employees at Emma Wood State Beach and Group Camp. Analyzing theft statistics and crimes against persons, including assault and battery, both county and city jurisdictions reveal a low number of reported incidents within the reporting districts nearest the Ventura River. Figure 5.51 illustrates the number of reported crimes involving theft or person to person perpetration from July of 2003 to March of 2008 for the City, and from 1999 to 2003 for the County.

Of crimes reported from a city reporting district adjacent to the river the most prevalent crimes were theft of motor vehicles and unlawful entry/burglary (Ventura Police Department 2008). Despite the fact that most districts reported less than one crime per week annually for a five year period (Ventura Police Department 2008), crime and the perception of safety is of significant concern for the functionality of public open space.

Crime Prevention through Environmental Design Guidelines (CPTED) promoted by the International CPTED Association (ICA) identifies six unsafe site elements which create an increased perpetration of crime. Currently, as noted through site visits, a lack of sightlines and the presence of hiding and entrapment spots, including trees and bushes, are two unsafe site elements that are ubiquitous in and near the Ventura River. CPTED identifies isolation, no immediate access to help, poor lighting and limited presence of security services as unsafe, all conditions which are also present at the river. One notable example of these conditions is River's Edge Trail at Emma Wood State Beach Group Camp, where park service employees warn individuals not to travel alone. While reported incidents of crime are low in and around the river, according to CPTED Guidelines current site conditions present crime opportunities. Circumstances therefore may warrant concern for personal safety.

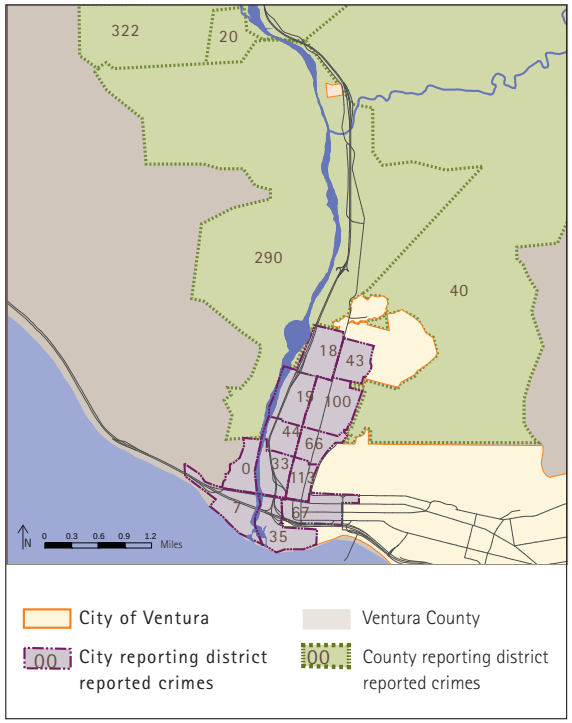


FIGURE 5.52 *Annual Average Reported Crimes. Data sources: City of Ventura; City of Ventura Police Department; Ventura County Sheriff Department.*

Homelessness and Affordable Housing

HOMELESSNESS

While homelessness was not identified as a concern by community meeting attendees, it could be a significant issue for the community and proposed Ventura River Parkway. As discussed in Chapter 3. Hydrology, the Ventura River is an EPA Section 303(d) listed impaired water body. Byproducts of unplanned habitation, including abandoned items contribute to these impairments. Past planning documents have acknowledged that unplanned human habitation in the river is an issue which adversely effects riparian biology (Hunt 1994; Wetlands Research Associates and Philip Williams Associates 1994). Additionally, conversations and interviews with experts and local residents, attendance of neighborhood council meetings and personal observations supports the conclusion that unplanned habitation in the river is of considerable importance regarding water quality, habitat disturbance, and its perceived relationship to personal safety.

The Nation and the Region

The general public sometimes sees homelessness as the result of personal choices, however researchers at the University of California have found that the strongest predictors for high rates of homelessness are in fact shortages in low income housing and in mental health care (Elliot 1991). These structural determinates of homelessness are matters of public policy, rather than personal choice, but they allude to some of the personal circumstances that contribute to the complex and persistent issue of homelessness in the United States (Elliot 1991).

The National Alliance to End Homelessness estimates that in 2007 there were between 65,000 and 160,000 homeless persons in California. That same year the Ventura County Homeless and Housing Coalition (VCHHC) counted 1,961 homeless persons, including 282 children (VCHHC 2007a). During the count, which functions as a one day snapshot, VCHHC also conducted a longer survey that reached 273 homeless adults or 16.3 percent of the 1,679 adults counted (VCHHC 2007b). Information as to the personal circumstances of the homelessness in Ventura County is shown in Figure 5.52. Figure 5.53 illustrates that of the total number of persons counted on the night prior to the official count, 531 slept in locations not intended for human habitation (VCHHC 2007a). If this number is typical, the City of Ventura, which is home to approximately one-seventh of the county's population, bears the burden of just over one-third of the county's homeless population.

Project Area

Seaside Wilderness Park and the Ventura River Delta are commonly referred to as the "Hobo Jungle"; a name given to this area as a reflection of the influx of people setting up encampments during the Great Depression. Encampments continue to persist today and in November 2004 approximately 150 persons were relocated away from the river (Alvarez 2004). This effort was organized in order to prevent exposure to winter flooding and came to be known as Camp Hope. It was an example of service providers, private citizens, and public officials coming together to provide crisis management for the homeless. (Ventura County Star 2004). Initially a short term shelter was provided at the National Guard Armory and included food, showers, clothing, health care resources, and legal advice. After a few days a tent city located at Emma Wood State Beach Group Camp was granted a permit for long term temporary reprieve. However, scattered personal items, materials used for bedding and rudimentary shelter are evidence of continuing unplanned habitation in and near the Ventura River, as shown in figures 5.55 through 5.57.

Circumstances of Homeless Persons in Ventura County	
Women	31.1%
Men	68%
Homeless one year or more	61.6%
40 years or older	57.5%
Married	11.7%
Working	24.6%
Veterans	14.3%
Mental health diagnosis	37%
Developmental or physical disability	28.2%
Heart trouble	10.6%
Victim of domestic violence	34.4%
Formerly in foster care	8.5%
Substance abuse problems	29.3%

FIGURE 5.53 *A sample of the individual circumstances of the homeless in Ventura County with percent of total population experiencing them. Source: VCHHC 2007b.*

AFFORDABLE HOUSING

Considering California's estimated 65,000 to 160,000 homeless persons and that "...housing constitutes the single largest expense for most Californians", (Housing California 2005, 2) it may not be surprising that California has a shortfall of 60,000 to 80,000 available affordable

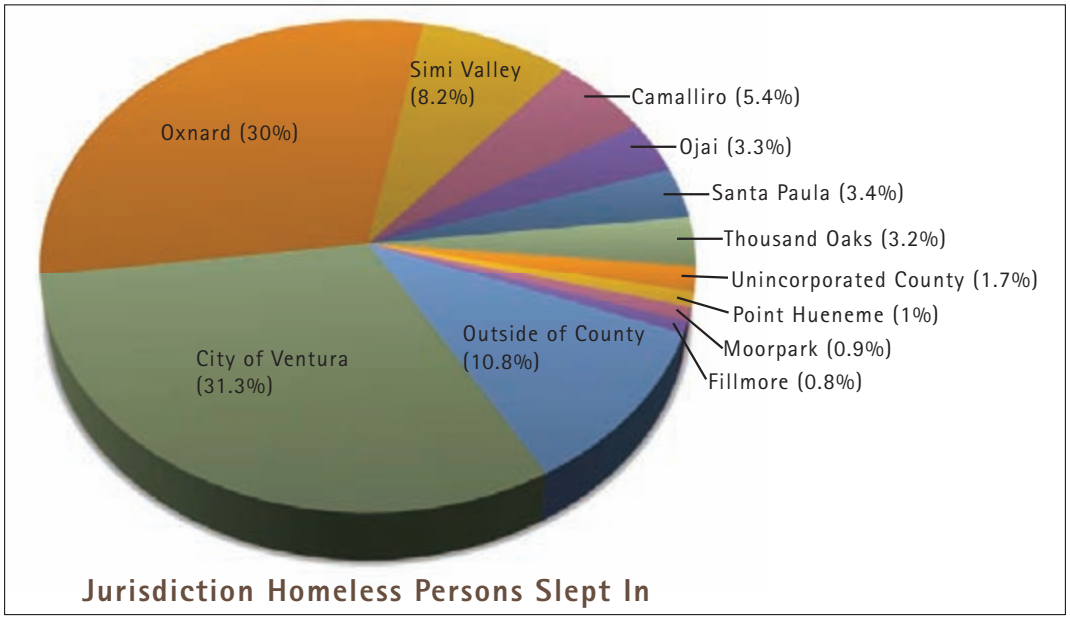


FIGURE 5.54 *During the Ventura County homeless count individuals were asked where they slept the night before. Jurisdictions were identified based on their responses. Data source: VCHHC 2007a.*

housing units every year (Housing California 2005). Housing California characterizes the situation through the following statement:

> *Lower priced housing tends to be located far from job centers, creating a severe jobs-housing imbalance that further inflates costs, stifles economic growth, swells commute times, and negatively impacts the environment and our quality of life. Those who bear the brunt of the housing cost burden—paying over a third of their income for housing—are families with children and people of color.* (Housing California 2005, 2).

In Ventura County 46 percent of homeowners pay 30 percent or more of their income on housing, for renters this figure is 53 percent (VCCA 2007). VHHHC estimates that on average between 10 and 20 percent of the county's population is at risk of losing their homes (VHHHC 2007c). Additionally, in 2006 Ventura County residents needed an annual income of $170,320 to buy a home, but the median income was only $79,500 (Housing California 2009).

In the City of Ventura Census 2000 found that during 1999 the shortage in affordable housing exerted pressure on housing markets causing 40.6 percent of renters to pay 30 percent or more of their household income on gross rent (USCB 2000). Census tracts 22 and 23, representing the parkway project area and the Westside, had similar patterns. In tract 22, closest to the river, 49.4 percent of renters spent 30 percent or more of their household income on gross rent and of those 44.6 percent spent 35 percent or more. In tract 23, 49.9 percent of households spent 30 percent or more of their income on gross rent, but of those only 37.3 percent spent more than 35 percent of their income on housing (USCB 2000). In addition to increasing housing costs generally, the national shortage of affordable housing is consistently shown to lead to overcrowding in low income households (Housing California 2005). With a household member average of four (double the city's average), Census 2000 indicates that overcrowding may be an issue in the Westside (USCB 2000).

From the national to local scales a range of government

FIGURE 5.55 *Encampment in a stand of Arrundo donax.*

FIGURE 5.56 *"Home Sweet Home." An above ground storage tank.*

FIGURE 5.57 *Abandoned items in the Ventura River.*

Name of Service Provider	Service Provided
Catholic Charities 1	• emergency shelter vouchers • temporary emergency material aid • counseling • rental assistance • food pantries
Family Services 155 S. Oak St. 2	• meal services • food pantry • referral services
Housing Authority of the City of San Buenaventura 3	• administers HUD Section 8 rental assistance • administers public housing
Jewish Family Service 4	• homeless services • non-housing related services
Khepera House Inc.125 W. Harrison Ave Khepera Recovery House 5	• residential drug and alcohol recovery for men • transitional housing for graduates
Miracle House Inc. 1997 E. Main St. 6	• residential drugs and alcohol recovery for women
Our Place Shelter 7	• men and women singles • overnight and hygiene related services • case management
Project Understanding 8	• housing assistance • eviction related legal services • non-housing related services
Senior Home Sharing Program 9	• matches seniors and others in need of shared housing
Readjustment Counseling Service-vet Center 10	• counseling services for veterans
Teen Challenge 11	• family services
Turning Point Foundation 12	• emergency shelter for singles • drop-in center • services for mentally ill • non-housing related services
Salvation Army Transitional Living Center Ventura 13	• transitional shelter for families with children and single women
Ventura County Behavioral Health 14	• emergency shelter for mentally disabled

[ABOVE AND RIGHT] FIGURE 5.58 *There are a number of social service providers providing aid to impoverished and homeless persons in the parkway project area. In addition to this list there may be services whose locations are confidential for the protection of individuals receiving services, as in battered women's shelters. Data sources: Ventura County General Plan 2005; VCHHC 2007. After: Google Maps 2008.*

actions, service providers, and community outreach programs have been developed to assist low-income and homeless persons. The need and importance of such service providers is self evident. However as with the example of Camp Hope, much of the net effect has been a fiscally and socially costly system which only manages poverty and homelessness, doing little to truly stem the dual tide of this problem (VHHHC 2007c). Figure 5.58 marks the location of providers of services for low-income and homeless persons in the parkway project area and identifies the type of services provided. In its omissions this figure points to the structural determinates of homelessness identified by Elliot (1991); shortages in low-income housing and mental health services. The most notable omission is the lack of a facility for medically supervised detoxification for low-income and uninsured persons (Wilson 2008). Permanent low-income and inclusive housing services were also not readily identified when compiling figure 5.58. Additionally, the somewhat dispersed location of services leads to the appearance that coordination between service providers is not a strong component of these programs. Uncoordinated approaches are typical in the United States despite evidence that coordinated service provision ensures ease of access to needed programs and resources, resulting in better service outcomes (VHHHC 2007c).

ENDING HOMELESSNESS

In 2001 former President George W. Bush challenged the nation's 100 largest cities to end homelessness (VCHHC 2007c). As of 2007 approximately 300 municipalities had developed plans to this end. After observing success in other municipalities and conducting extensive analysis of local dynamics, in 2007 Ventura County, the City of Ventura, other cities within the county, and public and private agencies released the 10-Year Strategy to End Homelessness in Ventura County (the Strategy), (VCHHC 2007c). Implementation of this plan was scheduled to begin in 2008.

The Role of The Lower Ventura River Parkway

Finding the appropriate manner to mitigate impacts to the Ventura River from unplanned habitation necessitates an understanding of some of the recommendations found in the 10 Year Strategy. It identifies three homeless sub-populations. Those populations are the chronically homeless (homeless for a year or more), episodically homeless (homeless for up to a year), and those at risk of homelessness. The Strategy then makes twenty-two county wide planning and programmatic recommendations targeted at meeting the needs of these populations (VCHHC 2007c). Four of these recommendations have particular significance for the proposed parkway.

- Assertive community treatment that would entail bringing treatment and service options to homeless persons wherever they are located. As long as homeless people make encampments in the river there is a likelihood that this type of service would occur within the proposed parkway premises.
- Fundraising events to benefit programs related to homelessness.
- The development of community education programs regarding the scope and nature of homelessness could conceivably take place on parkway premises or be part of parkway programming.
- The Strategy recommends that non-profit organizations involved in ending homelessness in Ventura County seek out public funding, and provides a list of funding sources including general descriptions of activities they support. Many of these funding sources provide grants for programs that include physical and mental health care services (VCHHC 2007c). With a growing body of evidence that recreational open spaces provide physical and mental health benefits (Gies 2006; Morris 2003) the potential for the parkway to function in partnership with direct service providers is clearly available.

The Strategy also makes recommendations that have possible relevance to the proposed parkway, for the establishment of additional buildings for shelter, both existing and new construction. These recommendations would result in the creation of; 300 units of permanent affordable housing, 3156 supportive housing units or beds for chronically homeless and chronically homeless and addicted men and women, 150 shelter beds, 90 transitional housing units for families and individuals, and the creation of a 20 bed medically monitored detoxification center (VCHHC 2007c). This vision plan has not analyzed appropriate siting for the future location of any of these facilities; however should planning activities determine that some percentage of them be new construction in the parkway project area it may appear at first that their development is at odds with objectives for preservation of open space in and near the Ventura River. However, in relation to the other community concerns identified for the river and project area, especially those pertaining to potentially contaminated sites and access to recreational open space, the provision of affordable housing is not in opposition to open space preservation. Rather, meeting housing needs while ensuring equitable access to recreational open space and natural environments is one aspect of ensuring that all people have healthy environments in which to live, work and play.

Ending homelessness, as defined by the Strategy, is a partnership between individuals and the community and reflects an ideological departure from past public policy. As a location which is currently impacted by the effects of homelessness and as a proposal which seeks to enrich the community, individuals representing the Ventura River and proposed parkway are one group of players in that partnership. Furthermore, for the Ventura River Parkway to benefit from the elimination of the adverse effects of unplanned habitation, parkway planners and advocates need to confront homelessness and not leave it solely for other to address. Planners and advocates must lead the quest to ensure that no individual or family ever needs to turn to the river bottom for residency. As with addressing access to recreational open space and contamination, striving to ensure that all people have access to healthy living environments is a matter of environmental equity.

Conclusion

The proposed Lower Ventura River Parkway has the potential to be a significant cultural resource; one from which people across the region will benefit. Its relevance as a resource that can augment quality of life touches not only on benefits commonly associated with recreational open space, such as environmental quality and physical fitness, but also on issues which are not always considered from within the purview of open space planning.

The Ventura River's unique position as a relatively intact natural river system, which demarcates and separates a highly urbanized region from a less developed one, presents multiple opportunities from which society can benefit by preserving and protecting this natural resource.

Development of a publicly accessible parkway along the lower Ventura River has the potential to reconnect the people and culture of Ventura to the Ventura River through brownfield remediation, urban infill, economic development, educational opportunities and therapeutic and recovery assistance.

CHAPTER 6: DESIGN FORMULATION

Overview

This chapter discusses the ways in which the authors have analyzed the data related in Chapters 1 through 5, in order to arrive at recommendations for a Parkway Vision Plan.

The chapter begins with a brief discussion of some of the principles and precedents that have had an impact on the formulation of this Vision Plan. Principles and precedents guide all phases of the design process, initially suggesting the most significant areas for fact gathering, then assisting in the formulation of specific issues and objectives, and pointing the way to appropriate design responses.

> The project goal for this Vision Plan is to reconnect people with the Lower Ventura River by providing opportunities for recreation, education and stewardship while protecting and enhancing hydrological and wildlife resources.

[FACING PAGE] FIGURE 6.1 *The Lower Ventura River looking south from Foster Park.*

The overall goal of this Vision Plan may be seen as the intersection of concerns for three subject areas – hydrology, ecosystems, and cultural resources (figure 6.2). Geomorphology, soils, and climate, discussed in Chapter 2, form the basis for existing resources in those subject areas – the resources themselves and the processes that have changed and continue to change them are discussed in Chapters 3 through 5.

In the Issues and Objectives section, these resources and processes are considered in light of the project goal. Issues may be seen as challenges to the attainment of that goal. These issues arise principally from the ways in which human activities have impacted natural resources and processes, but they also arise from human needs. The issues themselves are considered once again in light of the project goal, and for each issue a specific objective in furtherance of the project goal is determined.

The Opportunities and Constraints section applies several forms of suitability analysis, pointing out the location of

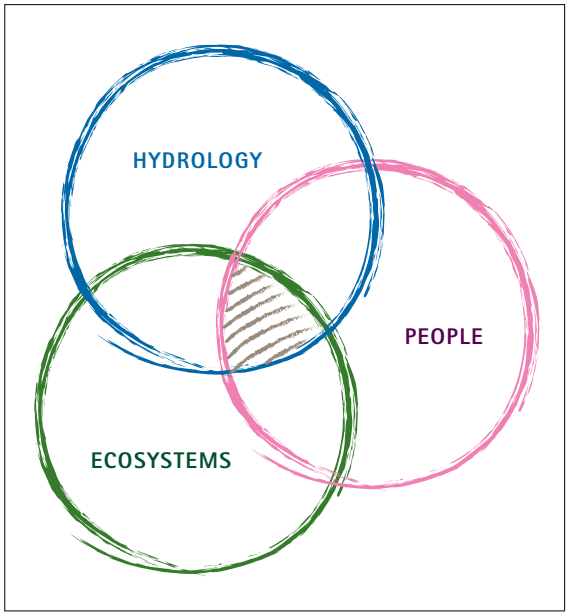


FIGURE 6.2. *The overall goal for this Vision Plan may be found at the intersection of three concerns.*

existing conditions in the proposed parkway area that will be significant to the achievement of specific objectives for creating the parkway. The location of these opportunities and constraints leads to the placement of the elements that appear in Chapter 7, Parkway Plan.

Site Selection looks for clusters of the most significant opportunities and constraints. These clusters suggest the best sites within the proposed parkway area for a more detailed exploration of design concepts for meeting objectives. These sites are discussed in Chapters 8 through 11.

Finally, the processes mentioned above culminate in charrettes, an intuitive group process that leads to specific design concepts. The results are a broad set of elements for the six mile proposed parkway corridor, and a more detailed set of design concepts for three smaller sites (figure 6.3).

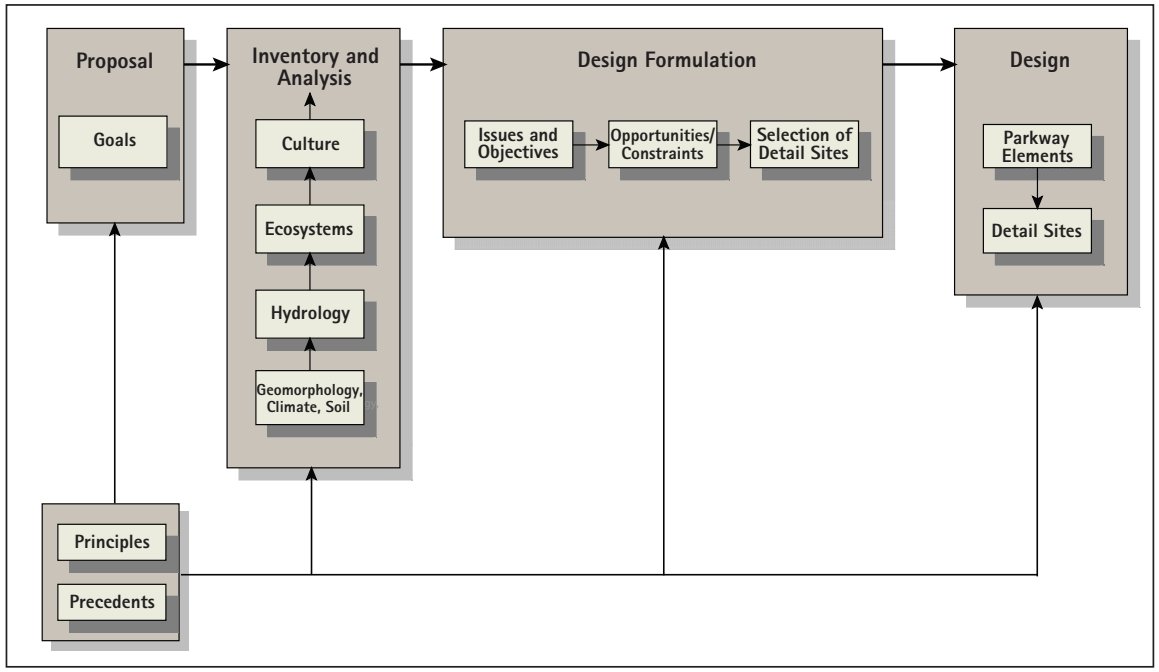


FIGURE 6.3 *Design formulation. The design formulation process is based on a project goal and an inventory and analysis of existing conditions. These elements lead to the identification of issues and objectives, opportunities and constraints for the parkway, and the selection of smaller sites for more detailed design. All of these stages are informed by principles and precedents.*

Principles

Thinkers and writers in the fields of landscape architecture, urban planning, ecology, and low-impact development have provided insights that form both an ethical framework and a practical road map for the formulation of this Vision Plan.

The Ahwanee Principles (2005)

The Local Government Commission (LGC) is a nonprofit organization of local elected officials, city and county staff, planners, architects, and community leaders who provide inspiration and technical assistance to local government leaders. Much of the LGC's work centers on The Ahwanee Principles, originally drafted at a conference in Yosemite Valley, California, in 1991 and later expanded. The Principles for Resource-Efficient and Livable Communities (LGC 1991) Principles for Economic Development (1997) and Water Principles (2005) were among the first concise guidelines for smart growth and sustainability, widely adopted and cited throughout the United States.

The Ahwanee Principles encourage the formation of communities that are compact and integrated with housing, stores, work places, schools, parks, and civic facilities within walkable distance (LGC 1991). Those communities should have well-defined edges formed by greenbelts such as agriculture or wildlife corridors that are permanently protected from development (LGC 1991). Wetlands, floodplains, recharge zones, riparian areas, open space, and native habitats should be identified, restored, and preserved (2005), and planners should preserve natural terrain, drainage, and vegetation wherever possible (1991). Planning at the regional level should include a continuous system of greenbelts and wildlife corridors (1991). This Vision Plan is designed to fulfill these goals for the Lower Ventura River and the City of Ventura.

Sustainable Sites Initiative (2008)

The Sustainable Sites Initiative (SSI) is a project of the American Society of Landscape Architects and the Lady Bird Johnson Wildflower Center with major funding from the United States Botanical Garden. This initiative has benefited from input from more than thirty experts from a wide range of stakeholder groups, working to enunciate principles for sustainable landscape design and to create measurable benchmarks and ratings systems for sustainability in outdoor sites. One of the objectives of the SSI is to incorporate landscape design more extensively into the existing, architecture-oriented LEED program of the United States Green Building Council (USGBC). Under the LEED program, developers receive recognition for "green" building after voluntarily meeting sustainability benchmarks.

The SSI draft guidelines and benchmarks identify 12 ecosystem services that are provided by landscape sites, services that include not only wildlife habitat and biodiversity but also the health and well-being of humans. The draft advocates over 50 specific practices for site selection, design, construction, and maintenance that enhance those ecosystem functions. For example, prerequisites for site selection decisions are the preservation of biodiverse habitat as well as important farmland soils, the safeguarding of the hydrological function of floodplains, and an emphasis on brownfields or greyfields for redevelopment (ASLA et al. 2008). Practices relating to hydrology include the daylighting of piped streams, restoration of stream banks and channels to healthy condition, avoidance of culverting even for small crossings, and the shading of water features to avoid overheating water (ASLA et al. 2007).

Practices recommended by SSI for the enhancement of human health and well-being include outdoor recreation opportunities, connection of outdoor sites to surrounding amenities and services, features for accessibility, safety, and wayfinding, the design of storm water management features to be a "landscape amenity," and the protection of cultural and historical features (ASLA et al 2008). This Vision Plan incorporates these practices for the Lower Ventura River, the City of Ventura, and Ventura County.

Saving Nature's Legacy: Protecting And Restoring Biodiversity (1994)

This leading text on preservation and management of biodiversity resources by Reed Noss and Allen Y. Cooperrider has as its guiding principle: protect biodiversity and let natural process operate while permitting compatible human use in suitable areas. This Vision Plan strives to accomplish this balance.

Restoring Streams in Cities: A Guide for Planners, Policymakers and Citizens (1998)

This comprehensive guide by Ann Riley is an introduction to river science and stream restoration with an extensive discussion of United States floodplain policy.

One of Riley's most important concepts is that even in urbanized environments where streams have little room for natural function, projects can be designed in a way that maximizes the environmental values of the resource. (Riley 1998). Recognizing that the floodplain often cannot be entirely restored in urban areas, the emphasis is on restoring "dynamic equilibrium" (a changing, self-sustaining natural regime as opposed to a static, engineered channel regime) to the bankfull channel and then taking appropriate measures to protect the floodplain from flood damage (Riley 1998).

Riley also advocates the regulation of land use to save existing natural streams, the employment of environmentally-sensitive stream channel maintenance practices, and the training of citizen stream restorationists who acquire expertise and then assist, and sometimes prod, governmental organizations into action to save natural streams from channelization. This Vision Plan develops a framework for action which will encourage public participation in preserving the wild character of the Lower Ventura River and in restoring those hydrological functions that have been impaired.

The Green Visions Plan for the 21st Century (Ongoing)

Since 2003, a partnership between local land conservancies and the University of Southern California has worked to promote habitat preservation, watershed function and people's access to open space. The result is a comprehensive set of publications and planning tools, often updated, that address the historical ecology and hydrologic assets of Southern California, the distribution of target species, and peoples' access to open space. This clearinghouse not only guides southern California decision makers but also informs the methodologies of those who would perform similar surveys in other regions.

The Green Visions Plan has been especially influential in documenting inequities that exist in the access of different Los Angeles County communities to recreation and open space. This Vision Plan emphasizes the potential for the proposed river parkway to improve access to open space for economically challenged neighborhoods in Ventura.

Design for Human Ecosystems (1985)

John Tillman Lyle's book was an early comprehensive approach to the then-new field of ecologically-sensitive landscape design. Inspired by Ian McHarg's pioneering work with suitability analysis, Lyle laid out a comprehensive philosophy, a practical sequence, and many detailed tools for ecosystemic design.

One central idea in Lyle's work is that every planning decision at any scale is impacted by, and has impacts on, what happens at a range of other scales from the global to the local. This leads to a necessity for understanding the relationship between every site and the larger world.

Another core value expressed in Lyle's book is that humans are part of nature and that their presence on the land can be *regenerative* – actively restoring and enhancing sustainability – rather than merely conservationist. Ecosystemic design takes into account the many flows of materials and energy into a design site, the ways in which those elements are transformed through natural and anthropogenic processes on the site, and the energy and material by-products that exit the site. By approaching an understanding of those flows, designers can envision human activities such as industrial production that actually complement and reinforce natural processes.

This Vision Plan creates a Ventura River Parkway Plan at multiple scales which seeks to be regenerative ecologically, socially, and culturally.

Precedents

Following are brief descriptions of several urban stream restoration or river parkway projects that have provided valuable perspectives for envisioning a parkway on the Lower Ventura River. Many precedents were consulted; the few described below have particular relevance because they involve an issue or issues that are critical to this Vision Plan.

Precedents such as these are valuable for both the positive and negative lessons that they teach. Any comparison with a project in another locale will address both similarities and marked differences compared to the context for this Vision Plan.

FIGURE 6.4 *The channelized Guadalupe River immediately upstream from its entry into a flood diversion structure and a new, unchannelized stream.*

Guadalupe River Park, San Jose, California (ongoing)

The Guadalupe River flows through the heart of downtown San Jose, with skyscrapers inhabiting the floodplain on one bank and a large urban park and sports arena on the other bank. Prior to this parkway project, the river had been completely channelized and landscape planners who desired to restore a more natural stream in this corridor had to accommodate a high risk of flood damage to the urban core of the city. The city reestablished a bankfull channel for an unchannelized stream with adjacent developed urban parks, and dealt with flood risk by creating an elaborately engineered underground bypass channel to carry occasional flood water away from the urban stream and the city itself.

Landscape planners created a river center at the confluence between the Guadalupe River and a smaller creek near the center of downtown. There, the concrete-channelized river enters an attractively landscaped park with interpretive materials that educate visitors about the dechannelization of the river, the flood bypass channel, and the importance of steelhead trout habitat. The park is centered on a basin where the concrete river dramatically transitions into a more intimate stream with riparian vegetation and walkways on its banks (figure 6.4). During flood events, high waters flowing into the basin are diverted over a concrete barrier into the underground bypass culvert (figure 6.5), while a smaller amount of water continues to enter the "natural" stream at the end of the basin.

Notable features of this project are the awe-inspiring way in which it directs visitors' attention to the process of "naturalizing" the river, and the sensitive way in which river forms are emulated in the design of a plaza that "points" to the confluence and walkways and the landscaped areas that emulate abandoned floodplain terraces. In addition, the parkway is notable for the fact that it makes the river the centerpiece of a network of urban parks and recreation areas that will continue to grow for decades: the "Great Park" of the city (San Jose Redevelopment Agency 2002). However, this project has been criticized for a highly

FIGURE 6.5 *Flood waters flow over a concrete barrier into a subterranean culvert. The "naturalized" stream, downstream from this structure, can be seen exiting on the left.*

engineered flood-risk solution that treats floodwaters as a problem to be hidden underground, with the end result being a stream that is incapable of overflowing its bankfull channel and therefore, not a natural stream. This undoubtedly resulted in part from the absence of available floodplain in this urban core, but observers have commented that by allowing the park network to double as an active floodplain, floodwaters could have been accommodated without shunting them underground (Ryan 2005).

The San Jose project is similar to this Vision Plan in that it attempts to balance the goal of bringing city dwellers into closer contact with a more natural river with the necessity of protecting an urban area that is already heavily developed on the floodplain. However, it is dissimilar in that, prior to the parkway project, the Guadalupe River was completely channelized in this area and highly constricted by urban development on both of its banks, with virtually no unobstructed floodplain left. The Lower Ventura River is in a much more natural state and has a natural floodway, which may suggest a markedly different design concept for this Vision Plan.

Nine Mile Run, Pittsburgh, Pennsylvania (July 2006)

More notable for its differences with the context of this Vision Plan than for its similarities, this effort to rescue what was once one of the most degraded rivers in the United States is nevertheless valuable for the lesson that it teaches, which is: Even where the function of a watershed has been severely modified by development, techniques that have their source in natural river function can work best.

FIGURE 6.6 *Nine Mile Run. Photo: Trust for Public Land.*

The Nine Mile Run, actually seven-and-one-half miles long, emanates from headwaters that have been entirely replaced by storm drain pipes buried under the eastern suburbs of Pittsburgh. The river is fed entirely by polluted storm water runoff, devoid of the natural sediment that would feed a natural river and reduce erosion. With its natural groundwater supply cut off by impermeable surfaces, the river ran almost dry in the summer. Storm water runoff from the same impermeable surfaces caused the river to flash flood in winter storms. The sediment-free water cut away at the river's bed, gradually digging a deeper and narrower channel so that flood waters, instead of overtopping the bankfull channel and dispersing on the adjacent floodplain, were growing increasingly rapid and violent within the channel itself, exposing sewer pipes that had originally been placed underground. The lower reaches of the river, above its confluence with the Monongahela River, flow through a narrow gap between two vast and biologically inert slag piles left over from a half-century of steel production (Harnik 2007).

When the city planned a residential development on the lower river, initial proposals called for putting the entire lower river into a pipe and burying it under the regraded slag, allowing a smaller, non-storm water flow to remain on the surface as an artificial stream (Harnik 2007). After neighbors and environmentalists protested that they wanted a "living stream" (Harnik 2007), a coalition of citizens, city officials and ecosystem restoration experts put together a new plan. They scaled back the residential development, reinstated a functional watershed for the river by setting aside 115 acres of parkland enclosing the lower river from

riverbank to ridge top, and began reconstructing a bankfull channel and adjacent floodplain system virtually from scratch, based upon emulation of natural river morphology principles. The aims were to widen the river channel and raise its elevation to approach the adjacent floodplain so that floodwater would be slowed and dispersed, and recreate a riffle-pool system that would nurture wildlife (Harnik 2007). Landscape planners hope that the result will be a reconstructed river that supports wildlife, enhances the new housing development, and safely transports flood water without pipes or tunnels.

The Nine-Mile Run project is mostly dissimilar from the context of this Vision Plan in that it concerns a river that was so seriously degraded that it had to be almost entirely rebuilt. However, it is similar in that it poses, within an urban context, the issue of whether the deleterious effects of *replumbing* on river ecosystems should be mitigated through more and more plumbing, or through engineered systems that emulate natural processes and attempt to jump start an ecosystem that will eventually sustain itself. Landscape planners for the Nine Mile Run, the largest river restoration yet attempted by the U.S. Army Corps of Engineers, have chosen the latter course. Critics have opined that the landscape supporting the Nine Mile Run may be too degraded to regain biological vitality and that "the jury is out" on the project (Harnik 2007), but the project will continue to provide valuable lessons for years to come.

Santa Clara River Parkway Project, Los Angeles and Ventura Counties, California (ongoing)

The Santa Clara River Parkway is notable for its geographical proximity, and the similarity of its hydrological

FIGURE 6.7 *The Lower Santa Clara River. Photo: California Coastal Conservancy; Trust for Public Land.*

and ecological resources to those of the Lower Ventura River.

This parkway project, initiated by the California Coastal Conservancy in partnership with The Nature Conservancy, is also notable for its scope. The Santa Clara River has its mouth just five miles from the Ventura River mouth, but it flows for 116 miles and drains a watershed nearly seven times larger than the Ventura River (California Coastal Conservancy 2006).

Advocates for the project have acquired over 10,000 acres along 25 miles of the lower river and floodplain for restoration of hydrologic and habitat resources, enhanced flood protection and public access and education (California Coastal Conservancy 2006).

Apart from its size and scope, the Santa Clara River project is similar to the context of this Vision Plan in most respects. Like the Ventura River, the Santa Clara is an example of an arid southwestern river with low surface flows in the summer, winter flash flooding, a rich assortment of ecosystems, and many impacts from hydrological engineering, agriculture, and urban development (California Coastal Conservancy 2006). The project also shares many issues with this Vision Plan regarding public access and education, including:

- Balancing public access with sensitive ecosystems
- Whether and how to design visitor approaches to a river that is flashy, changeable, and surrounded by dense riparian vegetation
- Building public appreciation and stewardship for a wild river that does not fit the stereotypes that many people have about rivers.

The early stages of the project have centered on the Santa Clara River Parkway Floodplain Restoration Feasibility Study, a comprehensive inventory and analysis document that has provided valuable information about most of the subject areas that are discussed in Part 2 (Inventory and Analysis) of this Vision Plan.

The Santa Clara River was the subject of planning documents prepared by The 606 Studio in both 1995 and 2009.

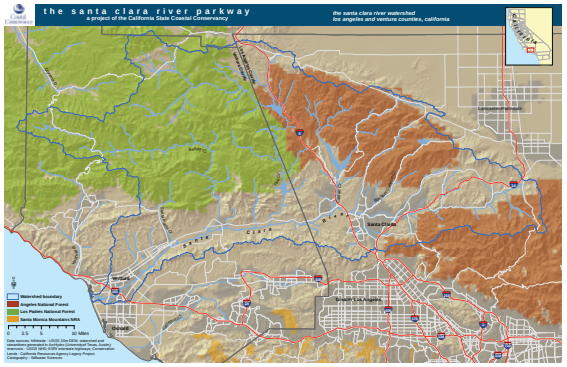


FIGURE 6.8 *The Santa Clara River Watershed. Map: Stillwater Sciences.*

Issues and Objectives

Subject Area	Goal	Issues	Objectives
Hydrology	**Protect and enhance river function**	Floodplain development has diminished the space available for natural river function.	Preserve and expand space for natural river function.
		Hydrological infrastructure has impaired river function.	Mitigate the impact of hydrological structures on river function.
		Water consumption diminishes instream flow.	Ensure adequate instream flow.
		Structures and activities adjacent to the Lower Ventura River are at risk of flood damage.	Protect parkway structures and activities from flood damage.
		The quality of surface water and groundwater is impaired.	Improve the quality of surface water and groundwater.
Ecosystems	**Increase biodiversity**	Diminishment and degradation of ecosystems within the project area has resulted in the reduction of the quantity and quality of ecosystem services.	Restore and enhance ecosystems.
		Unsustainable practices negatively impact biodiversity.	Enhance biodiversity by reducing harmful impacts.
		Habitat areas lack connection with each other.	Increase habitat connectivity.
		Invasive plant species limit native species .	Manage invasive species.
People	**Reunite people with the Ventura River**	There are insufficient opportunities for access and recreation along the Lower Ventura River.	Improve access to and recreation at the river.
		Many existing land uses degrade the river and reduce its value for visitors.	Minimize incompatible land uses near the river.
		Awareness of the river and its functions is lacking.	Increase cultural awareness of the river through formal and informal education opportunities.
		Increased public stewardship of the river is needed.	Encourage stewardship of the river.

FIGURE 6.9 *Issues and objectives.*

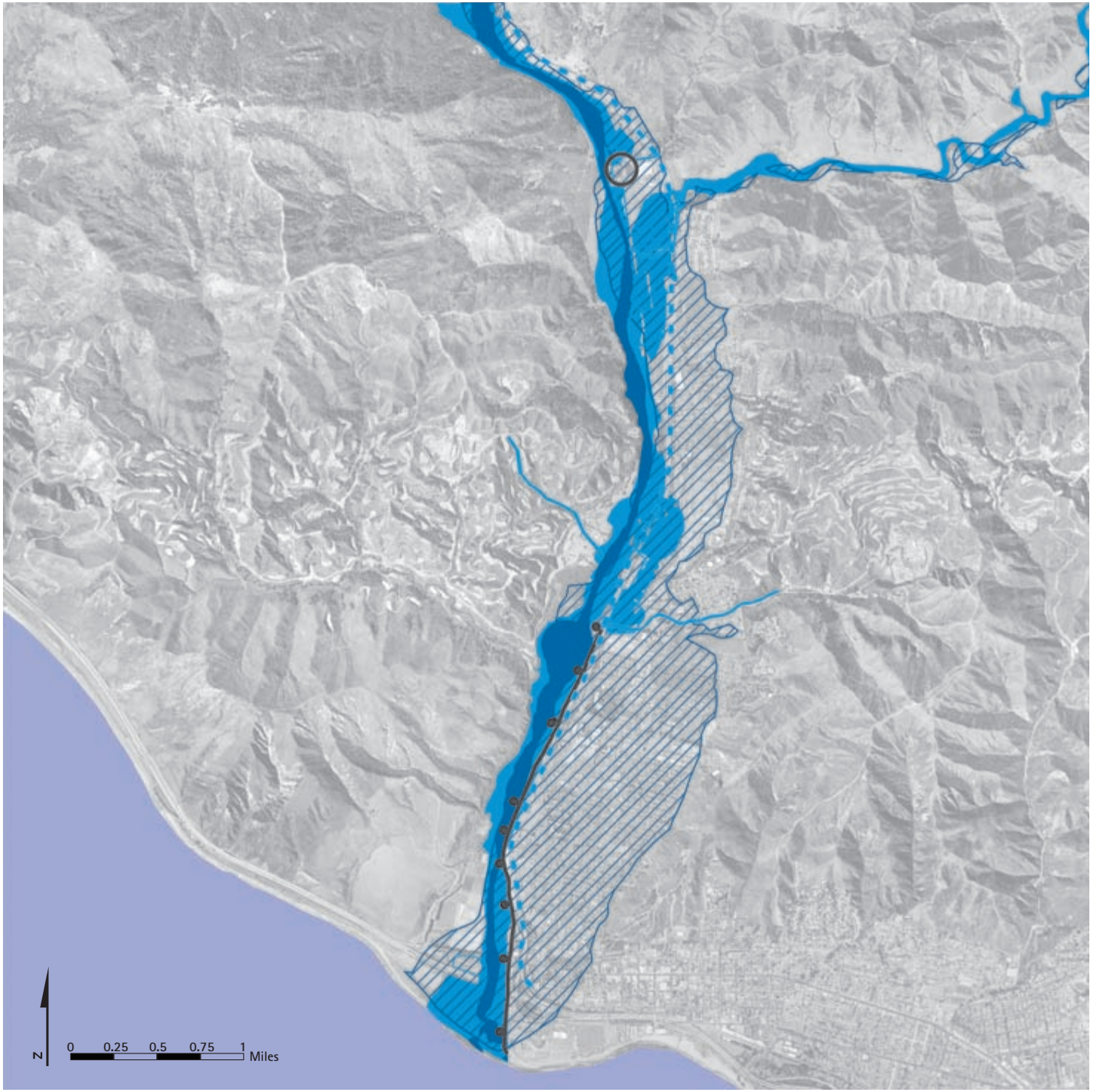
Opportunities and Constraints

The following section examines the location of opportunities for the achievement of various Vision Plan objectives as well as constraints upon the achievement of those objectives. To a great extent, these are intrinsic in the physiographic characteristics of the land (McHarg 1969). However, some opportunities and constraints also arise from patterns of human habitation or aesthetic values.

The suitability of a site for any specific purpose can be seen as a function of the opportunities and constraints that are present (LaGro 2001). Site analysis focusing on opportunities and constraints can range from simplified diagrams such as those shown here to complex suitability studies that employ many layers of information combined through Geographic Information Systems (GIS) technology. Here, opportunities and constraints are used to analyze the spatial arrangement of elements for a conceptual plan across the entire proposed parkway site in chapters 7 and 8, and also to find the best locations for more detailed site analysis and design in chapters 9 through 11.

Each of the four diagrams shown here vary in their approach according to their subject matter. Hydrology (figure 6.10) relies upon the combination of several criteria based on GIS data and field observations to estimate the location of areas where opportunities are present for meeting Vision Plan objectives such as groundwater recharge. The ecosystems diagram (figure 6.11) relies to a greater extent upon the identification of ecosystem zones and features that are well documented, while the cultural diagram (figure 6.12) focusses on features that are primarily based on personal observation.

All three diagrams have an impact on parkway design recommendations reflected in chapter 7. A fourth diagram, Site Selection (figure 6.13), is a composite that illustrates the relationship between these clusters of opportunities and constraints, compared to the sites that were selected for more detailed treatment in chapters 8 through 12.


N
0
0.25
0.5
0.75
1
Miles

HYDROLOGY

opportunities

- FEMA floodway — currently protected from development
- Wastewater treatment plant effluent augments instream flow
- Areas with low slope, permeable soil and underlying aquifers suitable for increased groundwater recharge
- Army Corps levee shields Westside communities from floods
- Outfall locations for potential bioremediation treatment of stormwater at river entry
- NS Neighborhoods appropriate for Low Impact Development measures for water conservation
- NS Neighborhoods appropriate for distributed storm water runoff treatment

constraints

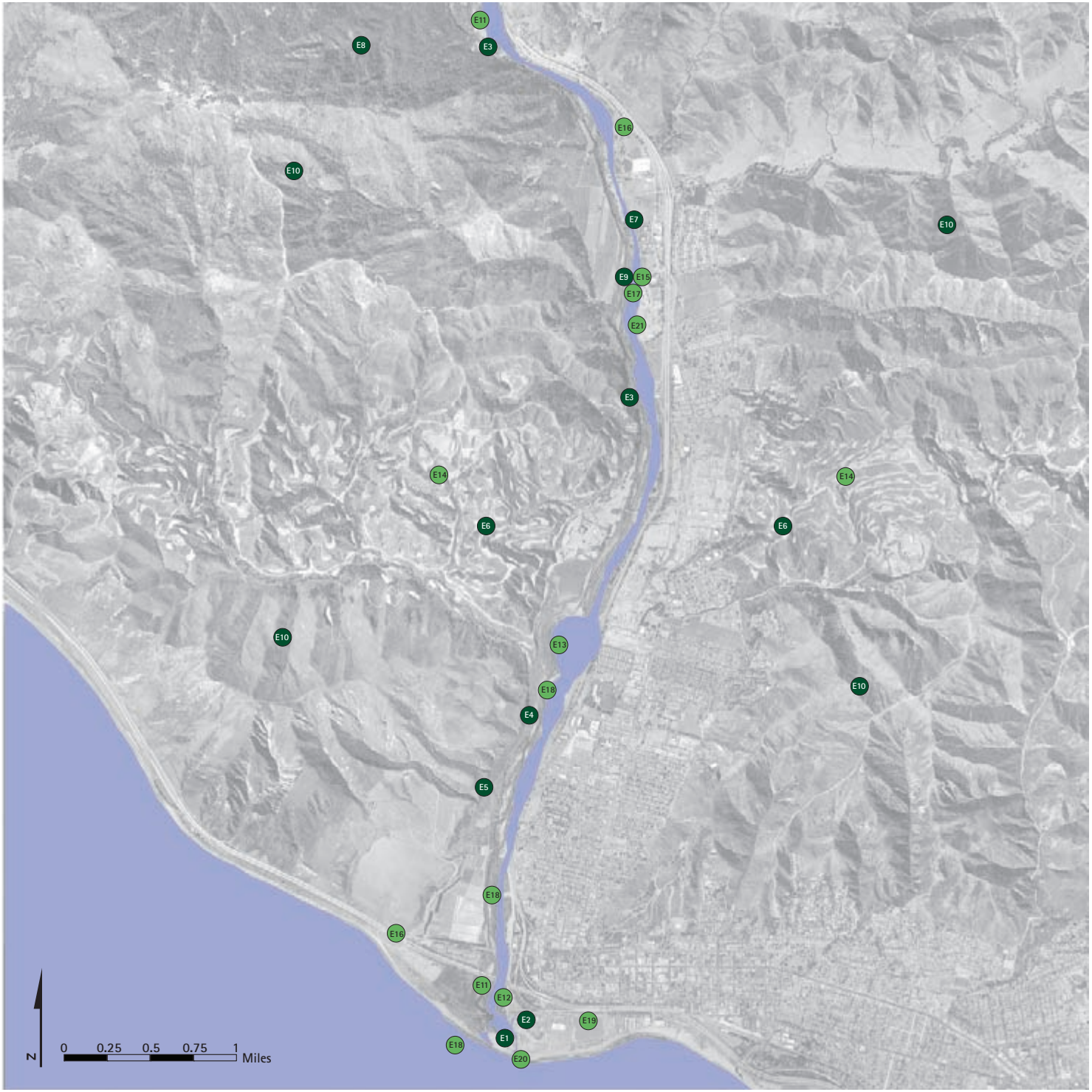
- Army Corps levee constrains river flow
- Highway 33 constrains river flow
- Wastewater treatment plant
  - encroaches on river floodway
  - releases effluent with excessive nutrients and temperature
  - some facilities at risk from 100-year flood
- FEMA one percent annual probability (100 year) floodplain
- Areas with structures in 100 year floodplain
- Tributaries with sections that are channelized/culverted or otherwise impaired near confluence with river
- Storm drains release untreated storm water runoff into Ventura River and estuary
- NS Localized soil contamination may limit groundwater recharge opportunities
- NS Localized groundwater contamination from prior industrial activities
- NS Matilija Dam blocks sediment flow to lower river
- NS Los Robles Diversion dam blocks some sediment and reduces instream flow
- NS Agricultural activities may impair water quality

NOTES:

1. Data presented here is solely for the purpose of illustrating potential approaches to meeting parkway objectives. Extensive field studies, beyond the scope of this Vision Plan, are required in order to obtain data usable for actual site design.

2. Some opportunities and constraints for meeting parkway objectives are located outside of the proposed parkway area itself and are not shown in this illustration. "NS" - not shown.

[FACING PAGE AND ABOVE] FIGURE 6.10 *Opportunities and Constraints — Hydrology. Orthophotography: CIRGIS.*


E11
E8
E3
E16
E10
E7
E10
E9
E15
E17
E21
E3
E14
E14
E6
E6
E10
E13
E18
E10
E4
E5
E18
E16
E11
E12
E2
E19
E1
E18
E20
N
0
0.25
0.5
0.75
1
Miles

ECOSYSTEMS

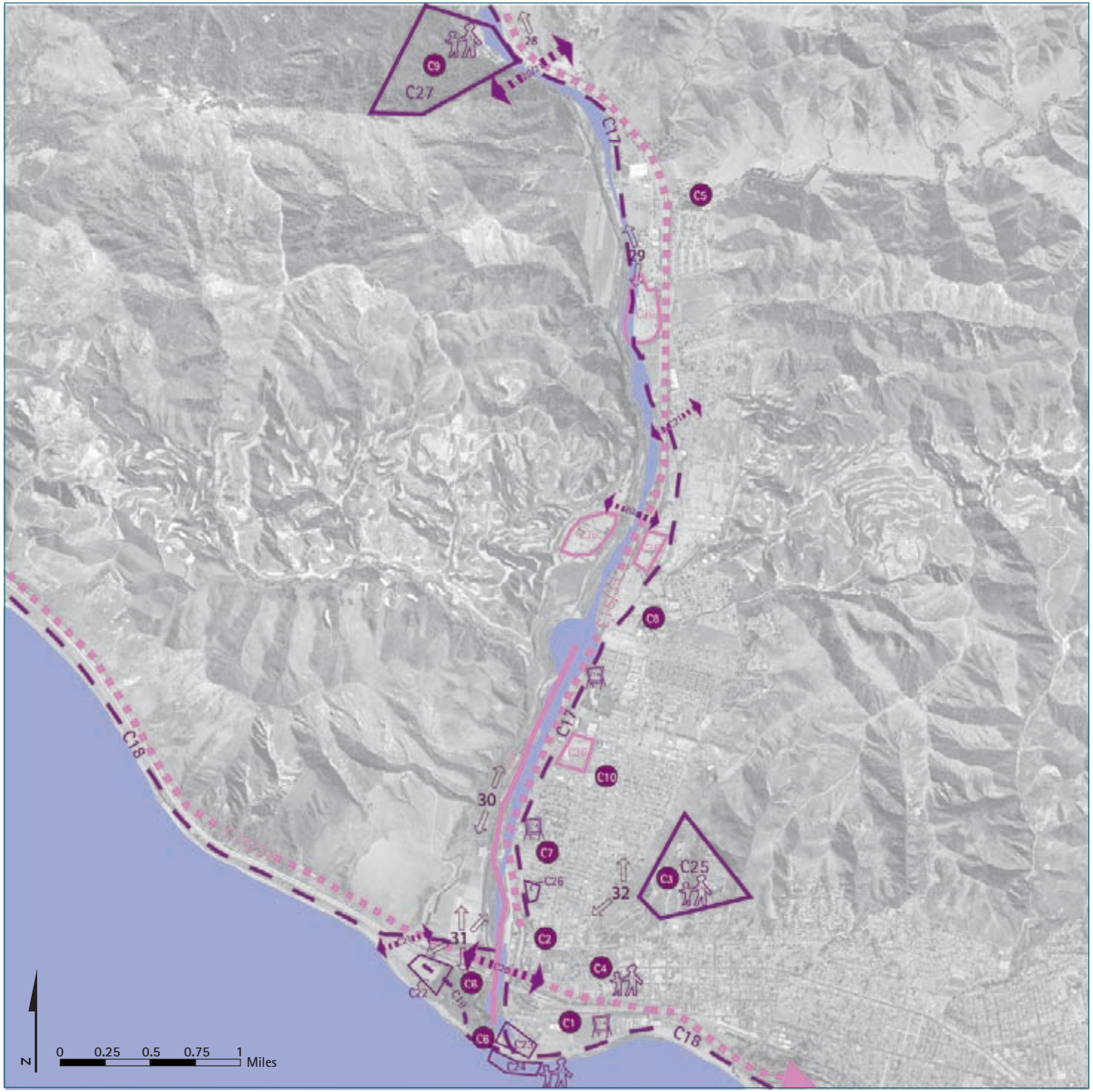
opportunities

- E1 Former location of historical wetland and estuary ecosystem
- E2 Small number of existing Fairgrounds structures increase potential to reconfigure site to accomodate ecosystem restoration
- E3 Suitable pools, glides, and riffles for steelhead trout, and extensive riparian canopy
- E4 Existing riparian habitat provides habitat for Least Bell's vireo and increases shade and cooling for steelhead trout
- E5 Site of recent ecological restoration
- E6 Remnant chaparral ecosystem
- E7 Oak woodland habitat provides nesting and breeding opportunity for Cooper's hawk
- E8 Existing black walnut woodland, a rare and imperiled natural community in California
- E9 Confluence of the main stem of the Ventura River and Cañada Larga tributary
- E10 Large areas of intact wildlands connect to National Forest and can support the range needs of species such as the bobcat

constraints

- E11 Invasive plant species infestation degrades estuary, wetlands, riparian, and river ecosystems and reduces ecosystem services
- E12 Levee flood control system limits boundaries of historical ecosystems and related ecosystem services
- E13 Excessive amounts of fine sediment in some sections of riverbed can reduce ability for fish to see and feed, and also degrade habitat for insects on which fish feed
- E14 Eroded hillsides, impacted sage scrub ecosystems, and fragmentation to surrounding wildlands
- E15 Channelization of the Cañada Larga tributary contributes to fragmentation of habitat and population fragmentation for the endangered California red-legged frog
- E16 Roads and highways fragment connectivity
- E18 Untreated urban runoff delivers contaminants and degrades marine, riparian, river, wetland and estuary ecosystems
- E19 Asphalt parking lot contributes to urban heat island effect
- E20 Diminished dune ecosystem reduces critically scarce habitat opportunities for the endangered California least tern and endangered Ventura marsh milk vetch
- E21 Unremediated and exposed brownfield site subjects surrounding ecosystem to contamination risks

[FACING PAGE] FIGURE 6.11 *Opportunities and Constraints — Ecosystems. Orthophotography: CIRGIS.*


C27
C9
28
C17
C5
29
C8
C18
C17
C10
30
C7
C26
C25
C3
32
31
C2
C4
C1
C18
C6
C24
N
0
0.25
0.5
0.75
1
Miles

CULTURE

opportunities

historical resources

1. Shishalop Village site (south end of Figueroa St.)
2. Ortega Adobe
3. Junipero Serra Cross
4. San Buenaventura Mission/historic Main Street
5. Aqueduct remnant
6. "Hobo Jungle" depression-era homeless camp
7. Simpson housing tract
8. E. P. Foster home
9. Foster Park stone gates and amphitheater
10. Ventura Avenue oilfield

social/public

12. Social nodes (existing popular gathering places)
13. Libraries/schools
14. Existing public art installations

circulation

15. Highway 33 — connections to Central, Northern California
16. Highway 1 — connections to Southern, Central Coast
17. Ventura River Trail: connections to Ojai Valley Trail
18. Omer Rains Trail: connections to Southern, Central Coast
19. Ocean's Edge Trail: Connecting Emma Woods and Seaside Park
20. Existing public bridges across Ventura River

20a. Potential public river crossing (bridge currently private)

21. Existing pedestrian/bike crossings under Highways 1 and 33

parks/recreation

22. Emma Woods State Park
23. Seaside Park
24. Surfers' Point
25. Grant Park
26. Westside Park
27. Other Parks

viewsheds

28. Foster Park riverbed view north into middle watershed
29. Cañada Larga confluence with Ventura River
30. West Bank Lower Ventura River
31. Main Street Bridge — views north and south
32. Grant Park overlook — view entire lower river

constraints

barriers to access

33. Highway 33 — barrier between Ventura and river corridor
34. Highway 1 — barrier between river corridor and beach
35. Levee — barrier between Ventura and river corridor

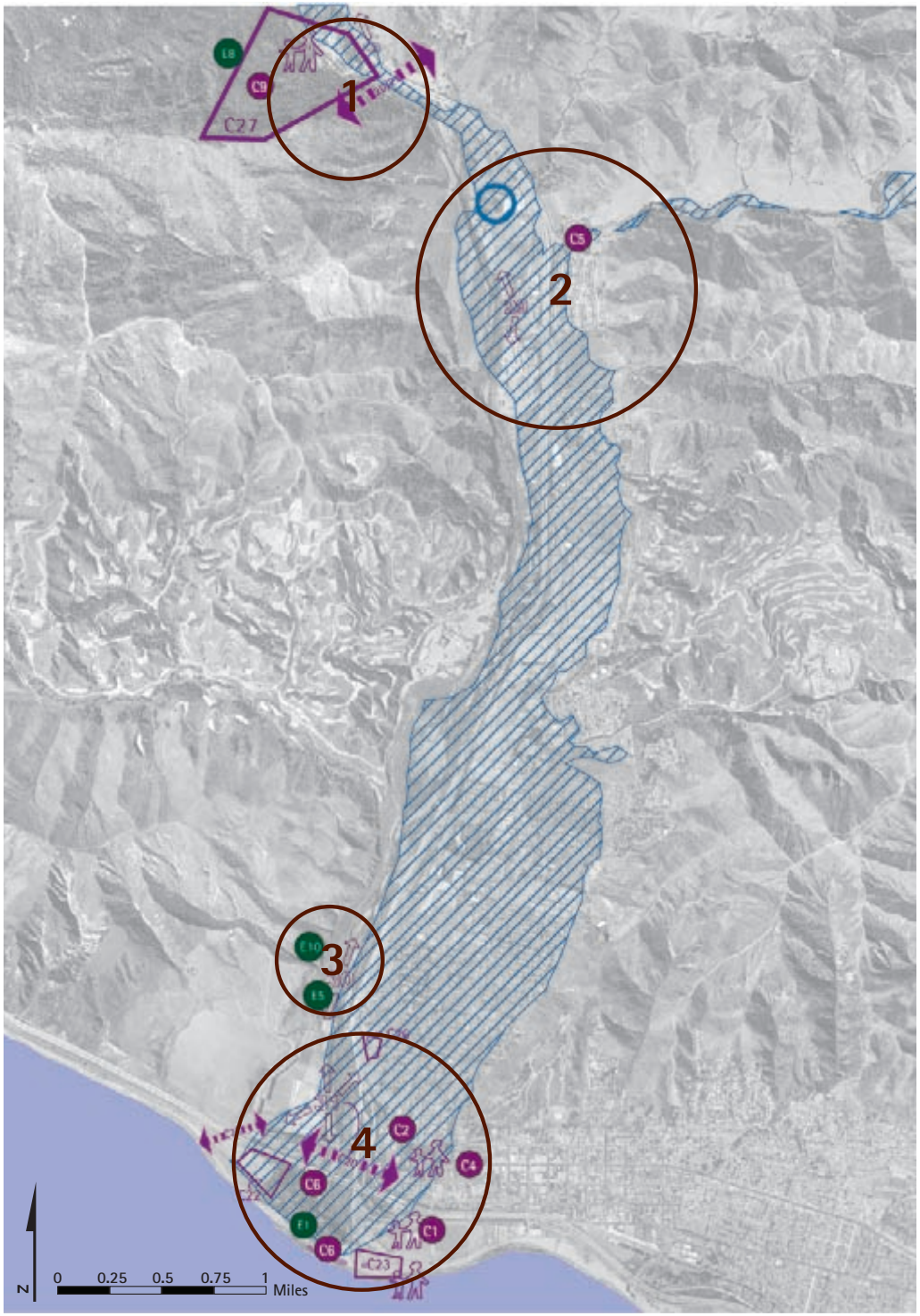
Not shown — posted "no trespassing" signs along riverbanks

incompatible land uses

36. Brownfields/grayfields

NOTES: Data presented here is solely for the purpose of illustrating potential approaches to meeting parkway objectives. Extensive field studies, beyond the scope of this Vision Plan, are required in order to obtain data usable for actual site design.

[FACING PAGE] FIGURE 6.12 *Opportunities and Constraints — Culture. Orthophotography: CIRGIS.*



OPPORTUNITIES — SITES

1. Foster Park

- E8 — Existing Black Walnut woodland, a rare and imperiled natural community in California
- C9 — Foster Park stone gates and amphitheater
- Existing popular gathering place
- Existing park
- C1 — Existing bridge (vehicle/bike/pedestrian across Ventura River
- C1 — Scenic viewshed north into mid-watershed

2. Cañada Confluence

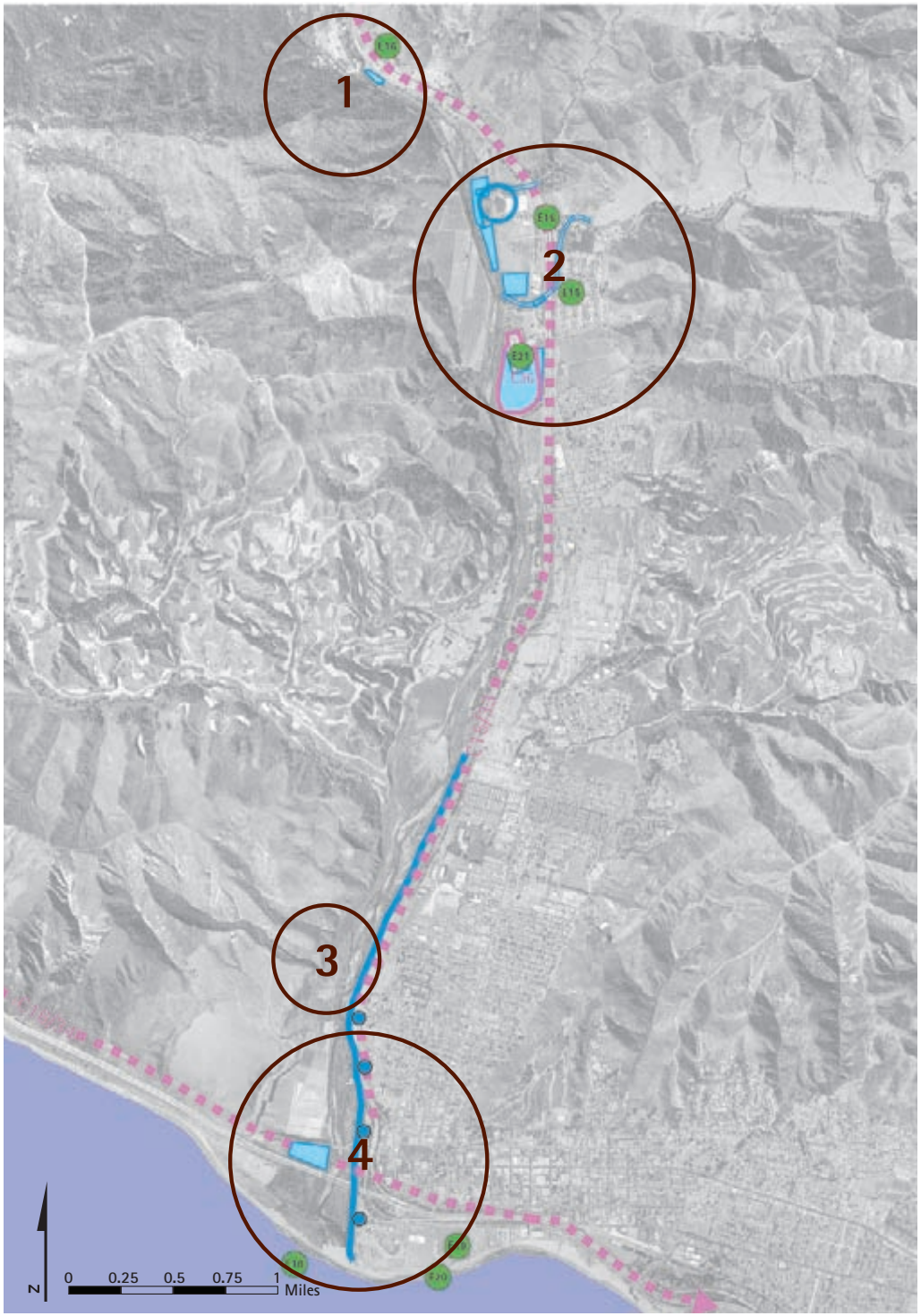
- E7 — Oak woodland habitat provides nesting and breeding opportunity for Cooper's hawk
- E9 — Confluence of the Ventura River and Cañada Larga tributary offers opportunity for connecting river to surrounding hillsides
- C5 — Historic resource — Spanish aqueduct remnant
- C1 — Scenic viewscape to the north and south
- Waste treatment plant effluent contributes to instream flow in Ventura River
- Areas with combination of flat slope, permeable soil and underlying aquifers suitable for increased groundwater recharge

3. Cottonwood Junction

- E5 — Site of recent ecological restoration
- E10 — Large areas of intact wildlands connect to National Forest and can support the range needs of species such as bobcat.
- C1 — Scenic views to north and south

4. Downtown Delta

- Areas with combination of flat slope, permeable soil and underlying aquifers suitable for increased groundwater recharge
- E1 — Former location of wetland and estuary ecosystem
- C1 — Historic resource — Shishalop Village site
- C2 — Historic resource — Ortega Adobe
- C4 — Historic resource — San Buenaventura Mission
- C6 — Historic resource — "Hobo Jungle" depression-era homeless camp
- Existing parks — Emma Woods State Park, Seaside Park, Westside Park
- Existing gathering spots — Surfers Point, Fairgrounds, Historic downtown
- C1 — Existing public crossings under/over Ventura River, Highways 1 and 33



CONSTRAINTS — SITES

1. Foster Park

- Structures in 1% annual chance (100-year) floodplain
- E16 Roads and highways fragment habitat connectivity

2. Cañada Confluence

- Structures in FEMA 1% annual chance (100-year) floodplain
- Tributary with sections that are channelized and culverted near confluence with the river
- Waste treatment plant facilities in 100-year floodplain and effluent with excessive nutrients and temperature
- E15 Channelization of Cañada Larga contributes to fragmentation of habitat and population fragmentation of steelhead, California red-legged frog and other species
- E16 Roads and highways are barriers to connectivity of habitat and animal populations
- E21 Unremediated and exposed brownfield site subjects surrounding ecosystem to contamination risks
- Unremediated brownfields incompatible with recreation

3. Cottonwood Junction

- NS Riverbanks posted no trespassing

4. Downtown Delta

- E18 Roads and highways fragment habitat connectivity
- E19 Asphalt parking lot contributes to urban heat island effect
- E20 Diminished dune ecosystem reduces critically scarce habitat opportunities for the endangered California least tern and endangered Ventura marsh milk vetch
- NS Highway 33 — barrier between urban Ventura and river corridor
- NS Highway 1 — barrier between river corridor and beach
- NS Levee — barrier between Ventura and river corridor
- NS Not shown - Riverbanks posted no trespassing

[FACING PAGE AND ABOVE] FIGURE 6.13 *Opportunities and Constraints — site selection. Orthophotography: CIRGIS.*

River parkways protect and restore riparian and riverine habitat.

California River Parkways Act of 2004
California Public Resources Code §5751(f)

CHAPTER 7: PARKWAY VISION PLAN

Overview

Design concepts for a Vision Plan for the Lower Ventura River Parkway begin with a look at the entire six-mile proposed parkway corridor.

The material presented in this Chapter consists of a summary plan view (figure 7.1) followed by individual elements with features to address objectives related to hydrology, ecosystems, and culture. In addition, there is an introduction to the locations of more detailed design concepts presented in later chapters.

A vision plan is not a blueprint. A plan for a parkway for the Lower Ventura River will be developed by citizens of the Ventura River Watershed after they have become committed to the parkway, and after they have engaged in a long process of discussion about the way in which they want the river to be a part of their children's lives.

A vision plan has a broad brush. It is a big-picture look at ideas that will be useful to those future discussions. More than anything, it is an attempt to present the idea of a parkway on the river as something that could really exist someday.

PARKWAY VISION PLAN

Summary

Land Uses

- Ventura River floodway
- Expanded floodway
- Open Space — Riparian
- Open Space — Oak Woodland
- Floodplain farming
- Estuary/wetlands expansion
- Tributary restoration with riparian buffer

Circulation

- Freeways/Highways
- Major Roads
- Trails — Multiple Use (Bike/Walking
- Trails — Walking
- Trails — Ephemeral
- Cross-river bridges (vehicular/pedestrian)
- Pedestrian bridges

Sites (Chapters 9-12)

1. Foster Park
2. Cañada Confluence
3. Cottonwood Junction
4. Downtown Delta

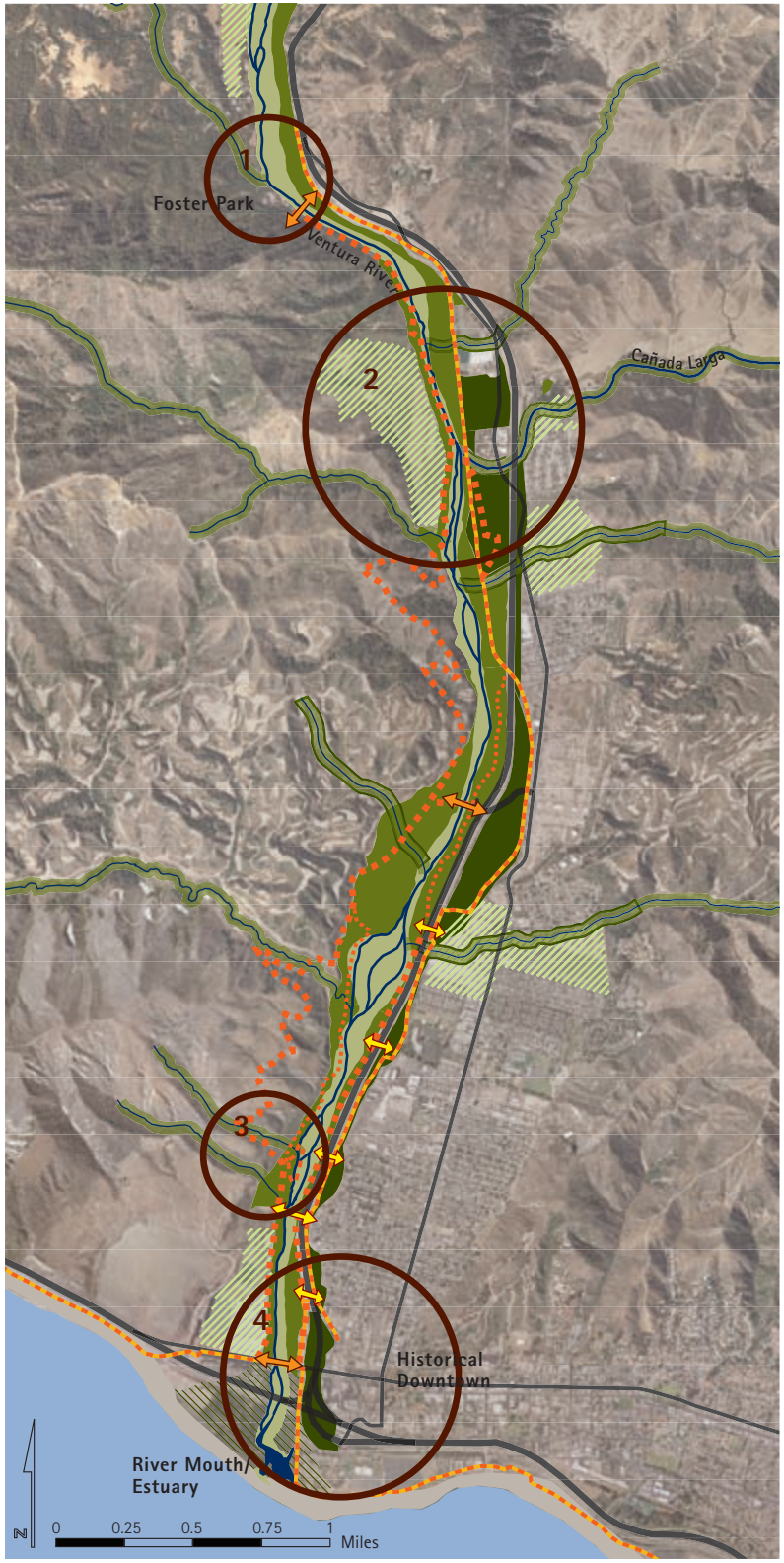


FIGURE 7.1 *Parkway Vision Plan Summary.*

Hydrology Element

Key objectives for the hydrology element of this Vision Plan are preservation and expansion of the space available for river function, mitigation of negative impacts from existing hydrological infrastructure, ensuring of adequate instream water in the lower river, and improvement of water quality.

MAKING SPACE FOR THE VENTURA RIVER

One important goal for this element is the preservation and enhancement of the natural river function — the wild quality — of the Lower Ventura River. The river can remain wild only as long as there is no substantial loss of the space that is available for its flows.

Although the course of the river has been significantly constrained by levees in the lower six miles that comprise the parkway zone, it has been spared from concrete channelization largely because a zone – wide in some areas, narrow in others – has previously been preserved exclusively for the flow of its floodwaters. The floodway (illustrated in Figure 7.2 and discussed in Chapter 3) is an area defined under FEMA flood insurance regulations, an area of river channels and floodplain that is important for the safe conveyance of occasional flood waters. FEMA flood insurance regulations discourage development in the floodway zone, and these policies are reflected in the Ventura County floodplain ordinance. Most of the land in this zone is above water, most of the time. It is a zone of mostly riparian ecosystems through which braided channels of the river move in changing configurations.

The floodway is a reasonable starting point for preserving and expanding the space that will be available to the river for its flow and function. This plan envisions preservation of both wet and dry portions of the current floodway as no-build, low impact areas where hydrological function is increased, native vegetation and wildlife habitat is emphasized, and human activities are limited.

The floodway of the Lower Ventura River is a unique place with characteristics that are largely determined by the geology, topography, soils, and climate of the watershed (see Chapter 3, Hydrology). Although large areas of the floodway are dry for much of the year, the entire zone, wet and dry, must remain available for the changing paths of the river and for the swift conveyance of occasional floodwater. A parkway that emphasizes passive recreational activities — and only those activities — in this zone furthers the goals of the county's floodplain management ordinance and General Plan while also expanding opportunities for human use and appreciation of the river.

Preservation means limiting development within that zone and designing parkway structures and visitor activities that are compatible with the movement of wild water.

Moving outward from the floodway, this plan seeks opportunities to preserve additional riparian space along the floodway edges — the area defined by FEMA as the floodway fringe. In some cases, this can be accomplished through the relocation of existing structures that are in the pathway of a 100-year (one percent annual chance) flood, a subject discussed further in Chapter 10, Cañada Confluence. Another possibility for expanding the river space is the setting aside of some agricultural edges for a return to riverine and riparian ecosystems, through mechanisms such as conservation easements, conservation subdivision, and fee title acquisition on a "willing seller" basis.

MITIGATING THE IMPACTS OF HYDROLOGICAL INFRASTRUCTURE

Hydrological structures within the proposed parkway corridor are addressed in several sections of this Vision Plan. The Army Corps levee on the lower river seriously impairs human access to and awareness of the river, and these effects are addressed later in this chapter and in Chapter 12, Downtown Delta. The Ojai Sanitation District Waste Treatment Plant has both beneficial and adverse impacts, and is addressed in Chapter 9, Cañada Confluence.

Some projected infrastructure changes will occur beyond the proposed parkway corridor. The removal of Matilija Dam, expected to begin during the next decade, is one of the largest and most complex dam removal projects undertaken in the United States, and it will have a significant beneficial

PARKWAY VISION PLAN

Hydrology Element

- FEMA floodway: no development
- Remove structures from 100-year floodplain
- Floodplain limited development areas
- River-friendly farming
- River-friendly neighborhoods
- Monitor/remediate soil and groundwater
- Urban storm water runoff treatment
- Constructed wetlands/polishing ponds
- Relocated Ojai waste treatment facilities
- Ventura water purification facilities
- Daylighted/Dechannelized Tributary
- Army Corps levee
- Highway 33

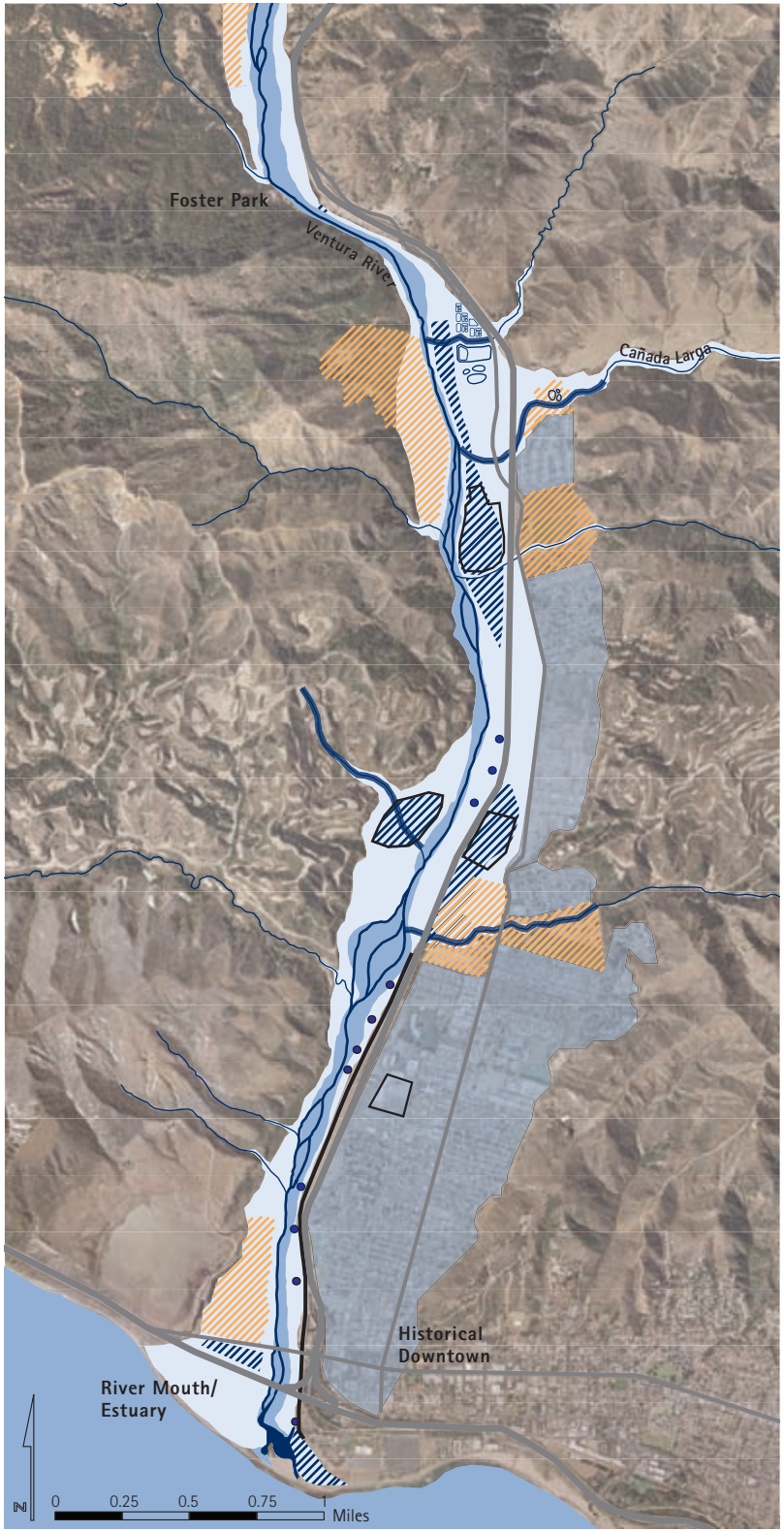


FIGURE 7.2 *Parkway Vision Plan, Hydrology Element.*

impact on the lower river. The dam has not performed any significant water storage function for many years, and its removal will not significantly increase the long-term supply of water to the lower river. However, removal will return the sediment flow in the river to something more closely resembling the pre-development regime, and it will supply additional sand to Ventura's depleted beaches. As landscape planning studies continue, the manner in which the return of sediment will occur and its impacts on the river are still uncertain (Greimann 2006). Despite this uncertainty, the project, with its improved sediment regime, presents opportunities for bank restoration, erosion control, and correction of riverbed elevations that will gradually help to correct impairments in the river in the proposed parkway area over the many decades to come. Due to the influence of dam removal, these stream restoration activities along the Lower Ventura River may not be amenable to any comprehensive plan at the present time. Feasibility studies indicate that the gradual adjustment of the Ventura River channel will require approximately 20 years after dam removal, and that there will be large variations in both flow and sediment supply during that period (Greimann 2006).

An additional impact from dam removal, the removal of barriers to steelhead trout migration, is discussed in the section Ecosystems.

The Los Robles Diversion Dam, the source for Casitas Lake and much of Ventura's drinking water, is not slated for removal. The dam has continuing impacts on river hydrology in the areas of instream flow, sediment supply and steelhead passage, and during the last decade it has been the subject of structural improvements and policy changes that attempt to address all three of these areas. Instream flow has been addressed to some extent by regulations that limit the amounts of water that may be diverted by the dam during low flow periods, while the dam's tendency to trap sediment is being addressed by plans that call for the construction of a high flow bypass structure to sluice sediment from behind the dam (Greimann 2006). Finally, the dam's status as a barrier to steelhead migration has been addressed by some extent through the construction of a fish passage facility during the past decade.

The future monitoring and adjustment of all three of these programs will be crucial to the functioning of the lower river so that the continued operation of the Los Robles facility, just one-and-one-half miles upstream from the proposed parkway, does not prevent the expected beneficial impacts of removing Matilija Dam.

Restoring Tributaries

The healthy functioning of tributaries that meet the lower river in the parkway area is important because the river receives much of its water and sediment from those sources. In addition, tributaries are important corridors for connecting the main river with the surrounding hillsides which is crucial for wildlife movement and the dispersal of genetic material. These corridors also offer opportunities for hikers to branch out from the river parkway into those hillsides. This plan envisions opportunities for the daylighting or dechannelization of impaired tributaries where they meet the Lower Ventura River within the parkway area as well as the restoration of riparian ecosystems along those tributaries.

ENSURING ADEQUATE INSTREAM WATER

Humans and the river compete for the same water. Balancing the allocation of surface and groundwater between human users and instream flow will make more water available for sustaining healthy ecosystems and for natural river functions such as the movement of sediment. Efforts to maintain and increase instream flow need to take into account the history of competition for water between different groups of people, and between people and the needs of ecosystems, and the complicated water rights law that has developed out of that competition. The ensuring of adequate instream flow for the Lower River will require measures both within the parkway project and beyond, at the scale of the entire watershed.

Both within and adjacent to the parkway area, instream flow can be enhanced through measures that are designed to maintain and enhance the supply of water to the river. In this regard, it is critical to note that water users in the Ventura River Watershed have successfully avoided expensive and energy-intensive importation of foreign water through their reliance on surface water and groundwater pumping, and the continued future availability of this water for agricultural and domestic use is a matter of great concern for residents of the watershed. However, there are measures that can potentially enhance the availability of instream water without calling for a reduction in surface water diversions or pumping from wells, and some of these are mentioned below.

One important measure is the increased replenishment of groundwater basins through groundwater recharge. Increased recharge has the potential to directly supply water

ENVISIONING A RIVER-FRIENDLY NEIGHBORHOOD

Westside residential neighborhoods adjacent to the proposed parkway corridor consume scarce water for landscape irrigation, leaving less water for Ventura River flow. Polluted storm water runoff drains from impermeable road and hardscape surfaces in the same neighborhoods directly into the river Improved with Low Impact Development (LID) measures, the same neighborhoods can conserve water by consuming less and by capturing and cleaning storm water and returning much of it to groundwater basins. Figure 7.3 envisions the use of some of these measures at the corner of Prospect and Sheridan Streets in the historic Simpson housing tract less than 600 feet from the river. This example is based upon the Oros Green Street project designed by North East Trees in a neighborhood adjacent to the Los Angeles River (North East Trees 2007).

[LEFT AND ABOVE] FIGURE 7.3 *A river-friendly retrofit on Prospect Street.*

1. Permeable paved surfaces with sand/gravel substrate in appropriate areas filter runoff and allow it to penetrate instead of running off.

2. Parkway rain gardens with curb cuts capture both sidewalk and street runoff.

3. Runoff captured by rain gardens is filtered through sand/gravel substrate and enters perforated underground catchments to slowly enter the ground.

4. Additional runoff from driveways and sidewalks is captured by driveway trench drains and routed to catchments.

5. Any remaining street runoff is captured and enters cisterns at downhill end of street where coarse sediment settles out. Overflow is routed to pocket park for additional filtration/storage.

6. Pocket park on small lot at downhill end of street captures and filters large amounts of storm water for slow infiltration into the ground.

7. Drought tolerant and appropriate native plantings throughout the neighborhood consume less water and no invasive species are used.

8. Overflow from pocket park enters storm drain to river.

Illustration: Adapted from North East Trees 2007.

to the Lower River, and also has the benefit of improving the quality of the currently non-potable groundwater of the proposed parkway area and protecting that groundwater against saltwater intrusion at the river mouth.

One method for enhancing groundwater recharge is the preservation of the floodway and of areas of adjacent floodplain that are promising for groundwater recharge activities. The hydrology opportunities and constraints diagram in Chapter 6 (figure 6.9) roughly indicates areas that are promising groundwater recharge because they are nearly flat, overlie groundwater basins, and have permeable soil. Plan areas designated as floodway or floodplain open space (figure 7.2) overlie these recharge areas.

Potential recharge areas also underlie urban neighborhoods and farms that are adjacent to the proposed parkway. Recharge in neighborhoods can be enhanced through low impact development (LID) practices such as permeable pavements and widely-distributed street-level storm water treatment systems (figure 7.3) that capture, treat, and infiltrate storm water runoff near its source. LID practices, such as the use of drought-tolerant landscape plantings, also benefit instream flow by conserving water in developments that implement them. The controlled application of irrigation water on parkway farms (sidebar – A River Friendly Farm) would also conserve water. Water conservation means less competition between humans and wildlife for the water that is in the river.

Finally, within the parkway corridor, instream flow would be enhanced through the continuation of discharges of tertiary-treated effluent from the Ojai Valley Sanitary District Water Treatment Plant (Chapter 10, Cañada Confluence). The importance of the availability of high-quality effluent to the ecosystems of the Lower Ventura River should be balanced against any future proposals for reclamation of water from the treatment plant for other purposes.

Instream flow is also dependent upon policies and practices for water allocation at the watershed level, since water diverted from the river or pumped from groundwater basins for agricultural and domestic consumption in communities upstream from the parkway corridor is unavailable to the lower river. The County of Ventura has aggressively pursued policies for the conservation and allocation of surface and groundwater but the focus of these policies has been on watersheds other than that of the Ventura River (IRWMP 2006), and parkway stakeholders should actively consider the further development of these policies in the Ventura River Watershed as well, including:

- Conjunctive use, an umbrella term for a set of policies in which planners make the most efficient use of surplus surface and groundwater by transferring water supplies between these two sources (and between adjacent groundwater basins in some cases) and by making flexible allocations of water to agricultural and domestic consumers depending on where surplus water exists (IRWMP 2006).

- Groundwater management, in which removals for agricultural and domestic consumption are directly regulated through groundwater agencies, formal plans and agreements, ordinances, and in some cases, court adjudication in accordance with a water budget for the watershed (IRWMP 2006).

Many other policies and programs including ecosystem restoration, flood protection, land use planning, water quality protection, and water recycling, discussed at length in the county's Watershed Management Plan (IRWMP 2006), have an impact upon the availability of instream water and warrant continued attention at the watershed level in furtherance of parkway objectives.

Many of these programs are aimed at making the best use of storm water through storage mechanisms such as surface reservoirs or spreading basins for groundwater recharge. However, in rerouting storm water for these purposes, planners should remember that even during wet periods when channels are overflowing their banks, water that is needed by wildlife and riparian vegetation or for the natural processes of sediment transport should not be viewed as surplus; achieving an appropriate balance between the role of storm water in natural river processes and its use as surplus supply for consumers is an important subject for continuing research.

MANAGING FLOOD RISK

Taking Flood Risk Seriously

The Lower Ventura River has been extensively altered by the 1947 Army Corps levee as well as numerous smaller levees for the purpose of protecting developments in the floodplain, such as the residential neighborhoods of North Avenue and Westside, from periodic extreme flood events. The risk of property damage and personal injury from flooding is a subject that cannot be ignored in any vision of the Parkway.

Flood damage can be nearly eliminated if people remove all floodplain developments and abstain from further

building in the floodplain – in that event, much of the Lower Ventura River Valley would be returned to a natural floodplain. However, this Plan arises in the context of a floodplain that has already been heavily developed on the eastern side of the river for nearly a century. In a post-oil 21st century, it is reasonable to foresee the gradual disappearance of industry from the Lower River, but no existing plan contemplates the abandonment of the floodplain and the relocation of the residents of North Avenue and Westside. On the contrary, the City of Ventura contemplates the annexation and residential and commercial development of neighborhoods along the east side of the lower river. In that context, no Parkway facilities or activities would be developed that would remove existing structures built for protection against flood damage.

Protecting Parkway Structures and Users From Flood Risk

Although structures in the floodway itself will be limited or nonexistent, this parkway plan envisions an increased presence of human visitors. Wayfinding and interpretive signage and related structures should be located away from areas where channels frequently flow, and designed to offer minimal resistance to the flow of water during flood events and minimize damage to the facilities during those events.

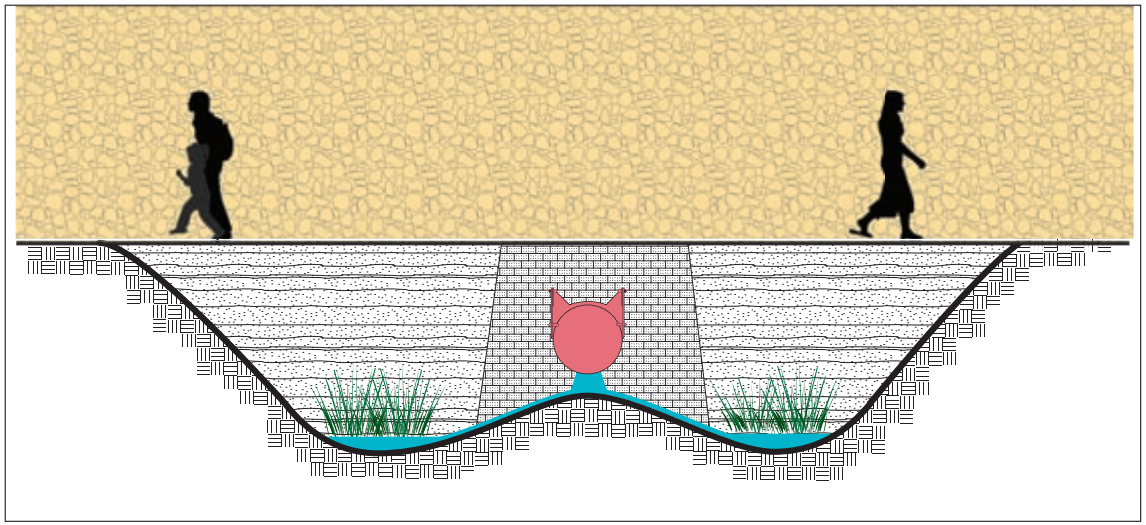


FIGURE 7.4 *Bioremediation swales to treat urban runoff entering the river through the levee wall.*

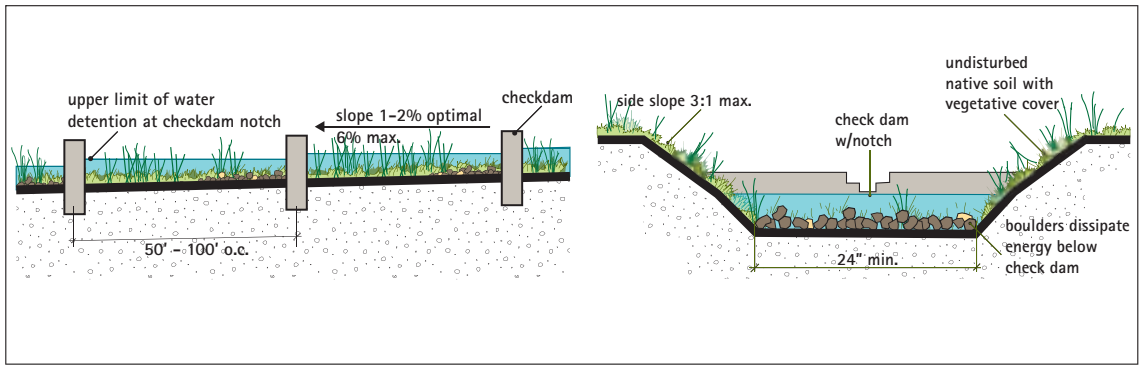


FIGURE 7.5 *Longitudinal and cross-sections through a typical vegetated swale. Adapted from BASMAA 1999. Not to scale.*

Any visitor activities allowed in the floodway would necessitate adequate early warning systems and evacuation procedures to protect visitors from personal risk from floods that can and do arise here on short notice.

Acknowledging and Celebrating A History of Floods

Flooding is a risk that must be taken seriously in the parkway, but it is also an opportunity for fascination, awe, education and increased stewardship. The parkway project would exploit every available opportunity for educating users about the natural occurrence of floods, including occasional opportunities for rainy-day visitors to view flood waters from sheltered, safe locations (See sidebar Experiencing a Flood in the Culture Element of this chapter).

IMPROVING WATER QUALITY

This Plan envisions opportunities for enhancing the quality of water in the Lower Ventura River in three ways: by treating urban storm water runoff, treating agricultural runoff, and by improving treatment plant effluent.

Treating Urban Storm Water Runoff

Recognizing that untreated storm water runoff from the urban areas of Ventura and its surrounding unincorporated neighborhoods is a major potential source of pollutants in the river, this Plan recommends several approaches for a reduction in the quantity of runoff and the reduction of pollutants in that runoff. The first of these approaches emphasizes the capture, cleaning and infiltration of runoff at the source, street by street in residential, commercial and institutional neighborhoods on the east side of the river. Capturing runoff at the source, one aspect of the Low Impact Development (LID) practices described in Appendix B, would reduce the quantity and improve the quality of runoff while also helping to replenish groundwater supplies, and would be equally applicable to parkway facilities themselves.

Second, storm water runoff would be further treated at the outfall locations where it currently enters the lower river. Figure 7.4 shows a typical storm drain outfall with a hinged cap where it exits the base of the Army Corps levee into the floodway fringe of the river. Approximate locations of many of these outfalls are noted in Chapter 6, Hydrology Opportunities and Constraints.

Currently, polluted runoff exiting the levee wall at each of these outfalls enters a deep dirt and rock-lined swale that conveys it to the main stem of the river with minimal treatment. As illustrated in Figure 7.4, this situation could be improved by conveying the runoff from each of the outfalls into multiple shallow swales that would perform a bioremediation function based on filtration through selected plants. The gentle side slopes and bottom of a swale consist of native soil planted with grasses and rushes that are genetically appropriate for this ecosystem and have a proven ability to filter pollutants. Some plants with proven bioremediation potential that might warrant consideration, including bentgrass (*Agrostis exerata*), California brome (*Bromus carinatus*), and red fescue (*Festuca rubra*) are California natives, and one rush, Juncus, is a native to the Ventura River that had significant uses among the Chumash. Checkdams at intervals slow down the flow of water through the swale increasing filtration of pollutants as well as infiltration into groundwater. In areas with poor soil drainage, a perforated drain pipe can be installed underneath the swale to carry treated runoff away, but that is not necessary in this location, in well-drained alluvial soil over a groundwater basin.

Treating Agricultural Runoff

Agricultural runoff that can be rich in nitrates, phosphates, and fecal coliform can have an impact on water quality both in tributaries such as the Cañada Larga (where fecal coliform is listed as a Section 303(d) impairment) and in the Ventura River itself. A “river-friendly” farm is one where potential pollutants are contained and eliminated at their source. Figure 7.6 illustrates how this approach could be implemented by a floodplain farm to treat wastes from both crop and livestock operations. Practices such as improved monitoring that limits fertilizer applications to the root zone of plants, or irrigation that is controlled by evapotranspiration monitors, can reduce pollutants before they accumulate in runoff or leach into groundwater. Swales planted with appropriate native plants can gather and filter nutrient-laden runoff from farm operations, while larger amounts of runoff can be also be treated on-site in surface or subsurface constructed wetlands. Native plant buffer zones around the edges of crop operations, particularly where the farm meets the river corridor, can provide additional protection from runoff reaching the river, while also provided valuable wildlife habitat.

Improving Treatment Plant Effluent

Recognizing that treated effluent from the Ojai Wastewater Treatment Plant makes up a significant portion of the lower river’s water, this Plan envisions several measures to enhance the quality of that effluent, discussed in Chapter 10, Cañada Confluence.

FIGURE 7.6 *A river parkway farm.*

1. Bioremediation swales
2. Buffer zone
3. Subsurface-flow constructed wetland

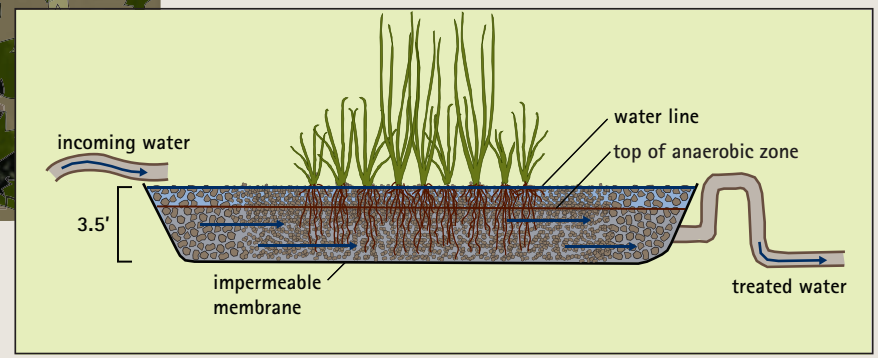


FIGURE 7.7 *Subsurface-flow constructed wetland. Adapted from Lyons 2006.*

ENVISIONING A RIVER-FRIENDLY FARM

Ventura City and County have placed a high priority on preserving their agricultural heritage. Parkway corridor farms are not only compatible with parkway objectives in general, but actually further those objectives by keeping land in open space, providing limited but valuable habitat for wildlife, and helping to keep nearby urban residents in touch with where their food comes from. Although riverside farming activities can impair water flow and quality by consuming excess irrigation water and contributing leachate and runoff with excess nitrates, bacteria, and other pollutants, many farming practices are evolving that can mitigate these impacts. Figure 7.6 envisions an existing farm adjacent to the lower river as a proving ground for these practices:

1. Bioremediation swales at the edges of plots capture and treat crop runoff in addition to providing habitat for birds, reptiles and small mammals.

2. Some farmland is dedicated through a conservation easement or conservation subdivision to widen a buffer zone of riparian vegetation between the farm and the river. This zone not only protects the river but also enhances farm productivity by hosting bees that pollinate crops and birds and insects that help control crop pests.

3. A subsurface-flow constructed wetland (detailed in figure 7.7) is a low-maintenance, high-volume solution that can treat agricultural runoff that might otherwise flow untreated directly into the river. Bulrush (*Scirpus* ssp.) and cattails (*Typhus* ssp.), two plants that are native to this valley, grow with grasses in a matrix of gravel through which farm effluent slowly flows. Bulrush carries oxygen from its shoots down into its roots in the anaerobic region of the gravel, creating micro-aerobic zones that convert nitrates/nitrites through several stages into harmless nitrogen gas. Meanwhile, the gravel surfaces form a microscopic biofilm that can remove phosphorus, heavy metals and pathogenic organisms (Lyons 2006).

Other potential practices that are not illustrated in figure 7.7 are the use of sensors that monitor nutrient concentrations and evapotranspiration in the soil on a yard-by-yard basis so that fertilizer and water are applied only where, and only in the amounts needed by crops. This conserves water and helps to prevent fertilizer from leaching into groundwater.

Ecosystems Element

Key objectives for the ecosystems element of this Vision Plan are to restore and enhance ecosystems, enhance biodiversity, increase habitat connectivity, and manage invasive species.

RESTORING AND ENHANCING ECOSYSTEMS AND BIODIVERSITY

The ecosystems element of the Vision Plan is an extension of the hydrological element. Enhanced biodiversity and the health of all ecosystems in the parkway area are inextricably linked to quality of hydrological functions. Therefore, most of the actions recommended for meeting hydrological objectives also serve to enhance biodiversity. River corridors tend to be the most dynamic place in landscapes (Forman 1995) and the hydrological activity of rivers with varying flow rates, occasional floods, lateral migration of channels, gravel bars that appear and disappear with accompanying vegetation, and a changing network of pools, riffles, and snags in the channels themselves naturally supports habitat heterogeneity, a key to biodiversity (Forman 1995).

This Plan envisions the preservation of the existing mixed riverine and riparian habitat of the river floodway, designating that area as one for low-impact activities only. Riverine habitat, home to aquatic plants and harboring many design species identified in Chapter 5, dominates in those areas where the river channel frequently runs. Gravel bars accumulate in between the river channels and are host to riparian plants that provide valuable shade for the river water as well as cover and food for animals.

Mature trees are relatively infrequent along the Lower River, due to the scouring action of floods in recent years and competition by invasive species. However, the eventual eradication of invasive *Arundo donax* will encourage the return of more trees, and when multi-year dry weather periods occur, some of those trees will establish themselves to the extent that they can survive flood scouring (Capelli 1991).

In the floodplain outside of the floodway (riverbed), many areas of riparian habitat would be expanded through the conversion of existing industrial infrastructure (much of it close to abandonment) to restored open space. This zone would include areas of parkland, mostly of riparian nature but also including oak woodland and coastal sage scrub environments. Some of these would be reserved for vegetation and wildlife and low-impact human activities, while others would be mixed uses. The creation of a greenbelt along the east edge of Highway 33 would bring the highway into the parkway rather than leaving the highway itself as the border of the parkway.

Parkway farms would also play a role in enhancing biodiversity. Within and around the proposed parkway corridor, river-friendly farms (see Hydrology Element, this Chapter) would incorporate vegetated swales and buffer zones of native vegetation around their edges, providing valuable support for many species while also enhancing their own productivity through enhanced opportunities for pest control and pollination of crops.

This Vision Plan would expand three threatened habitat areas: estuary, coastal wetlands and coastal dunes.

In and around visitor facilities and more developed areas

PARKWAY VISION PLAN

Ecosystems Element

- Ventura River
- Tributary corridor for restoration
- Floodway — Riverine/Riparian
- Riparian
- Greenbelt (mixed riparian/woodland)
- Estuary
- Dune
- Farming

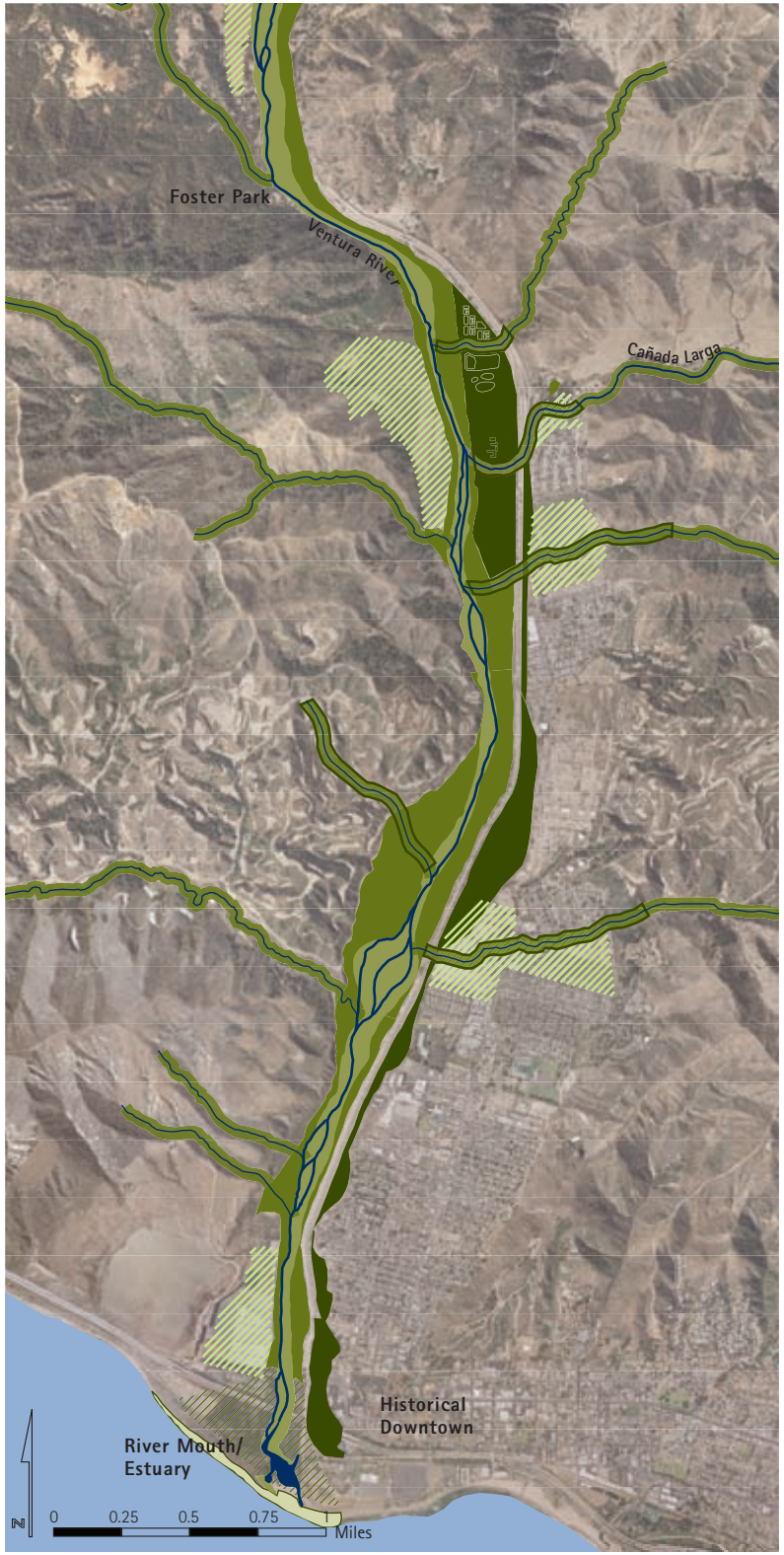


FIGURE 7.8 *Parkway Vision Plan, Ecosystems Element.*

of the parkway corridor, the maintenance of ecosystem services would be enhanced through the use of a palette of California native plants that are designed to emulate preexisting or neighboring ecological communities and to increase visitor appreciation for these communities.

INCREASING HABITAT CONNECTIVITY

Fragmentation of prime wildlife habitat into smaller and smaller patches under modern development pressures reduces biodiversity and threatens the survival of viable populations of plant and animal species.

Fragmentation can be reversed by actively forging connections between large habitat patches, connections that enable individuals of many species to circulate between those patches (Noss and Cooperrider 1994). This Vision Plan recognizes that river corridors such as the proposed Lower Ventura River Parkway are critically important as connectors for several reasons. First of all, river corridors themselves are inherently dynamic and rich in biological activity. As inherently heterogeneous environments, they can support the needs of many diverse species moving through them (Forman 1998). Secondly, the ubiquitous pattern of slopes and drainages across most landscapes means that connected rivers and streams reach nearly everywhere.

This Plan envisions the Lower Ventura River Parkway as a habitat connector in two distinct ways: Locally, as a means of connecting the riverine and riparian habitat of the lower river itself with large habitat patches on the surrounding hillsides; regionally, as one element of a larger corridor connecting the lower river and the Pacific Coast with large, significant patches of prime habitat in northern Ventura and Santa Barbara Counties. These two distinct functions are discussed below.

Local Connections

For the purposes of landscape ecology, a river corridor is considered to be a band of vegetation that encloses a water course. It may be as narrow as a stream and the adjacent banks, but it can also include the adjacent floodplain, hillsides rising from the floodplain, and an adjacent upland area (Forman 1995). Locally, the Lower Ventura River functions as a connector within its own floodway by supporting the movement of species up and down the six miles of the proposed parkway area.

The proposed parkway corridor would also function as a connector to local habitat outside the floodway by encouraging movement between the riverbanks and habitat areas within the adjacent floodplain, hill slopes and upland areas.

In 2002, the California Department of Forestry and Fire Protection (FRAP) classified California land according to its management status and habitat value. Figure 7.9, reflecting the results of that classification, illustrates that most of the land on hillsides both to the east and west of the floodplain of the lower river is "working" open space that retains "considerable habitat value for native species" (FRAP 2002). A notable exception is the swath of open space devoted to oil production, which virtually cuts the hillside habitat in two. While this impaired landscape may eventually be targeted for restoration, for the moment the river itself may serve as a means of connecting the hillside habitat that is fragmented by it. Virtually all of the open space shown in figure 7.9 is designated as an area of interest by the Ventura Hillsides Conservancy, prioritized by that organization for eventual protection as open space (Ventura Hillsides Conservancy 2008). Examples of species that would circulate between the lower river and these hillsides within their ranges are bobcat (*Lynx rufus californicus*), and gray fox (*Urocyon cinereoargenteus).*

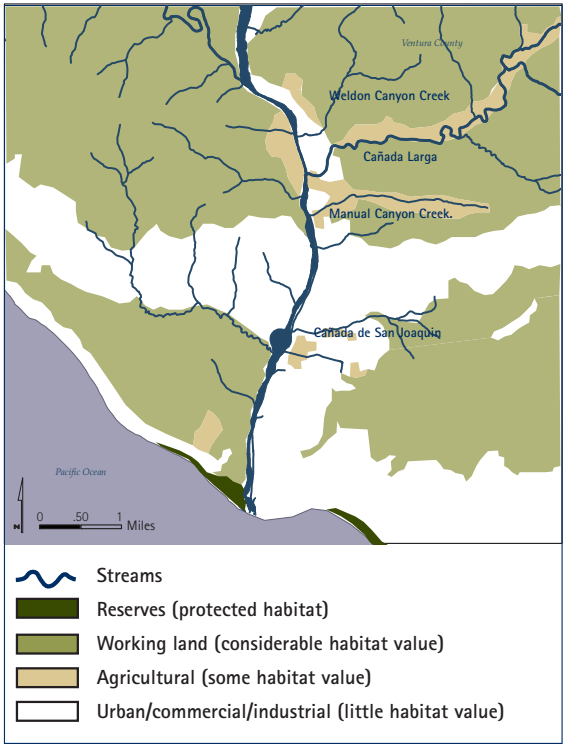


FIGURE 7.9 *Proposed parkway area — Management status and presumed habitat value of land. The four named tributaries would potentially connect the Ventura River with hillsides to the east. Coverage is approximate, subject to change since the date of origination of this data. Data source: California Department of Forestry and Fire Protection 2002.*

Width and connectivity are key determinants of the effectiveness of corridors as habitat (Forman 1995). The current capability of the Lower Ventura River to serve as a habitat corridor varies along the length of the proposed parkway between the estuary and Foster Park. The floodway itself is continuous for the entire six miles of the proposed parkway area, and is at least 200 yards wide from the estuary to Shell Road. However, for about one and one-half miles upstream from Shell Road, it ranges from only 50 to 75 yards wide. The minimum width of a riparian corridor for effective movement of a wide range of terrestrial species is subject to many factors, a determination beyond the scope of this document. However, it is reasonable to assume that the effectiveness of the parkway as a corridor will vary along with its width.

Approximately four and one-half miles of the Lower River connect directly with adjacent slopes and upland areas to the west, affording excellent opportunities for movement between the two. The floodplain and hillsides to the east of the river are another story. The presence of the Army Corps levee, Highway 33, and significant urban and industrial development in the floodplain may be expected to deter most animal movement across the floodplain into the western hillsides.

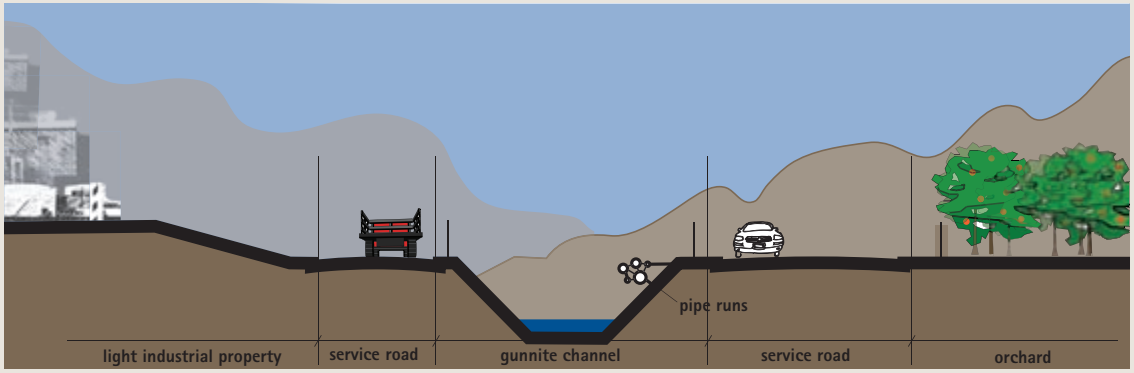
ENHANCING THE CORRIDOR FUNCTION OF A TRIBUTARY

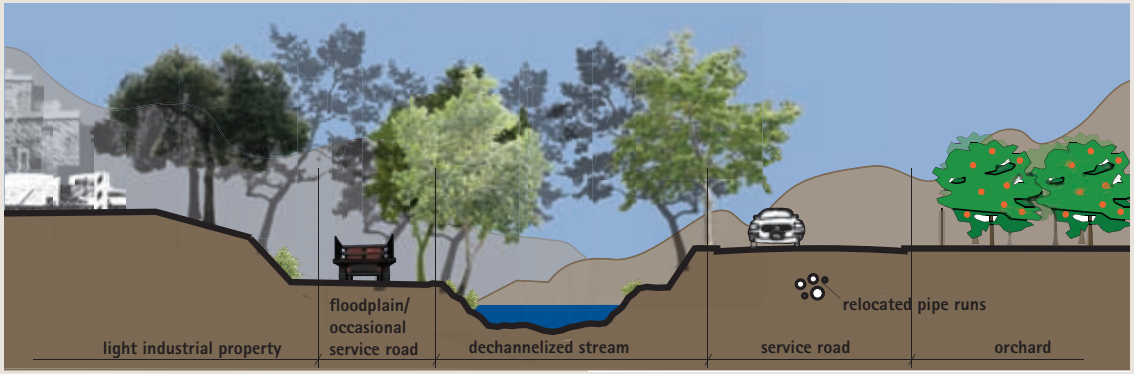
This Vision Plan identifies tributaries to the east of the Lower Ventura River as one strategy for reducing habitat fragmentation and connecting the lower river to the hillsides to the east. Tributaries that would perform this function include the Cañada de San Joaquin, Cañada Larga, and Weldon Creek (figure 7.8 — Ecosystems Plan Element). One significant advantage in relying on tributaries for these connections is that, for hydrological purposes, these water courses already safely navigate through the developments on the floodplain and already penetrate Highway 33, the most significant barrier to wildlife movement across the floodplain. For species other than those that live in riverine environments, the key feature of a river corridor is not the water itself, but the vegetated strip that reaches out from the water (Forman 1995). Thus, the key to using the connective potential of these tributaries is to enhance the riparian buffer zones along their edges.

Cañada de San Joaquin (figure 7.5) is an example of how this potential ecosystem service could be enhanced. In its existing state where it crosses Ventura Avenue near its confluence with the Lower Ventura River, the stream is tightly contained between a dirt-surface industrial service road to the north and a paved industrial and agricultural service road to the south. Virtually all that remains in between, at the point illustrated in figures 7.5 and 7.6 (upper) is a narrow gunnite channel that serves as a conduit for runs of petroleum pipe.

Figure 7.6 (lower) shows a proposed method for creating a narrow but functional strip of riparian habitat along this tributary, without taking away space that is currently devoted to industrial and agricultural transportation. Instead of maintaining the stream as a deep channelized ditch between two roads, the dirt road surface (to the left of the stream on this section) is lowered to an elevation closer to the base elevation of the stream itself, enabling it to function as a limited floodplain and riparian space and effectively widening the corridor while still allowing occasional use as a service road. Adding this floodplain makes it possible to dechannelize the stream itself. With the addition of riparian canopy to shelter wildlife and lower the temperature of the stream's water, a small but effective habitat corridor may be effected. For another example of enhancing these habitat connections, see the "daylighting" of Cañada Larga where it crosses Highway 33, illustrated in Chapter 10, Cañada Confluence.

FIGURE 7.10 *Cañada de San Joaquin, existing condition adjacent to Ventura Avenue.*





[RIGHT] FIGURE 7.11 *Upper: Cañada de San Joaquin, existing condition. Lower: An alternative for enhancement in approximately the same space. Concept adapted from Riley 1998.*

Based on the foregoing, this Vision Plan identifies the following general strategies for increasing local habitat connectivity within and adjacent to the proposed parkway area:

- Increase the width of the riparian corridor wherever possible upstream from Shell Road by preserving additional open space, particularly in the "pinch" between the refinery and water treatment plant and the avocado orchards to the west.

- Preserve the existing connectivity between the lower river and the hillsides to the west and maintain the undeveloped lands characteristic of the west bank by limiting visitor access primarily to hiking and related activities, consistent with recommendations elsewhere in this Plan.

- Enhance the function of tributaries, particularly the Cañada de San Joaquin, Manuel Canyon Creek, Cañada Larga, and Weldon Creek as a means of providing for wildlife passage across Highway 33 and the developed floodplain and into the hillsides to the east.

- Promote the preservation of open space in the adjacent hillsides to the east and west of the proposed parkway, in accordance with efforts of the Ventura Hillsides Conservancy.

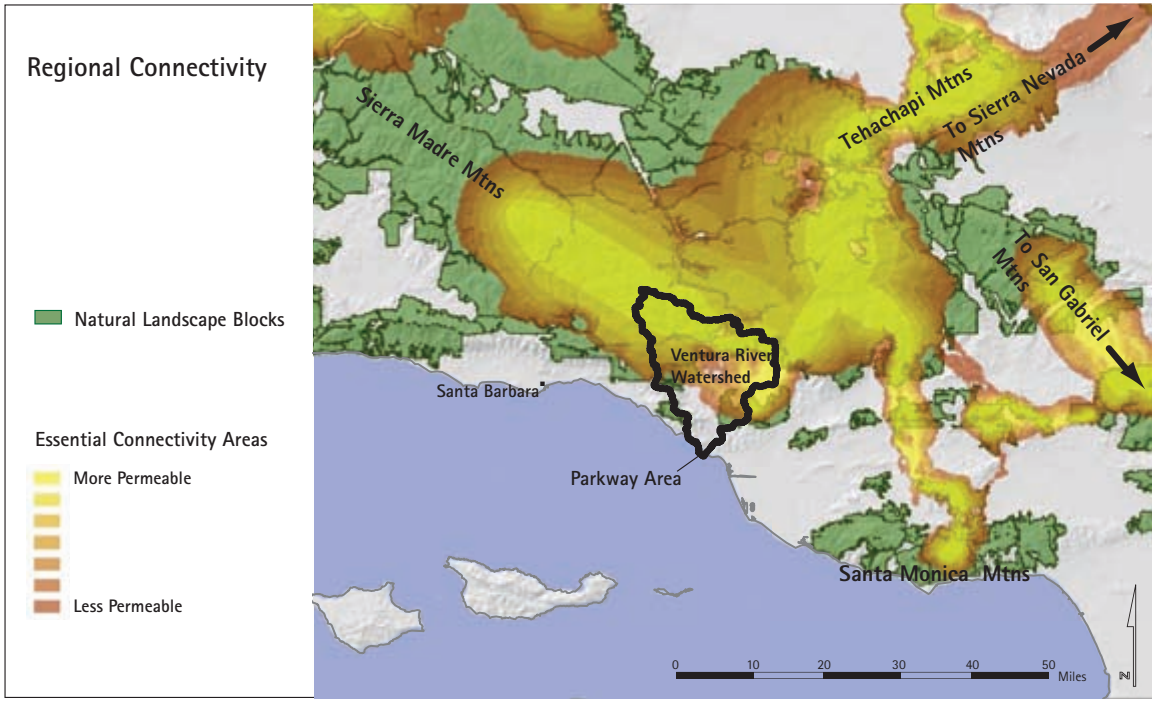


FIGURE 7.12 *The Ventura River Watershed in relation to Natural Landscape Blocks and Essential Connectivity Areas identified by the South Coast Missing Linkages Project and incorporated in the California Essential Habitat Connectivity Project. Data Source: Spencer et al 2010.*

Regional connections

The Lower Ventura River Parkway has the potential to connect the Pacific Coast with prime inland wildlife habitat in a network reaching across Southern California. Science and Collaboration for Connected Wildlands, a nonprofit organization working with ecologists, land managers, and planners, implemented the South Coast Missing Linkages Project to plan a regional conservation strategy that stretches from the Southern California Coast to the Sierra Nevada ranges at the eastern edge of the state (South Coast Wildlands 2008). The results of this analysis have been incorporated into the California Essential Habitat Connectivity Project (CEHCP), with input from more than sixty agencies across the state. The CEHCP identifies Natural Landscape Blocks, large natural areas with sufficient ecological integrity to support native biodiversity, and also identifies areas that are essential for future ecological connectivity between those blocks. Figure 7.12 shows this analysis for the region surrounding the Ventura River Watershed, with Natural Landscape Blocks larger than 2000 acres shaded in green. Overlapping areas that range from orange to yellow are identified by the CEHCP as Essential Connectivity Areas that could potentially ecologically connect these areas with each other and with other natural areas across California. The upper portion of the Ventura River Watershed (delineated in black on Fig. 7.12) reaches directly into one such connectivity area that could potentially connect with the Tehachapi and Sierra Nevada Ranges to the northeast, the Santa Monica Mountains to the southwest, and the San Gabriel Mountains to the east (Spencer et al 2010). Although the proposed parkway area on the lower river is not within this identified connectivity area, it has a riparian corridor connection with it and the parkway could be an exciting laboratory for exploring the biodiversity effects of relationships between inland mountains and the sea. Perhaps the most notable example of a species that directly connects these landscapes is the Southern California steelhead trout. However, the potential for migratory routes or other connections up and down the river certainly exists for many other species. One example of a potential terrestrial relationship is the bobcat (*Lynx rufus californicus*). Although the average range of an individual of that species is smaller than the distance between the coast and the National Forest, the potential for many individual ranges to overlap along this corridor might reduce inbreeding and enhance survivability. While a full discussion of the potential importance of the river as the connector between mountain and sea is beyond the scope of this Vision Plan, that limitation is also an opportunity

– exploring this subject would be one theme for visitor education and stewardship programs in the parkway, a way of fostering bioregional citizenship.

California Wildlife Action Plan

The California Wildlife Action Plan, completed in 2007 by the UC Davis Wildlife Health Center for the California Department of Fish and Game, focuses on the conservation of ecosystems and habitat at the regional level, and identifies the Ventura River as a "largely intact" drainage that is regionally important. The document contains detailed guidelines that urge federal, state and local agencies and nongovernmental organizations to work together toward goals that include the protection and restoration of "the best remaining regional examples of ecologically intact river systems" (Bunn et al. 2007). Plan guidelines that agencies should follow in implementing the proposed river parkway include:

- development of regional Natural Community Conservation Plans
- protection of regional linkages identified by the South Coast Missing Linkages Project, discussed above
- a focus on the protection and restoration of coastal wetlands habitat
- eradication or control of invasive species and the prevention of new introductions
- protection of sensitive species and important wildlife habitats
- development of a comprehensive Southern California Outdoor Recreation Program to ensure that recreational access does not conflict with wildlife needs

A Planting Palette for the Parkway

The parkway concept presents many opportunities for restoration of existing plant communities in floodplain areas that are retained in a wild state, as well as new plantings for mixed use areas such as urban parks, streetscapes, and visitor facilities. All parkway activities will be in close proximity to the ecosystems associated with the river and every planting activity regardless of its purpose will have an impact on the vitality of the native plant communities that are part of those ecosystems. Therefore, for all restoration programs or landscape designs, this Vision Plan recommends using native plants and seeds from local, genetic sources. Using genetically local species will enhance the local character of the area and will also aid in fulfilling two ecosystem objectives of this plan, the restoration of historical and existing ecosystems and the enhancement of biodiversity.

Exotic plant species that lack local predators often directly compete with native species for growing space and nutrients, suppressing natives due to short-term competitive advantages. However, what is less obvious – and equally important – is that only local native plants can support the existence of the ecological communities upon which humans depend. Locally-evolved native plants are tightly integrated in a web of relationships that support every link in the food chain. This web starts with native insects and birds that have a demonstrated preference, often exclusive, for trace chemicals in the food provided by plant species with which they have co-evolved (Tallamy 2007). Therefore, every introduction of an exotic species in the vicinity of wilderness areas threatens to suppress every form of life in that ecosystem. The use of local species avoids this harm, and aids in the preservation of genetic integrity and diversity, and has the added benefit of relying on plants that are better suited to succeed under local environmental conditions with minimal water and fertilization.

Since this Vision Plan represents an early stage in the development of the Lower Ventura River Parkway, now is the appropriate time for the commencement of collection of local, native plant seeds that can be cultivated in anticipation of future revegetation projects. Initial local collection and cultivation efforts should emphasize slow-growing and longer-living plants, while faster growing plants and seeds can be cultivated closer to the date of design implementation. These activities can tie in with other important objectives of the parkway by affording opportunities for civic involvement and stewardship that also educates.

Considerations for selecting appropriate plant palettes for each of the design sites should be based on species native to the design area and local plant communities, aspect, soil, and available water. Since soil and available water surveys are beyond the scope of this Vision Plan, and premature in the case of remediation sites, plant palette recommendations in this Vision Plan are based on species native to the area and local plant communities. These recommendations are not comprehensive, but rather should serve as a general guide pending more specific surveys.

Limiting Equestrian Activity

The least Bell's vireo and other threatened bird species experience significant breeding disturbance as the result of nest-parisitism by cowbirds, which are attracted by equestrian activity. An active cowbird control program has been initiated on the Ventura River (Hunt 1994). For this reason, multi-use trails, nature trails and other circulation systems (Chapter 8) that approach the river floodway or adjacent riparian zones throughout the proposed parkway should exclude equestrian activity.

California Endangered Species Act

Implementation of a long-range parkway project will involve many actions that directly impact riverine and riparian ecosystems, including trail alignments, streambank restoration, programs that may bring more people into contact with the riparian areas, and visitor facilities that may include construction, hardscape, and planting projects. For the protection of threatened or endangered species and their habitats, all implementation steps including both construction and operation over the life of the parkway, should be carefully reviewed for compliance with the California Endangered Species Act (CESA), including the issuance of incidental take permits where they are warranted under the provisions of CESA

STEELHEAD TROUT RECOVERY

The National Marine Fisheries Service (NMFS) has designated the Ventura River, its major tributaries, and the estuary at its mouth as critical habitat for the recovery of Southern California steelhead (*Oncorhynchus mykiss*), a species that has been listed as endangered under the federal Endangered Species Act since 1997 (NMFS 2005). For a discussion of the life cycle of this species in relation to project area ecosystems. Critical habitat is defined as "specific areas in which are found physical or biological features essential to the conservation of the species, and which may require special management considerations or protection" (NMFS 2007). Although steelhead trout have historically been present and are currently present in the Ventura River Watershed, annual runs are estimated to have declined by 90 percent or more (NMFS 2007). "Recovery," for the purposes of the ESA, would mean the restoration of the species and its ecosystem to the point that its future is safeguarded (NMFS 2007).

The Endangered Species Act requires the NMFS to develop and implement recovery plans for species that the agency has listed as endangered, and NMFS has placed a high priority on the development of a recovery plan for steelhead that will be issued in draft form in 2008 (NMFS 2007). The NMFS recovery plan strategy relies primarily on a widely dispersed set of core populations in inland areas and large watersheds, including the Ventura River Watershed, that are capable of sustaining larger populations (NMFS 2007). There are few such core populations in Southern California, and they have low redundancy due to the impact of dams, water diversions, flood control measures and urbanization, as well as wildfires (NMFS 2007). Due to this low redundancy, the NMFS has specifically stated that the restoration of water flows and fish passage in the Ventura River are "necessary steps" to achieving the viability of the Southern California steelhead population (NMFS 2007). The unique and specific importance of the Ventura River Watershed to steelhead recovery efforts warrants a special focus on this species in this Vision Plan.

A strategy for addressing steelhead recovery in this Vision Plan starts with acknowledging the fact that this species historically adapted and thrived in Southern California in the face of environmental stresses that are somewhat unique to this region with its arid Mediterranean climate, challenges that are not common for more northern populations. Highly variable seasonal precipitation patterns result in years when the flow of river water is insufficient to open the sand bar at the river mouth, blocking passage both to and from the ocean (NMFS 2007). Periods of low precipitation combined with certain riverbed geological formations can lead to interruptions in surface flow along sections of rivers, further blocking steelhead passage (NMFS 2007) (Chapter 4, Figure 3.23 illustrates an area of occasional interrupted surface flow in the Ventura River near Foster Park). Flood scouring during the rainy season, described in Chapter 4, has both harmful and beneficial impacts on steelhead. It removes riparian cover and can result in unhealthy high water temperatures during subsequent summer-fall low-flow conditions. However, it also clears water passages and flushes out fine sediments, leaving gravels more suitable for spawning and fry (NMFS 2007).

Southern California steelhead trout have adapted to these regional stresses in several ways. Some research suggests that they have developed the ability to survive in higher water temperatures than their more northern relatives (Leydecker and Grabowski 2006; Capelli 1997). Other research suggests that anadromous steelhead trout populations survive blockage of the river mouth and other barriers further up the river through life history switching (NFMS 2007). According to this research, individuals that have been blocked from migrating to the ocean by a sandbar may become lagoon anadromous, spending a season in the estuary at the river mouth before migrating to the ocean. Similarly, individual steelhead trout that have been prevented from migrating to the ocean by low surface water or other barriers to passage may become freshwater resident in the upper river for all or part of their lives, and their progeny can revert to anadromous behavior (NMFS 2007).

While the natural stresses described above don't need "fixing," they result in a local population that has wide variation in run size from year to year (NMFS 2007), and this has significance for recovery efforts: a population that experiences "good years and bad years" in terms of run size (and reproduction) may live closer to the edge of survivability, magnifying the impact of human changes such as water pollution and dams. Therefore, a recovery strategy for this Vision Plan envisions the preservation and enhancement of natural river functions (such as pool and riffle formation) that are already employed by steelhead trout in their struggle for survival, as well as the removal of man-made pollution and of barriers to migration such as dams. Figure 7.9 summarizes threats to steelhead trout survival identified by NMFS in its interim recovery plan, parkway features to address those threats, and broader policies for the entire watershed.

Threat Factors		Recommendations	
Description	**Impact**	**Parkway Area**	**Watershed**
Threats to habitat and range:			
Alteration of natural stream flow patterns and floodplains; physical impediments to fish passage (NMFS 2007)	• Blocked passage to and from spawning areas • Loss of localized "survivable areas" such as pools, snags • Lack of vegetative canopy	• Reduce water consumption through conservation to leave more instream flow • Preserve unchannelized status of Lower Ventura River • Prevent development in the floodway	• Reduce water consumption through conservation to leave more instream flow. • Implement Matilija Dam Ecosystems Restoration Project • Develop and implement fish passage facility for Casitas Dam • Monitor function of fish passage facilities at Los Robles Diversion dam for improvements as needed
Alteration of sedimentation regime	• Disturbance of gravels used for spawning and sheltering of fry	• Preserve unchannelized status of Lower Ventura River • Prevent development in the floodway	• Implement Matilija Dam Ecosystems Restoration Project • Monitor and improve function of sediment screening at Los Robles Diversion dam
Waste discharges	• Excess nutrients in stream water • Excessively high water temperature	• Arboretum and polishing ponds • Distributed storm water treatment • Promote volunteer water quality monitoring	• Enhance agricultural practices and storm water treatment practices at watershed level
Exotic species	• Interference with hydrologic function (*Arundo donax*, Quagga mussels) • Competition with native vegetation (*Arundo donax*)	• *Arundo donax* eradication • Prohibit introduction of game fish in Lower River	• *Arundo donax* eradication (beginning in upper watershed • Continue Quagga mussels eradication efforts in Casitas Lake
Loss of estuarine habitat	• Loss of habitat for juveniles and lagoon-anadromous individuals	• Expand Ventura River estuary	---
Stocking of hatchery reared non-native steelhead and other fish	• Inbreeding depression • Predation • Disease	• Prohibit introduction of hatchery reared non-native steelhead trout	• Prohibit introduction of hatchery reared non-native steelhead trout • Consider elimination of introduced game fish from Casitas Lake
Other threats:			
Overfishing	• Steelhead trout population decline	• Continue prohibition on steelhead fishing in Lower Ventura River	• Continue prohibition on steelhead trout fishing in watershed

FIGURE 7.13 *Steelhead trout recovery: threats and recommendations.*

Cultural Element

This element focuses on meeting objectives related to the relationship between people and the Ventura River. Major objectives for this element are improving access and recreational opportunities at the River, increasing awareness of the river through formal and informal educational opportunities, encouraging stewardship, and minimizing land uses that would be incompatible with the overall objectives of the parkway. The circulation of visitors through the parkway is a major component of improved access; that subject is discussed in greater detail in Chapter 8, Circulation.

Bringing People to the River

Improved public access and riverside recreation are two important purposes of river parkway development under the California River Parkways Act (2004). Currently, convenient approaches to the Lower Ventura River within the proposed parkway area exist only at Foster Park and at the river mouth. This is due primarily to man made factors such as private property, a lack of public easements, and the barriers presented by Highway 33 and the Army Corps levee. However, lack of access is also attributable in part to natural factors such as dense riverside vegetation and changeable river channels that would defy many visitors' images of a quiet streamside walk. The following chapters of this Vision Plan present ideas for addressing these difficulties.

The river that lies at the core of the proposed parkway is an invaluable natural and recreational resource. This plan emphasizes the enjoyment and protection of that resource through passive recreational activities such as walking, hiking, biking, nature viewing, and education. Features that promote these activities, discussed in Chapters 9 through 12, include safe and legal access points for close observation and enjoyment of the Ventura River, places where people can gather near the river for picnics or other activities, places that focus visitors' attention on the historical richness of the area, and places that focus visitors' attention on current and future efforts to remediate the hydrological systems and ecosystems of the area.

Entry points are important places for visitors to become aware of the existence of the proposed parkway and the river and the activities and facilities available. Foster Park at the north end of the parkway corridor, and downtown Ventura and the river mouth at the south end, are natural entry points for travellers on the major roads in the area, and Chapters 9 and 12 give attention to informational facilities for orienting visitors at these locations.

Wayfinding features such as path alignments, signs and trail markers shown in the following chapters are important for suggesting the existence of destinations and activities that visitors might otherwise miss, and helping them get there with minimal disturbance to natural systems. These features can enhance the experience of visitors by suggesting that they are safe and will not get lost, but they can also show users when a location might be unsafe or an activity damaging to the environment. At the same time that they perform all of these functions, these features need to suggest many crossroads and many open choices, so that there is some adventure in every visit.

Balancing Visitor Access with Ecosystem Protection

Implicit in the objective of improving visitor access is the priority that improved access must not significantly impair the health of sensitive river ecosystems. The impacts of visitors can include the trampling of fragile vegetation, the erosion of soils, water and air pollution, and the disruption of wildlife. These impacts, as well as those of congestion and the deterioration of the aesthetic qualities of a landscape, can also lower the quality of the visitor experience itself (Manning 2007).

To some extent, existing difficulties for people in approaching the Ventura River might be seen as factors that have protected the sensitive natural ecosystems along the lower river from human disturbance and left the Ventura River as "one of the very few watercourses left in southern California that bear any semblance to pre-settlement conditions" (Hunt 1994). In fact, they were one factor leading a conservation biologist to recommend in the 1990's that the Ventura River bike and pedestrian trail be routed away from the river, on the east side of the levee. They are also likely factors influencing the county's policy of discouraging camping in the floodplain and estuary.

However, the isolation of the river from the city that lies just a short walk away also has serious costs. For Ventura citizens, ignorance of the river next door can lead to a lack of stewardship and a lack of awareness regarding the steps that should be taken to protect the ecosystem services provided by the river — *out of sight, out of mind*. The result is that vandals, polluters, and unauthorized campers have access to the river (and an impact on its health) while potential stewards among the public do not have access. In this respect, increased public access under appropriate circumstances should be seen as a factor that would enhance stewardship and protection for the river's ecosystems.

The general approach advocated in this Vision Plan, then, is a balancing of ecosystem protection and visitor access that advances both of these objectives without significantly compromising either. While a perfect balance may be unattainable, methods for systematically approaching this goal are available. For an example of a popular method and its application to the proposed parkway, see "The National Parks Experience" in this chapter.

Strategies for balancing visitor access with ecosystem protection that are discussed elsewhere in this Vision Plan include:

- Designation of the west side of the river as primarily natural and undeveloped in character with limited visitor facilities that reinforce that designation
- Continuance of the Ventura River Trail (which is primarily used by cyclists) on the east side of the levee and highway rather than closer to the floodway itself
- Creation of walking trails with different levels of facility, some of them ephemeral, in order to avoid overcrowding of especially sensitive areas
- Limitation of vehicle access and parking facilities in sensitive areas
- Signage and interpretive materials that emphasize the sensitivity of river ecosystems and encourage appropriate visitor behavior
- Stewardship programs, including docents, trail guides and river quality monitoring that are designed to encourage the consistent presence throughout the parkway of concerned individuals.

BUILDING STEWARDSHIP

Stewardship -- "Actions taken to maintain, restore and improve one's community, the landscape, and larger ecosystems" (Hester 2006) is the most important reason for designing improved public access to the Ventura River. Given the adjacency of the Lower Ventura River to an urban population, people will inevitably have an impact, for better or worse, on the river and its associated ecosystems. Stewardship -- a process through which humans interact with their environment in a positive, nurturing way -- should be seen as a prerequisite for the sustainability of the river.

Stewardship is reciprocal in the sense that people who serve their community and the ecology of their landscape also receive rewards that include experience as well as recognition, and this reciprocity is what makes stewardship impelling to Americans in spite of the sacrifices involved in giving service (Hester 2006). Engagement in stewardship changes individuals by directing their attention outside the inner circle of the self, into an ever-expanding world of awareness and concern about their neighborhoods, cities, watersheds, and finally, the vast ecological web of the landscape itself (Noss 1994) (Figure 7.17).

In his book *Design for Ecological Democracy* (2006), Randolph Hester imagines an future in which ecological concern and democracy become inseparable components in the urban planning process:

> *Direct democracy enlivens ecology with local wisdom and overcomes the alienation, anomie, and bleakness*

FIGURE 7.14 *Looking north from the Main Street Bridge.*

AN ABUNDANCE OF RICHES: TAKING ADVANTAGE OF VIEWSHEDS IN THE PARKWAY CORRIDOR

> *A view is an impeller: A powerful magnet, it will draw one far, and from one position to another, for the opportunity of better commanding its limits or seeing some part in a new and intriguing way (Simonds 1997).*

Siting decisions regarding trails, paths and resting areas in the following chapters attempt to take advantage of the abundant viewshed resources that are present in the proposed parkway area. Here are a few examples:

- The view into the upper watershed from the Casitas Vista Bridge at Foster Park (Chapter 9)
- Meandering river channels tightly framed by bluffs to the west as seen from the Cañada Confluence or the trail to Cottonwood Junction (Chapters 10, 11)
- The wide-open expanse of the Downtown Delta gradually narrowing into the middle watershed as the river passes north through farms and urban neighborhoods, as seen from the Main Street Bridge (Chapter 12).

ACHIEVING A BALANCE BETWEEN VISITOR ACCESS AND ECOSYSTEM PROTECTION: THE NATIONAL PARKS EXPERIENCE

With over 250 million visitors per year and responsibility over sensitive landscapes that are nearly sacred in the eyes of many, the U.S. national parks may be an ideal place for "pulling out all the stops" in an attempt to achieve a balance between visitor access and ecosystem protection. For nearly twenty years, the National Parks Service (NPS) has systematically studied the management issue of *social* carrying capacity — the level and type of recreation use that can be accommodated in a park without violating defined standards for both resource protection and a quality visitor experience. One result of the NPS experience is its Visitor Experience and Resource Protection (VERP) framework for the development of carrying capacity plans. The framework is currently being incorporated throughout the park system and has already been applied at more than twenty locations within the system (Manning 2007).

The VERP framework is based on the principle that the requirements of ecosystem protection and the desires of visitors are not necessarily in conflict, and that limitation of visitor access need not be the underlying intent in management policies to protect park resources. The key is to identify the factors that provide a quality experience as defined by visitors themselves, and then match those factors with the requirements of resource protection in order to pursue both priorities. For example, studies have disclosed that wilderness visitors tend to prefer encounters with five or fewer other groups per day (Manning 2007). This visitor preference for a quiet, uncrowded wilderness experience is consistent with the priority of avoiding excessive impacts on park resources, and can be satisfied through management policies such as structuring visitor facilities to avoid overcrowding. The VERP framework is applied by identifying visitor preferences through surveys or other means, defining park management objectives (often called *desired conditions*) that encompass both the quality of visitor experience and ecosystem protection, and then developing related and measurable *indicators* and *standards* for maintaining those desired conditions. Ultimately, management actions for achieving the identified standards are not limited to those that restrict visitor activities; in many cases, ecosystem protection is enhanced through the *expansion* of areas available to visitors or through programs to educate visitors about minimizing their impacts on the environment (Manning 2007). This process is illustrated in Figure 7.16.

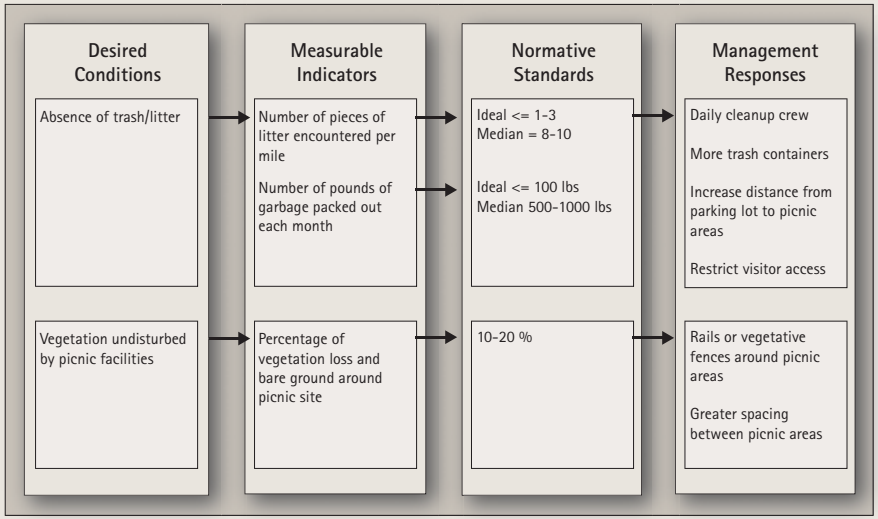


FIGURE 7.15 *An example of the application of the VERP framework to several desired parkway conditions.*

> *that some see in a world of severe limits. Hands-on participation shows ecology how to recultivate fallow community and environmental caring. . . . Direct democracy provides the forum through which ecological thinking becomes part of daily life and decision making. (Hester 2006)*

In this view, spaces are not only designed *with* input derived from public participation in the planning process; they are also designed *for* the encouragement of public participation that continues in the form of stewardship. This Plan recommends six main strategies for promoting continuing stewardship for the Ventura River and its environs:

- Bringing people closer to the river through improved access and circulation
- Finding opportunities for people to participate in the construction of the parkway
- Educating people regarding the river and its environs
- Involving people in a continuing relationship with the environment through activities that focus on monitoring environmental conditions
- Creating a local floodplain school as a nexus for many of these activities
- Seeking funding for professional stewards with appropriate training and expertise who can recruit, support and supervise volunteer stewards and ensure that their activities are sensitive to ecological concerns.

Building the Parkway with People

While charrettes and community input workshops are frequently employed in landscape planning processes, public participation in the construction of large landscape projects may be far less common. Community members could participate in the building of the parkway. For example, local seed collection and propagation would provide a safe, supervised context for the presence of volunteers in and around the river floodway and would result in a supply of

native plant material for parkway restoration – plants that are best adapted to climate conditions and the needs of local ecosystems.

Education for Stewardship

Another strategy for promoting stewardship is to recognize that the primary purpose of interpretation — efforts to orient and educate visitors to the proposed parkway — is to build public support for the river environment, rather than merely making for an interesting visitor experience. An observation platform at the river's edge (Chapter 10) can provide a pleasant view of the water. However, with appropriate interpretive materials, the same observation point can make visitors aware that their own efforts to conserve household water can help to increase the flow of water in the river, and that the floodplain and its active flooding processes need to be preserved.

People Monitoring the Parkway

As a third strategy, this plan recommends an emphasis on planning programs that will involve the public in the continuing preservation and enhancement of the environments in and around the proposed parkway area. One appropriate focus for these programs would be the monitoring of the environment. A multi-generational effort to restore large areas of the lower watershed will require an enormous body of data regarding the existing flora, fauna and hydrological conditions of the area as well as numerous observations regarding the continuing effects of restoration activities on those features. One existing local program, the Ventura Stream Team (see inset), shows how members of the public can contribute scientifically-valid observations with professional training and supervision, while having a great time doing it. In a similar vein, future volunteers could photograph evolving erosion and sediment conditions along the river, record animal sightings, or map the distribution of invasive plant species in support of eradication efforts.

Passive recreation in undeveloped areas is pleasant and rewarding for its own sake, but many hikers are aware that an additional element of joy comes with having a mission to fulfill in approaching the undeveloped lands. Proper planning and supervision of monitoring activities could result in a greater number of people safely and sensitively approaching the Ventura River and constituting a consistent presence there. Their mere presence would passively discourage vandalism, poaching or other harmful activities, while increasing the perception of safety for all parkway visitors.

A Floodplain School

Less than ten feet underneath every school building on the Westside of Ventura, water percolates through groundwater basins, moving toward the Ventura River and eventually, toward the Southern California bight. How many students in these schools are aware that they live and study in a floodplain? A fourth strategy for building stewardship would be a river-friendly floodplain school, a home base that would reinforce the other three strategies of parkway-building, education and monitoring. A Westside school could be enhanced with curricula in the humanities, arts, and sciences sharing a focus on watershed processes and watershed restoration. Reading classes could include Aldo Leopold's *A Sand County Almanac* and other classics in environmental literature. Arts workshops could enlist North Avenue artists who are increasingly producing work that addresses both the history and the future of the river. A school cross-country team could use parkway trails for training, while a chemistry class could test the quality of groundwater samples. If the program is established at an elementary school, students from a nearby high school would receive extra credit for visiting and supervising similar activities after school. Conversely, if the program has a high school as its base, local elementary students would frequently visit for the same activities. Using the school as a base for community meetings to plan the parkway and for the organization of volunteer programs for adults and youth would strengthen community ties in two ways -- first of all, by involving all ages together in the restoration of the lower watershed and second, by strengthening the relationship between civic activities and their sense of place.

ONE STEWARDSHIP MODEL: THE RIVER GUARDIANS

Efforts to improve Ventura River water quality have benefited uniquely from the work of volunteer stewards. Each month since January 2001, the Ventura Stream Team, a joint effort of the Santa Barbara Channelkeeper organization and the Surfrider Foundation Ventura Chapter, has trained and organized students, local residents and environmental activists and sent them knee-deep into the river and its tributaries to sample water quality and report on the results. The Team collects data on eight critical quality measurements at fourteen sites from the lowest freshwater reach of the river to streams above Matilija Dam (Santa Barbara Channelkeeper and Surfrider Foundation 2006).

In January 2006, The Stream Team published the results of six years of testing in a comprehensive and understandable guide to water quality for all of Ventura's residents — the report, and information about volunteering, are at http://www.stream-team.org.

FIGURE 7.16 *Ventura Stream Team. Photo: Surfrider Foundation 2008.*

PROMOTING ENVIRONMENTAL JUSTICE

Issues of environmental justice arise when the benefits of a healthy landscape, including open space and recreational opportunities, are unevenly distributed across different socioeconomic groups. Chapter 5 describes the relative lack of accessible public park space for residents of Ventura's Westside, a community that includes a large proportion of Hispanic and low-and-moderate income families. This Plan seeks to address this inequity by improving circulation and mitigating the physical barriers that stand between this neighborhood and the proposed river parkway, and by addressing access to the river from Westpark (chapter 12).

Issues of environmental justice also arise when the detriments of an unhealthy landscape impact disproportionately upon historically disadvantaged neighborhoods. Again, the Westside of Ventura appears to contain a disproportionately high number of brownfield sites with demonstrated or actual contamination arising from past industrial activities. One illustration of an approach for addressing this concern appears in the discussion of a prominent Westside brownfield site in Chapter 10, Canada Confluence.

MINIMIZING INCOMPATIBLE LAND USES NEAR THE RIVER

Chapter Three discussed the concept that a river is an integrated system of a constantly changing wet channel (or channels) and an adjacent floodplain, that is, the area beyond the river channel that may be intermittently flooded. Determining the exact boundaries of an existing floodplain is difficult since an unimpeded floodplain slowly but continuously changes in response to changes in river flow, sedimentation and topography due to both natural and man made causes. Nevertheless, based on visible topography it is reasonable to assume that the landscape encompassed by the proposed Lower Ventura River Parkway lies entirely within the present or historical floodplain of the river. Any discussion of land use policies for the parkway area should occur within the context of responsible and sustainable floodplain management.

Developments in the Ventura River floodplain that warrant a brief discussion within the context of this Vision Plan are industry, agriculture, and housing or mixed-use housing and commercial. An additional existing landuse that deserves discussion is the practice of casual or unauthorized camping primarily by homeless individuals, that occurs within the floodway of the river itself.

Two Visions for the Floodplain

A specific land use plan for the Lower Ventura River floodplain, beyond the proposed river parkway, is beyond the scope of this document. However, it is useful to imagine two starkly differing pictures of a future Lower Ventura River floodplain; both visions include human land uses in the floodplain, and both involve the need for the mitigation of risks to life and property from occasional high velocity floods.

In one vision, a traditional model based upon Twentieth Century practices, an unbroken cycle occurs: flooding leads to loss of life or property damage, governmental disaster relief, and large structural flood control projects such as concrete channels and levees. These efforts and the perception of flood protection that they create lead to increased floodplain encroachment and development. Despite the construction of flood "control" measures, future floods cause even greater economic losses due to the higher density of development, leading to still more structural flood "control" projects in a seemingly unending cycle (Riley 1998; Water Resources Council 1979). Under this regime, average annual flood damages (adjusted for population growth and inflation) actually increased -- more than twofold -- following this nation's era of massive flood control projects (Riley 1998).

Under another vision, the one recommended by this Plan, limited development continues in the floodplain within a context of non structural flood protection measures including land-use planning and regulation for a mixture of development and open space, stream restoration, emergency flood warning systems, relocation of structures from hazard areas, architectural designs that raise buildings above the floodplain or incorporate flood walls, and environmentally sensitive snagging and clearing projects. These measures, pioneered by the Tennessee Valley Authority in the 1950s, are increasingly being advocated by the United States Army Corps of Engineers, despite a federal funding structure that remains strongly biased in favor of structural concrete flood control projects (Riley 1998). What all of these approaches have in common is that they serve a multi-objective planning strategy in which measures that may be necessary for flood mitigation also serve other purposes such as ecosystem restoration. Following are five land use issues where this approach may have implications for the management of the floodplain of the Lower Ventura River.

The Value of Open Space

Open space should be a priority land use for the floodplain surrounding the proposed parkway. Vegetated open space is an example of a land use that serves multiple floodplain management objectives. It minimizes damage from occasional floods through the absence of structures that would otherwise incur damage, while the availability of land for the spreading out of flood waters reduces flood velocity and damage downstream. At the same time, this land use provides a resource for public recreation while providing ecosystem services that include water storage and purification, reduction of the urban heat island effect, habitat for flora and fauna (including species that pollinate local crops) and sequestration of carbon that would otherwise enter the atmosphere and hasten global warming.

Ecosystem services have economic value that has been estimated at 33 trillion dollars per year worldwide (McKibben 2007), and there is a point in any landscape where the cost to society of displacing ecosystems begins to exceed the value of the man-made wealth produced by that displacement (Daly and Farley 2004). While it may not be possible to accurately determine this balance in monetary

displacement (Daly and Farley 2004). While it may not be possible to accurately determine this balance in monetary terms, there is a clear implication that open space is not merely vacant space in between economically valuable lands.

Minimizing Heavy Industry

During the past century, the floodplain has seen industrial uses including oil drilling, storage and refining, chemical production and storage, and riverbed mining. These uses have had economic benefits such as job and tax generation that continue to the present, and they have formed part of Ventura's cultural heritage. However, heavy industrial uses also present serious challenges for a successful parkway project in a floodplain. Large, heavy industrial infrastructure is unlikely to be compatible with even shallow, infrequent flooding, and facilities close to the river present a constant risk of toxic spills as well as groundwater contamination in this area where shallow aquifers lay adjacent to the river.

Petroleum extraction continues in the proposed parkway area and has a direct economic impact on the region that will continue for an indeterminate number of years. However, in considering the effects of this industry and other floodplain management and ecological objectives, it is reasonable to foresee the gradual conversion of this land use over several decades to come; the oil resource will not last forever and the lifecycle costs of extraction may exceed the economic benefits of extraction long before all of the oil has been removed from the area (Chen et al 2007).

Preservation of Agriculture

This vision plan encourages the preservation and expansion of agricultural production in and around the proposed parkway area, and includes (in Chapter 10) an illustration of a land use model consisting of restored river corridors buffered by agricultural land, transitioning into residential tracts. Agriculture, like recreational open space and undeveloped lands, is ideal for multi-objective floodplain management. Many farms can be compatible with occasional flooding and most farms provide some moderate ecosystem support (e.g. small animal cover on their edges) while also presenting opportunities for the involvement of visitors.

Sensitive Residential Development

Existing and planned residential developments in the floodplain also have both beneficial and potentially harmful aspects from the standpoint of parkway objectives. Floodplain residential neighborhoods allow people to live in closer proximity to undeveloped lands with greater opportunities to benefit from contact with the undeveloped lands. Residential developments with attendant commercial spaces also provide jobs and tax revenue. Designed and built with Low Impact Development practices described elsewhere in this Plan, they can be compatible with ecosystems related to the river.

However, floodplain residential developments also have the potential to devour all open space outside of the floodway itself, for the simple reason that according to traditional economics, they have economic benefits that are easy to measure. To some extent, these economic benefits can be illusory. Developers traditionally stress the jobs, construction related service revenue, and tax base provided by developments without including the costs of taxpayer-funded infrastructure and displacement of ecosystem services. Simply stated, residential development in the floodplain is incompatible with parkway goals only if there is too much of it.

The recommendation here is to balance the tendency toward floodplain development with a recognition that undeveloped lands, agriculture, and open space are more geographically appropriate floodplain uses with at least equal economic benefits.

Mitigating the Impacts of Human River Dwellers

Chapter Five discusses the fact that, while members of the general public have little access to the Lower Ventura River, a number of individuals, many or most of them homeless, actually live in the floodway of the river itself on either a short or long term basis, concentrated mostly in the area near the Main Street Bridge and in Seaside Wilderness Park near the estuary. Casual or unauthorized camping in along this stretch of the river is an historical land use reaching back at least to the "Hobo Jungle" period early in the Twentieth Century.

Casual or extra-legal camping in and adjacent to the floodway has negative impacts on river ecosystems that include fires, trampling of vegetation, predation of wildlife, trash and water pollution. It has negative impacts on potential parkway visitors reflected in the comments of community members who have reported that the presence of campers feels threatening to them. And, most importantly, the practice threatens the safety of the campers themselves, who face the risk of drowning in unpredictable but inevitable floods. Therefore, consistent with city and county policies, this Plan would discourage camping in the floodway. Any efforts to discourage an overnight presence in the floodway should be part of a broader effort to provide local alternatives to homelessness, discussed in Chapter 12, Downtown Delta.

Efforts to discourage overnight camping in the parkway are not a reason to ignore the historical presence of homeless individuals there. Interpretive exhibits should acknowledge the history of Hobo Jungle and educate visitors about the current efforts of the city and county to combat homelessness. As part of the parkway planning process, planners or volunteers should actively seek oral histories from individuals who have lived at the river in order to better inform the sense of this place that may be communicated to future visitors. Parkway planning processes should include the participation of city and county.

River parkways improve or protect the water quality in our rivers and streams.

California River Parkways Act of 2004
California Public Resources Code §5751(g)

CHAPTER 8: CIRCULATION PLAN

Overview and Existing Conditions

Much of the visitor's experience of the six mile Lower Ventura River will consist in moving around the river corridor, walking, pedalling, or driving. This chapter addresses existing circulation conditions in the proposed parkway area and concepts for visitor circulation throughout the parkway. Succeeding chapters feature more detailed circulation ideas pertaining to individual sites.

HIGHWAYS, ROADS, AND BRIDGES

Highways 101 and 33 intersect at the southern end of the project area, the 101 running east and west, while Highway 33 runs north and south. Major streets are Ventura Boulevard (north-south orientation) and Main Street (east-west). Automobile traffic along the six-mile stretch from Foster Park to the mouth of the river is served by public and private roads. A typical street grid services the east side of the river. Passage over the river is provided by two public bridges. The Main Street Bridge in the south and Casitas Vista Bridge in the north both also provide narrow passage for pedestrians and cyclists and views of the river. Both bridges feature free public parking less than a block away. Shell Road Bridge, in the central portion of the project area, provides crossing for industrial traffic and is privately owned. The west bank of the river in the project area is rural in character, with only three public roads; Casitas Vista Road near Foster Park, and Main Street which merges into the third public passage, Highway 101. However some of the properties have extensive fire roads. This network of roads allows motorists ample opportunity to cross and circumvent the Ventura River, but there are only two lots in which motorists can park their cars and join the River Trail or rest in a park-like atmosphere. These circulation patterns suggest that the paved and developed roads did not evolve with the Ventura River as a destination intended for the public.

[OPPOSITE] FIGURE 8.1 *Clockwise from left: Shell Bridge; Ventura River Trail in the North Avenue area; railroad trestle over the Ventura River Estuary; agricultural service road, west bank of river.*

TRAILS

No walking trails currently exist in the Lower Ventura River floodway or along either bank of the river. There are two designated trails which serve cyclists and pedestrians in the proposed parkway corridor. The Ventura River Trail begins approximately six miles upstream from the coast at Foster Park (where it meets the southern end of the Ojai Valley Trail) and runs along the east side of the river for almost the entire length of the proposed parkway, ending several blocks from the coast. A number of locations from the street grid provide entrance points. The Ventura River Trail is for both pedestrians and cyclists, although many people believe that it is only for the latter. Omer Rains is a coastal bike and pedestrian trail with a short section that runs up the river from the estuary, on top of the levee, until it reaches the Main Street Bridge and turns west to continue along the coast. Despite their proximity, the two trails never actually meet.

Despite its name, users of the Ventura River Trail cannot walk or ride near the Ventura River or enjoy views of the river. Along most of the first four miles of the trail below Foster Park, physical and visual access from the trail to the river is blocked by private property restrictions, fences, and high, dense vegetation. Along the other two miles of the trail approaching the coast, the Ventura levee and Highway 33 form a hard, impenetrable edge that blocks physical and visual access. These constraints impact not only trail users but residents of the Westside community. Long stretches with little vegetation and fast moving traffic create a hot, physically uncomfortable and unsafe atmosphere along sections of the trail.

THE TRESTLE

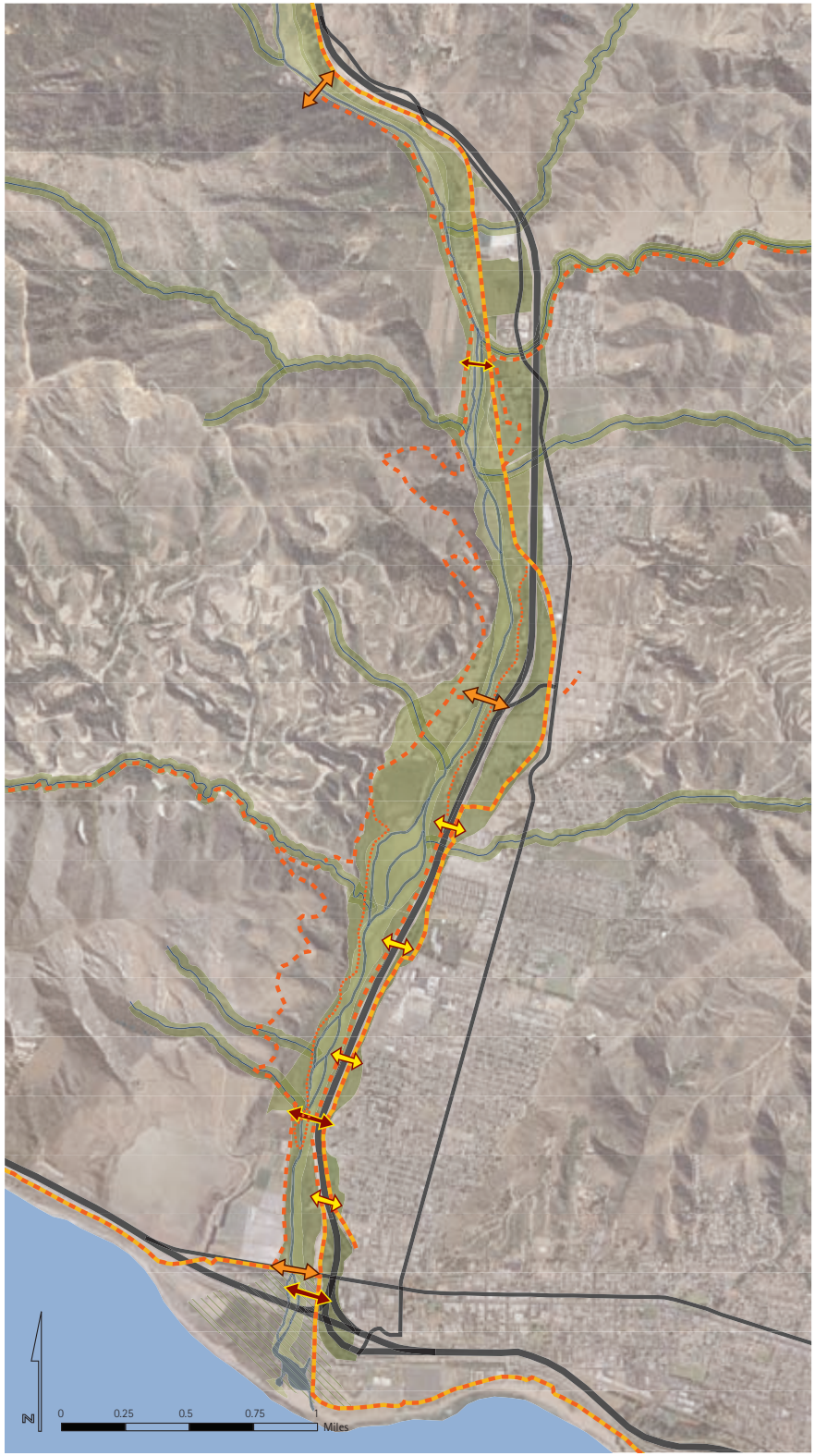
Railroad service cuts across the southern end of the proposed parkway near the beach. Where they cross the estuary at the river mouth, the tracks are supported by an iconic steel trestle that attracts both out-of-town visitors and Ventura residents. Pedestrians who cross here are treated to an impressive view of the river and estuary but risk severe injury, death, or prosecution. The trestle also impedes sediment flow and disrupts natural processes.

Design Concepts

CIRCULATION PLAN

Key ideas underlying the circulation element of this plan are:

- the opening up of the west bank and hillsides of the river through a variety pedestrian trails, improved or ephemeral, that emphasize a experience in nature
- the creation of opportunities on both banks of the river for walkers, and in some cases cyclists, to view the river more closely
- the combining of the trails with existing and proposed bridges to create loops that would provide flexibility in both distance and quality of experience (urban or wilds) for parkway visitors



Symbol	Element	Description
	Highways	Highway 101 and highway 33 — connections to outside the parkway
	Major Roads	Ventura Avenue — principal vehicular route within the parkway
	Multi-use Trails	•existing and proposed trails •universal access •segregated fast and slow lanes •permeable and impermeable paving •quick access to amenities and services
	Nature Trails	•provide access to river and undeveloped lands settings •limited amenities and services •unpaved •proposed trails
	Ephemeral Trails	•limited access •wild character
	All-access Bridges	•existing vehicular river crossing •currently has or is proposed to have bicycle and pedestrian lanes •connects urbanized areas to rural areas
	Limited-access Bridges	•proposed river crossing •non-motorized use •connects urban edge to undeveloped area
	Elevated Freeway Crossings	•proposed freeway crossing •originates in urban neighborhood from proposed pocket park •terminates on proposed Levee Trail •non-motorized use

[OPPOSITE AND ABOVE] FIGURE 8.2 *Circulation Plan.*

FIGURE 8.3 *Typical lane configuration.*

MULTI-USE TRAILS

Multi-use trails within the proposed parkway would provide elements which accommodate many types of users. Located primarily along the east side of the river adjacent to urbanized areas, the trails would provide multiple entry and exit points for easy access to the existing street grid with its restaurants, vehicle parking, and other urban attractions. In addition, they would pass through two existing parks and two proposed parks with rest rooms, picnic areas, and other visitor facilities. In addition, the trails would provide opportunities for trail users to stop at occasional river overlooks.

Most multi-use trails would follow the existing Ventura River Trail, but one, discussed and illustrated in Chapter 12, would be located on top of the Ventura levee. In some areas it would be necessary for multi-use trails to run in close proximity to Ventura Boulevard or Highway 33. Greening the edges of these thoroughfares would provide a more pleasant experience for trail users and motorists alike. Grading and pavement would be appropriate for wheelchair users and those in search of a relaxing stroll. There would be separate trails for slow- and fast-moving trail users. This would most often result in pedestrians on one path and cyclists or skaters on the other. Separating wheel traffic from foot traffic would allow each type of user to proceed at a comfortable pace without creating conflict.

NATURE TRAILS

Nature trails would run the length of the parkway on the west side of the Ventura River and would have permanent alignments, a clearly marked foot bed, appropriate signs for wayfinding purposes, and occasional interpretive displays for educational purposes. These trails would provide occasional views into the river itself, but they would be located outside the river floodway and designed to avoid undue impact on the high-value habitat through which they pass.

Development of these trails would require the permission and support of private property owners in some areas, and would require appropriate arrangements to avoid any impacts from recreational users on adjacent private land. Erosion control measures would be implemented where needed, but impermeable surfaces would not be put in place. Disruption of natural systems would be minimized during development, and alignments and signage would encourage visitors to keep to the trail.

Different trail segments would offer experiences of riverside, farms, orchards, and hills. Anticipating future permanent conservation of hillside areas above the river, several trails along tributaries would connect river walkers with potential trails on the hilltops. Nature trails would provide tomorrow's stewards a place to experience the natural world.

FIGURE 8.4 *Nature trails would include signage for wayfinding purposes and interpretive displays where appropriate.*

EPHEMERAL TRAILS

Ephemeral trails are one way to address the unique characteristics of the Lower Ventura River in a way that affords limited public access without excessive impact on sensitive riverbed ecosystems. Ephemeral trails are marked paths with temporary alignments. In the dry seasons, these would allow hikers to walk in the riverbed, climb over cobbles and boulders and touch the river's waters when conditions permit. These trails would feature no permanent improvements, and alignments would be changed periodically by parkway staff in order to minimize the impact of hikers.

Ephemeral trails are a useful concept along the Lower Ventura River because for most people the idea of a river means flowing water, and some visitors will attempt to approach the flowing river channels regardless of whether a safe, low-impact method exists for doing so. However, the flowing channels that run through the proposed parkway area are often deep within the undeveloped riverbed or floodway zone. This zone is rugged, densely vegetated in some places, hazardous for walkers unaware of loose boulders or snakes, and especially vulnerable to ecosystem damage from visitor traffic. Nature trails (previous page) can take walkers along the outside edge of the floodway where the flowing channels are usually not visible, but permanent trail alignments that would take visitors to the edge of a flowing channel will not be feasible in most parkway areas because the braided channels can change location, and because permanent infrastructure would unduly interfere with the sensitive ecosystems of the riverbed and would be subject to occasional damage or destruction from flood scouring.

FIGURE 8.5 *An ephemeral trail would be temporary and undeveloped but could include amenities such as movable trail markers and ramps to allow hikers to enter the riverbed without doing damage.*

Ephemeral trails would require virtually no development, but they would need programming, monitoring, and maintenance. Low-impact amenities might be located for the purpose of improving visitor safety as well as protecting the environment. For example, temporary pole markers could be placed to indicate a path that would avoid risky channel crossings or dense vegetation, or several movable aluminum ramps might be placed to minimize erosion, protect dense vegetation and avoid injuries at the especially vulnerable spot where hikers leave the riverbank and climb down into the riverbed. These riverbank entry points would also feature signage providing information about docent-led tours, warnings regarding the dangers of entering the riverbed and descriptions of riverine ecosystems. Regular monitoring must occur in order to ensure the integrity of river processes and habitat. Maintenance would be

conducted as indicated by monitoring, to address issues such as wear due to use and redirection of individuals away from sensitive habitats such as nesting areas.

The use of ephemeral trails in the parkway area would be extremely limited. The desired visitor experience might be provided by a trail of 200 yards or less; only one or two such trails might be maintained within the parkway, with locations changing according to conditions.

Ephemeral trails would be an ideal location for docent-led tours that would provide information about river processes and sensitive ecosystems, for example, the eddies, riffles, and pools needed for steelhead growth and passage, or the need for caution due to the presence of hazards such as stinging nettles and rattlesnakes. An important concept in ecosystem function, ephemerality could provide opportunities for visitors to learn about the unique qualities of the Lower Ventura River, including the realization that not all rivers are contained in one channel that is full of water all of the time. Experiences such as this could lead to a greater respect for the unique character of Southwestern rivers.

ALL-ACCESS BRIDGES

Three existing bridges that cross the Lower Ventura River – at Casitas Vista Road at Foster Park, at Shell Road near the center of the parkway corridor, and at Main Street near the river mouth – are well situated for crossings that would provide visitor access to the west side of the river. The bridge at Shell Road is currently closed to the public but an arrangement with the owner for public passage would be valuable when combined with trail easements on the west side of the river.

Only one of the bridges, at Main Street, has a dedicated lane for non-vehicular traffic. Expanding the bridges at Casitas Vista Road and Shell Road to better accommodate walkers and cyclists would improve circulation, but replacement or significant alteration are ruled out by the fact that both bridges are architecturally impressive. One solution that could be considered is a parallel bridge structure that would allow non-vehicular travellers to cross at the same location.

These crossings, combined with trails on both sides of the river, would form flexible loops that allow users the ability to choose the duration of their hike or cycling trip. In addition, they would provide access to many features in the western half of the parkway for visitors who prefer not to walk from their vehicles.

FIGURE 8.6 *The bridge at Shell Road.*

FIGURE 8.7 *Materials like rope and wood would suggest a more rustic sense of recreation for visitors crossing between urban Ventura and the Cottonwood Junction area.*

LIMITED-ACCESS BRIDGES

The parkway would feature one or more bridges for pedestrians only and this Plan identifies three potential locations for them. Each of these pedestrian bridges would be distinct from the others in its character and design. One, located between Casitas Vista and Shell Roads, would provide a crossing between the Cañada Confluence area (chapter 10) on the east bank and a trail through the avocado orchards on the west bank. The second (figure 8.7), located between Shell Road and Main Street, would provide a crossing between West Side Ventura and the Cottonwood Junction undeveloped area (chapter 11). Finally, a reconstructed railroad trestle at the river mouth would feature safe, dedicated pedestrian passage and impressive views of the estuary. In addition to accommodating the desire to cross the estuary (currently a hazardous attraction for many visitors), the reconstructed trestle with a wider span would allow improved hydrological function where the river enters the estuary (Wetlands Research Assoc. 1994).

It is natural to want to cross a river, and elevated crossings above the dense vegetation and rugged landscape of the Ventura River would be the most practical way for most visitors to closely observe the river channels and their associated ecosystems. The combination of all-access and limited-access bridges would provide six potential locations where teachers could plan field trips from local schools, where Ventura families and nearby workers could observe a truly wild place with just a lunch hour to spare.

ELEVATED FREEWAY CROSSINGS

Elevated freeway crossings would enable visitors to access the proposed Ventura levee trail (chapter 12) from four locations on the west side of Ventura. These connections would surmount the principal physical obstacle between the river and the community, Highway 33. Some users might stop and enjoy the views of the highway below, the river just to the west, and the Pacific Ocean and Los Padres Mountains beyond. The 15-foot-wide decks would provide room for other users to continue past to the levee trail unimpeded.

In addition to serving pedestrians, and to a limited extent cyclists, the overpasses would add interest to the highway itself by presenting drivers with a series of four graceful arcs that would invite them to exit the freeway and to further investigate the river. With programmed opportunities for locals to display artwork and participate in regular maintenance the bridges would celebrate the renewed connection between the Westside Community and the Ventura River.

The freeway crossings would originate from the Westpark Community Center (connecting the Omer Rains Trail with the Ventura River Trail) and three proposed pocket parks to be located on West Simpson Street, Vince Street, and Stanley Avenue. The frequency and distribution of the overpasses along the parkway corridor would serve two purposes. They would provide walkable access to the river for people in many neighborhoods and from schools located close to these locations. Second, they would provide ample prospect and refuge, an important consideration because local residents have revealed a perception of high crime at the river and levee. The overpasses would ensure that levee trail users do not feel isolated or trapped by the adjacent freeway and would relieve fear of victimization by providing exits which can be seen at all times and which are no more than one quarter mile away at any point on the path.

CONCLUSION

A combination of existing and proposed trails serving many kinds of non-vehicular movement, and connected by bridges and overpasses to form flexible loops would serve an important parkway objective by encouraging convenient movement throughout the parkway as well as increased physical and visual access to the Ventura River.

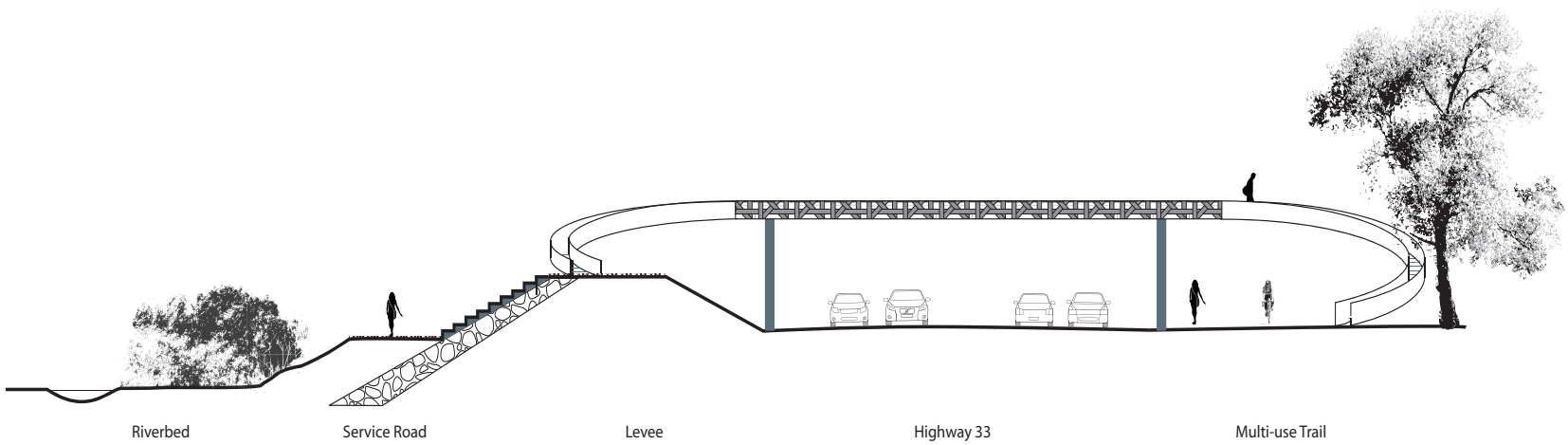


FIGURE 8.8 *Elevated freeway crossing.*

River parkways provide the recreational and ecosystem components of integrated regional water management and watershed plans.

California River Parkways Act of 2004
California Public Resources Code §5751(h)

CHAPTER 9: FOSTER PARK

FIGURE 9.1 *Foster Park, day-use area.*

Existing Conditions

THE PARK

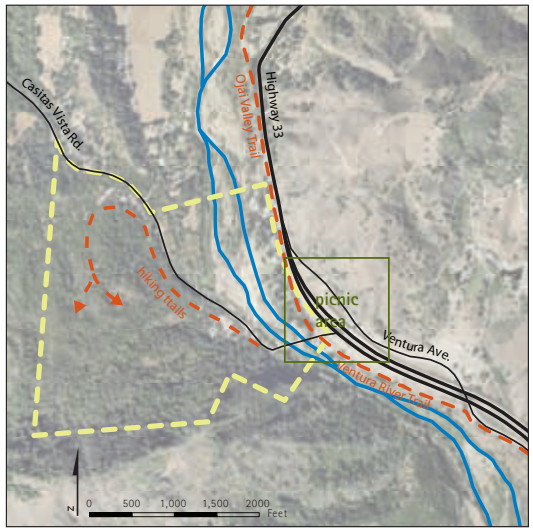
Foster Park is at the northern tip of the proposed parkway and directly east of Highway 33. The park, which is over 200 acres in area (Lubin 2008), was first developed in 1906 on land donated to the county by the well-known Ventura conservationist and benefactor, E.P. Foster. The majority of the park lies on steep hillsides to the west of the river, an area characterized by oak forests and abundant native vegetation. This area features hiking trails, an amphitheater dating back to the depression-era Works Progress Administration, traditional campsites, and more recently, eleven RV campsites. Below, at the riverside adjacent to Highway 33, a day-use area offers picnic sites and easy visitor access to the river itself.

This project does not address the hillside area of the park. Rather, it envisions an enhancement of the park's riverside day-use facilities that would attract more visitors as well as provide a visible introduction to the Lower Ventura River and the proposed parkway at its northern end.

THE SITE

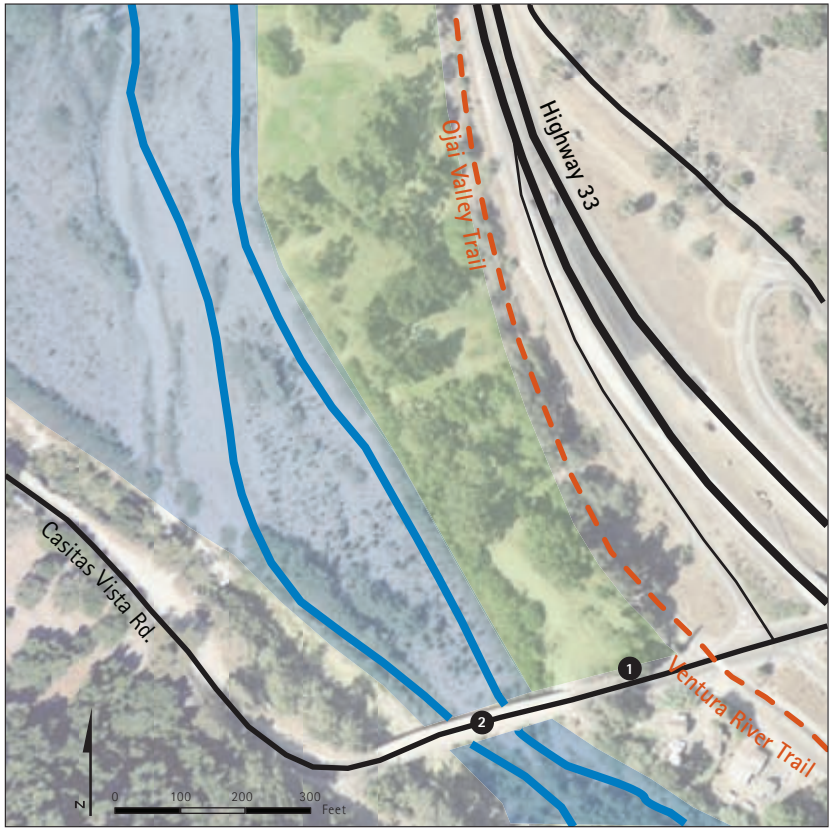
The day-use area, which is just under two acres (Lubin 2008), is characterized by sycamore trees, grassy swaths, and the Ventura River. Here, under ordinary (non-flood) conditions, the river consists of two large channels surrounded by a floodplain covered with cobbles, boulders and sparse vegetation, easily approached by visitors. This area includes rest rooms, picnic facilities, and a large group barbecue pit which, according to a sign posted on it, must be reserved for use. The meeting point between the Ventura River trail and the Ojai Valley trail flanks the eastern edge of the site, separated from the day use area by a short wooden fence. The authors' visits to Foster Park revealed a charming but apparently underused park resource. Though visually appealing, the day-use portion of Foster Park feels neglected and has limited activity generators to draw people. Reinforcing the neglected air, the park has also had problems with graffiti and vandalism in the past (Hadly 2008). The only entrance to the park is off the street and does not easily accommodate pedestrians or cyclists.

FIGURE 9.2 *Foster Park, located at the northern tip of the proposed parkway. Orthophotography: CIRGIS.*



Ventura River channels (location changes)
Roads
Trails
Park Boundary (Approximate)
Inset - Riverside Day Use Area

FIGURE 9.3 *Foster Park. Orthophotography: CIRGIS.*



Ventura River channels
Roads
Trails
Picnic Area
River Area
1 Entrance Gate
2 Casitas Bridge

FIGURE 9.4 *Foster Park day-use area. Orthophotography: CIRGIS.*

FIGURE 9.5 *Foster Park trail among native oak trees.*

FIGURE 9.6 *Entrance tribute to E.P. and Orpha Foster.*

FIGURE 9.7 *Ventura River at Foster Park day-use area.*

Design Concepts

THE PLAN

This Vision Plan recommends expanded amenities to encourage further use of Foster Park, including the creation of a seasonal swimming hole in the Ventura River, two access points from the Ojai Valley trail, a tot lot, improved picnic and rest room facilities, a sun deck, an informational kiosk, and signage on Highway 33 announcing the beginning of the Lower Ventura River Parkway. In addition to the new amenities, the suspension of existing day-use fees would encourage more visitors to stop for at least a quick look and an introduction to the parkway, while the more visible presence of a Park Warden would encourage those visitors to stay longer. These improvements are intended to increase recreational opportunities, generate activities, increase the perception of safety, and reinforce for visitors the significance of the park both as an historical setting for Ventura residents and as the gateway to the lower river.

SAFE, ACTIVE, MEANINGFUL PLACE

Research regarding the relationship between design, behavior, and the built environment has shown that there are common reasons for underuse of public facilities. These reasons include concern for personal safety due to actual and perceived risk, a lack of activity generators, and/or a lack of a sense of meaningful place (Ramanujam 2006; Luymes and Tamminga 1995; Schroeder 1984; Appleton 1975; Jacobs1961). Perceived danger influences behavior

1 Swimming Hole
2 Sun Deck
3 Tot Lot
4 Informational Kiosk
5 Parking
6 Entrance
7 Paths
8 Access to Ojai Valley Trail
Swimming Flag

FIGURE 9.8 Proposed design for riverside day-use area, showing new features.

FIGURE 9.9 *North facing perspective of swimming hole and 'Swimming is open!' flag.*

and can cause people to avoid places they associate with risk (Ramanujan 2006). Understanding these fears can guide design choices that can aid in improving perceptions. Actual or perceived factors affecting the perception of safety include:

- Prospect: the ability to see one's surroundings clearly and appraise and recognize strangers (Appleton 1975)
- Refuge: the ability to reach safety, including be seen by others who may assist or defuse a threatening situation (Appleton 1975)
- Choice and control: the ability to avoid isolated or entrapment places, or socially uncomfortable situations (Luymes and Tamminga 1995)
- Environmental awareness and legibility: the ability to locate one's self in the surrounding environment and to understand and find one's way through a landscape without becoming confused or lost (Luymes and Tamminga 1995)
- Solitude without isolation: "places where it is possible to achieve solitude and retreat without leaving the public realm" where "a person knows where he or she is in relation to the surroundings and has control over the immediate environment and the ability to escape threatening situations" (Luymes and Tamminga 1995).

Use of public space tends to lead to more use (Whyte 1988; Carr et al. 1992; Luymes and Tamminga 1995). Activity generators that draw people to public spaces tend to improve the perception of safety by increasing visibility by others and by promoting a sense of care and ownership by the community that uses the resource. Activities that draw people are perhaps more important than physical design in enhancing real and perceived safety from the threat of crime (Luymes and Tamminga 1995).

Meaningful spaces are spaces that allow people to make connections between the places, their personal lives, and the larger world (Ramanujam 2005). Meaning is created when people use, interact with, and become familiar with a space, forming associations that accumulate over time (Treib 1995).

HISTORICAL SWIMMING HOLE

A swimming hole on the Lower Ventura River could be a key point of attraction for the proposed parkway, providing a tactile experience of the river to the delight of residents and visitors that connects them with Ventura's past.

This concept has historical precedents. Community workshops revealed that older local residents have fond memories of swimming in the Ventura River.

In fact, during each summer in the early years of the 20th century, the county forester built a rock dam across the river at Foster Park to form a free swimming hole for visitors, as instructed by E. P. Foster (Percy 1976).

Foster Park, with existing day use facilities and easy river access, would be an ideal location for a pool. When river conditions permit, boulders could be arranged by Parks Department staff in order to catch a portion of the river water and create a public swimming hole. Iconic flags located both at Foster Park and in downtown would announce when the swimming hole is open, enhancing the community's sense of connection to the river and symbolically linking downtown and Foster Park. An adjacent sun deck, tot lot, and fitness area would combine with the swimming activity to make this picnic area a highly attractive destination in fair weather. Along with the swimming flag, new signage on Highway 33 would make the park more visible. Visitors drawn to these activities would be introduced to the Ventura River as well as the parkway at an informational kiosk staffed by volunteers. Cyclists on the adjacent Ojai Valley Trail would be less likely to overlook this park because bike path openings and signage would invite them into the day-use area.

Creating a river pool at Foster Park would require overcoming several practical challenges. First of all, the City of Ventura extracts drinking water from the Ventura River at Foster Park. This water is important to Ventura and is directly related to the City's success in avoiding the unsustainable practice of importing water from other watersheds. A swimming hole would have to be located so as to avoid any negative impact on the quality of water received by the city; this might require locating the pool downstream from the city's wellfields. Similarly, swimming activities would need to planned in a manner that would avoid any negative impacts on wildlife in general, and listed species in particular, in the area. Third, in 2011 the city will begin construction of spur dikes and other measures for the protection and restoration of the riverbanks at Foster Park; a pool in the river or connected to the river would need to be planned in a manner that would make it consistent with those alterations. Finally, a pool would require funding for safety, supervision and maintenance service beyond that which would be required for a day use area without swimming.

Resolving these obstacles would require engineering and feasibility studies beyond the scope of this document, but there are several alternatives to consider. A pool might be located downstream from the city's wellfields, but still within Foster Park or close enough to it to be easily accessible by park visitors. If location at Foster Park is not feasible, then other locations in the proposed parkway area might be considered in the context of long-term parkway planning. In this respect, it is relevant that the Regional Water Quality Control Board has designated contact water recreation as a beneficial use for the waters of the lower river throughout the parkway zone (CRWQCB-LA 2003). Finally, in the event that water quality or wildlife habitat considerations make an instream swimming hole infeasible, planners might work around these difficulties by channelling a limited amount of river water into a constructed pool (with boulders, gravel, and other natural features) that is adjacent to the river, then treating the water that exits the pool through filtration or other means before returning it to the river or using it for groundwater recharge purposes.

GATEWAY TO THE PARKWAY

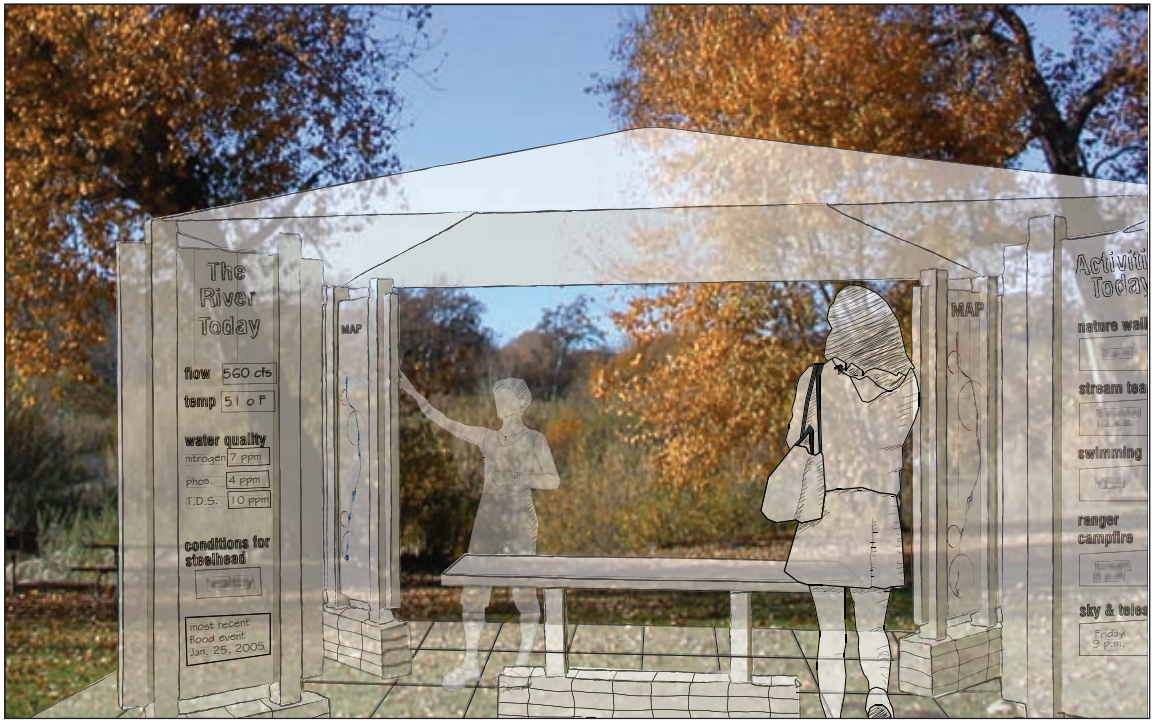
Announcing the River

Foster Park would be the gateway to the parkway corridor for visitors from Ojai Valley and other locations to the north. For those visitors, awareness of the parkway and of the lower river itself will be critical to their access to the river, their recreational enjoyment of the parkway, and their sensitivity to the ecological lessons that the parkway can teach. Cyclists and pedestrians on the Ojai Valley Trail would become aware of these elements through appropriate signage at the new access point (spur trail) to Foster Park. In addition, the swimming flag adjacent to Highway 33 and the informational kiosk area inside the park would be easily visible from the trail.

Highway 33 motorists entering the area at sixty miles per hour would have just seconds to become aware of the existence of Foster Park, the entry to the parkway, and the range of activities available within the next six miles. Motorists travelling at that speed have a limited range of vision that limits their reading of a highway sign to fifteen seconds or less (Watson 2003). Therefore, an announcement sign on the highway would have to be large and limited in content. However, even a quick view of the highway sign and the swimming flag would make visitors aware that a stop at the park would be valuable; then, the kiosk area inside the park would tell them the rest of what they need to know.

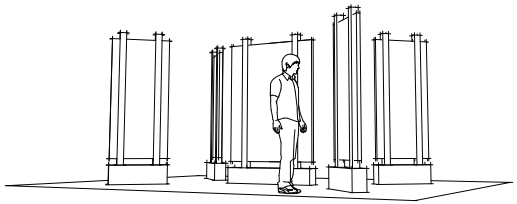
Informational Kiosk

Parkway visitors would benefit from information about the hydrology and ecology of the Lower Ventura River, the status of projects and activities designed to enhance the river, the layout of the parkway and the locations and

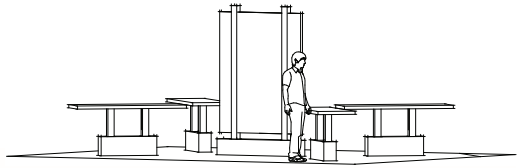


[ABOVE AND RIGHT] FIGURE 9.10 *A modular informational kiosk area would be a flexible approach to facilitating different levels of staffing and activity at Foster Park. Permanent stone foundations could accept combinations of signs, benchs, activity tables or flat displays, and shade structures on matching support columns.*

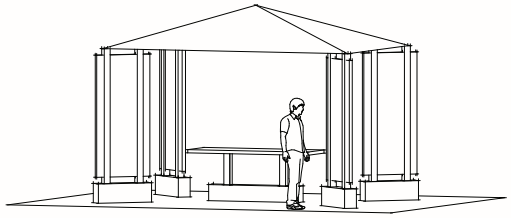
1. Permanent foundations accept multiple fixtures.



2. All vertical displays.



3. Activity tables or flat displays.



4. Vertical displays, table, and tent structure.

activities that might interest them within the parkway.

Information could be provided through a variety of installations, enclosed or open, staffed or not staffed, designed for passive or interactive viewing. Figure 9.10 illustrates a modular kiosk system consisting of a hardscape area with five low stone foundations designed to receive signposts, benches, activity tables, flat displays or supports for an overhead tent structure. At times, the kiosk could be simply a series of signs, either with or without a shade structure. However, when paid or volunteer staff are available, the kiosk could convert to activity tables for natural history demonstrations or craft activities. All of the components would be small enough to be transported with typical park utility vehicles and stored nearby.

ON-SITE STEWARD

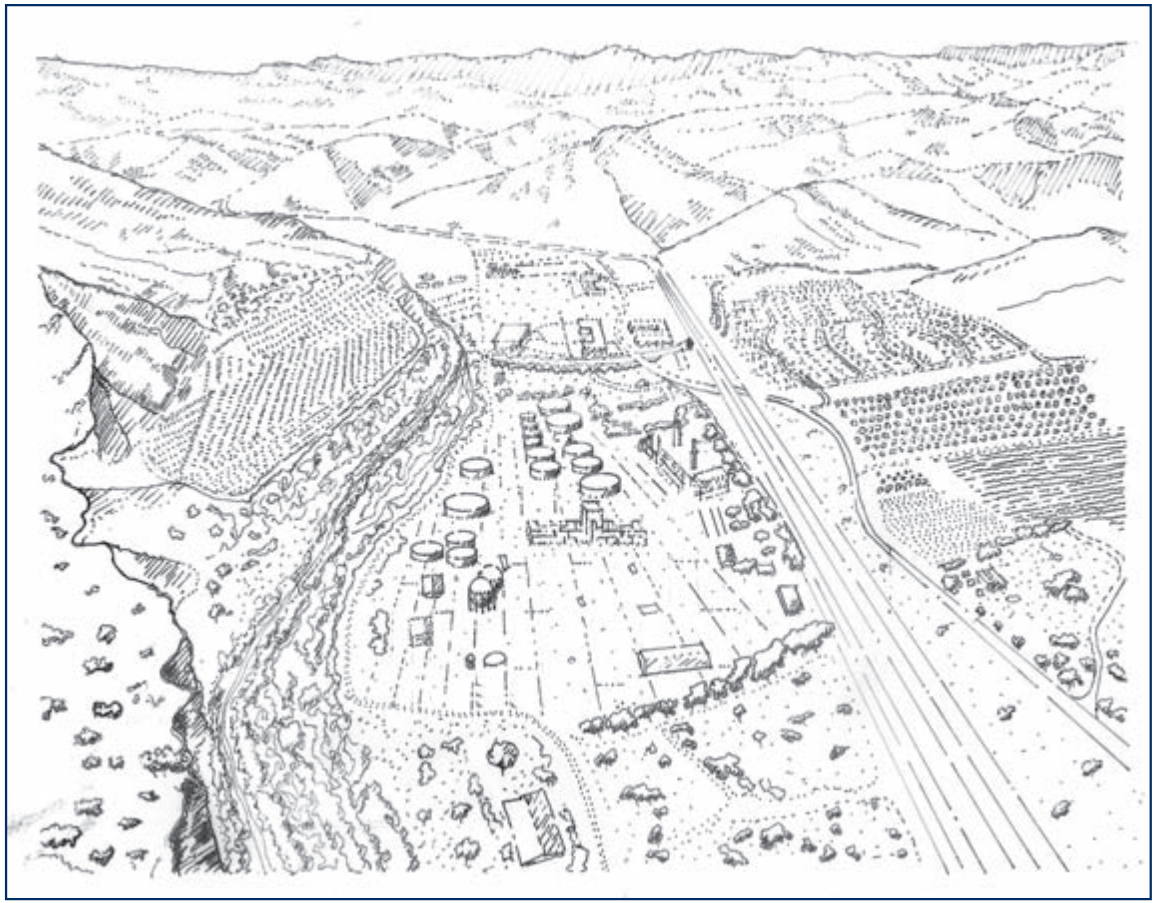
All of the ideas discussed above – considerations of prospect, refuge and safety, the potential for expanded activities, and the value of Foster Park as a gateway for orientation to the lower river – indicate that a residential on-site steward would be a valuable addition to the park.

CONCLUSION

The features discussed in this chapter would encourage a greater visitor presence and activity level in the section of Foster Park between the river and the highway, improve perceptions of safety, and contribute to an experience of place that has historical roots in the early years of the 20th century. In addition, these improvements would address the importance of the park as a gateway and orientation place for parkway visitors.

CHAPTER 10: CAÑADA CONFLUENCE

[OPPOSITE] FIGURE 10.1 *Clockwise from left: Existing bird's-eye view of Cañada Confluence area; open space area looking north to the Ventura municipal water purification plant; Mission-era aqueduct remnant; Cañada Larga, box culvert under Highway 33 and concrete channel to the west; the confluence of the Cañada Larga and the Ventura River; former USA Petroleum refinery.*




4TH
OF

Existing Conditions

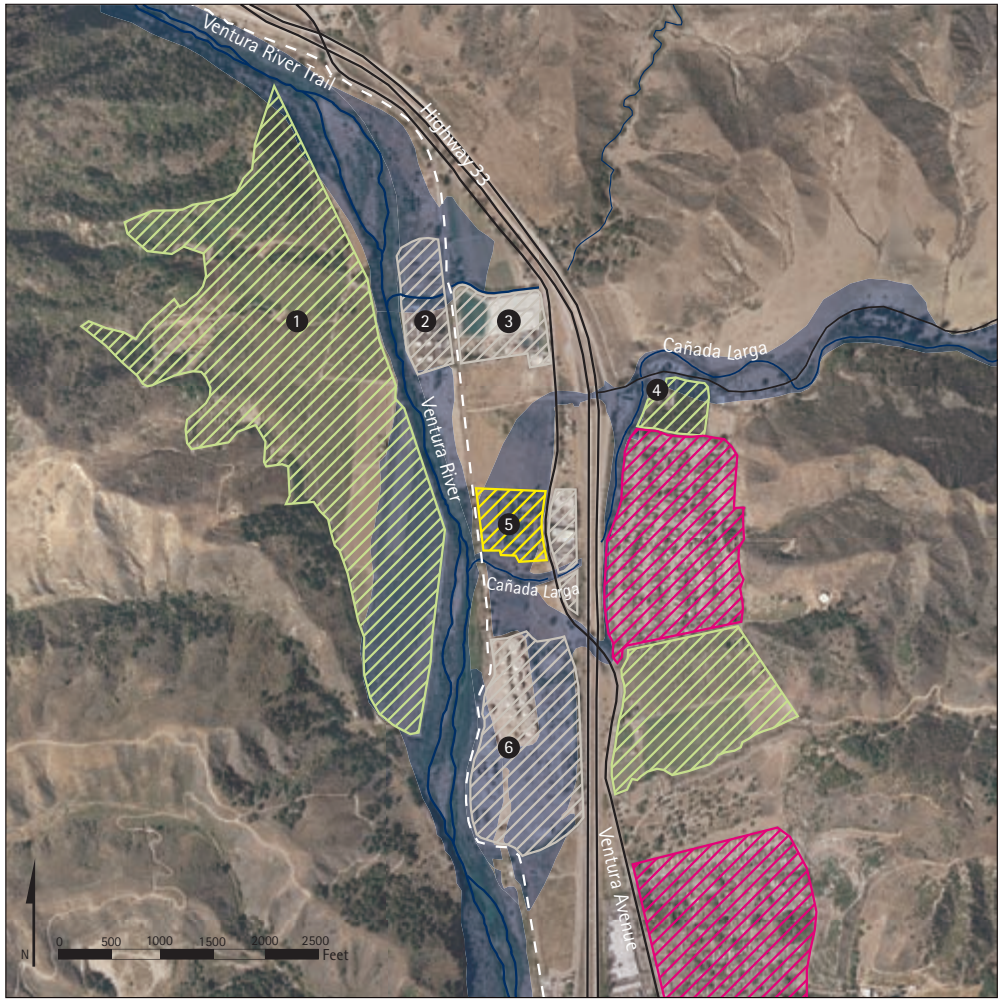
THE NEIGHBORHOOD

The second design site identified by this Vision Plan is centered on the confluence between the main stem of the Ventura River and one of its main tributaries, the Cañada Larga, that lies about one mile downstream from Foster Park. This site presents many opportunities for the development of parkway spaces that encourage a closer relationship between people and the river, while also improving the quality of both surface and groundwater, lessening the risk of flood damage, and developing public support for the remediation of a large contaminated brownfield site.

Both terrain and politics have shaped the developing landscape of the North Avenue area where the Cañada Confluence site is located. To the north, steep hills and mountains constrict the river valley, and the area is largely rural in character. The valley spreads wider to the south where the landscape transitions from vestiges of agriculture and industrial development into urbanization. Political boundaries and policies have also played a role in shaping this landscape.

North Avenue is an unincorporated area of Ventura County, which has policies limiting future development. However, the North Avenue area is also within the sphere of influence of the City of Ventura; its policy on development is more nuanced and it is considering the North Avenue area for annexation (City of Ventura 2005). The North Avenue area is closely associated with its neighbor to the south, the city's Westside community, and it shares some traits with that community. The Westside is one of Ventura's oldest communities and has one of its largest minority and low-income populations. In 1999 it was home to nineteen hazardous waste sites per square mile, compared to just one per square mile in other parts of the city (US Environmental Protection Agency 1999). The combination of a disproportionate number of hazardous waste sites within a large minority/low-income community is an issue of environmental justice for the Westside community, and the existence of hazardous waste at the adjacent Canada Confluence site adds to the seriousness of that situation.

FIGURE 10.2 *Location of Cañada Confluence design site.*



1 Avocado orchards
2 Ojai Wastewater Treatment Plant
3 Ventura Water Purification Plant
4 Aqueduct Remnant
5 Brooks Institute
6 Refinery

Agricultural
Residential
Industrial
Institutional

FIGURE 10.3 *Existing conditions at Cañada Confluence site. Orthophotography: CIRGIS.*

THE SITE

The meeting of streams amid rich riparian habitat endows this site (figure 10.3) with natural attractions for visitors. The existing campus of the Brooks Institute, which has a public exhibit space for photography, adds an element of architectural and cultural interest. However, the area also presents a combination of hydrological impairments, dilapidated or abandoned industrial facilities, and "No Trespassing" signs that make it uninviting, and the brownfield area in the southern portion of the site contains chemical pollutants and asbestos that may render it unsafe for public use in the short term.

Disruption of hydrological processes at this site includes the channelization and culverting of the Cañada Larga where it crosses Highway 33 and Ventura Avenue, erosion affecting both waterways, and water pollutants from point and non-point sources that have caused both waterways to be placed on the EPA's Section 303d list of Impaired Water Bodies. Several large structures and portions of Ventura Avenue lie within the FEMA 100-year floodplain, that is, the path of a projected flood with a 1 percent annual chance as determined by that agency.

The predominantly riverine and riparian ecosystems at the site of the confluence have been degraded by an extensive infestation of the invasive *Arundo donax* species, and those open space areas have been relegated, through the development of agricultural, institutional and industrial facilities, to a narrow strip along the riverside, while much of the site has been left as grassy unimproved lots or dilapidated industrial infrastructure. With the exception of the Ventura River Trail that passes through the site and the public exhibit space within the Brooks Institute, the site is largely inaccessible to the public due to no trespassing postings. Development recommendations that have been publicly considered by the city in conjunction with the proposed annexation would have a significant impact on the Cañada Confluence site, but the importance of striking a balance between mixed-use development and floodplain restoration and the task of stabilizing or removing existing soil and groundwater contaminants will likely make the site a challenging one for planners.


1
2
3
N

Overview of Design Concepts

- 1 Ventura Valley Arboretum Sub-site
- 2 Mission Aqueduct Sub-site
- 3 Confluence Park Sub-site
- River channels (changing)
- Stream & riparian corridor
- Stream, expanded floodway & riparian corridor
- Nature trail
- Multi-use trail
- Limited-access bridge
- Existing riverbed
- Expanded riverbed
- Restored floodplain
- Riparian habitat
- Greenbelt corridor
- Agricultural
- Residential
- Institutional
- Industrial
- Remediation site

Proposals for the site would address hydrological objectives, improve its ecological value, and expand its areas of quality wildlife and plant habitat by increasing the floodplain of the Cañada above the confluence, relocating structures in the FEMA 100-year floodplain, providing areas for water-quality treatment, and commencing the long-term process of mitigating the impacts of decades of industrial development. Meanwhile, suggested improvements would enhance physical and visual access to the river for visitors and provide opportunities for recreation and education that are sensitively integrated into the landscape. The name for the site in this chapter, Cañada Confluence, emphasizes the meeting of two very visible watercourses as a defining site feature.

Design recommendations at the Cañada Confluence focus on three adjacent sub-sites within the overall site. The Ojai Valley Sanitary District Wastewater Treatment Plant and the City of Ventura water purification plant along with approximately twenty acres of unimproved land, are located in the northern portion of the site and are collectively referred to here as the Ventura Valley Arboretum sub-site. The area of an existing remnant of a late eighteenth century aqueduct, east of Highway 33 on the banks of the Cañada Larga, is the second sub-site, referred to as Mission Aqueduct. The third sub-site, Confluence Park, incorporates the Brooks Institute, the actual confluence point of the Ventura River and Cañada Larga, and the former USA Petroleum Refinery and adjacent vacant land, features that form the southern end of the overall Cañada Confluence site.

[LEFT] FIGURE 10.4 *Cañada Confluence, proposed plan. Orthophotography: CIRGIS.*

Ventura Valley Arboretum

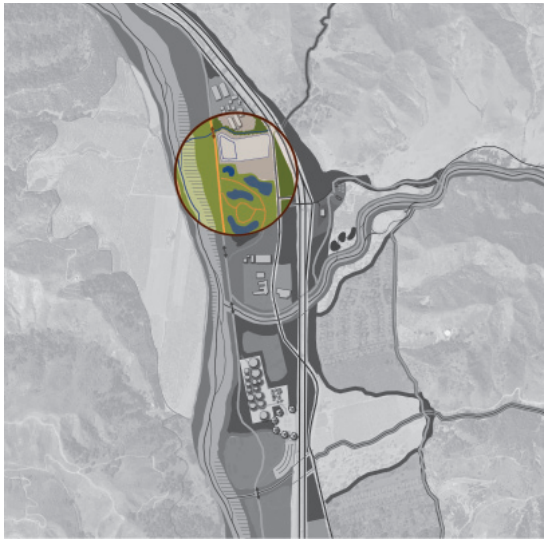


FIGURE 10.5 *Proposed location of Ventura Valley Arboretum.*

EXISTING CONDITIONS

The northern sub-site of the proposed Cañada Confluence is occupied by the Ojai Valley Sanitary District Wastewater Treatment Plant, the Ventura municipal water purification plant and approximately twenty acres of vacant land (figure 10.6). The Ventura River Trail passes the western side of the vacant land and between the water facilities. The experience of traveling on the Ventura River Trail in this area is generally bucolic. However there are significant issues in this sub-site that have an impact on the health of the river and related ecosystems as well as the quality of human use, and these issues are primarily related to the impacts of the county and city water treatment facilities.

The Ventura River floodway (the river channels and the areas of adjacent floodplain that are kept free from development) has a width of approximately 180 feet between the wastewater treatment facilities to the east and the orchards to the west, which is its narrowest stretch in the parkway area (figure 10.7). By way of comparison, the width of the floodway immediately to the north of the treatment plant is 500-600 feet. While a detailed historical survey of river morphology in this area is beyond the scope of this document, the relative narrowness of the river in this location is a cause for concern. The restriction of flow to a narrow zone could increase water velocity and the likelihood of flood damage in this area, and some of the wastewater treatment plant structures have been identified as being at risk for damage from a 100-year flood (Greimann 2006; FEMA 2005). Over the past quarter-century, the intensity of occasional flood flows combined with a lack of sediment in the water due to the impact of the Matilija and Casitas dams, has resulted in erosion that has caused the riverbed in this stretch to drop approximately ten feet in elevation, in many places to the depth of the underlying bedrock (Greimann 2006). In addition to the potential for flood damage and erosion, structural encroachments on the combined river-floodplain system in this area reduce the land available for recreational access and ecosystem function.

Moreover, although the wastewater treatment plant

FIGURE 10.6 *Lot adjacent to the Ventura Water Purification Plant.*

is designed to meet the requirements of its National Pollutant Discharge Elimination System (NPDES) permit, those requirements do not ensure that the effluent that it discharges will match cool, pristine river water. The effluent contains a level of nitrates that may have negative impacts on wildlife and has an average temperature that is too high for an indicator species, steelhead trout (*Oncorhynchus mykiss*). Despite these liabilities, the wastewater treatment facility is important to approximately 23,000 Ojai residents who depend on the plant for sanitation. In addition, the facility has great potential value to the river and its ecosystems and to potential parkway visitors in that it replaces instream water that has been removed from the river for domestic and agricultural use with effluent that, when properly treated, is highly valuable to the ecosystem. Thus, recommendations for this sub-site emphasize the mitigation of the facility's impacts.

1 Avocado orchard

2 Waste treatment plant facilities in 100-year floodplain

3 Ojai Valley Wastewater Treatment Plant

4 Ventura municipal water purification plant

5 River floodway constricted by water facilities

6 Unimproved land (some parcels possibly in agricultural use)

Streams

Major roads

Ventura River floodway

FEMA 100-year floodplain

Industrial

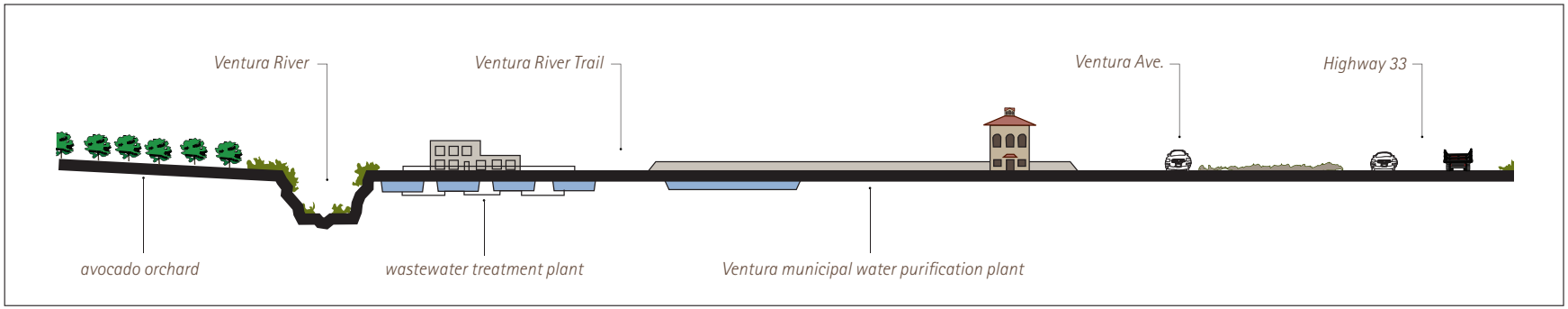


FIGURE 10.7 *Plan view and section A - A' (not to scale) illustrating existing conditions at the Arboretum sub-site. Orthophotography: CIRGIS.*

1. Relocated wastewater treatment facilities
2. Weldon Creek daylighted under Highway 33
3. Weldon Creek restored to soft bottom channel
4. Ventura water purification plant
5. Native arboretum and polishing ponds

- Ventura River floodway (previously existing)
- Expanded floodway/floodplain
- Open space - Riparian Vegetation
- Open space - Oak Woodland Vegetation
- Open space - Agricultural
- Water body
- Industrial
- Institutional
- Stream with riparian corridor
- Nature trail
- Multi-use trail
- Limited-access bridge

FIGURE 10.8 *Ventura Valley Arboretum, proposed plan.*

DESIGN RECOMMENDATIONS

The objectives of the Arboretum sub-site are to mitigate the negative impacts of the wastewater treatment plant, increase ecosystem quality, and enhance public use. Relocating structures that are in or adjacent to the FEMA 100-year floodplain would enlarge the river corridor, while establishing a public arboretum that includes polishing ponds would enhance water quality and provide additional space for passive recreation.

Floodplain Restoration

Relocating the wastewater treatment plant facilities away from their present location between the existing river floodway and the Ventura River Trail and removing the levee along the west edge of the plant would restore approximately eleven acres of land to the floodway with attendant benefits for riverine and riparian plants and wildlife. Implementation of this proposal would reduce the risk of flood damage to the treatment plant by relocating structures that are currently in the FEMA 100-year floodplain. Widening the floodway at this spot would spread occasional flood waters out to produce a lower flood intensity, helping to reduce erosion. An approximately one quarter mile section of the River Trail that currently runs between the fences of the Ojai treatment plant and the Ventura water purification plant would, instead, run through the center of a park-like restored floodplain area with native riparian vegetation and enhanced views of the river.

Identification of an alternative site for the treatment plant would require surveys that are beyond the scope of this Vision Plan, but one example of a possible site (figure 10.13, Item 1) is the undeveloped parcel immediately to the north of the Ventura water purification plant and east of the River Trail. Relocation of an industrial facility is a major project and it may not be feasible during the life cycle of the existing plant which is essentially only sixteen years old, since it was extensively renovated in 1996 (CRWQCB-LA 2003). However, the plant may need rebuilding during the long-term implementation of a parkway project, since water treatment facilities typically need to be replaced every twenty-five to forty years (Elmore 2001). Therefore, relocation should be considered as a potential element of a long-term parkway plan.

Ventura Valley Arboretum

The 22 acre parcel immediately south of the Ventura municipal water purification plant presents an opportunity for the creation of a significant public amenity while also improving the quality of effluent entering the river from the wastewater treatment plant. At this location, effluent discharged by the plant would slowly circulate through a series of ponds connected by vegetated wet swales before being returned to the river. These polishing ponds, a form of constructed wetland, would provide habitat for native mesic plant species that have a demonstrated value in removing

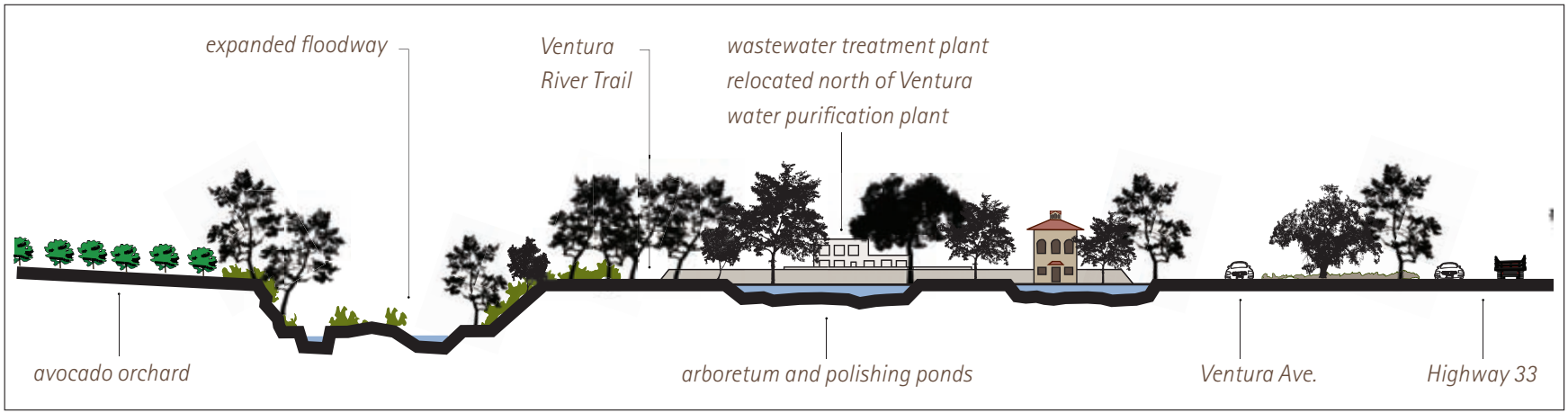


FIGURE 10.9 *Ventura Valley Arboretum. Section A-A'. Not to scale.*

FIGURE 10.10 *Ventura Valley Arboretum. West facing perspective.*

nitrates and other pollutants from water.

In contrast with engineered systems like the subsurface constructed wetland shown in chapter 7, the polishing ponds shown here would use processes similar to those of a natural pond or wetland to give a final treatment push to water that has already been treated in the Ojai plant. The ponds would form the heart of a public arboretum featuring California native tree species. Trees would provide shade for the pond surfaces, helping to lower the temperature of the effluent before it enters the river. Thus, the combination of ponds and arboretum would help to address excess nitrates in the treated effluent that are harmful to wildlife, and excess temperature that imperils steelhead trout *(Oncorhynchus mykiss)* (Leydecker and Grabowski 2006).

Trees and shade would also be an amenity for visitors strolling through the arboretum. Interpretive materials would explain the cleaning functions of the ponds and plants as well as the importance that many of the same plants had in historical Chumash populations for food, medicine and building materials. Finally, the combination of native trees, shrubs and water plants would provide valuable habitat for birds and amphibians. Thus, the Ventura Valley Arboretum would be a place where all elements provide equal benefits for hydrological, ecological, and cultural and recreational functions.

How the Ponds Function

In a natural wetland, a series of biochemical processes dependent on bacteria can remove organic nitrogen (from natural sources as well as from human pollutants like fertilizer) from the water by converting it into benign nitrogen gas that is returned to the atmosphere. Some of these processes take place in the presence of oxygen in the aerobic zone, a thin layer at the top of underwater soil.

Other stages of the process are concentrated just below the aerobic zone in oxygen deprived (anaerobic) soils. Many plants (figure 10.11) work together with microorganisms to make these cleaning processes possible. Two plants that are native to Ventura can play an important role here. Bulrush *(Scirpus californicus*) and Cattail *(Typhus latifolia)* have stems with hollow tubular chambers that transport oxygen from their leaves to their submerged roots, providing a boost to the aerobic or oxidizing stages of the nitrogen conversion process. Bulrush and cattails would be valuable components of the ponds because visitors would benefit from increased awareness regarding the historical importance of these plants to the Ventureno Chumash while they play their role in cleaning the water.

Other native wetland and aquatic plants also play a role in natural cleaning processes by absorbing nitrogen for their own nutrition and providing a supportive context in their root zone for the growth of microorganisms that clean the water. In addition, these plants provide fuel, in the form of carbon from their decomposition, that speeds up the anaerobic stage of the cleaning process.

Due to the direct connection between the arboretum ponds and the Ventura River, an emphasis would be placed on the avoidance of aquatic plants that, while they have shown effectiveness in pollutant removal, are exotic and invasive in this ecosystem. Examples are common reed *(Phragmites australis*) and water hyacinth *(Eichhornia crassipes)*.

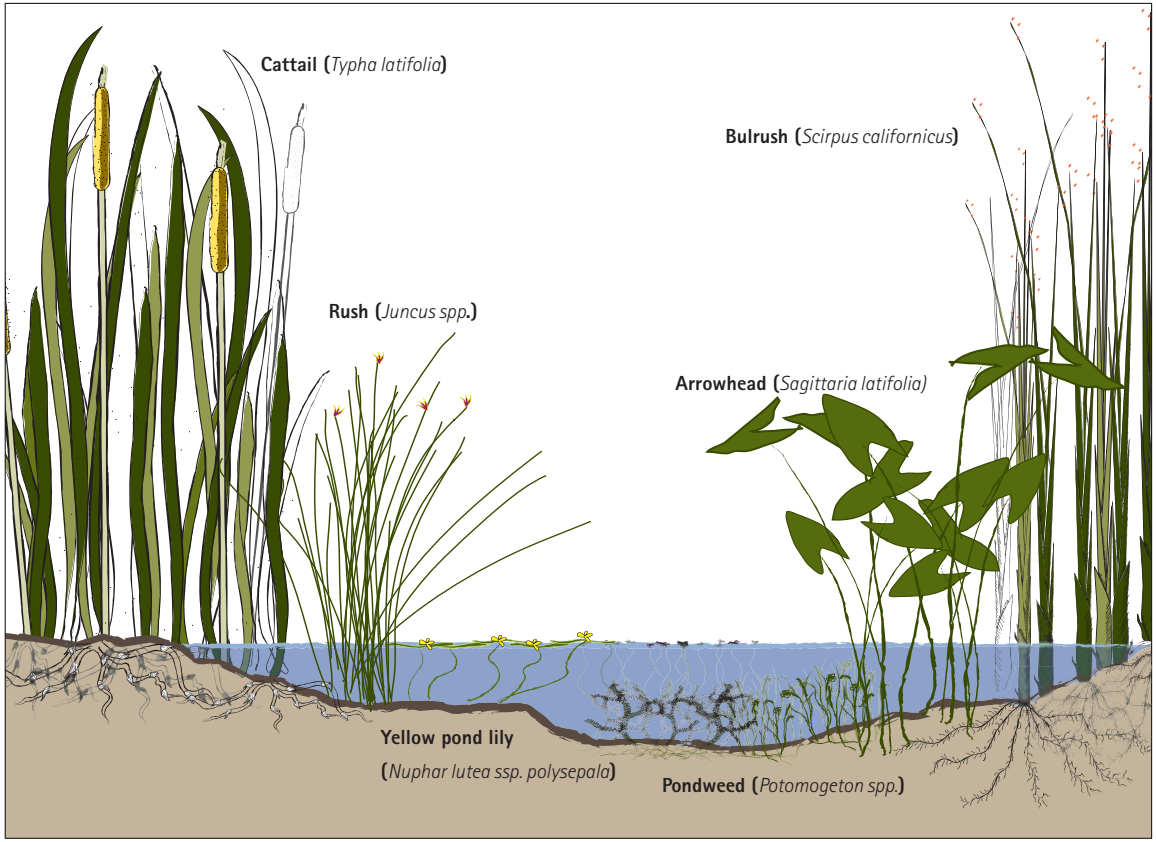


FIGURE 10.11 *Wetland and aquatic plants would play an important role in improving the quality of water in the polishing ponds in addition to contributing to the aesthetic experience for arboretum visitors.*

Mission Aqueduct

FIGURE 10.12 *Location of the historical aqueduct.*

EXISTING CONDITIONS

The Aqueduct

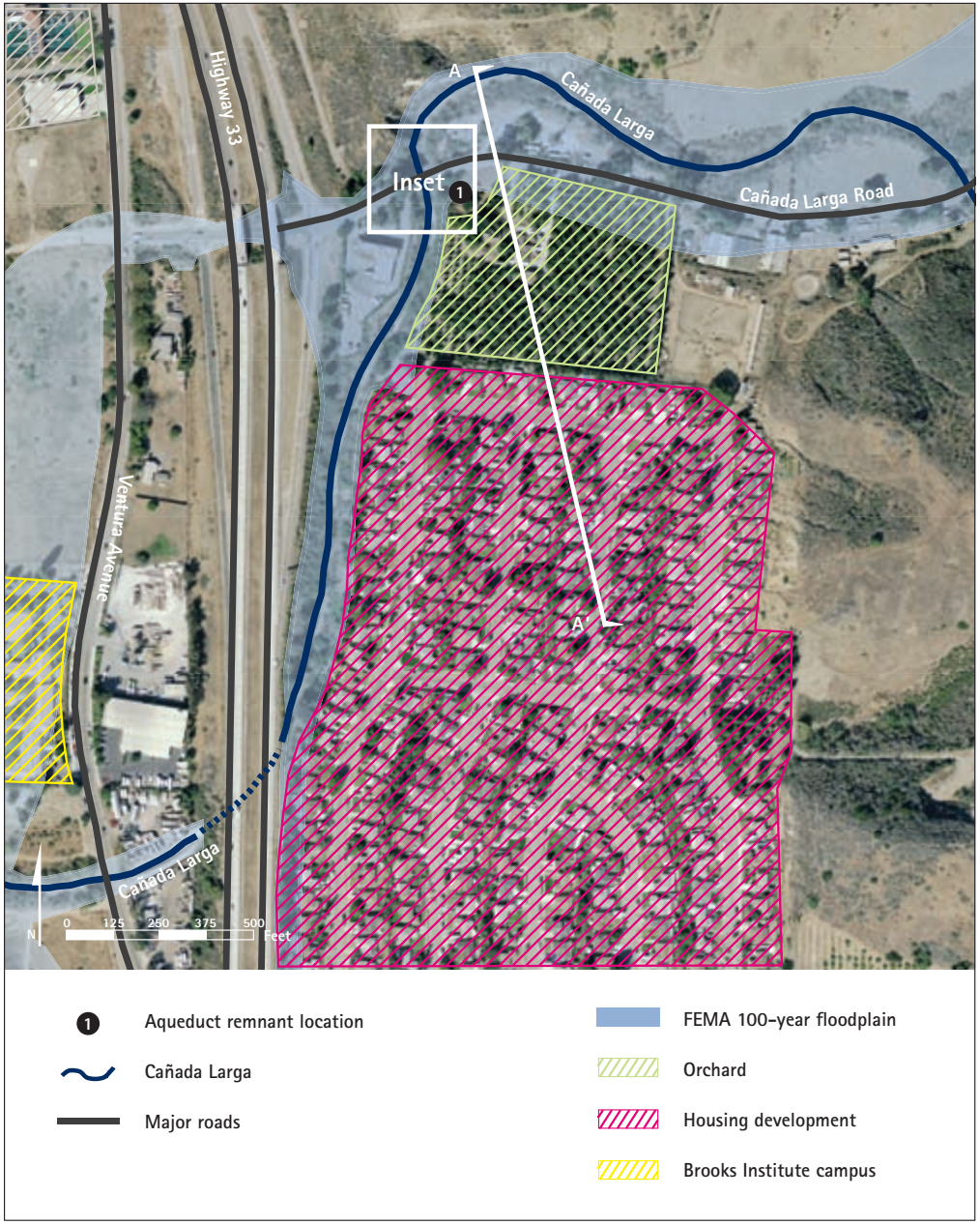
The second area of focus for this Plan within the larger Cañada Confluence site, is a threatened remnant of the San Buenaventura Mission Aqueduct located on the eroding banks of the Cañada Larga to the east and across Highway 33 from the arboretum site. The remnant is a valuable historical resource; a reminder to present day Venturans of the lifeline that once ran the length of the proposed parkway corridor carrying drinking water from the river at present-day Foster Park to the San Buenaventura Mission and settlement. Approximately 100 feet of the aqueduct, a Ventura County historical landmark since 1972, is clearly visible from Cañada Larga Road, but there is no signage to indicate that this crumbling wall was built by Spanish settlers in the late Eighteenth Century. Not only does it lie unprotected within the Cañada Larga's FEMA 100-year floodplain, it is also severely undermined by erosion and flood damage on the banks of the Cañada that has literally removed the ground from under a section of the aqueduct.

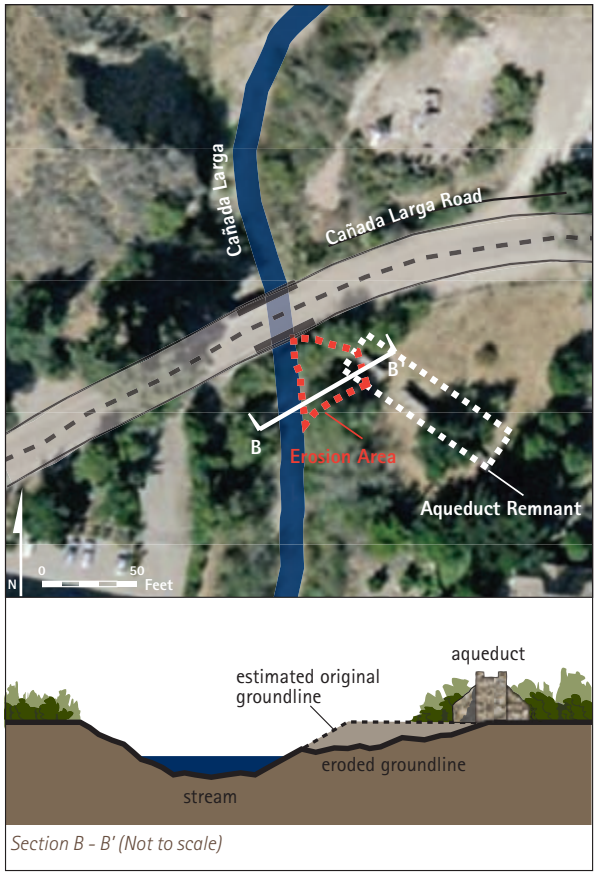
The Tributary

As the Cañada flows through a rural valley for a distance of approximately eight miles from its headwaters to its confluence with the Ventura river, it passes through relatively pristine areas as well as land devoted to cattle grazing. Along the way, water in the stream picks up enough bacterial contamination to render it unhealthy for human contact, and it also carries nitrogen and phosphates in excess of EPA standards. Where the stream reaches the Ventura River Valley just east of Highway 33, it is pushed by Cañada Larga road against a steep eroding bluff. Below that point, the stream has been engineered into two ninety-degree turns which form a dogleg resembling little more than a drainage ditch, tightly nested between the highway and a housing development, before passing underneath Highway 33 and into the Confluence Park sub-site discussed below.

FIGURE 10.13 *Historical aqueduct remnant undermined by erosion.*

Erosion damage to the aqueduct remnant may be a symptom of a larger problem that threatens the southern half of the Cañada Confluence site. FEMA flood maps estimate that in an event with an average annual probability of one percent (a 100-year flood), the Cañada Larga will sweep over the aqueduct, jump its banks at the "dogleg," threaten homes in the residential development, inundate Cañada Larga Road, sweep through the underpass at Highway 33, proceed west and inundate the campus of the Brooks Institute, and finally converge on the Ventura River (FEMA 2005).





[ABOVE] FIGURE 10.15 *Aerial view and section: Historical aqueduct remnant undermined by erosion. Not to scale. Orthophotography: CIRGIS.*

[LEFT] FIGURE 10.14 *Existing conditions in the vicinity of the historical aqueduct location. See Section A - A' on following page. Orthophotography: CIRGIS;. flood data: FEMA.*

DESIGN CONCEPTS

Objectives for the Aqueduct sub-site include increased flood protection along Cañada Larga, an improved habitat corridor and better water quality, protection from flood damage and erosion for the aqueduct site, and increased cultural awareness regarding the aqueduct remnant as an historical resource. Design recommendations to address these objectives include widening the stream corridor and the floodplain, directing the stream away from the aqueduct site, introducing limited flood detention and point source water quality treatment. Recommendations for visitor use include establishing a network of multi-use trails that would connect the Ventura River and the residential neighborhoods to the east with the valley of the Cañada Larga and the hillsides beyond.

The very limited step of reinforcing the banks of Cañada Larga immediately to the west of the aqueduct and restoring the terrain underneath it might alleviate the immediate threat of further damage to this historical structure, but it would not address larger issues of flood risk along this constricted stream. Instead, this Plan would increase the flood-handling capacity of the Cañada and improve its function as a habitat corridor by widening the stream and the adjacent floodplain and by reconfiguring the course of the stream to avoid right-angle turns and achieve something close to a meandering pattern – one that would flow away from the aqueduct site. One method for creating more room for the stream would be the removal through attrition, over a twenty to thirty-year period, of between ten and thirty homes along the edge of the adjacent development. The remaining residential neighborhood would be advantaged by the creation of a more attractive natural edge and improved pedestrian connections to

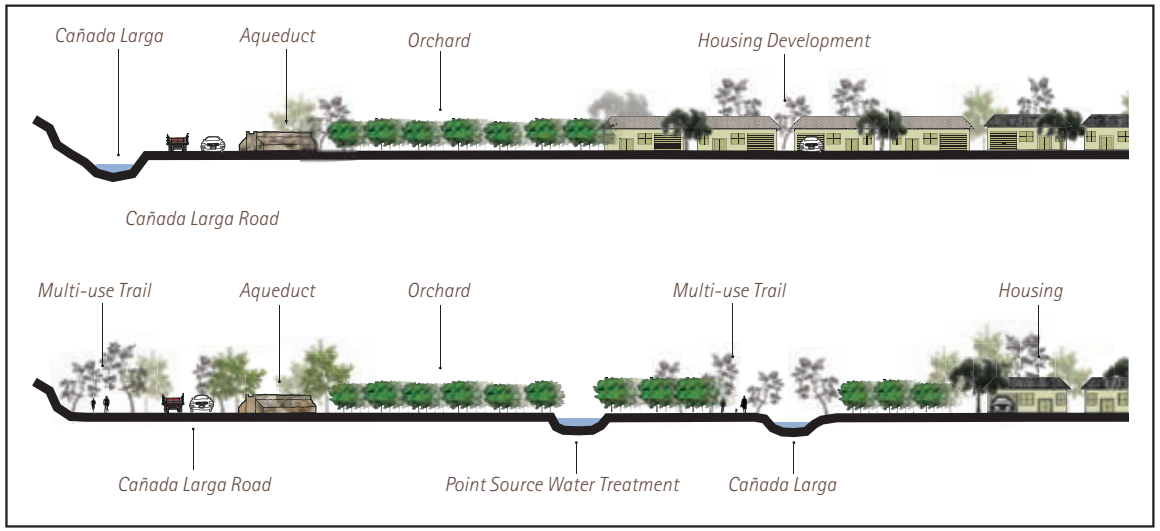


FIGURE 10.16 *Section A-A', existing conditions (above) in comparison with proposed concept (below). Not to scale.*

the Ventura River as well as decreased flood risk. An expanded orchard along both banks of the Cañada would be compatible with an expanded floodplain and would help protect water quality and habitat along the corridor while preserving agricultural open space in accordance with the regional SOAR policy. Finally, an upstream flood detention basin, if carefully managed in coordination with the operations of similar detention facilities elsewhere in the watershed (Campbell and Ogden 1999) would further increase the capacity for managing occasional floods. Under normal conditions, this shallow basin would support agricultural uses.

A successful stream restoration requires careful study of local topography and geology as well as a review of the stream's historical course and the sequence of development activities that brought it to its current configuration. Thus, the concept illustrated here is a general one and not a suggested map for the course of the future stream.

Establishing small on-site constructed wetlands at multiple farm and ranch sites along the Cañada (e.g. figure 10.17, item 3) would improve water quality in the tributary as well as the Lower Ventura River by removing fertilizer and bacterial contamination at its source, and some residual treatment capacity might be provided by the downstream polishing ponds (discussed in the preceding section).

Efforts to direct public attention toward an historical artifact such as the aqueduct need to be sensitively designed so that increased visibility leads to understanding of its importance and increased stewardship, and not

to increased opportunities for vandalism. However, the aqueduct remnant is currently clearly visible and known to many members of the public, and the existing fence that separates it from the road would not discourage a determined trespasser. This Plan would recommend the creation of a small parking lot, durable interpretive materials, and appropriate fencing to protect and enhance the educational value of this site. Access through multi-use trails would connect this small site into the larger context of the parkway as well as the valley of the Cañada, and the same trails would connect residents of nearby residential neighborhoods to the aqueduct, Cañada, and the Ventura River.

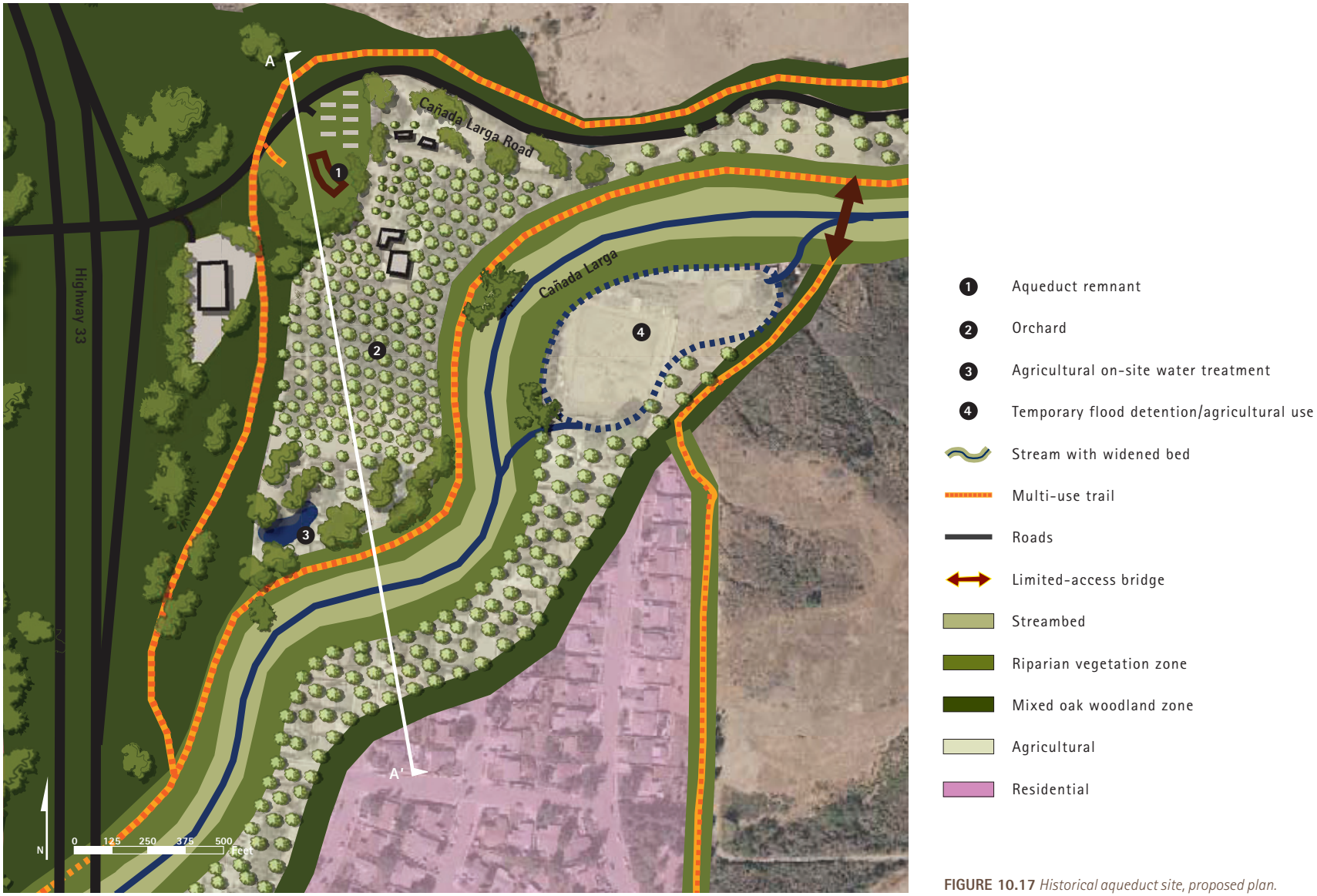


FIGURE 10.17 *Historical aqueduct site, proposed plan.*

Confluence Park

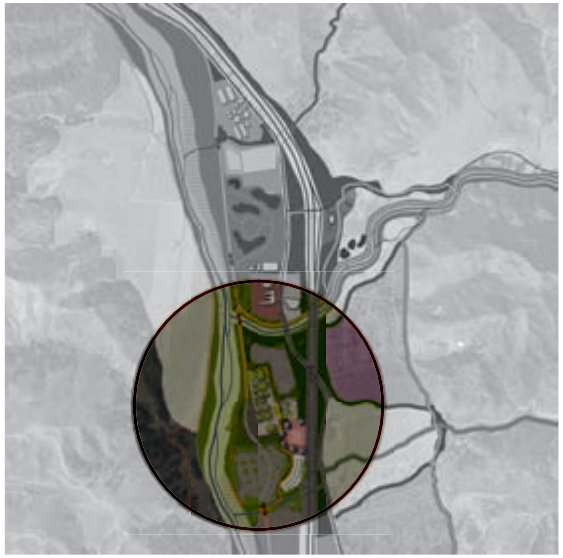


FIGURE 10.18 *Location of the Confluence Park sub-site .*

EXISTING CONDITIONS

The Confluence Park area lies south of the Ventura Valley Arboretum area, and makes up approximately one half of the Cañada Confluence site. The northern portion of this sub-site is an area of mixed land uses consisting of a campus of the Brooks Institute, a boat yard, an undeveloped lot through which the Cañada Larga runs, and the confluence of that stream with the Ventura River. The southern portion of the sub-site consists of the former USA Petroleum refinery. As in the case of the Ventura Valley Arboretum, the Ventura River Trail runs along its western edge, and Highway 33 along its the eastern edge.

Issues at this sub-site include the impairment of ecosystem services, the lack of public open space and access to the river, the culverting of a section of the Cañada Larga, and the existence of contaminated brownfields that may require remediation as a condition for increased public access or future development.

North Area

The Brooks Institute is a private college with a well-respected program in media subjects including photography, photojournalism, and graphic design with campuses in Santa Barbara and Ventura. The school's programs have recently expanded, and the City of Ventura has viewed it as a potential nexus for a larger arts-related development at this site which would possibly include the expansion of Brooks itself into the vacant areas north and south of the existing campus (Brooks 2008; City of Ventura 2005). However, as discussed in connection with the Mission Aqueduct above, parts of the campus, as well as the adjacent vacant lots, lie within the FEMA 100-year floodplain of the Cañada Larga, and the campus has sustained flood damage during recent storm events.

Before entering this site, the Cañada Larga passes through an approximately 300-foot long concrete box culvert under

FIGURE 10.19 *Cañada Larga box culvert under Highway 33.*

FIGURE 10.20 *The confluence of Cañada Larga and the Ventura River.*

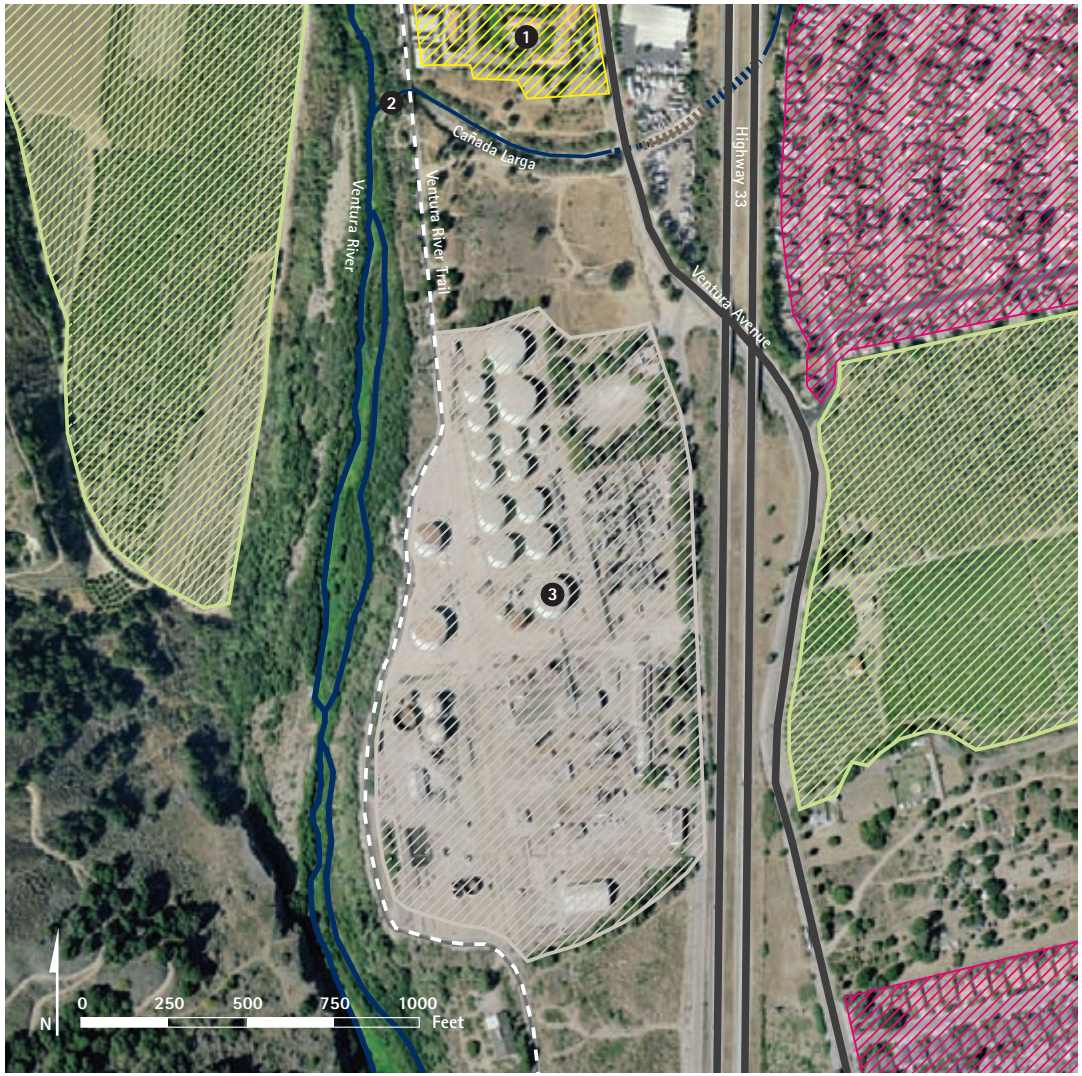


FIGURE 10.21 *Existing conditions across the Confluence Park sub-site. Orthophotography: CIRGIS.*

1 Brooks Institute campus

2 Ventura River/Cañada Larga confluence

3 USA Petroleum refinery

Streams

Box culvert

Concrete-sided channel

Major roads

Agricultural

Institutional

Abandoned or underutilized industrial landuse

Residential

FIGURE 10.22 *The Ventura River near its confluence with Cañada Larga.*

Highway 33 and an approximately 325-foot section of open concrete-lined channel. These engineered impairments effectively bar the riverside passage of animals between the Ventura River and the valley and hillsides to the east. A boat yard lies adjacent to the culvert on the island between Highway 33 and Ventura Avenue.

West of Ventura Avenue, as it passes through the undeveloped lot, the Cañada flows through a soft-bottom channel lined with rip rap. The banks and the lot are shady with oaks and other native and non-native vegetation, suggesting that the they currently have moderate ecosystem value. The area also appears to be used as an occasional camping location by homeless individuals and by others for riding dirt bikes. Further west, the southern bank of the Cañada is reinforced by a stretch of gabion wall; sections of the wall are climbable only with difficulty. The bed elevation of the Cañada is several feet higher than that of the Ventura River where the two rivers meet, (possibly the result of erosion discussed in chapter 3), and a concrete weir makes up the difference in grade. Directly above, an attractive bridge provides a crossing for the Ventura River Trail and the setting of the confluence is quiet and natural with impressive views upstream and downstream. However, other than the bridge with its bicycle traffic, there is no point where visitors are invited to approach either stream.

WHAT IS A BROWNFIELD?

"The term 'brownfield' is used to describe abandoned, idled, or underused industrial and commercial property that has been taken out of productive use as a result of actual or perceived risks from environmental contamination." (Dennison 1998)

The Old Refinery

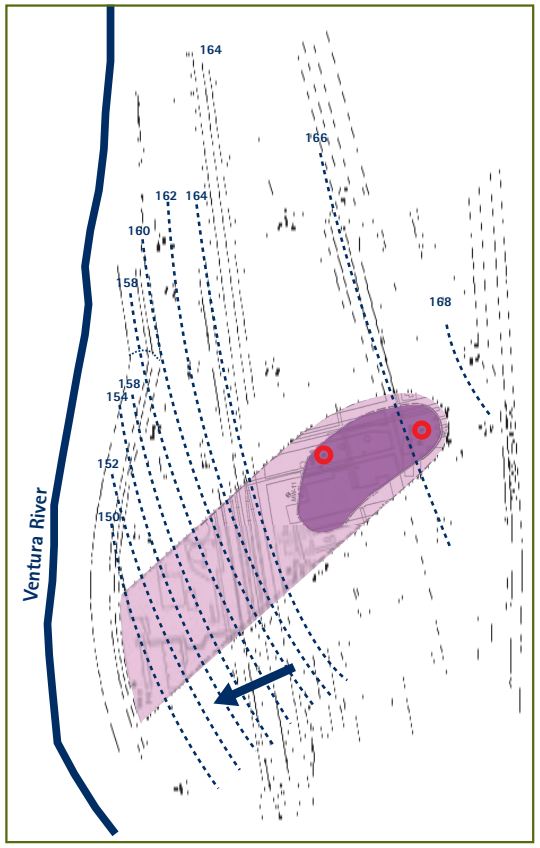
The USA Petroleum refinery site is located south of the confluence area on approximately 60 acres, largely consisting of an asphalt and gravel pad, partly constructed and partly open. This is a brownfield site that is mentioned as a candidate for annexation in the City of Ventura's General Plan (2005). Cracking towers near Crooked Palm Road and a tank farm to the east of the Ventura River Trail rise high above the landscape and could be described as iconic. However, participants at community meetings referred to the area as a "toxic eyesore" and a "rusty hulk." Extensive vandalism, corrosion and removal of exterior metal coatings from refining structures, easily viewed from the Ventura River Trail, reinforce a perception of dilapidation as well as contamination. This perception is reinforced by signs warning of asbestos contamination posted along the perimeter of the property and views of pools of stagnating water next to heaps of waste materials.

This site falls under the jurisdiction of the State Water Resources Control Board (SWRCB 2008) and is currently overseen by the County of Ventura Environmental Health Division (CVEHD). It is part of the County's Voluntary Cleanup, and Leaking Underground Fuel Tank Programs (CVEHD 2008a and b). Two underground fuel storage tanks and associated contaminated soils have already been removed (Stratus Environmental Inc. 2008). In addition a number of groundwater monitoring wells have been installed. Samples are taken quarterly and have shown the presence of petroleum hydrocarbons such as gasoline, benzene, ethyl-benzene, methyl tert-butyl ether (MTBE), xylenes and toluene. One well in particular has shown unacceptably elevated levels of these contaminates (Stratus Environmental Inc. 2008). In addition, recent acts of vandalism have released polychlorinated biphenyls (PCBs) into the soil (Salter 2008). An exhaustive survey of the type and extent of contaminates at the site has not been completed, and a survey of this sort will require the removal of existing above ground tank structures in order to allow further testing of the site. These actions would be completed through the Voluntary Cleanup Program and at the property owner's discretion. However, further inspection and monitoring are planned through the CVEHD (Salter 2008).

Figure 10.24 illustrates the estimated extent of groundwater contamination from methyl tert-butyl ether (MTBE), which is just one of the contaminants identified at the site (Stratus Environmental Inc. 2008). Water quality testing between 2001 and 2005 did not disclose detectable amounts of

FIGURE 10.23 *The former USA Petroleum refinery site.*

GROUNDWATER CONTAMINATION



This diagram, based on well monitoring data from mid-2008, illustrates the estimated location of a plume of MTBE contamination in groundwater below the former USA Petroleum facility. Water from two wells shown here had concentrations of MTBE higher than eight micrograms per liter (µg/L), and the dark purple zone had estimated concentrations above 5 µg/L, both exceeding California's secondary maximum contaminant level (MCL) of 5 µg/L (USGS 2007) for this volatile organic solvent. That MCL is directed toward aesthetic considerations such as taste and odor for drinking water, but MTBE also raises health concerns; the EPA has identified the chemical as a potential carcinogen (USGS 2007).

- Monitoring wells with MTBE 8.2 µg/L or above
- MTBE 5.0 µg/L or above (estimated area)
- MTBE 1.0 µg/L or above (estimated area)
- Direction of groundwater flow
- Water table (elev. in feet above mean sea level)
- Ventura River

FIGURE 10.24 *MTBE contaminated groundwater under the USA Petroleum site. Adapted from Stratus Environmental Inc. 2008.*

MTBE in the Ventura River itself (Leydecker and Grabowski 2006). However, groundwater under the USA Petroleum site flows directly toward the river channels immediately to the West of the site, suggesting the importance of future remediation efforts.

Like the water treatment facilities at the north end of the Canada Confluence site, the western edge of the old refinery site replaces the floodplain of the Ventura River with what appears to be a levee and pushes the river into a narrow cross section. Most of the refinery site is within the FEMA 100-year floodplain (FEMA 2005), a circumstance that further increases the risk of release of contaminants into the river.

CONFLUENCE PARK-REFINERY AREA: DESIGN CONCEPTS

- 1 Buildings relocated from 100-year floodplain
- 2 Brooks campus expanded across Ventura Ave.
- 3 Confluence Park
- 4 Former refinery - phytoremediation area
- 5 Poplar plantation (MTBE groundwater plume)
- Stream with riparian corridor
- Nature trail
- Multi-use trail
- Limited access bridge
- Existing riverbed
- Expanded riverbed
- Riparian habitat
- Greenbelt corridor
- Agricultural
- Residential
- Industrial
- Remediation site

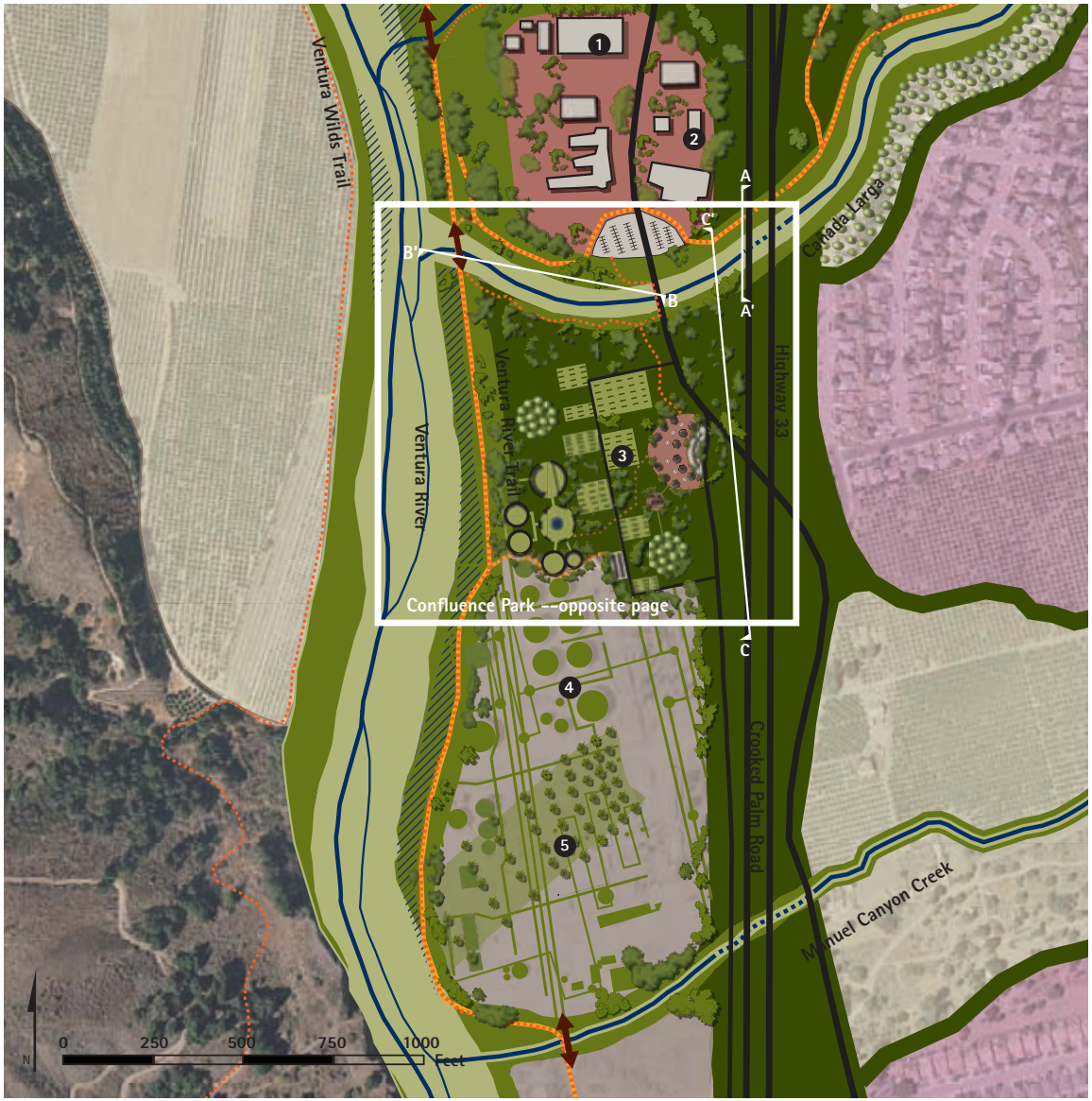
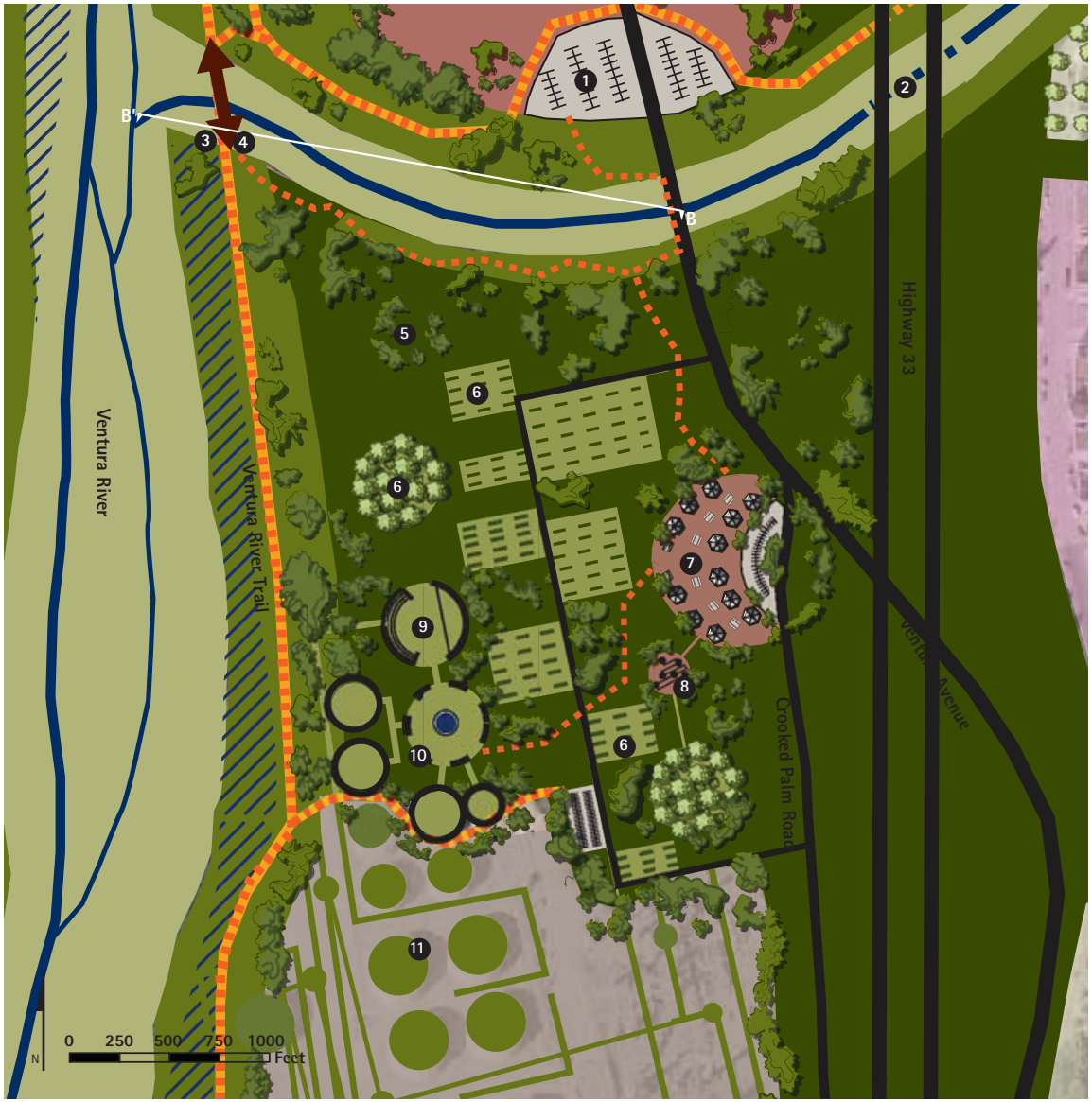


FIGURE 10.25 *Confluence Park and refinery remediation area, proposed plan.*



CONFLUENCE PARK – DETAILED VIEW

1. Combined parking Brooks / Confluence Park
2. Cañada Larga daylighted under Highway 33
3. Access stairs to confluence
4. Riverside observation station
5. Picnic/gathering groves
6. Community gardening area
7. Night market, concession area, restrooms
8. Climbing and play area
9. Oil tank amphitheater
10. Oil tank galleries, recreation, skate park
11. Former refinery - phytoremediation area

FIGURE 10.26 *Confluence Park, proposed plan.*

DESIGN RECOMMENDATIONS

Objectives for the Confluence Park sub-site include mitigating the impacts of development on the Cañada Larga tributary, increasing public access and recreational opportunities near the confluence between this tributary and the Ventura River, planning for future land uses that are compatible with the floodplain, and mitigating a brownfield condition that might otherwise limit future public access to the site. Design recommendations to address those objectives include the daylighting and dechannelization of a portion of the Cañada, the creation of a public park area highlighting the confluence, and the envisioning of a program for the remediation of the brownfield site that increases public awareness of, and support for, the cleanup process while affording limited, safe, public access to portions of the site.

Daylighting the Cañada Larga

This Vision Plan identifies tributaries as features that have strong potential for improving habitat connections between the main stem of the Ventura River and the surrounding valleys and hillsides. The culverting or open channelization of over 600 feet (the length of two football fields) of the Cañada Larga has effectively eliminated natural hydrological and ecological functioning from the stream precisely at the point where it enters and traverses the proposed parkway. Unchanged the channel would serve as a highly visible negative example of river function for visitors to Confluence Park. Instead, this plan recommends the daylighting of the stream through the removal of the box culvert and replacement with a bridge overpass for the highway, as illustrated in figure 10.27. Immediately west of the overpass, between Highway 33 and Ventura Avenue, the existing concrete channel would be replaced by a soft bottom channel with vegetated banks. While economic and engineering considerations may limit the width of the riparian corridor that can be daylighted under the highway, these changes would allow native vegetation and natural processes to reemerge and provide some passage for wildlife.

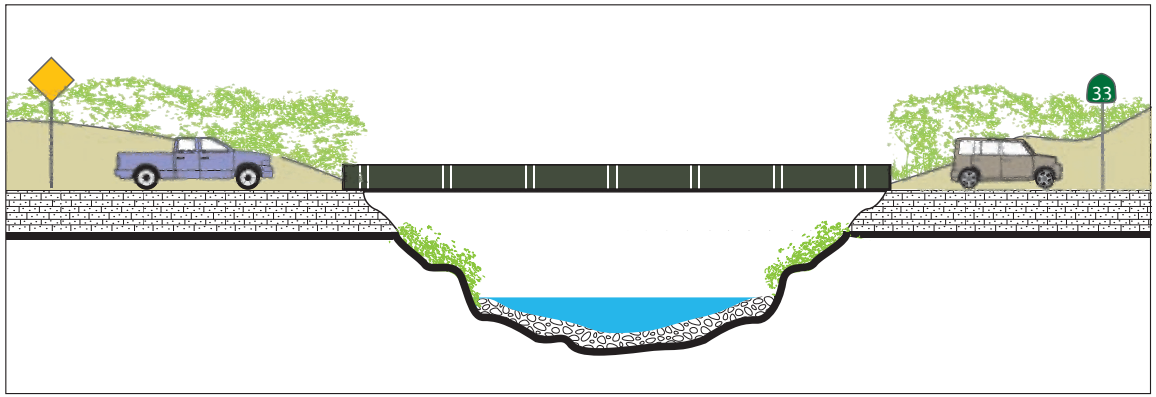


FIGURE 10.27 *Section A-A'. Cañada Larga daylighted at Highway 33. Not to scale.*

Confluence Park

The area immediately south of the Brooks campus would be a crossroads and a convenient rest stop for visitors travelling up or downstream on the Ventura River Trail, visitors coming from trails along the Cañada in the historical aqueduct area, visitors who might park along Ventura Avenue, and potentially, hikers crossing the river from the Ventura Wilds Trail via a limited access bridge. Here, passive recreational opportunities would be concentrated along the banks of the Cañada and at its confluence with the Ventura River. These amenities would include views and access to the confluence, resting and gathering spaces and interpretive materials regarding river processes.

A walkway, with views of the Cañada as well as the hills above the west bank of the Ventura River, would run from Ventura Avenue across the Ventura River Trail and down gabion stairs to the location of the confluence. The park would have an oak woodland character, transitioning into riparian vegetation along the stream and river banks. Oaks and other native trees would be clustered to form a series of small to medium outdoor rooms offering shade and picnic opportunities. In addition to enjoying shade from the oaks, visitors would also have the option to picnic in one of several ramadas along the walkway. One or more of these ramadas would be located to provide direct views of the confluence, with interpretive materials that highlight both dry and wet season conditions on the river. These locations would afford shelter on rainy days as well as an opportunity to safely observe occasional flood conditions, while learning from interpretive materials about the conditions that create floods on this flashy river and the importance of floods as a natural river function.

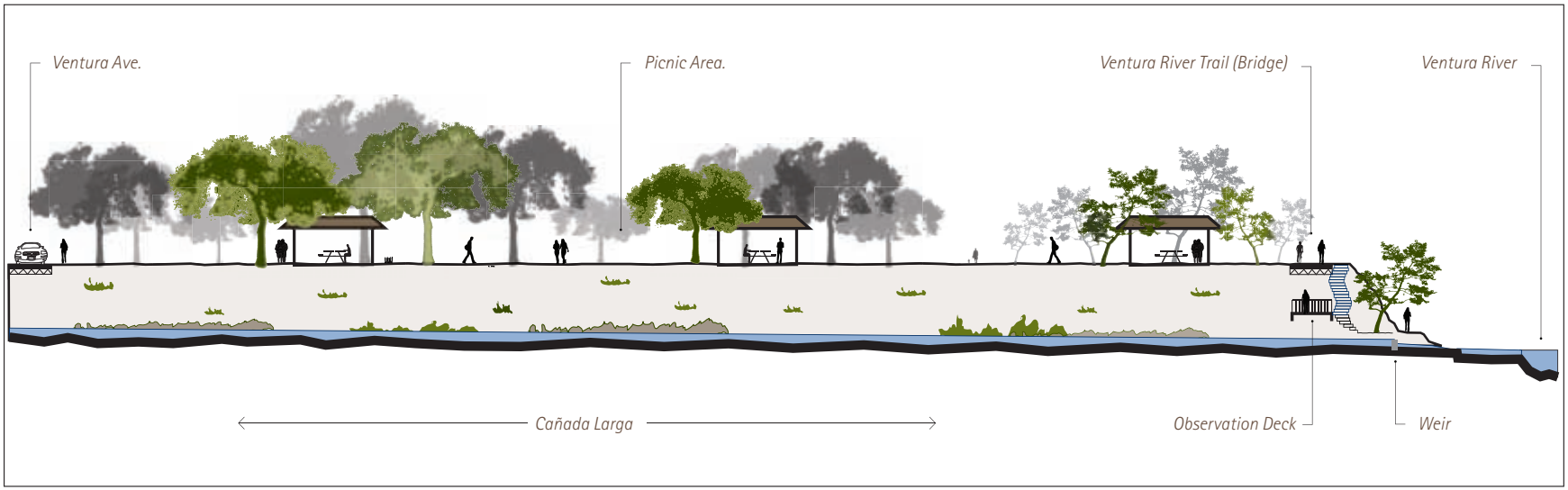


FIGURE 10.28 *Confluence Park Plan section B-B' showing Park, viewed from North, from Ventura Avenue to the confluence. Not to scale.*

Other interpretive materials would address related subjects such as the concept of watershed planning and the relationship between permeable surfaces, groundwater recharge and instream flow in the river; these ideas would be reflected in the design of the park itself, highlighting the use of permeable walking surfaces.

For parkway visitors, Confluence Park would offer an invigorating nexus between passive recreational opportunities and increased awareness of the river and its processes, and cultural opportunities at the adjacent Brooks campus and possibly other future arts related developments in the area. At the same time, the park would preserve valuable open space next to the campus: space that performs valuable ecosystem functions such as groundwater recharge, water quality protection and ecosystem support for native plants and animals.

The Refinery

This Plan envisions the former USA Petroleum refinery site not as a specific future land use, but as a remediation project and a site with an open future. Given the existence of substantial industrial infrastructure and known contaminants, cleaning up the site to the point where it is safe for public use may require many years of planning and implementation, a consideration that suggests that the remediation project itself will be an important feature of the parkway, rather than simply a prior condition to be completed before a parkway plan is implemented. Therefore, this Plan focusses on how a future visit to the Lower Ventura River Parkway can be enriched through increased awareness and appreciation regarding its industrial history, the reasons for remediation at this site, and the remediation process itself.

Remediation Efforts

Although a review of brownfield remediation strategies is beyond the scope of this Plan, a brief overview is useful from the standpoint of identifying opportunities for public interaction with the process; the focus of this discussion.

Brownfield remediation efforts are ultimately aimed at the return of abandoned or underutilized contaminated land to safe use for productive purposes. Anticipated future uses might be developments such as light industry, commercial

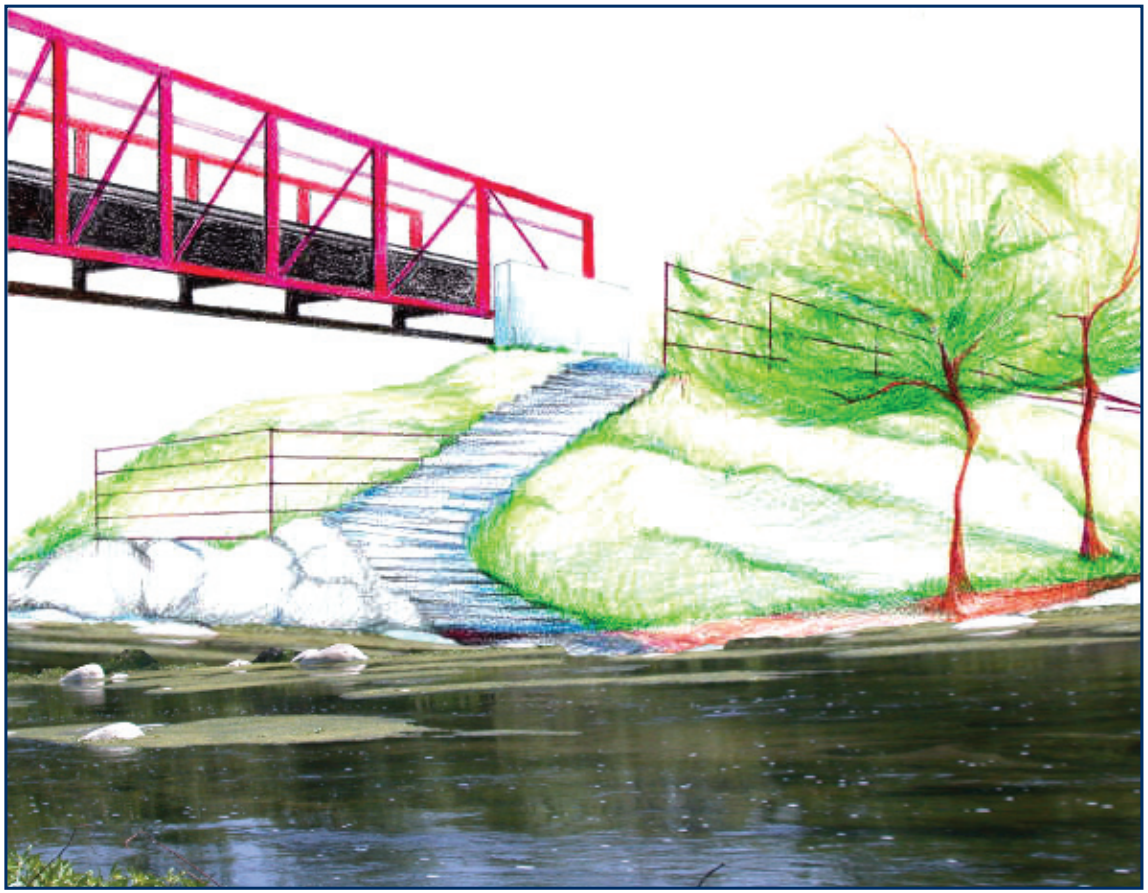


FIGURE 10.29 *Stairway from the Ventura River trail to the confluence of Cañada Larga and the Ventura River. Illustration by Ling Wei Lioa.*

space, or housing, or simply the return of the land to a more natural state for the provision of ecosystem services, or a combination of developed and open space. Although the complete cleanup and removal of contaminants from a site, referred to as *cleanup to background levels*, is ideal, recent years have seen an increasing emphasis by federal and state regulators on using environmental risk assessment methodologies to define acceptable risk-based cleanup levels that are less stringent and more economical but deemed adequate, with the anticipated future land use being the key factor. The result of this balancing of technological feasibility, economics, and land use planning is a situation where contaminants might be removed to the extent feasible, or in some cases might be quarantined through encapsulation, clean cover or some other means without being removed (Cairney and Hobson 1998).

Remediation of the refinery site would involve initial testing of the infrastructure, soil, and groundwater at the site (some of which has already occurred), removal and recyling of industrial infrastructure, and the removal or quarantine of any contaminants in the soil or groundwater at the site.

Methods for removal of petroleum-related soil contaminants include on-site excavation and treatment, ex situ approaches involving the removal of the contaminated soil itself from the site and decontamination or disposal of the soil at another location, or in situ approaches such as soil flushing, chemical neutralization, injection and extraction, biodegradation, and phytoremediation. Methods for stabilizing or quarantining of soil contaminants include capping contaminated layers with concrete or other materials, or mixing soil with concrete or other binders to trap contaminants in a solid matrix (Riser-Roberts 1998). Petroleum-related groundwater contaminants might be removed through pumping groundwater, filtering or otherwise treating it, and reinjecting it into the ground. (Riser-Roberts 1998).

This Plan recommends the consideration of phytoremediation as a key strategy that would address both soil and groundwater contamination at the site. Phytoremediation is the use of plants to remove contamination from soil, water, and air, using leaves,

> **"Cultural reuses of brownfields . .** are uses of properties that support those assets of communities that distinguish their architecture, function, residents, or other characteristics from others . . . . If communities are thought of as eco-systems of interdependent social, environmental, and economic ingredients, the history and culture of a community can be seen as the glue that binds these ingredients together." (Singer and Ploetz 2002)

shoots and/or roots to filter, extract, immobilize, stabilize, or biodegrade pollutants (Arthur et al. 2005). The roots of some plants supply carbon and energy to the root zone, rhizoshere, that increases the activity of soil microorganisms that biodegrade petroleum constituents (Arthur et al. 2005; Riser-Roberts 1998). Some plants can take up and isolate heavy metals, often associated with petroleum contamination, in their roots and shoots (Arthur et al. 2005).

A Public Viewport on Remediation

Phytoremediation would be a valuable element in a cleanup program for the refinery site, while also serving other parkway objectives. Phytoremediation strategies for the cleanup of industrial waste employ many of the natural characteristics that make plants valuable for cleaning air, water and soil in natural ecosystems. Many plants native to Ventura, such as cattail (*Typha latifolia*), iris-leaved rush (*Juncus xiphioides*), and bulrush (*Scirpus ssp.*) are useful in these remediation strategies (Arthur et al. 2005), just as they are valuable in natural ecosystems. Thus, employing phytoremediation strategies at the refinery site in a highly visible manner, with appropriate interpretive materials, would increase public awareness regarding the ecosystem services provided by vegetated open space, helping to build stewardship for the river and the parkway.

A highly visible approach to phytoremediation including safe, passive recreational components and ample explanatory materials might also help to generate public support for the remediation process itself. Even a seemingly desirable program like brownfield phytoremediation can generate public controversy, with questions arising about the choice of plants (in some contexts, non-native or even genetically engineered plants), the eventual fate of contaminants, or the safety of the process itself. The consideration of social acceptability for a specific remediation effort can be as important as scientific and technical expertise (Wolfe and Bjornstad 2002).

One idea for using highly visible biological cleanup processes and increasing visitor awareness is suggested by research indicating that deep-rooted trees such as poplar (*Populus deltoides x nigra* and other hybrids) can remove MTBE, a contaminant of concern at the refinery site, from groundwater in aquifers (Hong et al. 2001). A poplar plantation, planted in the path of a plume and appropriately sized depending on the width of the plume and the slope and rate of groundwater flow, can actually capture the plume (Mathews et al. 2003). This would seem to be a promising concept for the refinery site, with its high water table, relatively shallow aquifer and permeable alluvial soils. A stand of poplars or similar deep-rooted trees tracing the path of the MTBE plume (figure 10.24) would draw visitors' attention and create curiousity, presenting an opportunity for effective interpretive signage. One potential limitation is the fact that few poplars are native to this area, and the species with proven effectiveness at this time are both non-native and in some instances, genetically engineered. The need for exotic plant materials versus native ones, and the impact on local native plant communities and biodiversity would need to be assessed.

During some phases of the remediation effort, plants with phytoremediation potential would be established with different planting palettes forming a contrasting figure and ground pattern in order to clearly mark the footprints of former refinery structures and pipeline paths, calling attention to the past use of the site as well as the presence of a remediation effort. If it is determined to be safe, a trail with restrictive fencing could allow visitors to pass through the remediation area, in order to view signage explaining the importance of cleanup efforts and the qualities of the plants being used for phytoremediation.

The Future of the Refinery Site

The ultimate uses of the over sixty acre refinery site remain open in this Vision Plan. City annexation and development prospects, Brooks campus expansion possibilities, and the need for open space and the ecosystem services that it provides, all competing for space. As remediation progresses the following factors would warrant consideration.

First of all, the entire refinery site is in the floodplain of the Lower Ventura River, and significant portions of the site are within the FEMA 100-year floodplain. With the future restoration of the Lower Ventura River and the growth of public appreciation for the benefits of an active floodplain, the portion of the site that is subject to occasional flooding may grow rather than shrink. The outcome of remediation efforts at the site will have an impact on this; if contamination is capped or otherwise contained rather

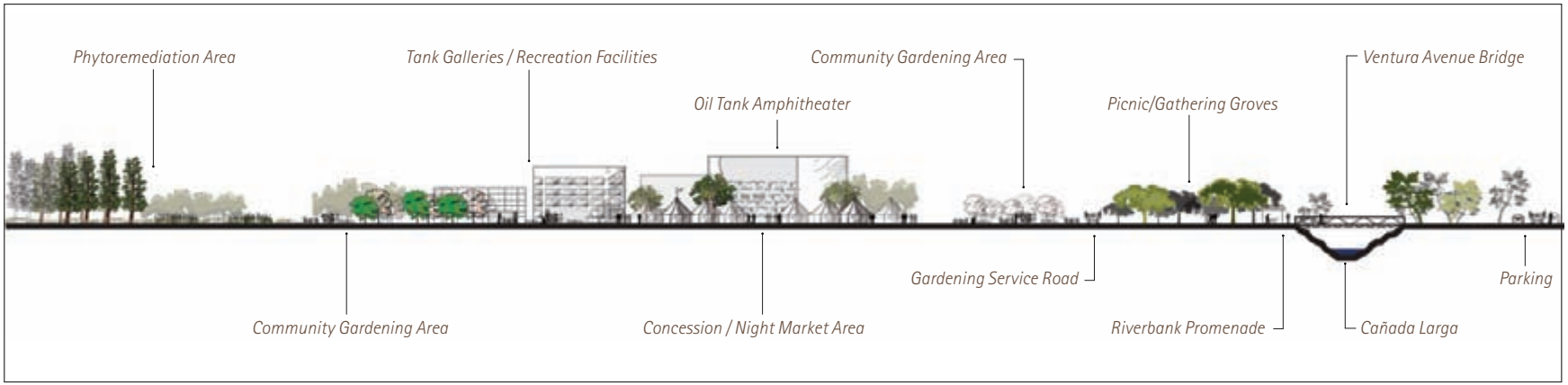


FIGURE 10.30 *Section C-C' showing Confluence Park and the edge of the refinery remediation site viewed from Ventura Avenue and Crooked Palm Road.*

than completely removed, the site may need to be leveed in order to prevent the release of contaminants into the environment during a future extreme flood event. Despite some uncertainty regarding these factors, future uses that are contemplated for the site should be ones that are compatible with some degree of flooding.

Refinery Park

Brownfields present planners with pressing priorities for both economic development and environmental restoration; the fact that these sites also often have historically significant past uses makes them uniquely suitable for a combined approach to social, cultural and economic values that leads to sustainable communities (Singer and Ploetz 2002). Devoting part of the refinery site to a cultural celebration of Ventura's petroleum producing heritage would provide an element of interest for visitors and strengthen their experience of this place.

This plan envisions cultural reuse of part of the refinery site as a refinery heritage park that would provide amenities for private use and community programs. The locations for these features shown in this Plan are illustrative of the concept only. Actual siting would be dependent upon the results of testing, remediation and monitoring activities to ensure that any public uses of the site are safe during or following completion of remediation activities.

The requirements for safe soil assessment, cleanup and monitoring may preclude the retention of any original refinery structures on the site. However, structures and spaces in the park could mimic the forms, distribution and placement of some preexisting storage tanks and refining equipment. For example, the form of an original above-ground storage tank might serve as inspiration for an amphitheater or outdoor gallery for both day and evening use, while the location of a preexisting underground tank could provide a skate park. Other structures might be newly designed and built to mimic refining equipment at a smaller scale, for example, an area of climbing and play equipment near Crooked Palm road that would mimic the preexisting cracking towers.

Some of these features would appeal specifically to groups of children, youth, or senior citizens, while others (such as an amphitheater for movies or performances) would appeal more generally to families or the general public.

A concession stand and rest rooms, visible to motorists on Ventura Avenue and Highway 33, would support park users and provide an incentive for travellers to stop and look. During the evenings on a weekly basis, a night market would be set up in the shadow of the park's structures. A dining experience popularized in Asia, night markets provide a festive outdoor venue in which restaurateurs and retailers can sell their wares while the community has a unique opportunity to get outside and socialize after dark.

FIGURE 10.31 *Night market in Confluence Park near the former USA Petroleum refinery site.*

CONCLUSION

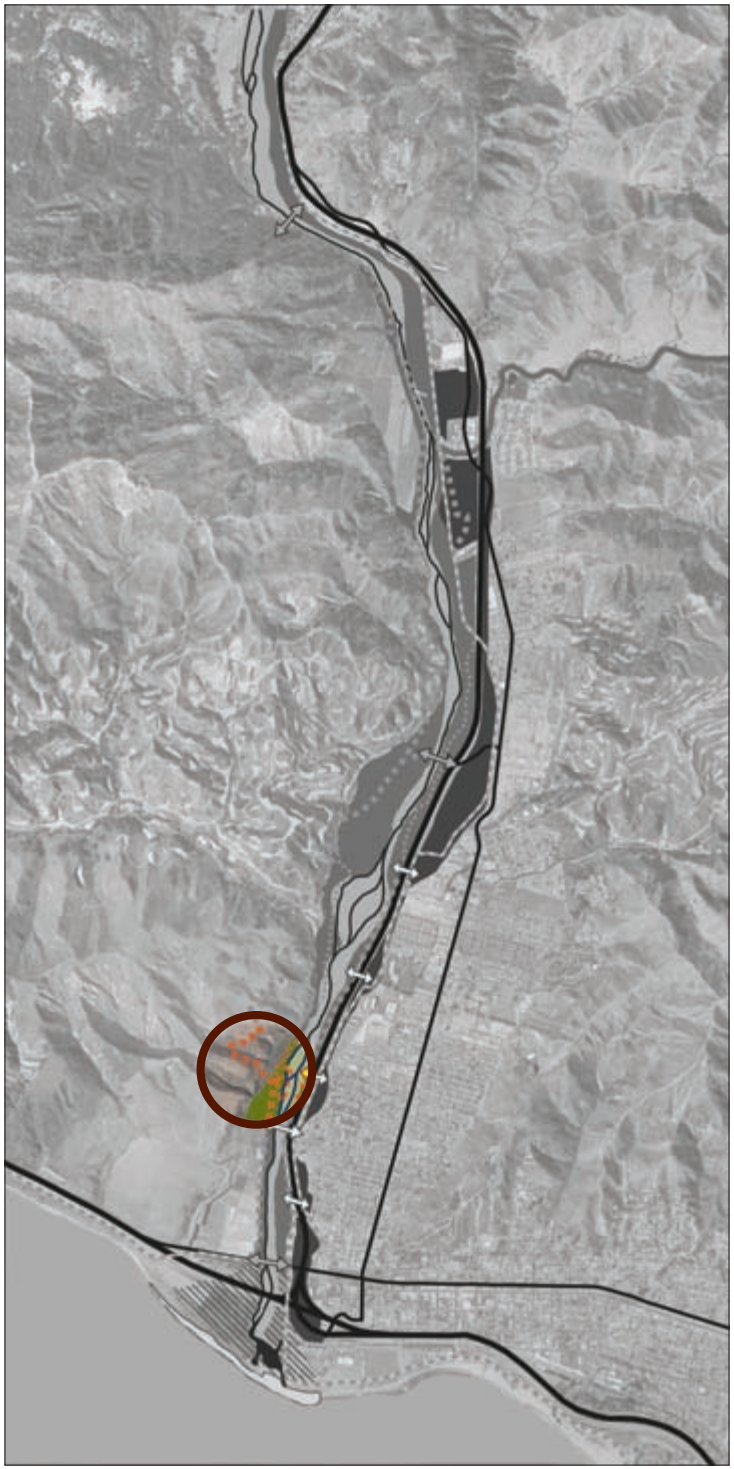
This Plan envisions the area where the Ventura River and Cañada Larga meet as a place where people could celebrate convergences of natural hydrology and urban infrastructure, of present-day development and historical remnants, and of ecosystems and human culture.

"California can improve the quality of life in this state by assisting public agencies and nonprofit organizations in establishing, developing, and restoring river parkways."

California River Parkways Act of 2004
California Public Resources Code 5751(i)

CHAPTER 11: COTTONWOOD JUNCTION

FIGURE 11.1 *Bluffs above the western bank of the Lower Ventura River.*



Existing Conditions

This chapter of the Vision Plan explores the concept of creating a small site at the junction of several potential trails on the west side of the river, which will serve as the focus for nature experiences for parkway visitors.

THE WESTERN BANK OF THE RIVER

The western edge of the Lower Ventura River has not been urbanized, and currently there is very little structural development. A panorama of stunning views, abundant natural processes and educational opportunities grace the lands along this bank between the Main Street Bridge and Casitas Vista Bridge. However, most of the property abutting the river is privately held and few people have the opportunity to experience it. At the northern end of the proposed parkway near Foster Park and Casitas Vista Bridge, Mission Avocado is an active orchard that reflects Ventura's agricultural heritage. The central section of the proposed parkway features oil extraction operations that cover an extensive swath of largely isolated hillside land. Aerial images indicate a disturbed but vegetated landscape. These combined factors indicate that this area provides moderate habitat value. Two row-crop fields are actively cultivated at the southern end of the western bank, representing an aspect of the economy of Ventura today, and provide large areas for stormwater to infiltrate the aquifer, but large farming operations this close to the river may also present risks for increased nitrates in river water due to fertilizer runoff. In addition to presenting natural and agricultural resources that would add richness to a visitor's experience, these farming operations feature packed-earth service roads adjacent to the river.

THE SITE

The scope of this vision plan and current restrictions on access preclude a detailed ground-level study of the west bank of the lower river. However, the site identified in figure 11.6 has characteristics that make it an appropriate example of a suitable site for a gathering area. This niche lies in an apparently undeveloped area between the northern and southern extent of the row crop operations on Taylor Ranch property (Philips 2000). It is nestled on a strip of terraced land between steep bluffs to the west and a drop to the riverbed to the east, with a packed-earth service road passing through.

FIGURE 11.2 *Proposed location of Cottonwood Junction.*

1 Avocado orchards
2 Row crops
Cottonwood site
Ventura River
Oil extraction
Agricultural
Native plant restoration

FIGURE 11.3 *Existing features on the west side of the Ventura River. Orthophotography: CIRGIS.*

FIGURE 11.4 *Service Road along the western bank of the river.*

FIGURE 11.5 *No trespassing signs are a frequent sight near the Ventura River.*

The site itself could provide visitors with lessons about natural processes. The clay-red bluffs display erosion and the underlying geology, while the distribution and density of vegetation gives clues to the location of groundwater and ephemeral streams. The riverine and riparian ecosystems of the river are just a short walk away on one side, and several ephemeral streams have cut notches into the bluffs nearby, offering opportunities for hiking into the hills. A native plant restoration has recently been undertaken at this location (Phillips 2000). The vegetation is representative of three ecosystems, as well as disturbed landscapes. Black sage (*Salvia mellifera*) and other low-growing plants represent the coastal sage scrub community, while oak woodland species such as coast live oak (*Quercus agrifolia*) and lemonade berry (*Rhus integrifolia*) are also present. Finally Western cottonwood (*Populus fremontii*), Western sycamore (*Platanus racemosa*), mule fat (*Baccharis salicifolia*) and other water-loving species demarcate the riparian zone and areas of abundant groundwater. Each of these ecosystems provides food and shelter for wildlife, as well as playing roles in natural fire regimes and soil stabilization. However, invasive species indicative of disturbance such as fennel (*Foeniculum vulgure*) and castor bean (*Ricinus communis*) are also present.

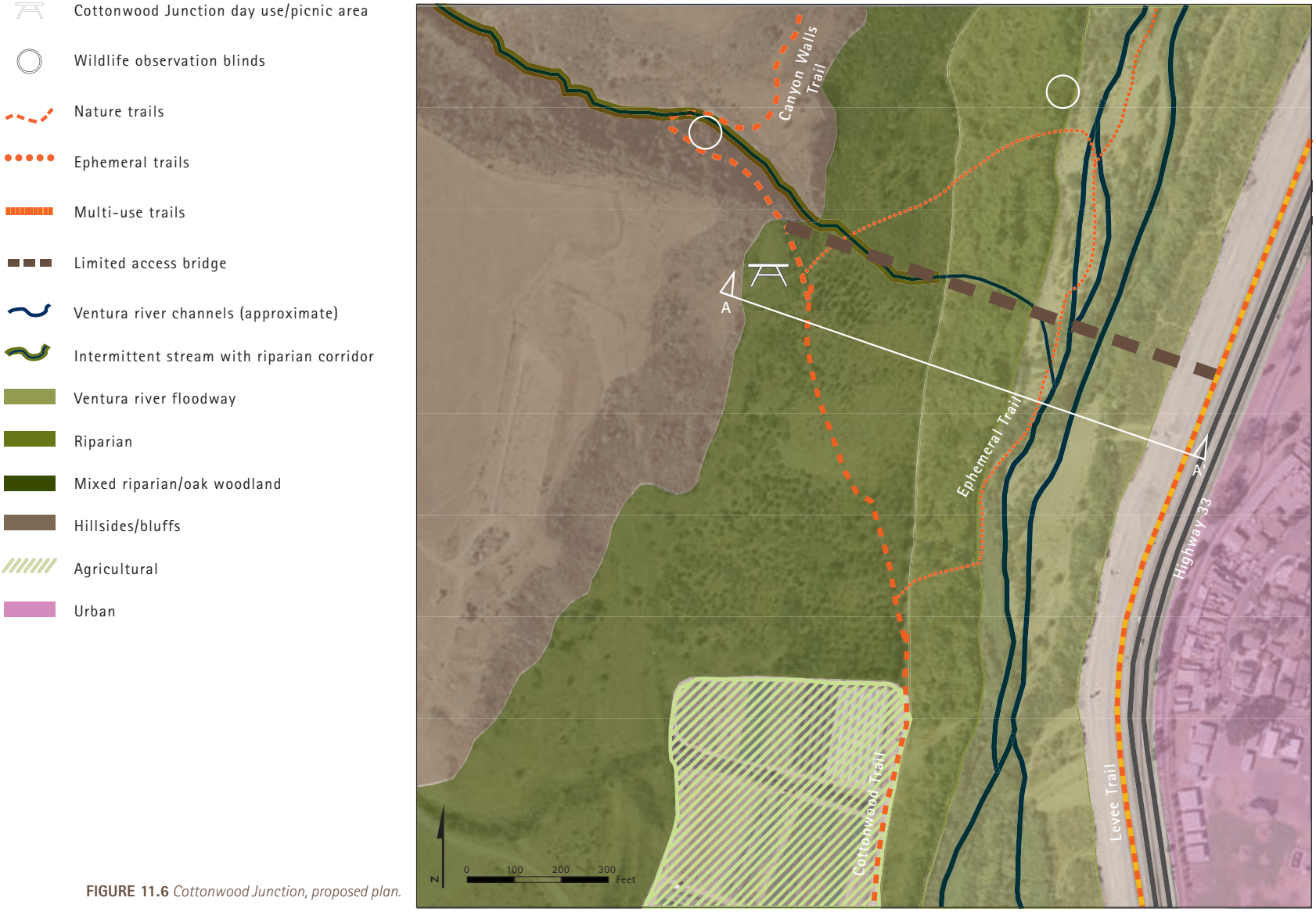


FIGURE 11.6 *Cottonwood Junction, proposed plan.*

Design Concepts

THE PLANS

Design objectives for this site are the protection and restoration of wildlife habitat, preservation of existing agriculture, the improvement of public access, recreation and education, and the encouragement of increased stewardship for the Ventura River. These objectives are consistent with an overall parkway objective, the permanent protection of minimally developed land and agricultural resources on the western side of the Ventura River from urban and suburban development.

Opportunities for the public to visit this area would be provided through a Ventura Wilds Trail and a public gathering area, Cottonwood Junction, along the trail. These amenities could be implemented with the least possible impact to natural systems and wildlife and would present special opportunities for the creation of future environmental stewards. Evidence suggests that providing children with outdoor experiences which are naturalistic in character can lead to a desire to protect and care for the natural environment as adults (Wells and Lekies 2006).

The Trail

The Ventura Wilds Trail would have the characteristics of a nature trail as discussed in chapter 8, Circulation. It would give users the opportunity to move through three distinct ecosystems with different sights and smells, feeling distinct ambient temperatures and possibly encountering different types of wildlife. Several points of entry at the north and south ends, and three intermediate bridges connecting with the urban grid across the river would allow hikers to choose the duration of their trip.

A trip from the north end to the south end of the parkway (moving downstream) along the west side might occur as follows. Beginning at Casitas Vista Bridge at Foster Park, visitors would take the Avocado Trail segment through the orchards of Mission Avocado, directly across the river from the proposed Cañada Confluence area (chapter 10). Here, hikers would be able to transverse the edge of the habitat-rich river and riparian zones while experiencing a piece of the agricultural heritage of Ventura. Hikers would also have the opportunity to cross the river on a limited-access bridge and explore the Confluence area. As they reach the end of the avocado orchard, hikers would ascend a steep hill, arriving at the top of a bluff with dramatic river views. The Canyon Walls segment of the trail would continue south on top of the bluffs, taking hikers through areas of chaparral and oak woodland and traversing the property of Aera Energy. This mostly undeveloped area currently features active oil production, but presents a significant opportunity

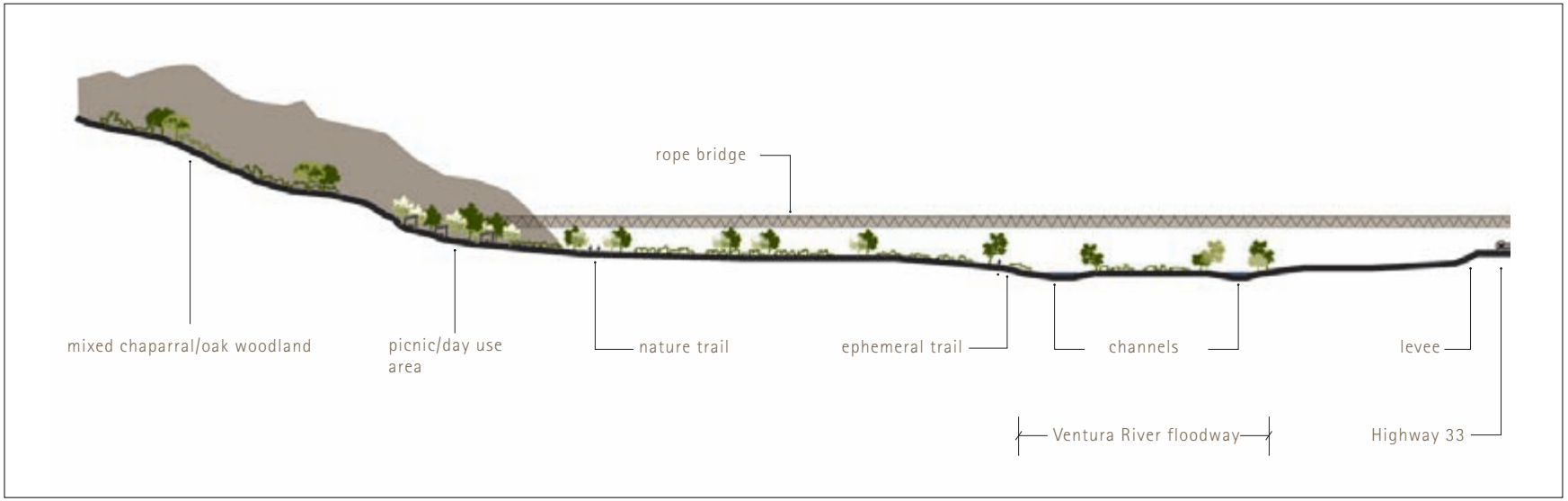


FIGURE 11.7 *Section A-A'. Not to scale.*

Picnic Area.

FIGURE 11.8 *Cottonwood Junction, north facing perspective.*

for future recreational open space and habitat restoration. Arrangements for public use of the 1930s era Shell Road Bridge, or a new limited-access bridge nearby, would give hikers an opportunity to descend to the river and cross to the urban side of the parkway, while other hikers might continue along the bluffs on a stabilized trail, moving in and out of canyons formed by intermittent tributaries of the Ventura River. This part of the trail experience would depend on the development of a strong public-private partnership with Aera Energy including easements for passive recreational use. A partnership of this nature would also open up future opportunities for the creation of other programs, including ecosystem restoration.

The Junction

After passing through the Aera land, hikers could descend from the Canyon Walls segment of the trail, arriving at Cottonwood Junction. This plan envisions the area at the foot of the bluffs with the river below, as the junction or meeting point of several parkway elements, all of which might bring visitors from different directions. Hikers entering the area from the bluffs to the north would encounter others walking up the Cottonwood trail segment from the Main Street bridge downstream. Some hardy, dry-season hikers might enter the area from upstream or downstream after boulder hopping along sections of the riverbed itself. The Junction is also near the point where two ephemeral streams meet the Ventura River from the hills above, possibly bringing wildlife down to the river from the hills above.

Finally, some visitors would enter the Junction on a limited-access bridge stretching across the river from the Ventura levee. If technically feasible, this would be a rope bridge. Used throughout history to span deep gorges, rope bridges are greatly admired today for their simple but solid engineering, aesthetic qualities, and adventurous character. The bridge would provide users of the Ventura Wilds Trail a unique and exciting opportunity to access the east side of the parkway, and vice versa.

The Junction itself would include amenities such as a blind for wildlife observation, picnic areas, interpretive displays, and a space where docents could conduct nature education programs.

An Ephemeral Trail

At the edge of the Ventura River just to the east of Cottonwood Junction, a marked ephemeral trail would take visitors over the bank and down into the floodway of the river itself. An ephemeral trail in the riverbed here, perhaps with a docent guide, would give visitors a look at essential Ventura River characteristics such as braided channels that they might not otherwise see up close. Due to the effects of periodic flood scouring, repeat visitors could experience significant changes in scenery and plant succession that would reinforce their understanding of the ephemerality or temporary nature of the environment of this unique river.

End of the Trail

Downstream from Cottonwood Junction, the Cottonwood Trail would form the final segment of the Ventura Wilds Trail. Walkers on this segment, an agricultural service road, would be flanked on the east by the riverbank and riparian vegetation with several opportunities to walk up to the side of river channels in which water generally flows. On the west side, visitors would pass active rowcrops, a reminder of where their food comes from and of one of Ventura's economic drivers. Finally, the trail would end at a proposed trailhead at the Main Street Bridge. The view would be an interesting look at the intersection of natural and structural engineering, that of the Main Street Bridge and Highway 101 rising above the river and cutting into the hillsides: the natural world overlaid by urbanization.

CONCLUSION

Cottonwood Junction would be the focal point for the themes of agriculture and nature experience that would define the west side of the proposed parkway corridor. The Junction would be a gathering space where visitors converge with programs revolving around observation of nature and respectful interactions between humans and natural communities.

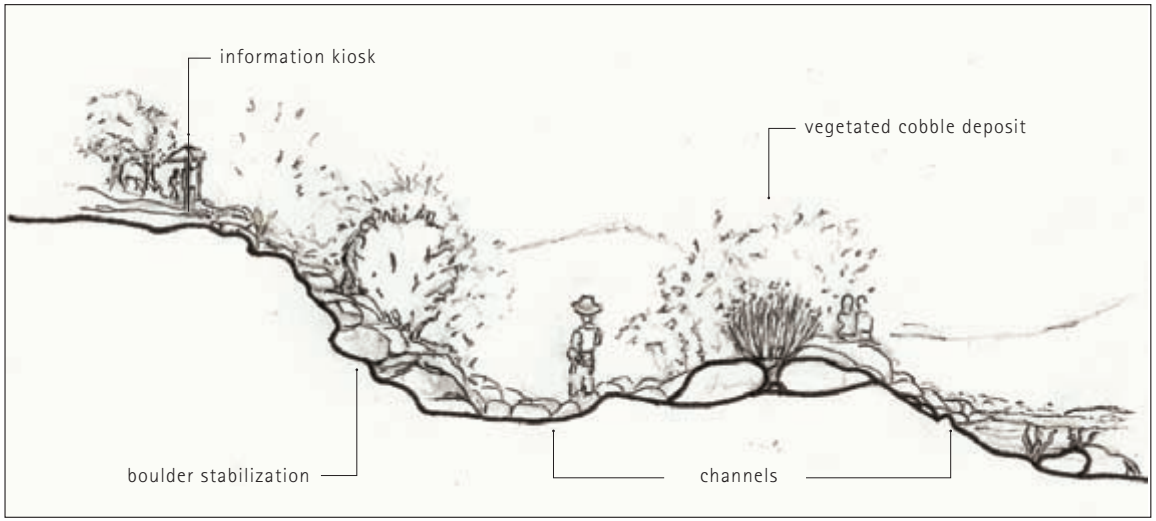


FIGURE 11.9 *Ephemeral trail detail, late winter in an average rain year. An information kiosk is located just before the trail head and the river bank has been stabilized with boulders and appropriate measures to prevent erosion.*

CHAPTER 12: DOWNTOWN DELTA

FIGURE 12.1 *Clockwise from left: Existing birds eye view, Downtown Delta; Second estuary; Mission water cistern and filtration building; Eastwood Park on Main Street; N. Olive Street, Westside community; Ventura River Trail, Westside community.*

DOWNTOWN DELTA

EXISTING CONDITIONS

The broadest portion of the Ventura River Valley - referred to here as the Downtown Delta – is an area with considerable urbanization and relatively flat terrain that is quartered by Highway 101 and Highway 33. It encompasses existing portions of the Westside community, the downtown historical corridor, and the downtown western beach area. This Plan proposes four design sites within these three neighborhoods: the Westpark Access, Ortega Zócalo, the Ventura County Fairgrounds, and the Ventura River Parkway Interpretive Center. The name Downtown Delta reflects both the presence of the Ventura River delta and the spatial form formed by the four proposed downtown sites.

Westside Community

Currently, the Westside community experiences limited access to the natural and cultural resources of Ventura. The Ventura River, the Ventura levee, and Highway 33 border the neighborhood on the west. While the levee and the highway provide significant benefits to the city, they also act as barriers that prevent physical access to, and limit experiential knowledge of, the Ventura River. To the east, the Westside community is bounded by hillsides which are a valuable natural resource for Ventura. However, as no trails or roads provide access between the Westside community and the hillsides, access to this natural resource is limited. The effect of these natural and manmade boundaries is that interaction between members of the Westside community, the river, and the hillsides, is discouraged.

Downtown Historical Corridor

The Downtown Ventura historical corridor is a vibrant urban streetscape, where up-scale shops, thrift stores, professional services, and restaurants with sidewalk dining line pedestrian-friendly blocks averaging 500 feet in length. Along Main Street, which is the location of many historical buildings, passing pedestrians are protected from slow-moving traffic by

FIGURE 12.2 *Location of proposed Downtown Delta site.*

rows of angled parking along both sides of the street. Additional shopping and dining venues are located on intersecting streets. Public parking structures and lots which are tucked behind the Main Street corridor are also easily accessible to visitors and workers. This area is a significant and rich part of Ventura's culture and has been enhanced by the preservation and restoration of historical resources. However, despite its historical linkage to the Ventura River, the downtown area currently does not highlight its connection to the river.

Downtown Western Beach Area

This document identifies the Ventura County Fairgrounds, the Ventura River's estuary, wetland and dune habitats, Emma Wood State Beach Group Camp, the secondary estuary, and the Ventura Beach R.V. Resort as the western beach area. This area is home to vital habitat, historical and recreational resources, and is central to Ventura's tourism industry. The Omer Rains coastal trail passes along the coast and alongside the estuary at the primary mouth of the river. Nearby resources outside the planning area include a marine kelp forest, the location of a former Chumash village, Surfers' Point (a popular point break for surfing and kite surfing), Seaside Park (a city park), Seaside Wilderness State Park (historically known as Hobo Jungle), the Ventura Pier, and the Crown Plaza Hotel-Ventura.

DESIGN CONCEPTS

The first proposed site is Westpark Access, located at the northernmost part of the Downtown Delta. This is a small area that includes a portion of the Ventura levee and Westpark, a neighborhood park in the Westside community. Design proposals for this area emphasize increased access between the Westside community and the proposed Lower Ventura River Parkway.

FIGURE 12.3 *Existing conditions at Downtown Delta site. Orthophotography: CIRGIS.*

The second site, Ortega Zócalo, lies directly south of Westpark Access. Due to its location, the Zócalo can be a significant link between several of Ventura's neighborhoods and the proposed parkway. A combination of enhancements at the Westpark Access and Ortega Zócalo can help remediate some of the environmental challenges affecting the Westside Community.

The third site, Ventura County Fairgrounds, is an area of significant ecological resources east of the Ventura River mouth, encompassing the fairgrounds, the Ventura River estuary, former wetlands, and the beach area near Surfer's Point. This site presents multiple opportunities for strengthening the ecological infrastructure of the region while reducing maintenance costs.

The fourth proposed site, Ventura River Parkway Interpretive Center, is located west of the Ventura River and estuary. This area encompasses Emma Wood State Beach and Group Camp Site, and the Ventura Beach Recreational Vehicle Resort. Because this site has existing graded areas adjacent to wetlands and river channels, facilities devoted to education about local ecosystems could be built and operated here without disturbing unimproved ground. Moreover, the location of this site, next to an interstate highway at the southern entrance to the proposed parkway, makes it ideal for introducing travelers to the proposed parkway and the river.

1 Westpark Access

2 Downtown Delta

3 Ventura River Parkway Interpretive Center

4 Ventura County Fairgrounds

FIGURE 12.4 *Proposed plan, Downtown Delta. Orthophotography: CIRGIS.*

Westpark Access Point

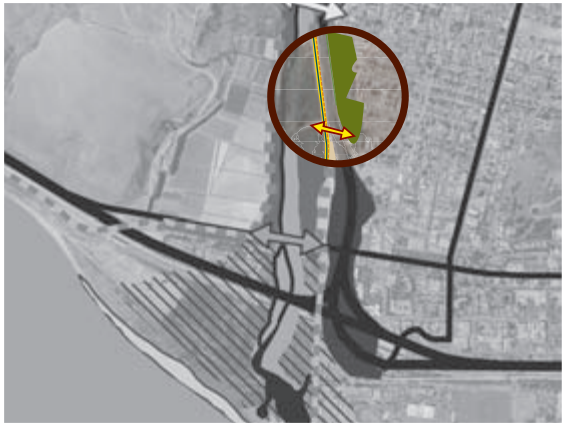


FIGURE 12.5 *Location of Westpark Access site.*

FIGURE 12.6 *Westpark. picnic area and tot-lot.*

FIGURE 12.7 *Ventura River from the Ventura Levee.*

FIGURE 12.8 *Westpark from the Ventura Levee.*

FIGURE 12.9 *Existing Conditions, Westpark. Orthophotography CIRGIS.*

EXISTING CONDITIONS

Westpark is an popular gathering place for Westside residents: sports fields, picnic areas, an indoor community center and an elementary school adjacent to the park make this site a social nexus. The western edge of Westpark is less than 250 feet from the eastern bank of the Ventura River, yet this site, and the Westside generally, is completely cut off from the river by Highway 33 and the Ventura Levee. Thus, the community is currently missing out on an opportunity for school field trips, wildlife observation, and river stewardship programs for adults and youth centering on the school and community center.

1. Community Center
2. Tot-lot
3. Picnic area
4. Sports fields
5. Skate bowl

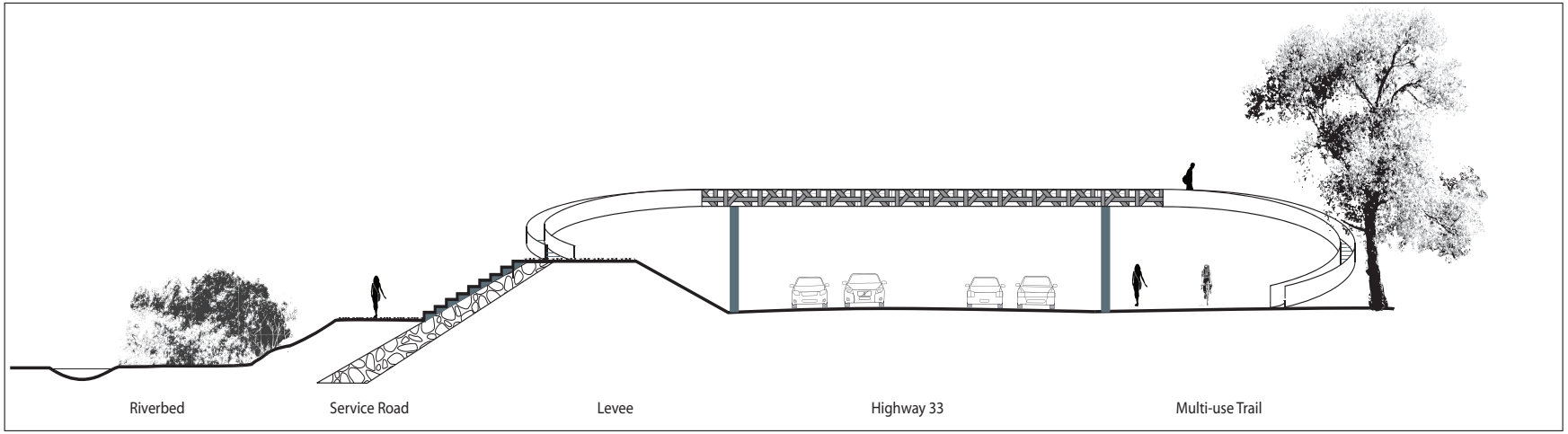


FIGURE 12.10 *Elevated freeway crossing.*

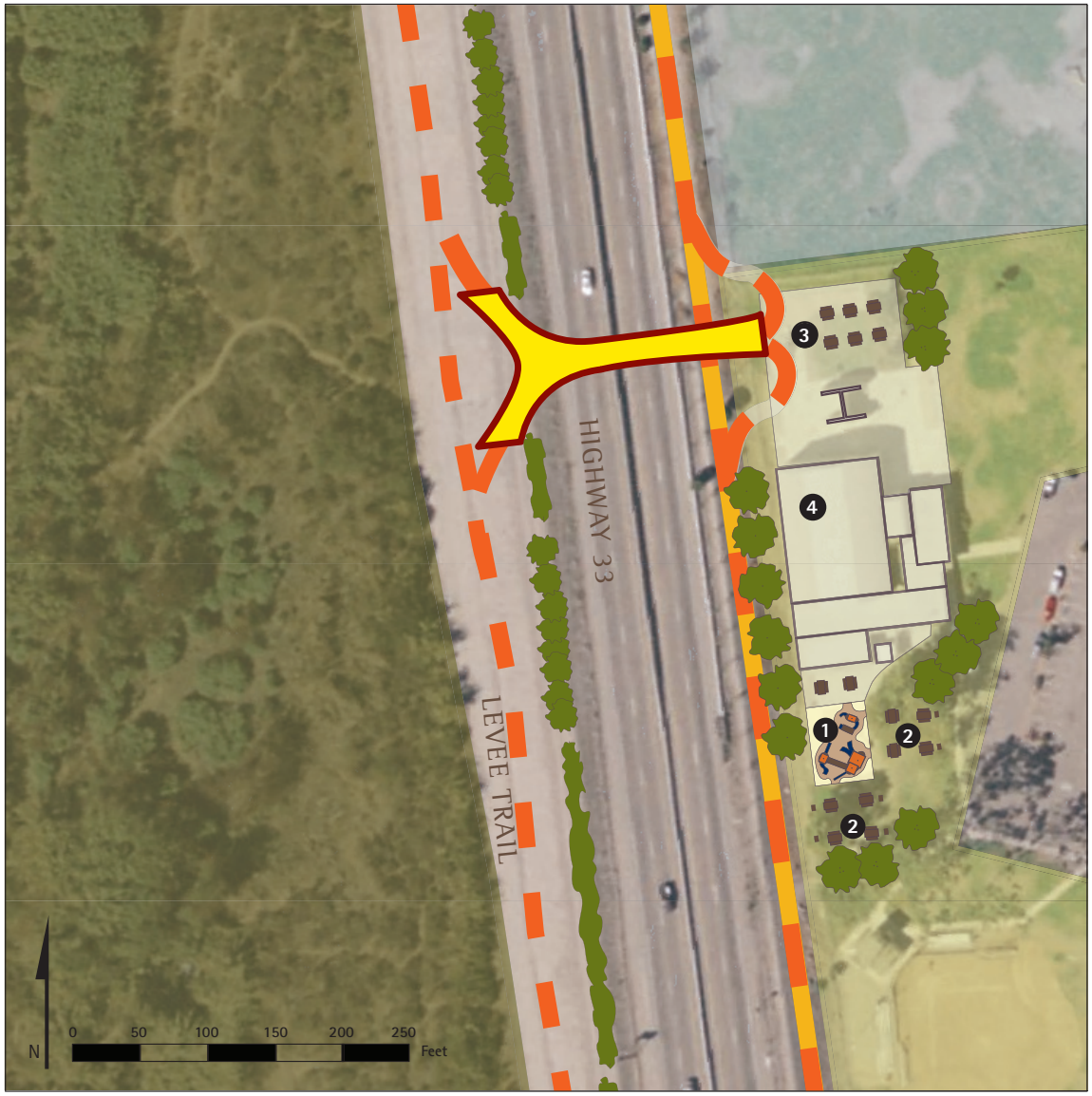
FIGURE12.11 *Perspective , multi-use levee trail.*

DESIGN CONCEPTS

Providing access points between the Westside community and the Ventura River is an opportunity to increase open space recreation and ecological resources for members of that community. An elevated freeway crossing from Westpark to a multi-use trail on the Ventura River levee, accessible by pedestrians and cyclists, could provide easy access from the local community while preserving existing park programming.

Improvements on the levee side of the elevated freeway crossing would contribute to a pleasant trail use experience. Vegetated levees can be fully functional provided their footprint is approximately double the size of concrete levees (Interview with Joe Lampara, 2008). Highway 33 may be a constraint on widening the levee in this area, but the addition of plant material may be feasible without such widening, and would create shade, break-up horizontal planes, and provide views of the chaparral ecosystem where it meets the riparian ecosystem. Using low growing plant varieties and maintaining the lowest tree branches above eight feet would ensure that visibility is not compromised. Using contained, below-grade planting beds and boxed elements can aid in preventing structural damage to the levee from vegetative root systems. The levee is currently being assessed for certification by the Federal Emergency Management Agency (FEMA) (O'Brien and Glenn 2010). Vegetating the levee and other proposed improvements would need to be carefully considered from the engineering standpoint and from the standpoint of its effect on the certification process.

Two popular community activities, soccer and outdoor gatherings, could be enhanced through preservation and improvement of existing gathering spaces such as the small picnic area near the Westpark Community Center, and the provision of additional soccer fields at the nearby Ortega Zócalo. Additional park programming, including nature walks for sports teams, public art on the freeway crossing, and a Community Pride festival that includes maintenance competitions, can also be incorporated as improvements to this site.



1 Tot-lot
2 Picnic area
3 Outdoor educational area
4 Community center
Barbecue pit and grill
Table and benches
Handball court
Multi-use trail
Nature trail
Elevated freeway crossing
Sheridan Way School grounds
Westpark grounds
Ventura River floodway

FIGURE 12.12 *Plan, Westpark Access Point. Orthophotography: CIRGIS.*

Ortega Zócalo

FIGURE 12.13 *Proposed location of Ortega Zócalo.*

EXISTING CONDITIONS

The natural and cultural features bounded by West Park Row Avenue, Highway 101, Ventura Avenue and the Ventura River give this area the potential to be an attractive connector between Main Street, the Ventura River, the beach, and the Westside community. The area has many resources including satellite medical facilities of the Ventura County Medical Center and Community Memorial Hospital of San Buenaventura, manufacturing and industrial facilities, the Ortega Adobe Historical Residence, the Bilingual Vocational Center training school, Mission Plaza Shopping Center, retail establishments, and residential housing.

This site should be a bridge between downtown and the river, but features of the site act as barriers and disrupt cultural connectivity. In comparison to the nearby Omer Rains Trail and a vibrant Main Street, this area, with limited streetscaping, disparate building types, and parking lot frontages, seems forgotten and unprogrammed. Wide streets, large asphalt parking lots, and big blank walls overwhelm the human scale.

Travel through this area creates diminished sensory experiences that stand in contrast to pleasant nearby neighborhoods. Sidewalks that lack physical barriers to automobile traffic of moderate speed challenge the comfort and safety of foot traffic, and pedestrian right-of-ways are not always contiguous with destination locations. The blocks between West Park Row Avenue and Main Street have a confusing layout, with streets that do not line-up with one another and unclear distinctions between private driveways and public streets. This absence of spatial clarity is aggravated by precarious pedestrian conditions, parcels with and without setbacks containing dissimilar building sizes in addition to vacant lots, sparse vegetation, extensive asphalt, and the occasional eyesores provided by construction sites with piles of disturbed earth. Further

FIGURE 12.14 *Homeless encampment in stand of Arundo donax in the Ventura River north of Main Street Bridge.*

FIGURE 12.15 *Highway 33 on ramp.*

FIGURE12.16 *Main entry Mission Plaza also the intersection of Main Street and S. Garden Street.*

1. *Arundo donax* stand
2. Storm drain outfall
3. Ortega Adobe Historic Residence
4. Bilingual Vocational Center
5. Mission Plaza Shopping Center
6. Medical facilities
7. Eastwood Park
8. Serra Cross
9. San Buenaventura Mission Complex
10. Freeway ramps
11. Freeway underpass
12. Ventura Hillsides

FIGURE 12.17 *Existing conditions at proposed location of Ortega Zócalo. Orthophotography CIRGIS.*

challenges to the pedestrian experience in this area include the on-ramp and off-ramp to Highway 33 and the active shopping mall driveway at the intersection of Garden Street and Main Street.

The Westside, of which this site is a part, has been identified by the EPA as an historical brownfield area (West Coast Environmental and Engineering 2001). Reported crimes for the police district corresponding to this area are low (Ventura Police Department 2005). Nevertheless, some community members perceive the area in and around the riverbed as dangerous (Community Workshop 1, March 2008). In the riverbed, large stands of the invasive plant Arundo donax obscure visibility and provide fuel and shelter opportunities for homeless encampments which contribute to the perception of risk. The combination of storm drain outfalls along this portion of the river, untreated waste from homeless encampments, degraded habitat due to invasive plant species, encampment footprints, and the area's brownfield character would also pose health and safety concerns for potential parkway visitors.

DESIGN CONCEPTS

This plan refers to the area bounded by W. Park Row Avenue, E. Thompson Boulevard, Ventura Avenue, and the Ventura River as Ortega Zócalo, a name inspired by the Historical Ortega Adobe Residence located in this area and the term *Zócalo*, often used in Mexico for a town or city's central square and community nexus. This Plan recommends three elements for the Ortega Zócalo:


TO GRANT PARK
LEVEE TRAIL
GARDEN STREET
A
A'
1
2
3
4
5
P
N
0
100
200
300
400
500
Feet

FIGURE 12.18 *Plan, Ortega Zócalo district.*

a new public open space between the Ventura River and N. Olive Street; a water-treatment-based streetscape and street grid clarification; and an area of mixed-use zoning. These proposals aim to form a cultural bridge between the Lower Ventura River Parkway and downtown by providing mixed-use development at the parkway's edge that includes features for improving water quality, increasing recreation and access to the river, and increasing cultural awareness of the river. These elements would also connect with a larger revitalization effort that would strive to address the environmental and economic challenges faced by residents of the Westside community .

Ortega Adobe Park

Proposals for an expanded and improved Ortega Adobe Park would create a developed, universally accessible urban park which would provide both an open space resource for the Westside community and an attractive extension of Main Street. The land adjacent to the Ventura Levee would provide a passive recreation opportunity and an access point to the Ventura Levee Trail. Proposed amenities for this area include a Chumash Ethnobotanical Garden with interpretive elements, surrounded by a strolling garden with picnic areas in large and small niches. Detailed plans for this garden could be developed with guidance from local Chumash bands and ethnobotanical historians. The addition of two soccer fields at the site would help alleviate potential overuse of the fields at Westpark. Like the proposed western portion of Ortega Adobe Park, the area surrounding Ortega Adobe Residence is well-suited to passive recreation, native vegetation, and educational opportunities, such as a learning garden featuring dryland agricultural plants and referencing planting strategies formerly utilized by the Spanish Mission. The gardens could utilize plants and interpretive elements to tell the story of human dependence on the Ventura River. Programming that encourages local school children and interested adults to take active roles in the care and harvest of these plants could further enhance the Ventura community's connection to local history.

Implementation of these features would require the assessment of some associated properties for potential environmental hazards, the resolution of at least one ongoing EPA hazardous waste investigation, and potential remediation actions.

Creating this park with sections on both the east and west sides of Highway 33 (figure 12.18) would create a strong visual connection and access point between the urban Westside, the Levee Trail, and the Ventura River. However, in order for this to occur, it would be necessary to overcome the barrier presented by the highway itself. The preferable method, if feasible, would be to excavate several at-grade openings, 50 yards or more in width, beneath the elevated highway and its associated ramps and construct pillar supports for the highway in those spaces. Openings of this size would have the benefit of providing a line of sight between the Westside neighborhood and the Levee Trail, visually unifying the Westside and the river to some extent, while providing pass-through corridors that feel safe. If this is not feasible, one or more elevated freeway crossings could serve these purposes in a more limited manner.

By providing meaningful open space, activity generators, increased vegetative surfaces for stormwater infiltration, and habitat opportunities for native insects and small animals, the Ortega Adobe Park could promote environmental justice for the Westside population, and contribute to the overall value of the Downtown Delta area.

Streetscapes

The streetscape proposed for the Ortega Zócalo area would incorporate environmentally sensitive and human-friendly features. Throughout the area, proposed streetscapes would provide on- and near-site water treatment as well as improved pedestrian and bicycle circulation. Planning recommendations begin with an effort to create a clarified, compact, and connected street grid for pedestrian and cycle traffic. New east-west public thoroughfares with re-designed pedestrian, cycle, and limited vehicular access are proposed for the area between W. Park Row Avenue and Mission Plaza Shopping Center, as well as an improved linkage connecting North and South Garden Streets through what is currently the Mission Plaza parking lot. Additionally,

the proposed street grid is intended to resemble that of the downtown historical corridor and the Westside community, thereby providing pedestrian-scale walking distances and continuity with the existing streetscape character.

The basic design unit for streetscapes in the area includes a network of filter strips, bio-swales, and small detention areas that mimic larger natural processes in order to reduce untreated wet and dry weather runoff volumes while protecting water quality in the Ventura River. These features replace existing curbs and gutters with permeable surface area between streets and sidewalks, allowing for absorption and physical filtration of runoff. Native materials and plants populate these spaces, providing phytoremediatory services that reduce pollution loads, and reinforce the location's relationship to the river. These plants could be further used as way-finders and educational tools. It is recommended that the distribution of plant material reflect natural distribution patterns. For example, western sycamore (Platanus racemosa), which prefers wetter soil conditions, would be used with more frequency closer to the river while island oak (Quercus tomentella), which has lower water needs, would be used more extensively further away from the river. In this way, the design would help create a sense of place, an important component in creating desirable urban spaces.

The pilot Street Edge Alternatives Project (SEA Streets) in Seattle, Washington provides a linear treatment model for just such a streetscape. It is a network of curb-less, vegetated swales and detention areas, with objectives that include reducing untreated runoff volumes into adjacent waterways (Seattle Public Utilities 2008). Initial monitoring reports indicate that runoff volumes were reduced by as much as 66 percent compared with traditional curb and gutter roads, and researchers anticipate an equal or greater reduction in pollutant loading (Horner et al 2002). Figure 12.20 illustrates how this model might be employed in Zócalo area, adjusted for climate differences, particularly the need for drought-tolerance, between Seattle and Ventura.

As illustrated in chapter 7, this linear water treatment network would terminate in modified storm-drain outfalls at the river that would employ native plants in bioremediation swales, cleansing runoff before it is allowed to enter the main river.

Additional streetscape recommendations provide pedestrian and cycle safety, encourage use of mass transit, and further develop connectivity and a sense of place. Implementing pedestrian crossing facilities on N. Olive Street at the ramp for Highway 33 would mitigate a significant existing barrier to safe, clear pedestrian circulation. Likewise, providing continuous sidewalks and bike lanes at the underpass for Highway 101 on Brooks Avenue would allow increased pedestrian and bicycle passage from the north into the Fairground area, an important consideration in light of the likely importance of the Fairgrounds railroad station for the future expansion of mass transit services.

The new streetscape would feature both angled and parallel parking along major streets in addition to the linear water treatment system discussed above. An angled parking arrangement currently narrows the street and slows automobile traffic on Main Street in the historical corridor, resulting in enhanced pedestrian safety; this arrangement could be continued into the Ortega Zócalo district, increasing design continuity between the neighborhoods. This Plan recommends expanded and increased visibility of bicycle lanes for improved safety, along with use of distinct paving patterns and additional signage. Other recommended elements include appropriately placed lighting, frequent litter receptacles, seating, and transit shelters with seating in close proximity to the housing and services of the Ortega Zócalo mixed-use area.

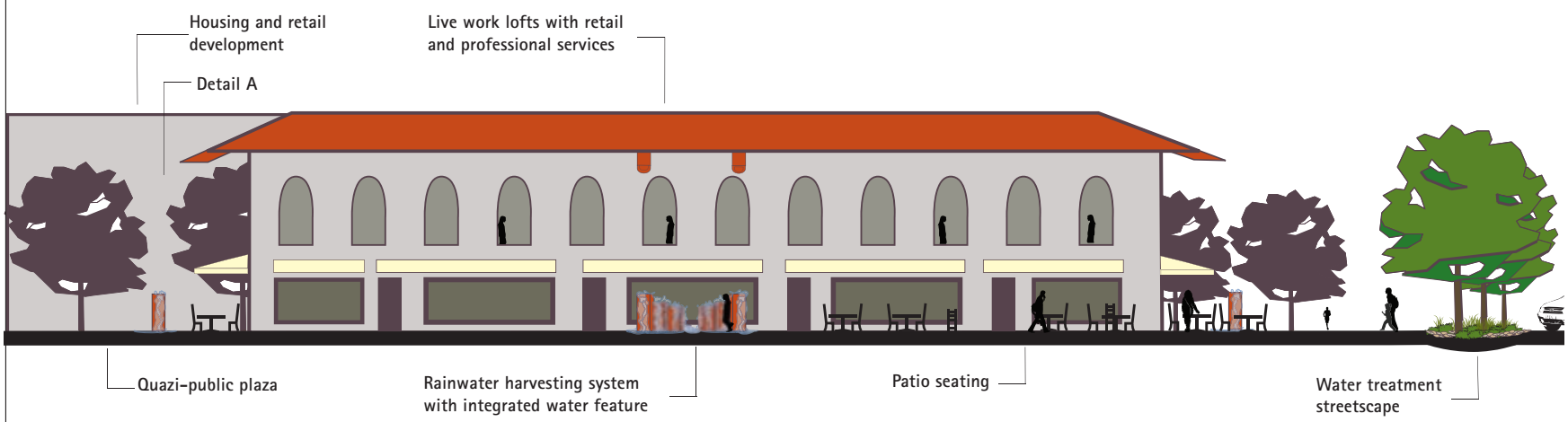


FIGURE 12.19 *Section A-A'. Ortega Zócalo, mixed use and inclusionary housing area. Not to scale.*

Streets provide opportunities for social interaction and community building. Jane Jacobs, an early advocate for strong cities, reflects on the importance of street life in her book *The Death and Life of Great American Cities* (Jacobs 1961). Jacobs observes that self-directed, casual interaction between members of a neighborhood as they run errands or are otherwise out and about in their neighborhood builds "a web of public respect and trust, and a resource in time of personal or neighborhood need... The absence of this trust is a disaster to a city street" (Jacobs 1961). The transformation of the urban area on the eastern banks of the Ventura River from a vehicular-based system to that of a vibrant district connecting people to the Ventura River will require the establishment of such trust.

Ortega Mixed-Use Development

The San Buenaventura Redevelopment Agency has recommended a private-entity, mixed-use development at the intersection of Garden and Main Streets (SBRD 2006). This mixed-use development would serve a primary purpose of this Vision Plan, that of creating an attractive, walkable connection between downtown and the river. This plan envisions all of the blocks surrounding the intersection as supporting residential spaces in combination with establishments and spaces for goods and services that meet aspects of life including education, health care, employment, civics, and recreation. The following proposals respond to the particular way in which regional, city and site-scale conditions converge at this site, with a view toward making the development a center for sustainable practices.

Increased Density and Infill

Many factors such as growth projections, a shortage of affordable housing, SOAR measures, a countywide dependence on private vehicles for long commutes, and Ventura's stated policy of infill first indicate the need for increased density and infill development that includes low-income and affordable housing. Therefore, this Vision Plan emphasizes the strategies of increased density and infill development for the proposed Ortega Zócalo District mixed-use area. Graduated height requirements would work to prevent new development from overshadowing the character of nearby neighborhoods. Meanwhile, graduated floor plan requirements would ensure that low-income, affordable, market-rate units would be available, encouraging residents from many income groups. Public and quasi-public areas designed with human-friendly elements like seating, sun and shade balance, and water features would invite residents and visitors of the district to utilize the neighborhood for a variety of purposes including dining, socializing, civic engagement, and work. Spaces which are not open to the public such as rooftops, courtyards, balconies, and patios would provide tenants with both communal and private outdoor opportunities, and should be designed to ensure that residents have adequate privacy. The nearby railroad and Amtrak station, bus line, and bike trails all provide opportunities to reduce dependence on private vehicles. These strategies would provide more sustainable land use patterns than those currently employed in the proposed Zócalo district, and reduce the pressure to site future developments on land in the flood plain currently designated as agriculture and open space.

Sustainable Design Elements

Design and construction proposals that further detail the Ortega Zócalo site include environmentally sensitive and sustainable systems and technologies. Passive solar and green roofs can reduce heating and cooling needs and absorb rainwater. Installation of solar panels can contribute electricity both to individual buildings and to the power grid. Runoff from hard-surfaced rooftops can be filtered and utilized for nearby landscaping. Wet-weather water features are recommended to replace traditional water features and can be integrated into cisterns. Other building

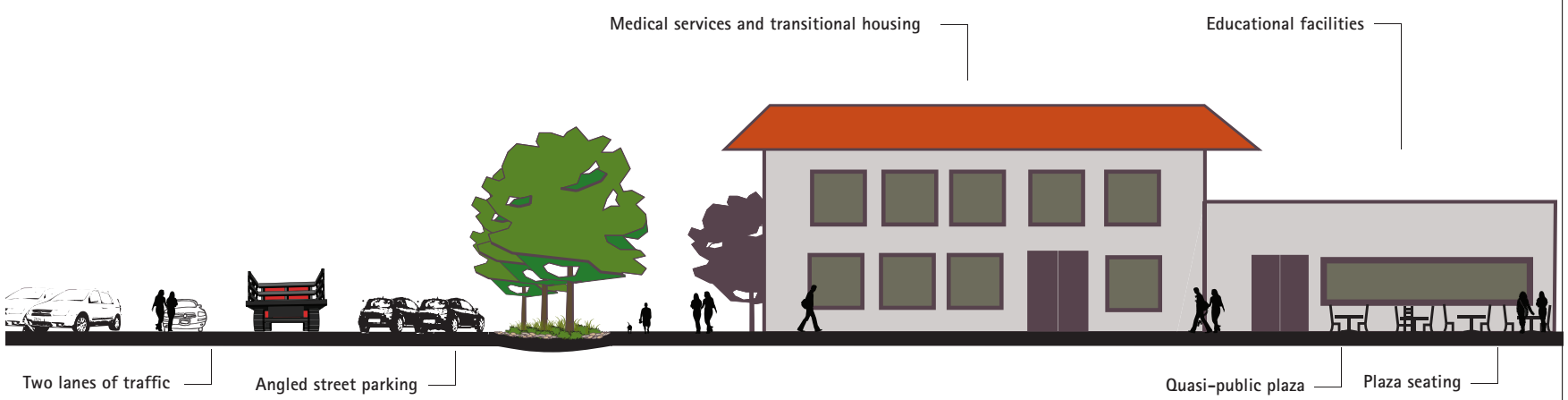


FIGURE 12.20 *Perspective of expanded Adobe Park and streetscape.*

elements to explore include composting toilets and other methods of turning traditional waste streams into end products including fertilizer and energy. These waste stream alternatives would require specific infrastructure investments but would lengthen the life spans of consumed resources, resulting, ultimately in less consumption and more sustainable use patterns.

Addressing Healthcare, Homelessness, Employment and the Local Economy

This document envisions healthcare-related services and education as core components of the Ortega Zócalo district that would help meet the objectives of this Vision Plan. Existing medical facilities on Main Street and Santa Clara Street provide a social and economic theme for the mixed-use development, an appropriate emphasis given current national, regional and local concerns for unmet healthcare needs. Healthcare-oriented development would improve healthcare access for Ventura's growing population while providing jobs and educational opportunities in this growing economic sector. Healthcare education programs in elementary and secondary schools in and near the Zócalo district could prepare interested students for careers in that industry. Those students and others would then have internship and job opportunities in the Zócalo District with programs for histology, medical billing, and other medical support services. Nursing and doctor training programs would also provide employment and prepare the next generation of skilled medical practitioners.

The healthcare focus of the mixed-use development would further other parkway objectives by supporting efforts to reduce environmental degradation of the Ventura River caused by casual habitation which is an outgrowth of homelessness. These efforts will only have a significant and lasting impact if they address the roots of homelessness in

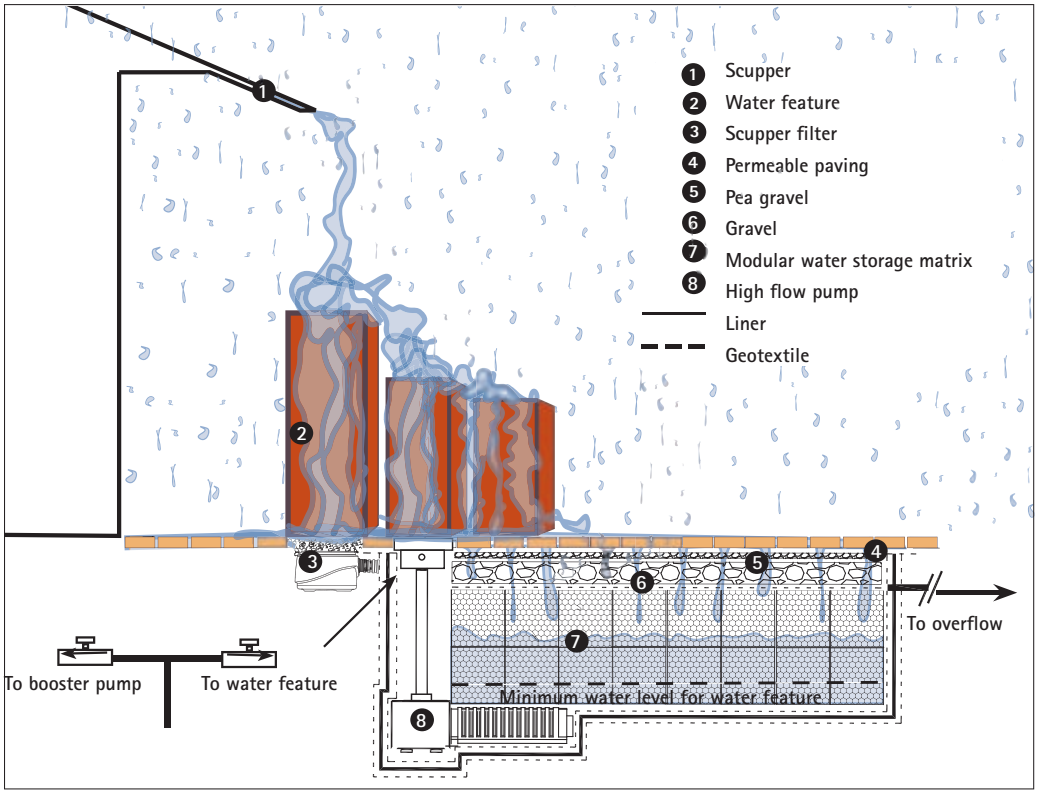


FIGURE 12.21 *Detail A. Rainwater harvesting system with permeable pavers and integrated water feature. Not to scale. Adapted from: RainXChange Rainwater Harvesting Systems by Aquascapes.*

FIGURE 12.22 *An example of sustainable design technologies, this green roof on the American Society of Landscape Architects headquarter building in Washington D.C. absorbs rainwater and helps to insulate the building below. Source: American Society of Landscape Architects.*

the area. The Ventura County Ten Year Plan for Ending Homelessness has established the county's framework for ending homelessness, and this Vision Plan recommends that planning and design efforts for the parkway include individuals and elements tied to the Ten Year Plan as well as homeless individuals themselves. A healthcare-centered economic focus for the Ortega Zócalo could further this objective by providing spaces for a stream of social services attempting to meet medical, educational and housing needs of the homeless population. Healthcare facilities would include a medically-supervised detoxification facility and space for rehabilitation programs. The needs of transitional homeless individuals for general education as well as employment training might be effectively addressed within the educational context provided by the Zócalo with its emphasis on growing healthcare industry jobs. All of these programs would be tied to transitional housing within the mid-use development itself, in a package of services leading to independent living.

Including a broad package of integrated services to the homeless in the Ortega Zócalo would help to reinforce a sense of place that is unique to this neighborhood, based on its proximity to the Lower Ventura River. Homeless people and other casual outdoor campers, even if unauthorized, have been a part of the landscape of the lower river as far back as the early twentieth century. Campers in the Ventura River are not a "nuisance", like other human beings, they are a part of the landscape in which they live and have compelling reasons for being where they are. Like other human beings from all economic strata who live on the land, they engage in some activities that harm the environment. Some of their activities such as camping, campfires and trash disposal, degrade the environment of the river and its associated ecosystems while also causing some visitors to feel unsafe. This is a is good reason for discouraging habitation in the riverbed. Providing transitional housing and services within a few blocks of the river would acknowledge the historic connection that homeless individuals have had with this landscape and provide a convenient context for their participation in the planning, construction and maintenance of the parkway as well as stewardship programs connected with it.

The proposed mixed-use area of the Ortega Zócalo, in conjunction with the Ortega Adobe Park and streetscapes, would help connect the proposed parkway, the Westside community, and the greater City of Ventura. The Zócalo district would enrich the city generally by providing walkable streetscapes, healthcare, jobs and commerce. In the meantime, the Zócalo would address the particular environmental justice issues affecting the Westside community by providing an economic driver for the remediation of local brownfields while enabling Westside residents to meet their needs for housing, employment, education, transit, recreation, and access to natural habitat without leaving the neighborhood.

Ventura County Fairgrounds

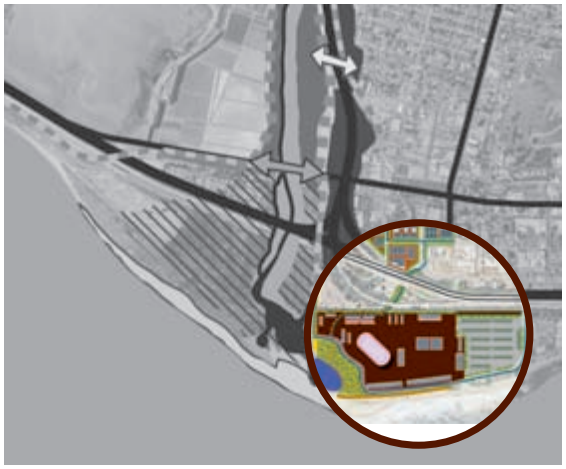


FIGURE 12.23 *Proposed location of Ortega Zócalo.*

FIGURE 12.24 *Ventura County Fairgrounds.*

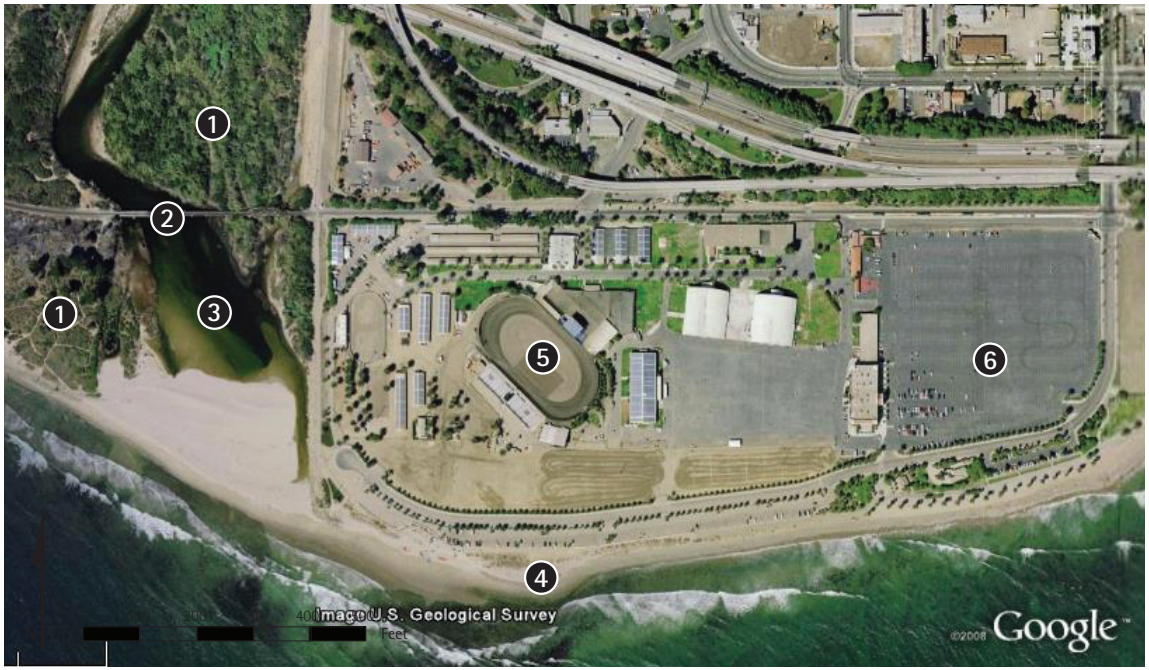
FIGURE 12.25 *Ventura County Fairgrounds entrance sign.*

The Ventura County Fairgrounds at Seaside Park is a sixty-two acre site directly east of the Ventura River. A 2,000 space asphalt parking lot lies within the property and also serves an adjacent Amtrak station. The site is currently owned by the State of California and has been in existence for 133 years. The Fairgrounds are intermittently open to the public for events that include the annual Ventura County Fair, Derby Club races, business meetings, trade shows, conventions, and concerts. Otherwise, the Fairgrounds are closed to the public.

According to historical maps, the Fairgrounds are situated atop previous wetlands and estuarine habitat. A current study by the California Coastal Commission, tentatively entitled *Historical Ecology Study: Ventura and South Coast Wetlands*, is underway and, once completed, can further pinpoint the previous extent of these valuable habitats.

The current design of the Ventura County Fairgrounds presents multiple opportunities for employing sustainable practices that will improve the environmental quality, visitor experience, and aesthetic appearance of this location. As a community resource owned by the State of California, improvements at the Ventura County Fairgrounds can match state, federal, and local objectives for enhancing environmental quality.

This Plan section proposes design ideas for the Fairgrounds site as well as the adjacent estuary, wetlands, and dune ecosystems of Seaside Wilderness Park. These recommendations have the objectives of improving the hydrological, habitat and social quality of this location and the broader areas that interact with this site.



❶ Wetlands ❷ Railroad Trestle ❸ Estuary ❹ Dune ❺ Fairgrounds ❻ Parking Lot

FIGURE 12.26 *Existing conditions Ventura County Fairgrounds and vicinity. Orthophotography: CIRGIS.*

EXISTING CONDITIONS
Estuary and Wetlands

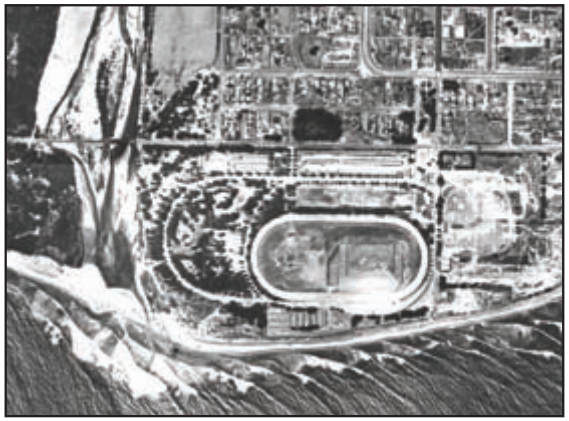
The Ventura River Estuary and surrounding wetlands are an essential ecological resource, as well as a source of recreation and pleasure for Ventura. The wetlands that lie upstream and surround the estuary are examples of a valuable and fragile watershed component (EPA 2001). Although wetlands occupy only about 5 percent of the land surface of the United States, they are home to 31 percent of California's plant species.

However, the Ventura River Estuary and adjacent wetlands appear to have been greatly diminished as the result of development during the past one-and-one-half centuries. Historical and contemporary imagery of the site provides clues to its earlier, natural habitat as well as evidence of the man-made, physical changes that have been imposed on this ecosystem. A historic survey map from the 1850's shows that the delta of the Ventura River once had a natural "V" shape and suggests that, in addition to the estuary area that exists today, an additional estuary and wetlands area once existed on what is now the Fairgrounds site. The filling and development of the Fairgrounds site brought civic benefits, but also deprived the area of the ecosystem services that would have been provided by these natural areas. The Ventura River channels that may have supplied this ecosystem have been constrained by the Ventura Levee, and the tributary systems that presumably also supported this ecosystem have been buried underground in conduits and storm drains as the result of the development of Downtown Ventura. However, the current estuary is buffered by wetlands to the north and west, a state beach and the Pacific Ocean to the south, and the Ventura County Fairgrounds at Seaside Park to the east which are sparsely built, suggesting a potential opportunity for at least a partial restoration of this ecosystem.

The Ventura River Estuary attracts many visitors. Situated along the Pacific Flyway, with broad views of the Channel Islands and the coastline, the estuary and wetlands provide stunning and unique ecological, recreational, and tourist opportunities for the City of Ventura. Allowing the estuary and wetlands to return to a closer semblance of their former size would provide increased opportunity for the City of Ventura to enhance the economic as well as ecological benefits derived from the estuary.

River channels, dense vegetation, safety concerns, and the needs of plants and wildlife that are sensitive to disturbance are all factors that currently limit visitor access to the estuary and surrounding wetlands. However, visitors currently enjoy stunning views of the estuary from a section of the Omer Rains Trail between the river mouth and the Main Street Bridge.

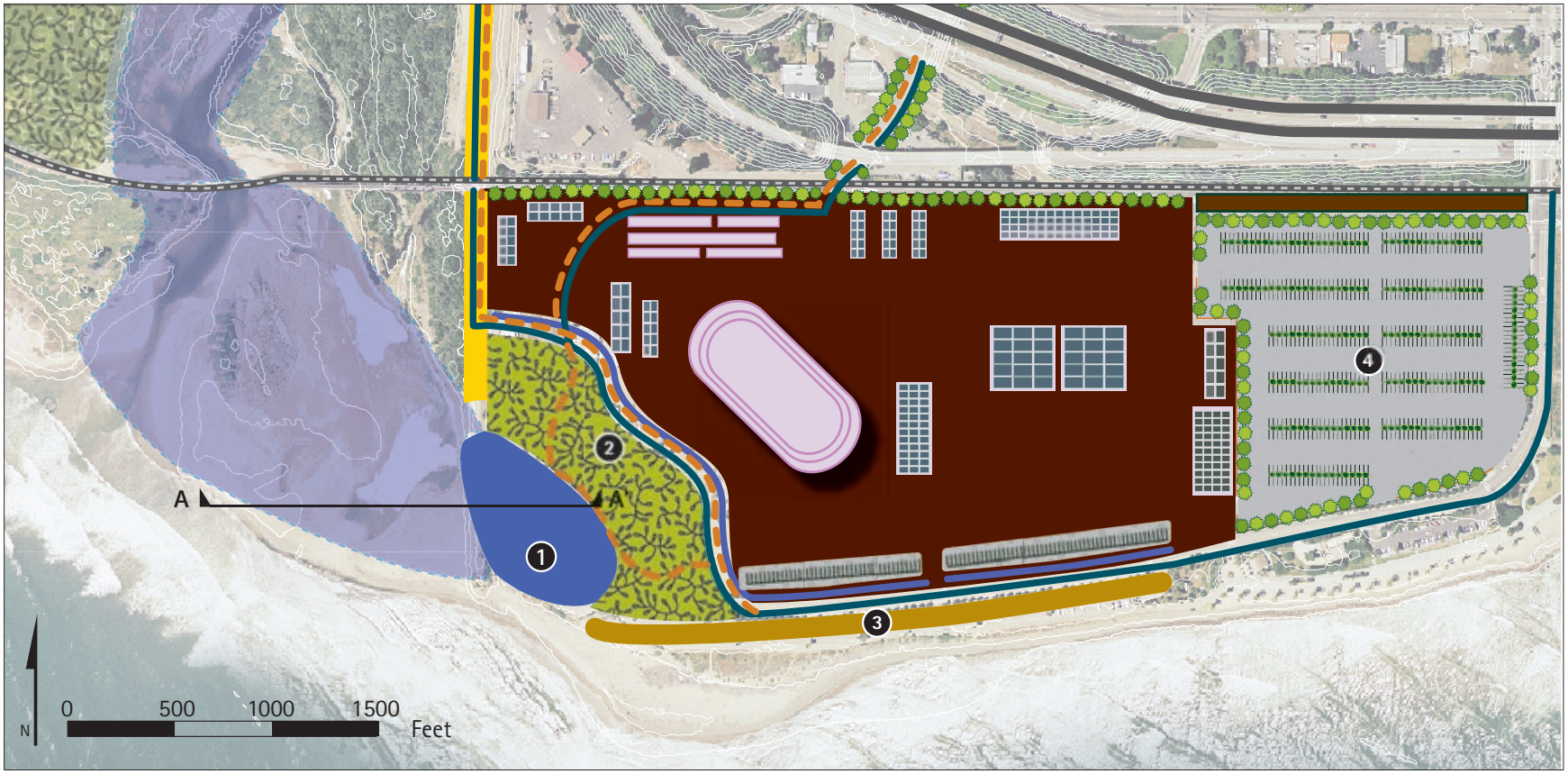
In addition, a railroad trestle across the estuary affords an attractive and potentially deadly temptation for walkers who often enter from the levee trail for a walk along the tracks. The close-up views of the estuary, wetlands and hidden river channels from the trestle are impressive, and the illegality of this crossing is not a complete deterrent to adventurers, some of whom have been killed on the trestle (Green 1998).



[NEAR RIGHT] FIGURE 12.28 *Views of the Ventura River Estuary. Top: the estuary is contained by an intermittent sandbar that is overtopped by tidal action and high river flows during wet periods. Middle and bottom: two sections of the railroad trestle that crosses the estuary.*

[FAR RIGHT] FIGURE 12.27 *Top: illustration of the Ventura River Estuary adapted from a survey from the 1850's, including a second estuary east of the Ventura River (highlighted). Middle: a1946 aerial photograph. Bottom: aerial photography from 2004. Sources: Museum of Ventura County, City of Ventura, CIRGIS.*

DESIGN CONCEPTS



1 Expanded estuary
2 Expanded wetlands
3 Dune
4 Parking lot

FIGURE 12.29 *Proposed designs at Ventura County Fairgrounds.*

This Vision Plan proposes removing an approximately 500 foot portion of the southern end of the Ventura River Levee, allowing the flow at the river's mouth to spread eastward, and returning a portion of the Fairgrounds site to estuary and wetland. Allowing the estuary to expand and return to an increased semblance of its original form could promote the return of many of the natural functions and species of the estuary and wetland environment. In addition, allowing these ecosystems to expand eastward could result in more robust ecological function in the currently existing estuary and wetland areas west of the levee, by creating increased groundwater recharge and additional distributary channels that would supply water to both the existing and expanded areas of the ecosystem.

Moving a portion of the Omer Rains Trail inland, so that it continues to follow the edge of the remaining Fairgrounds site, would protect the fragile wetlands and dune environment. However, a raised pedestrian boardwalk would connect the Fairgrounds and the Trail with the beach and Surfers Point while providing pedestrians with a close-up view of wildlife in the estuary and wetlands. Extensive feasibility studies would be necessary to determine the nature of the potential water supply to this section of the estuary, flood safety, the viability of the remaining Fairgrounds site, and the effects upon Surfers Point and the dune environment. The complexity of these factors is beyond the scope of this Plan, but the proposal itself highlights an important principle: that the historical removal of California's coastal wetlands is not wholly irreversible and that in addition to preservation, restoration of wetlands is an important agenda item for the future. Determining the appropriate restoration boundaries at this site would be aided by the California Coastal Conservancy's *Ventura Historical Ecology Study* when completed. Once the boundaries of the estuary and wetlands have been established and agreed upon, site restoration would entail re-contouring the topography, intensive wetland planting and seeding, possible relocation of buildings and the bike trail, and a maintenance regime for the control of non-native species.

The rail trestle across the main existing estuary is an attractive nuisance, a feature that entices visitors but can cause serious injury or death. Future planners should explore configurations of the trestle that would allow visitors to cross, since that is what they want to do, while remaining safely separate from occasional passing trains. If feasible, this feature would enable visitors in the Fairground area to cross to the area of the Ventura River Interpretive Center (below) with spectacular views, while causing minimal disturbance to the estuary and wetland ecosystems. If this arrangement is not feasible, planners should take aggressive steps, through more emphatic signage or physical barriers, if necessary, to prevent visitors from entering the trestle.

FIGURE 12.31 *The Ventura Levee currently constrains the estuary, limiting the extent of the benefits the estuary can provide.*

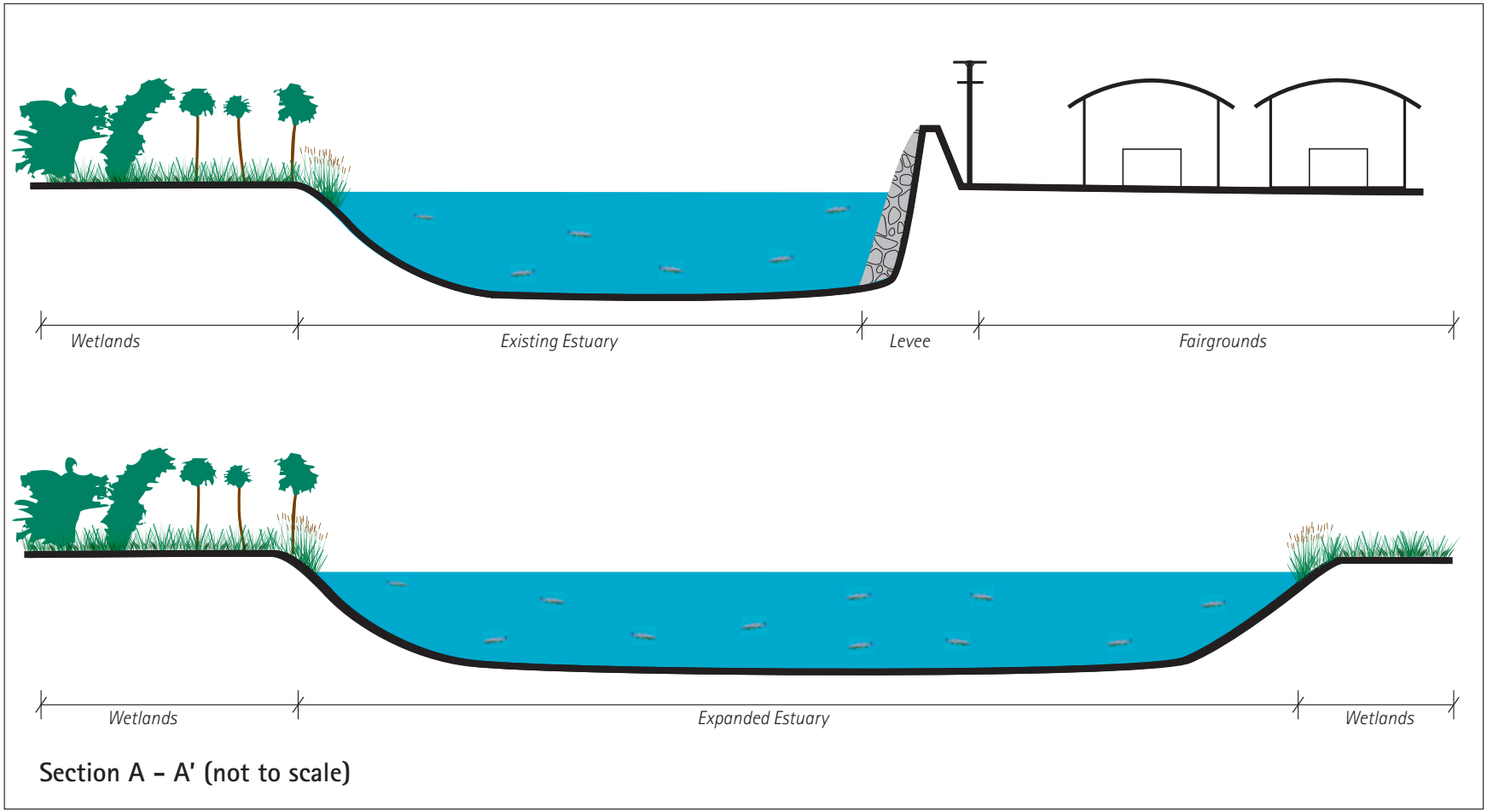


FIGURE 12.30 *Section A - A' (see Proposed Design, Fig. 12.29) demonstrating the current and proposed extent of the Ventura River Estuary.*

EXISTING CONDITIONS

Dune

In 1989, a bike path and parking lot were constructed on artificial fill adjacent to the beach at Surfer's Point. These facilities encroached upon a remnant dune formation (Jenkin, 2002). The construction of these facilities did not include adequate provisions for increased public beach access and this soon resulted in the destruction of the dune resource (Jenkins, 2002). In addition, the trail and parking lot were located too close to the active shoreline, and were therefore subject to flooding and erosion which continues to the present time.

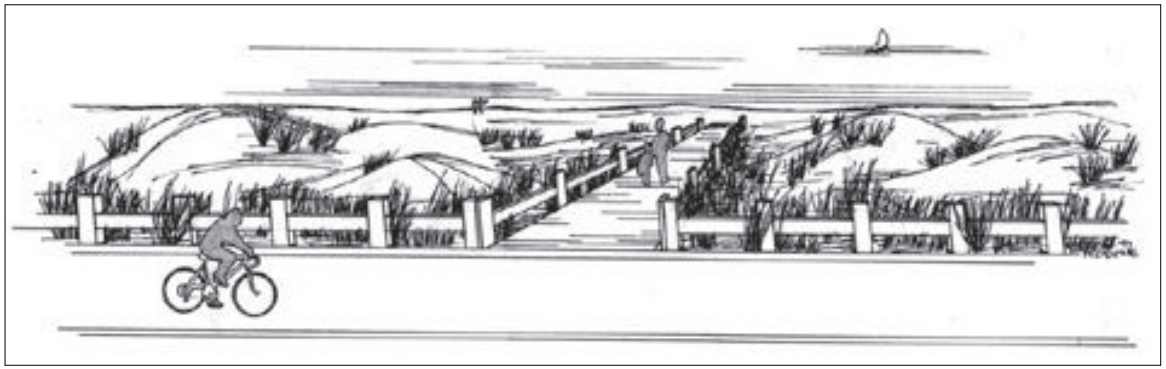


FIGURE 12.32 Proposed dune restoration as part of the *Surfers' Point Managed Shoreline Retreat (SPMSR) project.* Source: Surfrider Foundation.

DESIGN CONCEPTS

This Vision Plan supports the already existing Surfers' Point Managed Shoreline Retreat (SPMSR) project. The SPMSR project seeks to address the both the loss of dune habitat and current shoreline erosion that is occurring between Surfers' Point and the Fairgrounds. By replacing the existing bike trail and parking lot with sand and cobble and relocating these amenities sixty-five feet to the north, the SPMSR seeks to stabilize and restore 1,800 feet of beach that lies between Surfer's Point and the Ventura County Fairgrounds. At the time of writing, the SPMSR has been approved by the Ventura City Council, but is not yet completely funded (Ventura County Star, June 11, 2008).

FIGURE 12.33 *Evidence of erosion along the bike trail at Surfer's Point.*

Relocating the bike path and parking lot and restoring the area to a more natural beach habitat will aid in the long-term restoration of dune habitat. Since coastal dunes are a listed as "rare and threatened habitat" by State and Federal governments, and as "depleted" by the Marine Mammal Protection Act, this restoration effort will fulfill local and regional habitat improvement goals.

In addition to increasing ecosystem benefits, the trail and parking lot relocation as outlined in the SPMSR will also help preserve City resources that are currently being diverted to combat beach erosion. In addition to the increased ecosystem benefits and the preservation of City resources, the SPMSR will also result in enhanced coastal protection, the protection of a valued surf spot, and increased tourism opportunities. Lastly, expanding dune habitat would also increase the potential for the reestablishment of the Ventura Marsh Milk Vetch, a severely endangered plant of which the only remaining known population exists on a tiny segment of dune habitat in Oxnard (U.S. Fish and Wildlife Service 2001).

The SPMSR is the result of extensive negotiation between all stakeholders, and this Vision Plan recognizes and applauds that effort. However, since this Vision Plan supports estuary and wetlands restoration on the Fairgrounds adjacent to the dune habitat, this plan sees the trail relocation planned by the SPMSR as temporary. Pending further study and negotiation, this Plan supports future negotiations for parking and trail relocation that takes into account the restoration of all three critical habitat areas.

EXISTING CONDITIONS
Parking Lot

A 2,000 space, asphalt parking lot is situated as part of the Ventura County Fairgrounds site, and serves both the Fairgrounds and the adjacent Amtrak station.

Asphalt parking lots are detrimental to the environment in multiple ways. Urban runoff from asphalt parking lots is a major component of nonpoint source pollution (U.S. EPA 1996). Runoff from parking lots introduces heavy metals, petroleum products, and suspended solids to the surrounding environment. (For more information on urban runoff, see Appendix B). Asphalt parking lots also raise temperatures and contribute to the Urban Heat Island Effect. By absorbing and radiating heat from the sun and reducing the amount of water available for evaporation, large expanses of dark colored asphalt raise local air temperature and increase the energy demand for cooling. Additionally, as vehicles parked in the direct sun heat up, they emit smog-forming contaminants and, once travel resumes, require additional energy to cool the vehicle.

The extensive parking lot at the Ventura County Fairgrounds site presents an opportunity to lessen the environmentally detrimental effects of the asphalt lot, while improving the appearance of the site. Low Impact Development (LID) techniques, which promote using natural vegetation and small-scale site treatments to reduce runoff and pollutants, can bring environmental benefits to this site. (For more information on Low Impact Development, see Appendix B).

DESIGN CONCEPTS

This Vision Plan proposes redesigning the existing parking at the Ventura County Fairgrounds to employ LID techniques. The combined measures of permeable paving, runoff treatment swales, and vegetated shaded parking will all serve to reduce the negative environmental effects of the existing conditions, while improving the aesthetic appearance of the current parking lot.

Permeable pavers, an alternative to impervious asphalt, will provide multiple benefits to this site. Permeable pavers can be used to reduce the amount of runoff leaving the parking lot, facilitate pollutant removal, reduce thermal pollution to sensitive waters and the local atmosphere, and to improve the aesthetic appearance of the site (LID, 2008).

In order to reduce the risk of groundwater contamination, this Vision Plans recommends using an impermeable barrier and collection system below the pavers to transport the stormwater for additional on-site bio-remediation treatment. Though several studies have shown that permeable pavers limit pollutant migration to groundwater, with most pollutants retained either on the surface of the paver, on the geotextile layer, or in the upper sediments below the paver system, this Vision Plan recommends pro-active design which aggressively protects valuable groundwater resources.

FIGURE 12.34 *Asphalt parking lot at Ventura County Fairgrounds.*

FIGURE 12.35 *Bird's-eye view of Estuary and Fairgrounds.*

position/direction of perspective

Ventura River Parkway Interpretive Center

FIGURE 12.36 *Proposed location of Ventura River Parkway Interpretive Center.*

EXISTING CONDITIONS

The Ventura Beach R.V. Resort and the Emma Wood Group Camp site straddle Highway 101 and form the western edge of the Ventura River Delta. While Emma Wood is a State Beach and the R.V. Resort is private property both sites provide popular recreation services. Although public recreation is a priority of this plan, these recreational uses present potential conflicts with the priorities of wetland restoration and floodplain management, since both properties lie almost entirely within the FEMA 100 year floodplain and are located on former wetlands. However, in combination, these two sites still have the potential for meeting all three priorities.

Ventura Beach R.V. Resort

Currently, the RV Resort provides the opportunity for extended stays with modern conveniences in an outdoor setting for the segment of the population who have access to recreational vehicles or RVs. It supports 144 paved RV sites each with hook-ups for electricity, water and sewer, a general store, two group meeting halls, a basketball court, swimming pool, horseshoes, and tot-lot (Ventura Beach RV Resort 2009). Because of a serious risk of flood damage recurring at less than twenty-year intervals, this campground is considered safe for occupancy only with an alarm system that warns occupants to evacuate in the event of floodwaters upstream (Keller and Capelli 1992). The risk of flood damage is particularly high on the eastern third of the site. Figure 12.44 illustrates that the Resort is situated on land in the path of an historic and active distributary channel of the Ventura River. The Resort saw only four years of use before it experienced $1,000,000 in damage from a 1992 flood event. Additional evidence indicating that the Resort was inappropriately sited includes the span of the Main Street Bridge (built long before the Resort), which stretches well west of the Resort's eastern boundary. Before its construction

FIGURE 12.37 *R.V. Resort camp sites located south of the Main Street Bridge.*

FIGURE 12.38 *Emma Wood Group Camp, day use area.*

FIGURE 12.39 *Second mouth and railroad trestle at Emma Wood State Beach.*

FIGURE 12.40 *Emma Wood State Beach with view to Seaside Wilderness Park.*

in 1987-1988 the resort site was used for dry-farming through the 1950's, then lay fallow, with succession to a mixture of coastal sage scrub and riparian plants (Keller and Capelli 1992).

Emma Wood Group Camp

The Emma Wood Group Camp also sustained considerable damage in the 1992 floods (Weil 2008). However, two differences prevented the Group Camp from sustaining the level of damage and attention of the R.V. Resort. First, while within the FEMA 100 year floodplain, the day-use and camping areas of the State Beach property are not located in the path of a distributary channel. Second, there were many fewer guests staying at the Group Camp than at the R.V. Resort during the 1992 floods, and, like the agricultural area to the north, the Group Camp has fewer structural improvements and lacks the amenities that encourage human habitation during wet seasons. However, it does have a number of publicly available amenities, including a day use area, an RV site and an en-route site without hookups, four group camp sites organized for tent use, a hike and bike camp site, and the trail head for Ocean's Edge Trail. Juan Bautistia de Anza National Historic Trail (a 1,210-mile historic route from Nogales, Arizona to San Francisco, California) passes through the site, and a spur trail brings visitors east from the campground into the river. Developed in the early 1980's, the campground was designated as a group camp in order to meet a need for sites that supported large groups (Weil 2008). In testament to that need the Group Camp receives approximately 8,000 guests annually, and is often at or near capacity during peak season from May through October (Weil 2008). Individual and family camping accommodations are available at the

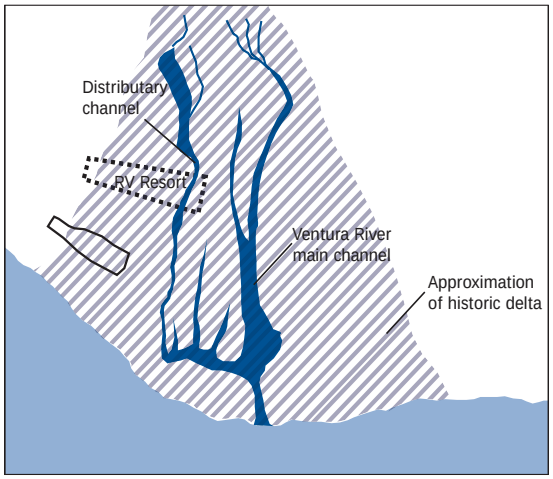


FIGURE 12.41 *The outlines of Ventura Beach RV Resort and Emma Wood Group Camp are superimposed over a diagram of the main river and distributary channels taken from an 1855 survey. The distributary channel that runs through the RV Resort passed floodwaters through the site on at least four occasions during the past 40 years. Adapted from Keller and Capelli 1992, map based on US Coastal Survey1855.*

FIGURE 12.42 *Existing conditions at the Emma Woods State Beach and adjacent private RV camping area. Nearly all of the area shown lies in the FEMA 100-year floodplain, not highlighted here. Orthophotography: CIRGIS.*

nearby Emma Wood North State Beach which provides R.V. camping, and by McGrath State Beach, which provides tent and R.V. camping.

A 1994 plan made numerous recommendations for restoring and enhancing Emma Woods State Beach, the Group Camp, and the adjoining Seaside Wilderness Park (Wetland Research Associates 1994). Recommendations for the Group Camp area that were implemented included the removal of invasive plant species, restoration of native plant species, and trail realignment. These actions most affected the spur trail leading to the river. Proposals that were not implemented included an interpretive center, a viewing platform for the river's second mouth, restoration of a twin-span railroad trestle to improve water flow to the second mouth, and restoration of the second mouth's seasonal lagoon habitat.As of 2008, the California State Parks department had no current plans for the development of an interpretive center at Emma Wood State Beach (Weil 2008).

The spur trail is now once again overgrown with Arundo donax, and Park Wardens warn visitors not to travel on it alone. While statistics are not available, crime is a concern to the Parks Superintendent, and regular patrols of the Camp Ground and nearby river area are conducted by State Park rangers (Weil 2008). The adjacency of the R.V. Park and the Group Camp sites to the beach, the estuary and second mouth of the Ventura River, Main Street Bridge, and Downtown Ventura all contribute to the popularity of these sites, making them a desirable location for recreational facilities. Addressing potential conflicts between natural processes and recreational opportunities at these sites will ultimately enrich the entire proposed parkway area.

① Camping/day use

② Interpretive Center

③ Restored wetlands

④ Railroad trestle

Nature trail

FIGURE 12.43 *Plan, Ventura River Parkway Interpretive Center.*

DESIGN CONCEPTS

Design concepts for these properties include the restoration of appropriate habitat on the eastern two thirds of the RV Resort, the introduction of an interpretive center built on the western third of the RV Resort, and, finally, improvements to the layout at the Emma Wood Group Camp. Objectives that guide these recommendations include floodplain compatibility, ecosystem preservation and restoration, increased access, and development of future stewards.

Ventura River Interpretive Center

The first design recommendation is the restoration of the eastern portion of the RV Resort to wetland and/or coastal sage scrub, the exact plants and cover to be determined by further study. Removal of impermeable surfaces, electrical and sewage hook-ups, and re-grading of the area of the resort that is most flood prone will allow for increased habitat area for sensitive ecosystems, and increase floodplain compatible use. In addition, returning this land to a form closer to its original state will help reinforce the natural character of this landscape as wild and not habitable.

The introduction of a small interpretive center on the western portion of the R.V. Resort would further meet objectives for floodplain compatibility, access to the Ventura River and its environs, and to encourage the creation of future stewards through educational opportunities. As proposed, floodplain compatibility will be ensured by placing buildings well west of the distributary channel. An architectural approach that allows for wet conditions and passage of flood waters at the eastern extents of the building will further provide this compatibility. Replacement of the existing recreational opportunity of the RV Resort with the proposed features will engender more flood compatible use by disallowing extended stays during high risk seasons. In addition, the proposed plan will create expanded access for a larger number of individuals. Ultimately the interpretive center will provide floodplain compatibility, ecosystem sensitivity, and greater visitor access to the Ventura River. Opportunities to educate the public not only about the flashy nature of the Ventura River, the importance of rivers and flood processes in general, and the valuable ecosystems in the vicinity will be provided by the facilities' programming as well as its unique location and construction.

Emma Wood Group Camp

The existing trail that leads to Emma Wood Group Camp from the western edge of the proposed Interpretive Center provides the opportunity for these two properties to offer complementary recreational experiences for outdoor enthusiasts. Together, these sites present the potential to offer education, primitive accommodations, and connections to outlying outdoor recreation. Introduction of more native vegetation to the day use areas and group camps would increase habitat and provide learning opportunities, as well as provide more privacy for family tent camping. These improvements at Emma Wood Group Camp would allow the proposed Interpretive Center and the Group Camp to function as complementary pieces of a recreational whole. This would reflect the reality that the natural systems existing at the R.V. Resort, Emma Wood Group Camp, and the Ventura River function as a unit.

Restoration of Lagoon Habitat

The proposals presented here anticipate, and are compatible with, other detailed recommendations in the Wetlands Research Associates 1994 plan. Notable among those recommendations are the restoration of a fresh/brackish water seasonal lagoon habitat that existed as a self-sustaining system at the second mouth of the river prior to its impairment by railroad activities starting in the1970's. Restoration would commence with reconstruction of the existing railroad trestle across the second mouth to restore a second bridge span that previously existed, thereby improving the supply of water and natural scouring action to the lagoon system (Wetlands Research Associates 1994).

In connection with reconstruction of the railroad trestle, planners should explore the feasibility of using the trestle as a support system for an elevated pedestrian trail that would provide visitors with views of the second mouth and surrounding wetlands, perhaps as an extension of the elevated pedestrian system discussed in connection with the estuary. While a system of this sort would involve engineering and safety considerations beyond the scope of this Plan, an elevated passage would eliminate the need for the spur trails to the north, minimizing intrusions on riparian and wetland habitat, and moving trail users above dense vegetation that provides opportunities for crime.

CONCLUSION

The proposed Ventura River Interpretive Center would be within easy reach of other proposed features of this Plan - Cottonwood Junction, the Ventura Wilds Trail, and the Levee Trail - as well as the Ventura urban center and the numerous existing multi-use trails through the area. These adjacencies would enable the Interpretive Center and Emma Wood Group Camp to function as a home base for parkway use for Ventura residents as well as an introduction to the parkway for coastal travellers.

FIGURE 12.44 *Bird's-eye view of the existing estuary and wetlands with a reconfigured railroad trestle, and with expanded and restored wetlands, Emma Wood Group Camp and the Ventura River Visitors Interpretive Center in the background.*

CHAPTER 13: EVALUATION AND CONCLUSION

Evaluation

In order to evaluate this Vision Plan, it is essential to understand both the intended purpose and the proposed audience for this document. This Vision Plan is intended to fulfill degree requirements for the Department of Landscape Architecture, California State Polytechnic University, Pomona. This plan is also intended to meet the guidelines set by its client, The Trust for Public Land, following recommendations and funding from the California Coastal Conservancy in support of the Lower Ventura River Parkway Planning Project (see Appendix C). In terms of audience, it is the hope of the authors that this document may serve as a tool for citizens and governmental and non-governmental organizations who will be involved in the planning and execution of the Lower Ventura River Parkway.

This Vision Plan is conceptual. Detailed descriptions of the hydrological, ecosystemic, and cultural needs of the project area were studied and objectives were created in Part 2, Inventory and Analysis. An evaluation matrix (figure 13.2) is used to assess which objectives are met by the design solutions proposed in Chapters 7 thru 12.

HYDROLOGY

As an EPA listed impaired water body, multiple design solutions are needed to improve the hydrological function of the Ventura River. Hydrological function is dependent on adequate instream flow, tributary conditions, and the quality of surface and groundwater. Likewise, adjacent communities require protection of human infrastructure from flood damage, but in order to reap the benefits of healthy river function, this coexistence requires minimizing impairment to hydrological function.

ECOSYSTEMS

A multitude of environmentally enhancing, cost-efficient ecosystem services are potentially available to the people of Ventura. Harnessing these local benefits requires the restoration of diminished ecosystems. Restoring tributary connections and increasing the size and frequency of habitat patches can improve biodiversity opportunities and are keys to increasing the benefits of ecosystem services. Incorporating design solutions that minimize both habitat loss and the introduction of pollutants will also aid in protecting and enhancing local ecosystems. In addition, the removal of invasive species, which colonize local habitats and usurp available resources, can help reduce these threats.

CULTURAL ELEMENTS

This Vision Plan's design solutions are also intended to create positive cultural impacts. Public access to the natural resources offered by the Ventura River is one of the first steps in reuniting Ventura's culture with the Ventura River. Identifying appropriate land uses and strategies for using the land adjacent to the Ventura River has broad-reaching design implications leading to increased physical and cultural protection of the river's important resources. Meeting objectives for both access and appropriate land use each provides potential to meet the further objectives of increasing cultural awareness through educational opportunities and promoting stewardship. Future generations will measure the success of these objectives by the degree to which the Ventura River Parkway presents a healthy river with thriving ecosystems that are acknowledged and embraced by the community and its culture.

FIGURE 13.1 *Kitesurfing as seen from Emma Woods State Beach.*

DESIGN SOLUTIONS	HYDROLOGY					ECOSYSTEMS				CULTURAL ELEMENTS			
	Preserve and expand space for natural function	Mitigate impact of hydrological structures on river function	Ensure adequate instream flow	Protect parkway structures and activities from flood damage	Improve the quality of surface water and ground water	Restore and enhance ecosystems	Enhance biodiversity by reducing harmful impacts	Increase habitat connectivity	Improve the quality of surface water and ground water	Improve access and recreation at the river	Minimize incompatible land uses near the river	Increase cultural awareness of the river through education	Encourage stewardship over the river
Parkway Plan													
Preserve existing Ventura River floodway	✓	✓			✓	✓	✓	✓		✓	✓		
Expand Space for river function	✓	✓			✓	✓	✓	✓		✓	✓		
Plan for wide variances in river flow and sediment load		✓				✓	✓						
Monitor and improve Casitas and Los Robles Dam	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Increase groundwater recharge and around parkway corridor		✓	✓		✓	✓	✓						
Implement LID practices in and around parkway		✓	✓		✓	✓	✓		✓		✓	✓	✓
Continue discharges from Ojai Waste Treatment Plant		✓	✓			✓	✓						
Improve quality of Ojai Waste Treatment Plant effluent		✓	✓			✓	✓						
Encourage water conservation at the watershed level		✓	✓		✓	✓	✓						
Balance human water consumption with wildlife needs		✓	✓		✓	✓	✓						
Parkway facilities compatible with 100-year floodplain						✓	✓						
Educate and celebrate flooding as a natural process				✓		✓	✓					✓	✓
Restore habitat corridors along tributaries	✓	✓		✓	✓	✓	✓	✓		✓	✓		
Reduce and treat urban runoff at the neighborhood level		✓			✓	✓	✓						✓
Treat urban runoff where it enters the river		✓			✓	✓	✓						
Incorporate river-friendly agricultural practices		✓	✓		✓	✓	✓	✓			✓		
Preserve existing habitat in and adjacent to the river floodway	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Expand estuary, wetland, and coastal dune environments	✓	✓			✓	✓	✓	✓	✓	✓	✓		

DESIGN SOLUTIONS	HYDROLOGY					ECOSYSTEMS				CULTURAL ELEMENTS			
	Preserve and expand space for natural function	Mitigate impact of hydrological structures on river function	Ensure adequate instream flow	Protect parkway structures and activities from flood damage	Improve the quality of surface water and ground water	Restore and enhance ecosystems	Enhance biodiversity by reducing harmful impacts	Increase habitat connectivity	Manage invasive species	Improve access and recreation at the river	Minimize incompatible land uses near the river	Increase cultural awareness of the river through education	Encourage stewardship over the river
Parkway Plan (continued)													
Use California native plantings for revegetation projects						✓	✓	✓	✓				
Gather seed from locally genetic sources						✓	✓	✓	✓				
Commence immediate collection of local seeds						✓	✓	✓	✓				✓
Increase width of riparian corridor upstream of Shell Road	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		
Maintain natural, undeveoped characteristic of west bank of Ventura River	✓					✓	✓				✓		✓
Promote preservation of open space on Ventura hillsides			✓	✓		✓	✓	✓			✓		
Increase passive recreational activities	✓	✓		✓		✓	✓					✓	✓
"Announce" the parkway at three or more entry points												✓	
Locate trails and visitor facilities to take advantage of scenic views										✓			
Appropriate signage and wayfinding features	✓	✓				✓	✓					✓	
Highlight existing historic sites within and around the parkway												✓	✓
Stewardship programs with focus on monitoring a changing river												✓	✓
Pursue educational tie-ins with neighborhood schools						✓		✓				✓	✓
Open space as first priority for future floodplain land uses	✓	✓			✓	✓	✓	✓			✓		
Limited, river-friendly mixed-use development		✓									✓		
Preserve and expand river-friendly agricultural practices	✓	✓	✓		✓	✓	✓	✓					
"Sunset" industrial land uses in parkway corridor	✓	✓	✓		✓	✓	✓	✓					

FIGURE 13.2 *Evaluation matrix.*

DESIGN SOLUTIONS	HYDROLOGY					ECOSYSTEMS				CULTURAL ELEMENTS			
	Preserve and expand space for natural function	Mitigate impact of hydrological structures on river function	Ensure adequate instream flow	Protect parkway structures and activities from flood damage	Improve the quality of surface water and ground water	Restore and enhance ecosystems	Enhance biodiversity by reducing harmful impacts	Increase habitat connectivity	Improve the quality of surface water and ground water	Improve access and recreation at the river	Minimize incompatible land uses near the river	Increase cultural awareness of the river through education	Encourage stewardship over the river
Foster Park													
Increased access points to park		✓								✓		✓	✓
Swimming hole										✓		✓	✓
Iconic swimming flag												✓	✓
Tot lot										✓			
Sundeck										✓			
Increased picnic facilities										✓			
Cottonwood Junction													
Public access at Cottonwood Junction Canyon Walls Trail										✓		✓	✓
Ventura Wilds Trail										✓		✓	✓
Rope Bridge										✓		✓	✓
Canyon Walls Trail										✓		✓	✓
Ephemeral Trail										✓		✓	✓
Cottonwood Trail										✓		✓	✓
Plant community restoration on adjacent hills						✓	✓	✓	✓				
Canada Confluence													
Dechannelize Weldon Creek		✓		✓		✓	✓	✓					
Remove selected structures from 100-year floodplain and return land to the river	✓	✓	✓	✓	✓	✓	✓	✓		✓			
Native Arboretum			✓		✓	✓	✓	✓					
Polishing Ponds			✓			✓							
Protect historical aqueduct remnant			✓						✓				
Restore Canada Larga tributary, including daylighting at Highway 33				✓			✓	✓					
Provide pedestrian access to Ventura River													
Clean up brownfield site		✓				✓	✓	✓		✓			
Ventura Avenue Night Market										✓			
Test, monitor, and remediate brownfields at former petrochemical facilities				✓	✓	✓				✓			
Constructed wetlands for diversion and treatment of Canada Larga water					✓	✓	✓						
Picnic and recreational amenities							✓			✓		✓	✓
Community gallery space										✓	✓	✓	✓

DESIGN SOLUTIONS	HYDROLOGY					ECOSYSTEMS				CULTURAL ELEMENTS			
	Preserve and expand space for natural function	Mitigate impact of hydrological structures on river function	Ensure adequate instream flow	Protect parkway structures and activities from flood damage	Improve the quality of surface water and ground water	Restore and enhance ecosystems	Enhance biodiversity by reducing harmful impacts	Increase habitat connectivity	Manage invasive species	Improve access and recreation at the river	Minimize incompatible land uses near the river	Increase cultural awareness of the river through education	Encourage stewardship over the river
Downtown													
Elevated freeway crossing										✓		✓	✓
Levee Trail						✓	✓			✓		✓	✓
Remove portion of levee		✓	✓			✓	✓						✓
Restore previous estuary habitat			✓	✓	✓	✓	✓						✓
Restore previous wetland habitat			✓	✓	✓		✓						✓
Relocate bike trail and portion of parking lot to restore dune habitat				✓	✓					✓	✓	✓	✓
Enhance coastal protection of built structures				✓	✓								
Protection of a valued surf spot				✓	✓	✓	✓			✓			✓
Increase the potential for the reestablishment of the Ventura Marsh Milk Vetch					✓	✓	✓						✓
Replace asphalt in existing parking lots with permeable paving				✓	✓	✓	✓				✓	✓	✓
Incorporate runoff treatment swales				✓	✓	✓	✓				✓		✓
Vegetated shaded parking at Fairgrounds				✓	✓	✓	✓						✓
Remove large *Arundo donax* infestations at two downtown river locations				✓	✓	✓	✓		✓				✓
Storm drain outfall treatment sites		✓			✓	✓	✓						✓
Mixed-use developments as a bridge between downtown and the river		✓			✓	✓	✓						
Creation of park and open space northeast of Main Street			✓										
Ethnobotanical and historical garden		✓			✓	✓	✓	✓	✓		✓	✓	
Re-design of street grid										✓			
Improved pedestrian crossings										✓			
Mixed use development with density and urban infill	✓		✓							✓	✓		
Mixed use development with public and private outdoor spaces												✓	✓
Mixed use development utilizing Green building practices		✓	✓	✓	✓		✓				✓	✓	✓
Mixed use development with homeless services and transitional housing				✓			✓						
Interpretative center with flood compatible structure and grounds	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Screen plantings for greater privacy at Group Camp										✓		✓	✓
Eliminate spur trails on Emma Wood property						✓	✓	✓					
Replace spur trails with elevated path along reconfigured railroad trestle	✓					✓	✓			✓		✓	✓

Conclusion

The Lower Ventura River is an essential resource for the people of Ventura and for the ecological health of the region. During the recent past, the river has experienced dramatic and far-reaching impacts that have separated Venturans from their river, have diminished hydrological, ecological, and cultural systems, and have threatened the inheritance of future generations. Without stewardship and policies to preserve and restore the river and the lands along the river, Venturans will face the potential of unrecoverable damage to what could be one of their community's most compelling natural features.

A Vision Plan for the Lower Ventura River Parkway seeks to end the current separation between the people of Ventura and their river. By providing concepts for education and recreational opportunities while promoting compatible behaviors that protect and restore river functions and ecological health, this Vision Plan seeks to maximize the potential benefits of a river parkway.

RECOMMENDATIONS

This Vision Plan represents an initial step in the realization of a parkway for the Lower Ventura River. Though the proposed parkway is only six miles long, the success of many of the proposed design solutions are dependent on employing improved practices at a much larger scale, the scale of the Ventura River Watershed.

The following recommendations are intended to contribute to the successful implementation of this Vision Plan:

- Collect and share data.
  Access to data facilitates research and problem-solving. It is recommended that data be centralized and made freely available to the public.
- Develop mechanisms for conservancies to acquire water rights.
  Without mechanisms to ensure adequate instream flow, competing interests threaten the hydrological function of the river, the ecological health of the region, and create the possibility of expensive legal battles at a later date.
- Increase protections to tributaries and headwaters.
  Headwaters and tributaries play a crucial role in river health. Impacts to these water bodies will impact river function.
- Employ sustainable practices throughout the watershed.
  Urban, agricultural, and industrial runoff need to be better managed. Employing sustainable practices is the common responsibility of all.
- Collect and propagate local native seeds and plants.
  Locally-evolved native plants best support local ecosystems. Propagating local seeds and plants will strengthen local ecosystems.
- Pursue "Rule of Common Law" to ensure low impact public access to hillsides and the river.
  Without access, the human relationship with the local environment is weakened. Foster public access and environmental conscientiousness to the local environment.
- Promote education and stewardship.
  Education and stewardship benefit the community and aid in the protection of community resources.
- Plan for the future.
  The burden of depleted lands and resources will fall to future generations. Identify and enact proactive measures to avert the residue of environmental damage and an unfair shifting of responsibility.
- Prepare for shifting consumer demand.
  As knowledge increases and public opinion shifts, consumers will increasingly seek products that are sustainably created or harvested.

FIGURE 13.3 *Bike trail, Ventura.*

The Ventura River is a critical coastal watershed in southern California and enhancement of habitat, water quality and other natural resources in the watershed is essential to the restoration and enhancement of significant coastal resources in the state, including riparian and watershed resources.

California Coastal Conservancy. 2007.
Staff Recommendation, Lower Ventura River Parkway Planning Project

APPENDICES

APPENDIX A

INSTREAM WATER RIGHTS, THE PUBLIC TRUST DOCTRINE, AND STREAM RESTORATION EFFORTS IN CALIFORNIA

Michael Kelley

INSTREAM WATER RIGHTS, THE PUBLIC TRUST DOCTRINE, AND STREAM RESTORATION EFFORTS IN CALIFORNIA

The success of any stream restoration project centered on habitat improvement depends, in part, on the assurance that instream water will be available in the amounts and at times that are appropriate to meet restoration objectives. Yet, for most of California's history, water law and policy were aimed primarily at allocating and ensuring the rights of private parties to remove water from streams and rivers for economic purposes. The emerging concept of the public trust in instream water for habitat purposes is a potential tool for land conservancies and other open space advocates seeking to ensure adequate instream water. This paper examines the status of law and policy concerning instream water rights, the issues confronting open space advocates attempting to employ the emerging concept of the public trust in instream water, and ideas for a more effective determination of instream water rights.

INSTREAM FLOW: A CRITICAL ISSUE FOR STREAM RESTORATION

The necessity of having adequate instream flow for habitat purposes can be illustrated by considering one endangered species, the steelhead (Oncorhynchus mykiss) as an example. It is not strictly necessary for the survival of individual fish that all reaches of streams in a watershed contain water at all times, since individuals can subsist in pools and upstream sections of a watershed even when downstream reaches dry up during summer and fall weather. However, adequate instream flow is necessary for the survival of the species because fish returning from the sea require stream water at least seven inches deep in downstream reaches in order to migrate upstream for spawning, and at least six inches deep (with a preferred depth of fourteen inches) in upstream areas in order to spawn. The timing of instream flows is also critical since adequate water must be present during the particular season when steelhead migrate and spawn, which is fall and winter in the case of Southern California steelhead (McEwan and Jackson 1996).

Human activities can interrupt or even stop instream flow entirely, even in major rivers. In the West, so much water is removed from the once-mighty Colorado River by a series of dams and diversions for irrigation and municipal water purposes that the river no longer flows to the sea except during floods (Glenn, Flessa et al. 2007) So much water is removed from the Ventura River in Ventura County, California for agricultural and municipal purposes that during some dry periods, the lower five and one half miles of the river consists predominantly of effluent pumped into the river by a water treatment plant (Capelli 1997). That effluent is high enough quality to replace watershed water for habitat purposes, but the situation amply demonstrates that people have acquired the capability to "turn off the tap" on the river. If the "tap" on a river can be turned off for habitat purposes, then it also can be turned off for many public recreational purposes. It stands to reason that people traveling to the riverside for picnicking, hiking, swimming and fishing prefer to see some water there, at least when it is seasonally appropriate.

How, then shall advocates of stream restoration for habitat and passive recreational use have confidence that water will be available for their stream? During the past quarter century, Americans have seen the emergence, and to some extent, the arrested development, of the public trust doctrine as a vehicle for asserting the rights of wildlife to instream water through the general public as stewards of wildlife habitat. In order to appreciate the revolution in environmental policy that this development represents one must first consider that for most of California history water in non-navigable rivers could be legally reserved only for private economic purposes.

CALIFORNIA WATER LAW AND THE RIGHTS OF ECONOMIC INTERESTS

Prior to the late Twentieth Century, instream water rights for habitat and ecosystem benefits were not recognized under California law. Successive doctrines regulating water use were solely for the benefit of people removing water from the stream for their use (Dunning 2005).

Under Spanish settlement, water rights throughout the New World were held by the Crown and the use of, but not the title to, water was granted to settlers and their communities for their sustenance. With the grant of water use came corresponding obligations for the communal development and maintenance of irrigation and drinking water systems. A 1783 document, the "Plan of Pitic" memorialized these rights and obligations for Spanish frontier settlements everywhere, based on the underlying principle that a town's waters should be shared by all settlers. Nature, however, was not given a share (Hundley 2001).

As Americans poured into the State during the 1840's another doctrine, "First in Time, First in Right," based upon a frontier tradition of recognizing the superior rights of the first settlers to arrive in an area, evolved to regulate huge demands for scarce water for mining activities. This principle evolved into the "prior appropriation" doctrine. The key elements of prior appropriation were:

- The right was not based on ownership of land; rather, it was based on the act of diverting water and putting it to beneficial, or economic use (and being the first to do so).
- Prior appropriation was a right to divert surface water for beneficial use, with due diligence

and in a non-wasteful manner; it was not ownership of the water itself.

- A prior appropriator's right to use water was lost by failing to actually remove the water from the stream and use it. In the traditional form of the doctrine, no investment in future water rights or storage of water for future use was allowed. By being first, a prior appropriator could obtain rights to as much water as he could use for beneficial purposes. Latecomers could establish "junior appropriator" rights, but could be left empty-handed if dry weather left only enough water for the senior appropriators uses.

Prior appropriation was originally a tool of miners, later of agricultural irrigators and private or municipal water districts (Hundley 2001). The doctrine continues in force but has been modified in modern practice by the application of governmental permit requirements and environmental regulations.

An ancient and competing system of water rights called "riparianism" was based upon the common law of England and the Eastern United States. Riparians who in California were often ranchers, acquired rights to water by virtue of acquiring land immediately adjacent to waterways. The main tenets of the doctrine were:

- Riparians acquired the right to use water through the ownership of land adjacent to it.
- Continuing water use rights did not depend on actual continuing use of the water.
- Riparians had the right to use unlimited quantities of water from adjacent waterways, without regard to leaving water for downstream users, but only for "domestic" purposes that were limited to drinking, bathing, and small scale gardening and livestock. Those uses did not include irrigation.
- In a modern application of the doctrine, riparians also had a more limited right to use water for "artificial" purposes such as power generation, dairy or ranching, or manufacturing, but only in a "reasonable" manner with regard to the rights of other users. (Sax, Thompson et al. 2000)

In California, users claiming water under the prior appropriation doctrine operated in the same watersheds as those asserting riparian claims, and increasingly the two groups clashed. In 1886, the California Supreme Court established a system for allocating and prioritizing rights between the two systems in the case of Lux v. Haggin. California continues to have a "dual" system of water rights that is relatively rare in American law.

For the purposes of this inquiry, what is notable about "beneficial" water uses under the prior appropriation doctrine and "domestic" or "reasonable" uses contemplated by the riparian doctrine is that none of these recognized any value for water remaining in a stream for the survival of wildlife or "instream" water.

Instream water consisted of whatever was "left over" when riparians and prior appropriators had taken their shares, and there was no requirement that any water be left, except for the purposes of navigation. In fact, instream water was considered a "waste to the sea," and such waste was prohibited by a constitutional amendment, now Article X, Section 2 of the California Constitution, passed specifically for the benefit of pro-development interests. An exception existed in Fish and Game Code Section 525, (currently Section 5937) enacted in 1933 and still in effect, which required that limited amounts of water be released from dams for the sake of downstream fish. That regulation, however, was not enforced (Dunning 2005).

DEVELOPMENT OF A NEW WATER RIGHTS DOCTRINE BASED ON THE PUBLIC TRUST

A general "public trust" doctrine existed under Roman law that protected the right of the public to access certain common resources. This principle was formalized in English law in the Magna Carta in 1215, and was carried forward into American law, exemplified by the Supreme Court's 1892 decision in Illinois Central Railroad Company v. Illinois, that the public always retained an interest in navigable waters "[F]or the people of the state that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interferences of private parties" (1892). Although that public right was superior to private property rights, it was limited to navigable waters, and it did not contemplate any public right to protect ecosystems (Dunning 2005; Mono Basin Clearinghouse 2007).

In an influential 1970 law review article, University of Michigan Professor Joseph Sax argued that the ancient doctrine should be employed by citizens seeking better environmental protection and resource management (Sax 1970). Although the article did not mention water rights, it provoked an expansion of the public trust doctrine for the following quarter-century. The following year, the California Supreme Court in Marks v. Whitney suggested (without ruling) that the public trust doctrine might not be limited to navigability, but might also extend to protection of tidelands for ecological purposes (Dunning 2005).

By the time that the California Governor's Commission to Review Water Rights Law met in 1977, instream water use was recognized as an important issue. The Commission's report recommended the establishment of standards for instream flow protection, but that recommendation was rejected by the Legislature (Dunning 2005). The same year, community activists, law students and law professors supporting the Mono Lake Committee initiated a "David vs. Goliath" conflict by filing a lawsuit challenging the diversion of creek water in the Mono basin by the Los Angeles Department of Water and Power. They based the suit on an expansion of the public trust doctrine to protect wildlife in Mono Lake, and the theory eventually developed in the direction of also protecting fish in the tributaries to the Lake.

The result in 1983 was a landmark California Supreme Court decision, National Audubon v. Superior Court that recognized the application of the public trust doctrine to protect instream

water rights for the sake of wildlife protection. The Court ruled that the public trust doctrine was a separate source of water rights that must be balanced against appropriative water rights on a case by case basis (1983).

It is important to note that the ruling in National Audubon did not require the public's acquisition of instream water rights, which would have required compensation to owners of existing appropriative rights. Instead, it declared that the public had an already existing right to benefits from instream water, an inherent limitation on the property rights of appropriators. Thus, no compensation was required (Dunning 2005). However, the public's right was not absolute; rather, it was a legitimate legal principle that coexisted alongside the doctrine of prior appropriation, and the role of the regulators and courts was to achieve a balance between the two approaches, that is, a balance between human water needs and the needs of wildlife (Id.). As a result of the decision, but after many delays, the State Water Resources Control Board ruled in 1994 that DWP must limit its diversions of water in order to maintain Mono Lake water at a specified elevation.1

DEVELOPMENTS IN THE PUBLIC TRUST DOCTRINE AND INSTREAM RIGHTS AFTER MONO LAKE: THE LITIGATION REGIME

The Mono Lake case established a precedent that would seem to be the tool needed by advocates of instream water. However, applying that precedent within the context of California regulatory law is another matter. There have been few judicial decisions on the public trust doctrine since the Mono Lake case and development of the instream water right has been "halting" (Dunning 2005).

Major appropriators of water, with some minor exceptions, must currently seek State Water Resources Control Board (SWRCB) approval through a permit process (Holland 2003). Since the SWRCB, post-National Audubon, imposes limited requirements for protection of instream water resources as a condition for such permits, that agency is the main "battleground" for legal disputes concerning instream water and the public trust. Yet, thirty years after the California Governor's Commission first recommended standards for protection of instream water the SWRCB still "has no system for establishing direct, substantive, and comprehensive instream flow standards." (Dunning 2005).

Two SWRCB cases, involving Lagunitas Creek and the Lower Yuba River, provide ample illustration of the operation of the public trust doctrine in California after Mono Lake. In the 1995 Lagunitas Creek case, the SWRCB considered conflicting claims by the Department of Fish and Game and a municipal water district, regarding how much instream flow was required to be preserved in order to support public trust resources such as steelhead. The Board stated that its role was "to regulate the major water diversions in the basin in a manner that maximizes the competing beneficial uses of water, maintains fish in good condition, and protects public trust resources where feasible" (Order No. WR 95-17 1995). The key species of fish in the watershed were not in "good condition" since the creek was supporting only a remnant population of four hundred or fewer spawning coho salmon individuals where there had once been runs of three to five thousand fish annually. Regarding the question of how much instream water was required in order to keep fish in "good condition" Fish and Game recommended a far greater allocation than the water district. The Board's decision increased the prior instream flow requirement, but in an amount far less than recommended by Fish and Game. The key was its application of the constitutional "reasonableness" requirement stated in the Mono Lake case (Dunning 2005); the Board interpreted this requirement as relegating fish habitat to the role of just one more interest to be balanced against water district rights rather than as a preexisting right with precedence over exploitative uses of the water. One commentator has suggested that this was the result of political pressure related to existing water shortages in the water district (Dunning 2005). This took five years.

In the Lower Yuba River case, fishery interests complained to the Board in 1988 that instream requirements incorporated into the permit issued to the local water district were not adequately protecting anadromous fish. The Department of Fish and Game entered the case and prepared a fisheries management plan for the lower river, but the issuance and distribution of a final decision by the Board took nine years, from 1992 until 2001. The decision established long-term instream flow requirements to take effect on April 1, 2008. Applying the "reasonableness" standard of the National Audubon decision that balances the survival of endangered species against fluctuating human needs, the decision included mechanisms for the Board's adjustment of flow requirements in favor of water purveyors under a multitude of circumstances. One example of such an adjustment was the Board's establishment of an temporary, lower instream flow requirement until at least 2006 based upon the Governor's declaration of a state of emergency regarding the state's electric power supply (2003).

The Board's decision was appealed to the courts, with most challenges centering on provisions that allowed lower instream flows (i.e. less water for wildlife) in dry years when human water supplies might be stressed. A group of water purveyors, state and federal agencies and environmental organizations entered into extended negotiations resulting in a proposed settlement agreement, the Lower Yuba River Accord, in 2005. In October 2007, the Final Environmental Impact Statement analyzing the potential impacts of the Accord was certified, and the Accord is currently before the Board for possible approval. Thus, at the present, the case appears to be poised for final resolution, twenty years after it began (2008).

The handling of instream water rights on a case-by-case complaint basis means that in every

1. The SWRCB ruling against DWP was based not only on protection of Mono Lake invertebrates and wildfowl, but also on prevention of air pollution.

restoration project there is a potential for continuing uncertainty about the future availability of instream water. This puts a financial burden on public trust advocates to litigate in order to establish instream rights rather than working within a predictable system for allocating rights.

UC Davis Law Professor Harrison Dunning has summarized the situation as follows:
[T]he legislative recommendations of the Governor's Commission on instream flow protection went nowhere and to this day the SWRCB has no system for establishing direct, substantive, and comprehensive instream flow standards . . . With long dry stretches in existence most of the time on the San Joaquin River – 'the heartland river of the Golden State' (citing Rose 1992) – it is impossible to conclude that instream flow protection law in California is in good condition (Dunning 2005).

As the law of water rights develops in response to the National Audubon case, other sources of protection for instream water have been found in the nation's environmental protection statutes. Section 5937 of the Fish and Game Code, mentioned above, continues to be raised with some effect in instream water proceedings before the SWRCB (Dunning 2005). The Federal Clean Water Act, Endangered Species Act, National Environmental Policy Act, California Environmental Quality Act (CEQA), and Federal and State Wild and Scenic Rivers legislation are all cited, where circumstances are appropriate, as sources for instream water protection (Sax, Thompson et al. 2000).

ALTERNATIVES TO LITIGATING INSTREAM WATER RIGHTS: ACQUISITION OF PRIVATE WATER RIGHTS BY THE PUBLIC

The argument that the public already "owns" instream water is of little use if development endlessly pushes aside riverine wildlife habitat while one case-by-case determination after another grinds on for years before the regulatory authorities. An alternative approach to restoring instream water has been developed by borrowing the tools, either persuasive or market-based or both, used by land conservancies and trusts. Land conservancies such as The Trust for Public Land are acquiring, on the public's behalf, donations of existing private water rights that are targeted for the protection of critical instream resources (Holland 2003). In four states (not including California) trusts or conservancies have been established since the mid-1990s specifically for the purpose of purchasing or receiving donations of instream and groundwater rights (Colorado Water Trust; Montana Water Trust; Oregon Water Trust; Washington Water Trust). A watershed-based water conservancy has been established in the Deschutes River area of Oregon (Deschutes River Conservancy).

California Water Code Section 1707 provides that the owner of a legal water right may transfer all or a portion of that right "for purposes of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water." This statute overrides the pre-National Audubon common law principle that water could not be dedicated to instream use because it could not be "controlled" for such use. Conservancies and other habitat advocates can use this law to acquire water rights for instream uses either through purchase or donation, however in doing so they must surmount many hurdles, including the following:

- The transfer must be approved by the State Water Resources Control Board. Temporary transfers for one year or less may be afforded a "fast track" approval by the SWRCB, but the procedure for longer or permanent transfers is lengthy and cumbersome.
- The transfer of rights must not exceed the rights that the seller or donor legally has; this means that the agency acquiring the rights for the public trust must carefully investigate the source and extent of the water rights at issue (Holland 2003).
- The transfer must not "unreasonably affect any legal user of water." An unreasonable affect may involve diverse factors including damage to the local economy through the removal of irrigated farmland from production or impairment of recreational uses.

In the opinion of one water rights expert, the above-referenced law has been "severely underutilized. However, the value of water transfers for environmental purposes throughout the Western states has grown from less than $500 thousand in 1990 to an estimated $20 million in 2003 (Westwater Research 2003).

LEASING OF INSTREAM WATER RIGHTS

Another tool for acquiring instream water for habitat purposes, employed extensively by the Oregon Water Trust, is the leasing of water allocations by their owners to the Trust. As previously noted, prior appropriators such as irrigators can permanently lose their rights by failing to fully use their water allocation for a period of time, for example, during fallow periods on a farm. As an alternative to this "loss through disuse", the owner can lease their water to the Trust for instream use on a seasonal basis, and such leasing is viewed as a full use of the appropriator's allocation (Oregon Water Trust). In California, the CALFED Bay-Delta program has leased an average of nearly 300,000 acre feet in recent years from irrigators for the purpose of lowering fish mortality by increasing stream flow (Westwater Research 2003)

WATER BANKING

Another concept that has come into practice is water banking which involves the establishment of regional markets for the transfer of both surface and groundwater rights, and has the potential for facilitating transfers of water into the public trust without some of the case-by-case regulatory hurdles discussed above. In one example, the Klamath Water Bank, the Bureau of Reclamation began by determining the amount of baseline water flow that would be necessary to reduce the threat to endangered Coho salmon in the Klamath River, based upon studies by the National Marine Fisheries Service. The "bank" that Reclamation established is not a body of water; rather, it is an accounting procedure enabling the Bureau to determine on an

annual basis the amount of groundwater that has not been used by irrigators with allocation rights. The Bureau purchases the unused water with the result that increased instream flows are available at the times most needed for Coho (Bureau of Reclamation 2005).

IMPLICATIONS FOR LANDSCAPE ARCHITECTURE PRACTICE

Landscape architects everywhere are increasingly involved in projects involving restoration of natural surface water features. The Sustainable Sites Initiative, with the American Society of Landscape Architects as a key participant, has recommended that future LEED performance standards for the field of Landscape Architecture implement the strategy of protecting the connectivity of hydrologic features, daylighting streams and restoring degraded stream banks as well as restoring clean, healthy aquatic environments (Sustainable Sites Initiative 2007).

Landscape architects can better accomplish these goals by including planning for adequate instream water in projects that involve surface water. In a large-scale project, the landscape architect is often the true generalist on the team, the individual (or firm) that is most likely of all participants to integrate the physical, cultural and political conditions into a plan and to implement the plan in a way that is sensitive to all those conditions.

One way for landscape architects to plan for instream water would be to include an accurate inventory of existing instream flows, and a projection of factors likely to impact those flows in the future in the baseline data for the project. Another way would be to work in conjunction with a hydrologist and prepare an "instream water budget" for surface water features, quantifying the available water resources and identifying any shortfalls that would require the future acquisition of additional water rights. Finally, the landscape architect might perform the ultimate "generalist" role, working with the conservation biologist and the open space advocate in the public sphere to openly advocate the donation of instream water rights as well as a new regulation of rights that puts the public trust on an equal footing with private economic interests.

REFERENCES

Capelli, Mark H. 1997. *Ventura River Steelhead Trout Survey*. Prepared for California Department of Fish and Game.

Colorado Water Trust. 2008. Introducing the Colorado Water Trust. http://www.coloradowatertrust.org/. Accessed February 20, 2008.

Deschutes River Conservancy. 2008. About us. http://www.deschutesriver.org/About_Us/default.aspx. Accessed February 20, 2008.

Dunning, H. C. 2005. California instream flow protection law: then and now. *MacGeorge Law Review* 36.

Glenn, E., K. Flessa, et al. 2007. Just add water and the Colorado River still reaches the sea. *Environmental Management* 40(1):6.

Holland, Elise. 2003. *Water Acquisition Handbook*. Washington, D.C.: The Trust for Public Land.

Hundley, Jr., Norris. 2001. *The Great Thirst: Californians and Water: A History*. Berkeley: University of Calif. Press.

McEwan, D. and T. A. Jackson. 1996. *Steelhead Restoration and Management Plan for California*. Prepared for California Department of Fish & Game.

Mono Basin Clearinghouse. 2007. The public trust doctrine at Mono Lake. http://www.monobasinresearch.org/timelines/publictrust.htm. Accessed January 22, 2008.

Montana Water Trust. 2008. Our mission. http://www.montanawatertrust.org/. Accessed February 20, 2008.

Oregon Water Trust. 2008. About Us. http://www.owt.org/about.html. Accessed February 20, 2008.

Rose, G. 2000. *The San Joaquin - A River Betrayed*. Sanger, CA: Word Dancer Press.

Sax, J. L. 1970. The public trust doctrine in natural resource law: effective judicial intervention. *Michigan Law Review* 68.

Sax, Joseph L., Barton H. Thompson Jr., John D. Leshy, Robert H. Abrams. 2000. *Legal Control of Water Resources: Cases and Materials*. St. Paul, Minn.: West Group.

State Water Resources Control Board. 1995. Order No. WR 95-17.

State Water Resources Control Board. 2003. Revised Order No. RD-1644, In the Matter of Fishery Resources and Water Right Issues of the Lower Yuba River.

———. 2008. Draft Order No. 2008-XX, In the Matter of Fishery Yuba County Water Agency's Petition to Modify Revised Water Right Decision 1644.

Supreme Court of California. 1983. National Audubon Society v. Superior Court. *Pacific Reporter* 658:709.

Sustainable Sites Initiative. 2007. *Standards & Guidelines: Preliminary Report.* http://www.sustainablesites.org/.

United States Supreme Court. 1892. Illinois Central Railroad Company v. Illinois. *United States Reports* 146:387.

Washington Water Trust 2008. Mission. http://www.thewatertrust.org/whoweare/whoweare_mission.html. Accessed February 20, 2008.

Westwater Research, I. 2003. *Review of Western U.S. Environmental Water Leasing Programs.* Laramie, Wyoming.

APPENDIX B

WHEN THE RIVER MEETS THE SEA: RIVER PLUMES, THE MARINE ENVIRONMENT, AND LOW IMPACT DEVELOPMENT

doreen Morrissey

INTRODUCTION

The Southern California Bight (SCB) is the body of water that lies between Point Conception in Santa Barbara County and Cape Colnett (south of Ensenada) in Baja California, Mexico. The word bight, derived from Old English byht meaning to bend, refers to a bay that is formed by a bend in the coastline. In this case, the Southern California Bight is formed by the southern California coastline.

Approximately three hundred rivers, streams, and storm drains discharge from the southern California coastline into the SCB, including the Ventura River. During rain events, these hydrological discharges form plumes as they enter the ocean. Since many of the rivers, streams and storm drains receive contaminated urban runoff, plumes also introduce high bacteria and pollutant concentrations into the marine environment.

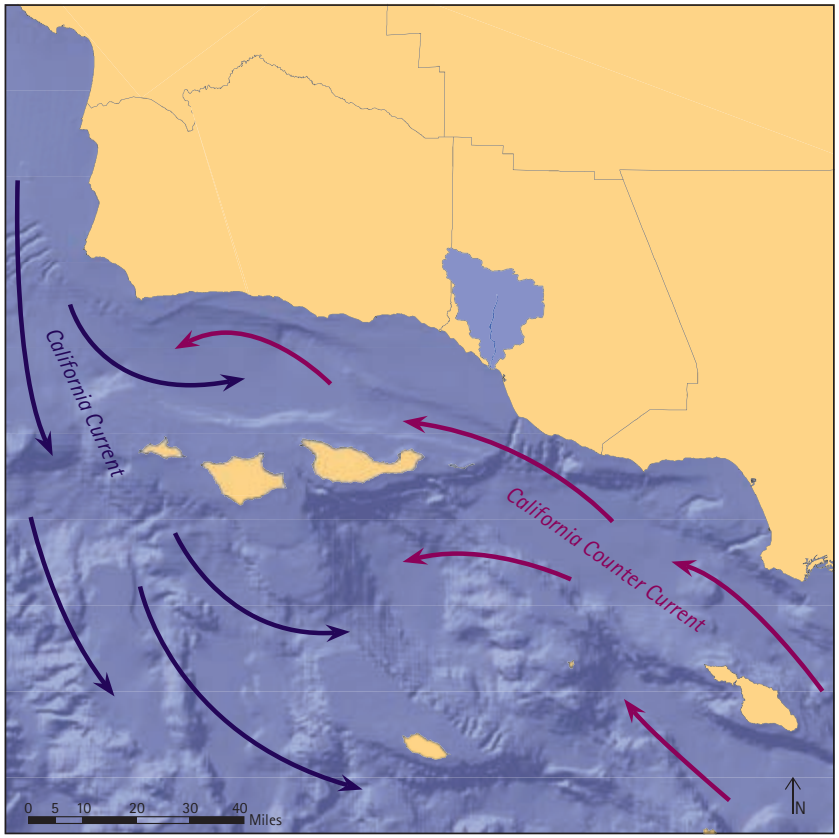
Understanding the ecological implications of terrestrial and river influences on the marine environment can serve to promote river stewardship and ecological resource management (Holligan and Reiners, 1992). The purpose of this paper is to provide an overview of significant characteristics of the Santa Barbara Channel within the SCB and to foster a better understanding of how landscape architecture practices can be a component of improving and protecting biological resources.

THE SOUTHERN CALIFORNIA BIGHT AND THE SANTA BARBARA CHANNEL

The Southern California Bight is a complex combination of climate, winds and currents, and marine and coastal ecologies that creates a dynamic environment. Within the Southern California Bight six major watersheds (Ventura, Santa Clara, Calleguas, Los Angeles, San Gabriel and Santa Ana) discharge large amounts of water and coastal sediments (Eganhouse and Venkatesan, 1993) into the ocean. The Santa Barbara Channel, located in the northern portion of the SBC, receives discharge from approximately forty sources (The Santa Barbara Coastal Long Term Ecological Research Project, 2008), and is associated with three major watersheds (Santa Barbara, Ventura, and Santa Clara).

Precipitation in the southern California coastal climate is characterized by brief and intense rainstorm events during the winter months. Watershed runoff patterns, affected by short and steep topography, alluvial soils, and varying degrees of impermeable surfaces throughout the southern California coast, further concentrate storm water runoff volumes. These intense rainstorm events often result in bacteria laden discharges into the ocean that pose human health risks and often force beach closures (Nezlin et al, 2005).

The bathymetry of the SCB includes some of the deepest ocean basins on the continental shelf. Similar to the regional coastal topography, bathymetry within the Bight is characterized by peaks (i.e. offshore islands), submarine canyons, ridges and basins. The California Current system, which passes through the SCB, is a combination of north and southward flowing currents. Cold temperate ocean waters arrive from the north and warm high salinity waters arrive from the south. These currents meet and result in swirling ocean waters referred to as eddies. Influenced by wind, bathymetry, and sediment upwelling, ocean waters are mixed and dispersed both vertically and horizontally. This mixing serves to distribute sediments, nutrients, and pollutants within the ocean waters. The resulting layered stratification is referred to as a water column.



The warm water California Counter Current and cool water California Current in the Santa Barbara Channel. Source: Channel Islands National Marine Sanctuary.

Since ocean waters are in continual motion due to turbulence and horizontal and vertical currents (Eppley, 1986), it is difficult to define distinct boundaries of each layer within the water column. However, every depth in the water column is unique due to light intensity, amount of nutrients, and temperature (Eppley, 1986). The unique layers of the water column create diverse habitats within the SCB. More than five hundred species of fish and 1,500 species of invertebrates exist within the SCB (The Southern California Coastal Water Research Project Authority, 2008). The SCB is also a major migration route for marine bird and mammal populations. Islands, offshore exposed rocks and relatively productive waters serve as isolated breeding grounds and host migrating species (Beers, 1986).

The base of this food web is phytoplankton. Phytoplankton is adapted to continual water motion and supports grazing zooplankton and fish, while the decay of phytoplankton supports marine bacteria (Hardy, 1993). For benthic animals (animals living at the lowest levels of the ocean), plankton and other small particles form their food source. Like phytoplankton, bacterioplankton and benthic animals also play an essential role in the food chain (Geesey, 1993), with many fish and invertebrates being benthic feeders at some stage in their lifecycle (Beers, 1986). Furthermore, both bacterioplankton and benthic animals play an additional role as a carbon sink. As a function of their role as terminal processors of detritus in the food chain and degrading organic and non-organic materials these organisms store carbon (Ducklow, 1986; Geesey, 1993).

Santa Clara and Ventura River Plumes into the Santa Barbara Channel after a large storm event in 2005. Source: The Scripps Photobiology Group.

The nutrients to support these organisms often arrive in the form of sediment discharged into the ocean. Species that utilize suspended sediments usually occur in near shore environments where their food supply is abundant (Beers, 1986). Stormwater runoff brings contaminated sediment to this environment, endangering these biological communities. Within the Bight, sediment contamination has been shown to have both acute and chronic effects and has been statistically linked to changes in the benthic community (Schiff, 2000).

THE VENTURA RIVER WATERSHED

The Ventura River Watershed discharges into the Santa Barbara Channel, located within the northern portion Southern California Bight. Dominated by forest, chaparral and coastal sage scrub, the Ventura River Watershed is the least developed in the SCB region. Compared to more southern watersheds, the Ventura River has relatively less hydrological controls in terms of major dams or flood control channels and the watershed experiences a higher rate of rainfall within the region (Nezlin, 2005).

The Transverse Ranges, which cross the northern part of the Ventura River Watershed, are comprised of steep and weak rock, which results in the highest rates of erosion within the Bight (Mertes, 1998). Erosion rates are further increased by the periodic fire regime that reduces vegetation and exposes soils that are then further prone to erosion. The high erosion and rainfall rates results in large volumes of sediment discharge into the ocean from the Ventura River following rain events. Though mitigated by the presence of estuaries and coastal marshes at the mouth of the watershed, once past the coastal marshes, the sediment is transported to beaches and into the ocean basin (Mertes, 1998).

When winter rains bring river freshwater to the sea, the freshwater floats above the saline water, forming a plume. The plume is comprised of freshwater, sediment and pollution. The shape and extent of the plume is influenced by local winds, river flow and currents. Phytoplankton blooms occur naturally in the Santa Barbara Channel each spring when plumes bring increased nutrient levels into the channel (National Oceanic and Atmospheric Administration). Sediment plumes and phytoplankton blooms are part of the physical and biological processes of the channel, and can have a major effect on marine life (National Oceanic and Atmospheric Administration, 2008).

Arriving through river plumes, pollutants generated along the Southern California coast are carried through the Channel and result in largely unquantified impacts to the region's valuable resources. All marine plant forms obtain their nutrients from the waters surrounding their habitats (Eppley, 1986). It has been hypothesized that the small eddies which often exist near shore along the coast of the Santa Barbara Channel are important transport mechanisms for moving water-borne materials such as nutrients and larvae to near shore habitats (Beckenbach, 2004). While it is speculated that these eddies are an important transport mechanism for nutrients and biogenic particles to ecosystems of the Southern California Bight (Beckenbach, 2004), this author further speculates that if nutrient can be distributed this way, then contaminants can also be distributed via this mechanism.

Plume mapping indicates that river sediment undergoes an initial rapid settling within

approximately one kilometer of the river mouth, followed by slower rates of settling (Warrick, 2004). Plumes can persist for multiple days, moving quickly away from river mouths and, responding to winds, can spread offshore for ten's of kilometers (Warrick, 2007). In addition, since alongshore movement of plumes can be more prevalent than across-shore movements (Warrick, 2007), the impacts of the pollutant and bacteria composition of dispersing river plumes can potentially affect neighboring kelp forests located along the coast of the Santa Barbara Channel.

URBAN RUNOFF

Urban runoff is surface water flow from urban landscapes which is channeled into storm drains that lead to rivers and streams and eventually the ocean. Formed during wet weather by rainfall or during dry weather from outdoor water uses, runoff collects pollutants as it flows. These pollutants most often enter freshwater bodies, estuaries, and the marine environment untreated, impacting water quality and the related ecosystems that depend on clean water sources.

Urban runoff from impervious surfaces is a major component of nonpoint source pollution (U.S. EPA, 1996). Urban runoff carries excess nutrients, including nitrogen and phosphorous, as well as other pollutants such as trash, sediments, oil, metals, bacteria, and pesticides (Hseih, 2007). Nutrients and sediment are usually the leading pollutants of impaired surface waters and groundwater in the United States (U.S. EPA, 1998). Excess amounts of nitrogen and phosphorous change the nature and types of plants and animals that can exist in a water body, which in turn affect temperature and lead to eutrophication (oxygen depletion). Additionally, excess nitrates can become toxic to warm-blooded animals and may also increase risks of cancer. Lastly, nitrates end up in rivers and streams more quickly than other contaminants, because they dissolve in water more readily and are not absorbed on soil particles (Hseih, 2007).

When areas are urbanized, much of the vegetation and topsoil is replaced by impervious surfaces such as roads, parking lots, and pavement. These impermeable surfaces prevent water from soaking into the ground and speed the flow of urban runoff. The rapid flow of surface water reduces the amount of water available for percolation and groundwater recharge thereby contributing to the lowering of the water table. In addition, impermeable surfaces speed the flow of water. This rapid flow away from urban areas can result in flooding, since the rivers and streams that collect the runoff were not "designed by nature" to handle such large amounts of runoff (USGS, 2008).

THE ROLE OF LANDSCAPE ARCHITECTURE

As a profession that designs, plans and manages land, landscape architects play a key role in integrating the needs of people and the environment. With increasing development that often endangers environmental resources, it is inevitable that applying design techniques which utilize environmental solutions is an integral part of the practice of landscape architecture (Tunney, 2001).

Low Impact Development (LID) is a new, comprehensive land planning and engineering design approach available to landscape architects, as well as planners, architects and designers. Developed through a Cooperative Assistance Agreement under the US EPA Office of Water 104b(3) Program, and supported by the California Coastal Commission, the goal of LID is to maintain and enhance the pre-development hydrologic regime of urban and developing watersheds (lowimpactdevelopment.org). Using natural vegetation and small-scale treatment techniques, LID techniques can manage water and water pollutants at the source, thereby preventing or reducing the impact of land development on rivers, streams, lakes, coastal waters, and ground water (EPA, 2007). Since runoff can carry pollutants directly to the marine environment and impairs water bodies en route, treating runoff close to its source creates the opportunity to lessen pollutants before they can impair water bodies and related ecosystems.

Preserving natural vegetation and natural drainage patterns are basic tools landscape architects may use to in order to achieve the goals of LID. In addition, incorporating landscape features that infiltrate, filter, store, evaporate, and detain runoff close to its source can reduce the negative impacts of urban runoff. The non-profit organization, Low Impact Development Center, along with the US EPA, have outlined six different categories of LID practices in order to achieve this goal. Utilizing open spaces, rooftops, streetscapes, parking lots, and median strips, these techniques can be applied by landscape architects to residential, commercial and industrial land use development as well as open space preservation. The following is a summary of the six recommended practices.

1. Conservation designs which preserve open space. Reducing the amount of impervious surface and using open space for infiltration and evaporation can reduce the volume of runoff. Minimizing site disturbances like the stripping of topsoil and compaction of subsoil that result from grading and equipment use can also reduce the amount of runoff. Examples of conservation designs that can be implemented by landscape architects include reduced pavement widths of streets and sidewalks, preserving open space, and shortening and sharing driveways.

2. Infiltration practices capture and infiltrate runoff close to its source. This practice can reduce both runoff and the infrastructure needed to convey runoff. Infiltration practices available to landscape architects include vegetated bioretention sites and permeable pavers.

3. Runoff storage practices capture and store runoff from impervious surfaces for later use or gradual infiltration. Runoff storage practices can reduce the volume of runoff discharged to surface waters and protect streams from the erosive forces of high flows. Stored water can be used later for irrigation. Landscape architects can use various means of storing water, including rain barrels and cisterns, as well as landscape islands and the void space beneath the paved areas of parking lots, streets, and sidewalks.

4. Runoff conveyance practices can be utilized during large storm events to slow flow velocities, lengthen the runoff time of concentration, and delay peak flows that are discharged off-site. LID conveyance practices utilize rough surfaces to slow runoff and to increase evaporation and the settling of solids. Typically permeable and vegetated, these practices can promote infiltration, filtration, and some biological uptake of pollutants while performing functions similar to those of conventional curbs, channels, and gutters. Practices that can be employed by landscape architects include eliminating curbs and gutters, utilizing grassed swales, roughening surfaces, creating long flow paths over landscaped areas, creating terraces, and installing smaller culverts, pipes, and inlets.

5. Filtration practices treat runoff by filtering it through media designed to capture pollutants. While filtration practices offer many of the same benefits as infiltration (runoff volume reduction, ground water recharge, reduced thermal impacts to receiving waters), filtration practices can also aid in pollutant removal. Pollutants are typically captured in the upper soil horizon and can be removed by replacing the topsoil. Examples of filtration practices include bioretention sites, vegetated swales, and vegetated filter strips and buffers.

6. Low impact landscaping practices focus on the selection and distribution of plants. Selecting species and preparing soils adapted to the microclimates of a site can reduce labor, water, and chemical inputs. Recommended low impact landscaping practices include planting native, drought-tolerant plants, converting turf areas to shrubs and trees, reforestation, and amending soil to restore infiltration capacity and chemical characteristics.

It is important to note that LID designs can usually incorporate more than one type of practice to provide treatment of runoff from a site. For example, landscape architects can incorporate a bioretention area, disconnected downspouts, curb removal, and vegetated swales in common areas to address runoff close to the source. Integrating multiple LID practices throughout a site is the basis of the LID design. (EPA 2007)

CONCLUSION

Urban runoff from impervious surfaces continues to be a major cause of degradation to freshwater bodies, estuaries, and the marine environment. By incorporating Low Impact Development practices, landscape architects can incorporate design solutions that treat urban runoff at its source which can aid in reducing impacts to water bodies and related ecosystems.

On a local scale, urban runoff contributes to the Ventura River plume waters which are transported to the Southern California Bight. Since the Ventura River plays an important role in delivering nutrients, pollutions, and pathogens (Warrick, 2007) to the marine environment, then the ecological implications of water quality discharged from the Ventura River is an important consideration for stewardship of the Ventura River.

REFERENCES

Allen, Edith B., and Abby G Sirulnik, Louise Egerton-Warburton, Sheila N. Kee, Andrzej Bytnrowicz, Pamela E. Padgett, Patrick J. Temple, Mark E. Fenn, Mark A. Poth, and Thomas Meixner. 2005. Air pollution and vegetation change in southern California coastal sage scrub: a comparison with chaparral and coniferous forest. http://www.treesearch.fs.fed.us/pubs/27020. Viewed online, June 26, 2008.

Beckenbach, Edwin. 2004. Links Between Coastal Circulation and Pollutant Dispersal in the Santa Barbara Channel. UC Marine Council Coastal Environmental Quality Initiative, 2004. http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1019&context=ucmarine/ceqi. (accessed February 18, 2008)

Beers, J.R. 1986. "Organisms and the Food Web." In *Plankton Dynamics of the Southern California Bight*, edited by Richard W. Eppley. New York: Springer-Verlag, 1986.

Bertrand-Krajewski, Jean-Luc, Ghassan Chebbo and Agnes Saget. 1998. "Distribution of Pollutant Mass vs. volume in Stormwater Discharges and the First Flush Phenomenon." *Water Research*, Volume 32, Issue 8. August 1998.

Ducklow, H.W., D.A. Purdie, P.J. Williams, and J.M. Davies. 1986. "Bacterioplankton: A Sink for Carbon in a Coastal Marine Plankton Community." *Science*, Vol. 232, Issue 4752. May 1986.

Eganhouse, Robert P. and M. Indira Venkatesan. 1993. "Chemical Oceanography and Geochemistry." In *Ecology of the Southern California Bight: A Synthesis and Interpretation*, edited by Murray D. Dailey, Donald J. Reish, and Jack W. Anderson. Berkeley and Los Angeles: University of California Press.

Eppley, Richard.W. and O. Holm-Hansen. 1986. "Primary Production in the Southern California Bight." In *Plankton Dynamics of the Southern California Bight*, edited by Richard W. Eppley. New York: Springer-Verlag.

Geesey, Gill. 1993. "Microbiology." In *Ecology of the Southern California Bight: A Synthesis and Interpretation*, edited by Murray D. Dailey, Donald J. Reish, and Jack W. Anderson. Berkeley and Los Angeles: University of California Press.

Hsieh, C. H., et. al., 2007. "Nitrogen Removal from Urban Stormwater Runoff Through Layered Bioretention Columns." *Water Environment Research* v. 79 no. 12 (November 2007) p. 2404.

Hardy, John T. 1993. "Phytoplankton." In *Ecology of the Southern California Bight: A Synthesis and Interpretation*, edited by Murray D. Dailey, Donald J. Reish, and Jack W. Anderson. Berkeley and Los Angeles: University of California Press.

Hogan, D. M., et. al. 2007. "Best Management Practices for Nutrient and Sediment Retention in Urban Stormwater Runoff." *Journal of Environmental Quality* v. 36 no. 2 (March/April 2007) p. 386-95.

Holligan, P. M. and Reiners, W. A. 1992. "Predicting the Responses of the Coastal Zone to Global Change." *Advances in Ecological Research*, 22.

Mertes, Leal A. K. Melodee Hickman, Ben Waltenberger, Amy L. Bortman, Ethan Inlander, Ceretha McKenzie and John Dvorsky. 1998. "Synoptic Views of Sediment Plumes and Coastal Geography of the Santa Barbara Channel, California." *Hydrological Processes*, Volume 12, Issue 6.

National Oceanic and Atmospheric Administration. Channel Islands National Marine Sanctuary. http://channelislands.noaa.gov/pcw2/pnbprep.html (accessed February 18, 2008).

Nezlin, Nikolay P., and Paul M. DiGiacomo, Eric D. Stein and Drew Ackerman. 2005. "Stormwater Runoff Plumes observed by SeaWiFS Radiometer in the Southern California Bight." *Remote Sensing of Environment*. Volume 98, Issue 4, Pages 494-510. 30 October 2005.

The Santa Barbara Coastal Long Term Ecological Research Project. Site Characteristics:Santa Barbara Coastal Ecosystem. Http://sbc.Iternet.edu/overview/sitechar.html. Accessed February 18, 2008).

Schiff, Kenneth. 2000. "Sediment Chemistry on the Mainland Shelf of the Southern California Bight." *Marine Pollution Bulletin*, Volume 40, Issue 3. March 2000.

The Southern California Coastal Water Research Project Authority. Bight'98 Fish Biomass Data. Httup://www.sccwrp.org/data/metadata/1998tfb.htm. Accessed February 3, 2008.

APPENDIX C
COASTAL CONSERVANCY
STAFF RECOMMENDATION
LOWER VENTURA RIVER PARKWAY PLANNING PROJECT
May 24, 2007
File No. 07-021
Project Manager: Bob Thiel

RECOMMENDED ACTION: Authorization to disburse up to $100,000 to the Trust for Public Land to carry out preliminary planning, stakeholder coordination and property analyses for development of a River Parkway program for the Lower Ventura River in the City of Ventura and portions of unincorporated Ventura County.

LOCATION: City of Ventura, County of Ventura (Exhibits 1, 2, and 3).

PROGRAM CATEGORY: Resource Enhancement

EXHIBITS

Exhibit 1: Regional Location Map

Exhibit 2: Ventura County watersheds map

Exhibit 3: Map of the Lower Ventura River

Exhibit 4: Letters of Support

RESOLUTION AND FINDINGS:

Staff recommends that the State Coastal Conservancy adopt the following resolution, pursuant to Sections 31251-31270 of the Public Resources Code:

"The State Coastal Conservancy hereby authorizes disbursement of an amount not to exceed one hundred thousand dollars ($100,000) to the Trust for Public Land to carry out preliminary planning, stakeholder coordination and property analyses in the development of a River Parkway program for the Lower Ventura River, subject to the condition that prior to the disbursement of any funds, the Trust for Public Land shall submit for the review and written approval of the Conservancy's Executive Officer a work program, budget, and schedule; and the names of any contractors to be employed in carrying out the work."

Staff further recommends that the Conservancy adopt the following findings:

LOWER VENTURA RIVER PARKWAY PLANNING PROJECT

"Based on the accompanying staff report and attached exhibits, the State Coastal Conservancy hereby finds that:

1. The proposed project is consistent with the purposes and criteria of Chapter 6 of Division 21 of the Public Resources Code (Sections 31251-31270) regarding enhancement of coastal resources.
2. The proposed project is consistent with the Project Selection Criteria and Guidelines adopted by the Conservancy on January 24, 2001.
3. The project area has been identified in the certified Local Coastal Program of Ventura County as requiring public action to resolve existing or potential resource protection problems.
4. The proposed project is undertaken at the request of the local jurisdiction, consistent with Public Resources Code Section 31251.2.
5. The Trust for Public Land is a nonprofit organization existing under Section 501(c)(3) of the U.S. Internal Revenue Code, and whose purposes are consistent with Division 21 of the California Public Resources Code."

PROJECT SUMMARY:

Staff recommends that the Conservancy authorize disbursing $100,000 to the Trust for Public Land (TPL) to create a conceptual plan and conduct preliminary property analyses that can be used in cooperation with public agencies and other stakeholders to develop and promote a River Parkway plan for the Lower Ventura River in Ventura County.

For a number of years, the Coastal Conservancy and several of its partners in Ventura County have worked to promote the creation of a river parkway program for the Ventura River--a comprehensive effort to acquire and restore a contiguous corridor of riparian habitat and open space along the 15 miles of the river from Matilija Dam and the City of Ojai to the estuary (See Exhibit 2). (The portion of the watershed above Matilija Dam is largely pristine, is part of the Los Padres National Forest, and has been considered outside the planning area for this river parkway program). For the purposes of the proposed project to be undertaken by TPL here, the section of the river termed the "Lower Ventura River' is defined as its lowest six miles: from the Foster Park area down through the estuary and Emma Wood State Beach (See Exhibit 3).

For the past two years, staff from the Trust for Public Land has undertaken a number of efforts in support of the River Parkway concept. TPL's efforts have included (a) holding one-on-one meetings with resource agencies and conservation organizations to assess protection needs; (b) organizing and holding stakeholder meetings and developing presentation materials about a river parkway concept; (c) attending meetings of natural resource agencies and other groups to promote increased protection of the river; and (d) consulting with others on mechanisms to develop and promote a river parkway program. The proposed project would complement the efforts of TPL, the Coastal Conservancy and their partners in the County by providing information that can be used to engage the community and assist key partners in developing a community-based River Parkway plan for the lower Ventura River. This project would consist of four main elements:

Develop a conceptual plan that promotes a vision for a Ventura River Parkway. TPL would create materials--such as a color brochure or booklet (of perhaps 5- 20 pages) with pictures, maps, sketches and text--that would offer a conceptual idea for a Ventura River Parkway stretching from the Matilija Dam and Ojai area in the north down through the estuary. These materials would serve an educational tool for engaging partners, the community, and potential funding agencies and donors. The brochure would be modeled after similar documents prepared to

illustrate conceptual visions of river parkway and other greenway efforts and would include examples of how other communities have worked to envision and protect such resources. The brochure could then form the basis for producing other materials--such as maps, posters or Power Point presentations--that could illustrate the basic concept of a river parkway for the Lower Ventura River.

2. Identify willing sellers of riparian parcels in the Lower River Parkway area. TPL staff would also perform a systematic analysis of landowner interest in participating in a river parkway program along the lower six miles of the river. TPL has already conducted some early feasibility analyses on seven particular landholdings, but its staff has noted that follow-up would be needed with those landowners as the concept of the parkway is developed further. In addition, other landowners need to be contacted and their willingness to participate assessed.

3. Assist in identifying priority properties and restoration projects. TPL staff would work with Coastal Conservancy and other partners to help create a prioritized list of potential targets for acquisition of fee title or conservation easements. Existing literature would be consulted to gather information regarding natural resources along the Lower Ventura River; it would then be combined with information on potential development projects collected from the City and County of Ventura to help identify threats and opportunities. Other information would be added as consultants to the Coastal Conservancy complete certain focused studies of the habitat value of floodplain acquisitions and the Watershed Protection District completes an assessment of portions of the Ventura River watershed with funding from a recent Proposition 50, Chapter 8 grant to the District under the Integrated Regional Water Management program.

4. Perform preliminary site assessment for a potential demonstration project. Under appropriate circumstances, TPL staff (working with its other partners on the River Parkway project) will conduct a preliminary analysis of a site that could become a demonstration protection or restoration project and thus help set the stage for subsequent projects on the lower river.

In each of these four efforts, TPL will consult with other partners and stakeholders in the Ventura River watershed, including the Ventura River Watershed Council. In particular, TPL will coordinate with local stakeholder groups and government agencies by interviewing key personnel and by participating in existing stakeholder meetings and processes.

The Trust for Public Land is a national 501(c)(3) organization whose mission is to "conserve land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for generations to come." As demonstrated by its successful completion of many projects with Coastal Conservancy funding, TPL has the requisite experience and expertise to execute and complete the proposed project along the Ventura River.

WATERSHED DESCRIPTION

The Ventura River watershed encompasses about 226 square miles and is roughly 31 miles long between its headwaters in upper Matilija canyon in Los Padres National Forest and the outfall into the Pacific. The mainstem of the river originates at the junction of North Fork Matilija Creek and Matilija Creek and flows about 15.6 miles to the ocean. Downstream the river's principal tributaries are San Antonio Creek, Willis Creek, Rice Creek, Coyote Creek and Cañada Larga.

The major issue within the watershed has been the dramatic decline of Southern California steelhead trout (Oncorhynchus mykiss), a federally listed endangered species. Until the late 1940's the river ran essentially unimpeded to the ocean, and 4,000 to 5,000 adult steelhead would migrate up the river each year to spawn and rear, creating within the Ventura River one of the largest steelhead runs in the state.

But in 1948, the Ventura County Flood Control District built the 198-foot high Matilija Dam on the Ventura River to control flooding and alleviate persistent water supply shortages that sup-posedly plagued the watershed since the 1920s. The dam-- located approximately 0.6 miles upstream of the junction of North Fork Matilija Creek and Matilija Creek--included no fish passage and thus cutoff access to more than half of the historic steelhead spawning grounds. In the next two decades, the Bureau of Reclamation built other dams and diversions along several of the main creeks that feed the Ventura River, further impeding the river's natural flow.

Although Matilija Dam was constructed with a design reservoir capacity of more than 7,000 acre feet, notching in 1965 and 1978 and massive sedimentation have reduced the reservoir's capacity to less than 500 acre feet. Over 6 million cubic yards of sediment are estimated to reside in the reservoir, and the reservoir is projected to fill in completely by 2020. Within the past decade, a concerted effort has been made to develop a coordinated engineering and funding strategy for removal of the dam. Removal of Matilija Dam would not only allow for fish passage to historic steelhead breeding waters in the upper watershed, and greatly enhance the opportunities for restored habitat for the other species of concern, but it would also restore natural sediment transport downstream to nourish the region's beaches.

Because much of the river corridor has retained its rural character, there are a number of relatively intact examples of riparian cottonwood, California black walnut, sycamore and oak woodlands, as well as chaparral, flood plain, and grassland habitats along the river. The diverse habitats of the river and its watershed include high numbers of plant and animal species. Habitats in and near the Ventura River area sustain some of the highest diversity of vertebrate species in Southern California; nearly 300 vertebrate species are known in the lower reaches of the Ventura River alone. At least 26 special status species inhabit or utilize the aquatic, riparian and wetland habitats in the watershed, including 13 listed species (endangered, threatened or fully protected) and 13 California species of special concern. In addition to steelhead, the listed species include tidewater goby, Least Bell's vireo, Southwestern willow flycatcher, California brown pelican, California least tern, peregrine falcon, Belding's savannah sparrow, ringtail, black-shouldered kite, western snowy plover, California red-legged frog and the California condor.

PROJECT HISTORY

For a number of years, the Coastal Conservancy and other state agencies have supported community efforts to enhance, protect and restore the Ventura River watershed. They include the Matilija Dam Evaluation Project and Matilija Dam Removal Feasibility Study; a grant to the Casitas Municipal Water District to fund the design and construction of a fish ladder at

the Robles Diversion on the mainstem; a $132,000 grant to the Ventura County Watershed Protection District to help fund Arundo removal on a five-acre parcel along the Ventura River near Casitas Springs; and a $100,000 grant to Santa Barbara Channelkeeper to conduct water quality monitoring and identify (and prepare conceptual plans for) habitat restoration opportunities in the Lower Ventura River watershed.

A $3.1 million grant from the Coastal Conservancy allowed the Ojai Valley Land Conservancy to acquire the 1,556-acre Fairmont Ranch along the River, a site now known as the OVLC's Ventura River Preserve. In 2004, a $450,000 grant from the Coastal Conservancy helped the OVLC acquire 14 acres in fee and a conservation easement of 16 acres for the OVLC's Confluence Property on the Ventura River at the mouth of San Antonio Creek. The property includes almost one-half mile of the Ventura River and San Antonio Creek, as well as a mature riparian, cottonwood, and sycamore forest.

In July 2005, the governing board of the Southern California Wetlands Recovery Project approved adding to its work plan a programmatic project for the Ventura River Parkway. Patterned after the Conservancy's river parkway program for the Santa Clara River in Ventura County, the program involves a multi-phased effort to acquire and restore a series of key riparian parcels along the Ventura River with the goal of creating a contiguous corridor of habitat and recreational open space along the river from Ojai to the estuary. The goal of this program--to be implemented in partnership with a number of other agencies and organizations--is to create a comprehensive river parkway along the lower 15 miles of the river. Because of the regional importance of the Ventura River corridor, a comprehensive river parkway program would help restore habitat linkages and connectivity, reconnect creek and river corridors to their floodplains, restore riparian and aquatic habitat, remove invasive species, and stabilize streambanks through environmentally-sensitive measures

The project to be implemented with the funds being requested here would complement the Conservancy's other efforts in the Ventura River watershed. The project would also assist other efforts now underway in the watershed, including the work of the community-based Ventura River Watershed Council, which formed in May 2006 and has since served as the mechanism for helping establish objectives and prioritizing projects in that watershed for the County's Integrated Regional Water Management Planning (IRWMP) effort.

PROJECT FINANCING:

Coastal Conservancy $100,000
Trust for Public Land $100,000
Total Project Cost $200,000

The anticipated source of funds for this project is an appropriation to the Conservancy from Proposition 50: the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002. Proposition 50 authorizes the use of such funds to protect coastal watersheds through projects that restore land and water resources. Funds may be used for planning and permitting associated with restoration, as well as restoration activities (Water Code §79570). The proposed project will accomplish those objectives by identifying restoration needs and opportunities along the Lower Ventura River and its tributaries and developing conceptual restoration plans that will allow for the restoration of coastal watersheds and associated wetlands located in the Ventura River watershed. As required by Proposition 50, the proposed project is consistent with local and regional plans, including the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, which identifies the Ventura River as an impaired water body and mandates the protection of beneficial resources in the region's coastal watersheds.

CONSISTENCY WITH CONSERVANCY'S ENABLING LEGISLATION:

The proposed project would be undertaken pursuant to Chapter 6 of the Conservancy's enabling legislation, Division 21 of the Public Resources Code (Sections 31251-31270), regarding enhancement of coastal resources.

Under §31251, the Conservancy may award grants for the purpose of enhancement of coastal resources that, because of natural or human-induced events, or incompatible land uses, have suffered loss of natural and scenic values. Consistent with this section, the proposed project would lead to improvements in the quality and availability of degraded habitat in the lower Ventura River watershed by identifying habitat restoration opportunities and by the preparation of conceptual plans for protection and restoration along the river and its tributaries.

The proposed authorization is consistent with §31252, because the certified Local Coastal Program of the City of Ventura, as described in the "Consistency with Local Coastal Program Policies" section below, identifies the lower Ventura River and its riparian resources as in need of enhancement and restoration.

The proposed authorization is consistent with §31253, which states that the Conservancy may provide up to the total cost of any coastal resource enhancement project. In the present instance the Conservancy's contribution would represent about 50 percent of the funds needed to carry out the project. As a private, nonprofit organization qualified under Section 501(c)(3) of the Internal Revenue Code and whose purposes are consistent with Division 21 of the Public Resources Code, the Trust for Public Land is qualified to receive a grant from the Conservancy.

Under §31251.2, the Conservancy may undertake a project affecting an area partly outside the coastal zone if the local public agency having jurisdiction over the project area requests the Conservancy's assistance. The City of Ventura as the local public agency has requested and supports the Conservancy's assistance on this project (See Exhibit 4: Letters of Support).

The proposed authorization is also consistent with §31111, which authorizes the Conservancy to award grants to nonprofit organizations to undertake plans and feasibility studies that will implement Division 21.

CONSISTENCY WITH CONSERVANCY'S STRATEGIC PLAN GOALS & OBJECTIVES:

Consistent with Goal 2, Objective A, the proposed project would help develop a priority project to protect open space in coordination with other state and local agencies and non-profit partners

Consistent with Goal 5, Objective A, the proposed project will help protect, restore and enhance biological diversity in coastal areas by identifying threats to coastal areas for resource protection and enhancement, providing information that can be used to develop and implement resource enhancement plans for sections of the Lower Ventura River and its tributaries, and developing local capacity to plan and implement resource enhancement projects.
Consistent with Goal 5, Objective B, the proposed project will help protect, restore and enhance biological diversity in coastal areas by helping to identify potential acquisitions needed to create corridors from coastal habitats to inland habitat areas.
Consistent with Goal 6, Objective A, the proposed project will assist in developing plans and projects to preserve and restore coastal watersheds and create river parkways by promoting public outreach and community involvement.
Consistent with Goal 7, Objective B, the project will foster the long-term viability of coastal agriculture by helping identify the potential acquisition of buffer strips along sensitive habitat and watercourses.
The Ventura River Watershed is specifically cited in the Coastal Conservancy's Strategic Plan (2003, at page 55) as a locus for Goals 5 (Coast/Ocean Habitat) and 6 (Wetlands, Rivers & Watersheds) of the Plan.

CONSISTENCY WITH CONSERVANCY'S PROJECT SELECTION CRITERIA & GUIDELINES:

The proposed project is consistent with the Conservancy's Project Selection Criteria and Guidelines, adopted on January 24, 2001:
Required Criteria
1. Promotion of the Conservancy's statutory programs and purposes: See the "Consistency with Conservancy's Enabling Legislation" section above.
2. Consistency with purposes of the funding source: See the "Project Financing" section above.
3. Support of the public: The proposed project is supported by Assemblymember Pedro Nava First District County Supervisor Steve Bennett, and the City of Ventura, as well as by several local community-based organizations, including the Ventura River Watershed Council and the Ojai Valley Land Conservancy.
4. Location: The Ventura River is a critical coastal watershed in southern California and enhancement of habitat, water quality and other natural resources in the watershed is essential to the restoration and enhancement of significant coastal resources in the state, including riparian and watershed resources.
5. Need: At this time, TPL's continued outreach efforts for a river parkway program cannot continue without Conservancy participation, because TPL must secure significant external funding if the project is to proceed. The planning analysis in this proposed project is needed to support efforts to protect and enhance the floodplain of the lower river.
6. Greater-than-local interest: Protection and restoration of the Ventura River is a regional priority because the river provides habitat and species linkages of regional and statewide significance. The river is critical to steelhead recovery in Southern California, and the Coastal Conservancy has dedicated substantial funds and staff time to various projects along the river. Restoration and enhancement of riparian habitat will be critical to efforts to promote the health of native coastal resources and to restore native steelhead trout runs in the Ventura River and its tributaries.

Additional Criteria
7. Urgency: The proposed grant will significantly aid current efforts to protect natural resources at risk from various encroachments and development threats. In addition, identification of acquisition and restoration opportunities for riparian habitat is critical to efforts aimed at restoring native steelhead trout runs.
8. Resolution of more than one issue: The project will address coastal resource protection, habitat restoration and species protection, water quality and watershed resource protection, and public education.
9. Leverage: See the "Project Financing" section above. TPL has committed substantial internal funds as a match for a Conservancy grant.
10. Readiness: By its implementation and completion of other projects funded by the Coastal Conservancy TPL has demonstrated its ability to start and finish this project in a timely manner.
11. Realization of prior Conservancy goals: As noted in the "Project History" section above, the Conservancy has funded a number of acquisition and restoration projects in the Ventura River to help promote watershed restoration and achieve steelhead recovery in the River. Implementation of this project will advance previous Conservancy projects by helping to identify other restoration opportunities as well.
12. Cooperation: The project would represent a significant level of cooperation among TPL, private landowners, and other stakeholders in the Ventura River watershed, including the Ojai Valley Land Conservancy, City of Ventura, Ventura County Watershed Protection District, Ventura River Watershed Council, and the Ventura Hillsides Conservancy.

CONSISTENCY WITH LOCAL COASTAL PROGRAM POLICIES:

The proposed project is consistent with the policy goals of the certified Local Coastal Program (LCP) of the City of San Buenaventura (the City of Ventura), as amended in 1990. The City's LCP includes policies which stress protection of the natural attributes and wildlife of the Ventura River (3.1), protection of sensitive wetland, riparian, and oak woodland habitat areas (e.g., policies 12.1, 12.4 and 12.6), preservation of the Ventura River in its existing semi-natural state and restoration to natural conditions (Policy 13.1), and cooperation with the Coastal Conservancy to protect and enhance the Ventura River estuary (policy 15.8).
The project would also help promote several major regional goals and Ventura County objectives in the Regional Strategy of the Southern California Wetlands Recovery Project. The project would promote at least four of the six Regional Goals of the Wetlands Recovery Project: restoring stream corridors in coastal watersheds, recovering native habitat and species diversity; integrating wetlands recovery with other public objectives; and promoting education related

to coastal watersheds. The project also would help a key County's key objective in the Regional Strategy: preserving the existing floodplain of the Ventura River and reconnecting the river to its floodplain where feasible.

COMPLIANCE WITH CEQA:

The proposed project is statutorily exempt from the provisions of the California Environmental Quality Act (CEQA) under 14 Cal. Code of Regulations Section 15262 because it involves only feasibility or planning studies for possible future actions that the Conservancy has not yet approved, adopted or funded. The project is also categorically exempt from CEQA under 14 Cal. Code of Regulations Section 15306 to the extent that it will consist of basic data collection, information gathering and resource evaluation activities which will not result in a serious or major disturbance to an environmental resource. Staff will file a Notice of Exemption upon Conservancy approval of the project.

REFERENCES

Abrams, Jim. 2007. House votes to override water bill veto. *Washington Post*, November 7.

Adzani, Aditya. 2005. Where the river came last. *Landscape Architecture*, February.

Allen, Edith B., and Abby G Sirulnik, Louise Egerton-Warburton, Sheila N. Kee, Andrzej Bytnerowicz, Pamela E. Padgett, Patrick J. Temple, Mark E. Fenn, Mark A. Poth, and Thomas Meixner. 2005. Air pollution and vegetation change in Southern California coastal sage scrub: A comparison with chaparral and coniferous forest. http://www.treesearch.fs.fed.us/pubs/27020.

Alvarez, Fred. 2004. It's packing time for riverbed's dwellers. *Los Angeles Times*, December 1.

American Society of Landscape Architects, Lady Bird Johnson Wildflower Center, United States Botanic Garden. 2007. Preliminary report on the standards and guidelines for sustainable Sites. November 1, 2007. http://www.sustainablesites.org/SustainableSitesInitiative_PreliminaryReport_110107.pdf.

———2008. Guidelines and performance benchmarks draft 2008. SustainableSites Initiative. http://www.sustainablesites.org/report/.

Appleton, Jay. 1975. *The Experience of Landscape*. London: John Wiley.

Aquatic Bioassay and Consulting Laboratories. 2006. Ventura County storm water monitoring program, Ventura River Watershed, 2005 bioassessment monitoring report. Submitted to: The County of Ventura, Watershed Protection District.

Arthur E. L., P.J. Rice, P.J. Rice, T.A. Anderson, S.M. Baladi, K.L.D. Henderson, and J.R. Coats. 2005. Phytoremediation – An Overview. *Critical Reviews in Plant Sciences*, 24: 109-122.

Baiocchi, Bob. 1998. California Sports Fishing Alliance. http://users.rcn.com/ccate/VenturaMar98.html.

Bakker, Elna S. 1971. *An Island Called California: An ecological introduction to its natural communities, 2nd ed.* Berkeley: University of California Press.

Bittman, Roxanne. 2003. Measures of biodiversity: Richness, rarity, and endemism. *Atlas of the Biodiversity of California*, California Department of Fish and Game.

Bunn, David, A. Mummert, M. Hoshovsky, K. Gilardi, and S. Shanks. 2007. California Wildlife: Conservation Challenges. California's Wildlife Action Plan. Prepared by the UC Davis Wildlife Health Center for California Department of Fish and Game. http://www.dfg.ca.gov/wildlife/WAP/docs/report/full-report.pdf.

Bornstein, Carol and David Fross, Bart O'Brien. 2005. *California Native Plants for the Garden*. California: Cachuma Press.

Brooks Institute. 2008. Materials on display, viewed during visit to Brooks Institute, April 29, 2008.

Busby, P. J., T. C. Wainwright & G. J. Bryant. 1996. *Status review of west coast steelhead trout from Washington, Idaho, Oregon, and California*. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-NWFSC-27.

Cairney, T. and Hobson, D.M. 1998**.** *Contaminated land: problems and solutions.* 2nd ed. London: E & FN Spon.

California Academy of Sciences. 2008. Hotspot: California on the edge. http://www.calacademy.org/exhibits/california_hotspot/overview.htm.

California Coastal Conservancy. 2006. The Santa Clara River Parkway project. http://www.santaclarariverparkway.org/parkwayplanning.

———2006. The Santa Clara River. http://www.santaclarariverparkway.org/theriver.

———2007. Staff recommendation: Lower Ventura River Parkway planning project. May 24, File No. 07-021.

California Coastal Sediment Management Workgroup (CCSMW). 2006. California coastal sediments master plan status report: Draft for public review and comment. http://www.dbw.ca.gov/CSMW/PDF/SMPSR_status_report.pdf.

California Department of Conservation. 2006. Farmland mapping and monitoring program. http://redirect.conservation.ca.gov/DLRP/fmmp/county_info_results.asp.

———2006. Farmland conservation report. Farmland Mapping and Monitoring Program. http://redirect.conservation.ca.gov/DLRP/fmmp/county_info_results.asp.

California Department of Employment Development. 2007. Industry employment data search tool. http://www.labormarketinfo.edd.ca.gov/?pageid=1014.

California Department of Fish and Game. 1994. Amphibian and reptile species of special concern in California, California Red-legged Frog. http://www.dfg.ca.gov/habcon/cgi-bin/read_one.asp?specy=amphibians&tidNum=66.

California Department of Water Resources. 2003**.** *California's groundwater.* Sacramento, Calif. : Department of Water Resources.

California Environmental Resources Evaluation System (CERES). 1997. The Ventura River. http://ceres.ca.gov/wetlands/geo_info/so_cal/ventura_river.html.

California Postsecondary Education Commission. 2007. Public higher education performance accountability framework report. June 5-6. http://www.cpec.ca.gov/Agendas/Agenda0706/

Item_12.pdf.

California Regional Water Quality Control Board, Los Angeles Region. 2003**.** Fact Sheet. Order No. R4-2003-0087. Waste Discharge Requirements for Ojai Valley Sanitary District (Ojai Valley Wastewater Treatment Plant).

———. 2006. Cwa Section 303(D) List Of Water Quality Limited Segments Requiring Tmdls. http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/r4_06_303d_reqtmdls.pdf.

California Resources Agency. 2006. Secretary for Resources Mike Chrisman Announces $38 Million for California's River Parkways. Press Release. June 30.

———2007. Secretary for Resources Mike Chrisman to Announce $32.7 Million for California's River Parkways. Press Release. June 27.

———2008. Secretary for Resources Mike Chrisman Announces Funding for California's River Parkways. Press Release. June 23.

California State Polytechnic University, San Luis Obisbo. 2006. Avenue to the Future: Westside and North Avenue Draft Background Report. Community Planning Laboratory, Academic Year 2006-2007. City and Regional Planning Department. December. http://venturacorporategames.org/files/community_development/planning/planning_communities/resources/westside/slo_bg_report.pdf.

California Watershed Council. 2003. California agency watershed management strategic plan. Appendix B to Inaugural California Watershed Council Meeting, August 18, 2003. http://cwp.resources.ca.gov/docs/WatershedStrategicPlan.pdf.

CalTrans. 2007. 2007 Traffic volumes on the California state highway system. State of California Business, Transportation and Housing Agency Department Of Transportation, Division Of Traffic Operations. http://traffic-counts.dot.ca.gov.

Caltrout.org, 2008. http://www.caltrout.org/pages/regions/South_Coast/Matilija_Dam.asp.

Campbell, C. and Ogden, M. 1999**.** *Constructed Wetlands in the Sustainable Landscape*. New York: John Wiley.

Capelli, Mark H. 1991. Recreational impacts on coastal habitats: Ventura County Fairgrounds, California. Presented at the Seventh Symposium on Coastal and Ocean Management, Long Beach, CA.

———1997. Ventura River steelhead trout survey. Prepared for California Department of Fish and Game.

Carr S., M. Francis, L. Rivlin, and A. Stone. 1992. *Public Space*. New York: Cambridge University Press.

Casterline, M. et al. 2003. Group project brief: wildlife corridor design and implementation in southern Ventura County, California. Donald Bren School of Environmental Science & Management. http://www.bren.ucsb.edu.

Center for Plant Conservation, 2008. National collection plant profile. *Astragalus pycnostachyus var. lanosissimus*. http://www.centerforplantconservation.org.

Chang, Grace C. and Andrew H. Barnard, Scott McLean, Peter J. Egli, Casey Moore, J. Ron V. Zaneveld, Tommy D. Dickey, Al Hanson. 2006. In situ optical variability and relationships in the Santa Barbara Channel: Implications for Remote Sensing. http://www.opl.ucsb.edu/tommy/pubs/ChangAppOpt2006.pdf.

Channel Islands Regional Geographic Information System (CIRGIS). 2004. 0.3 meter resolution seamless color orthoimagery for Ventura, Oxnard, Matilija and Ojai areas. MrSID format.

Chavez, Deborah J. 1993. *Visitor perceptions of crowding and discrimination at two national forests in southern California*. United States Department of Agriculture, Forest Service.

Chen, Y., Deines, M., Fleishmann, H., Reed, S., Swick, I. 2007. *Transforming urban environments for a post-peak oil future. A vision plan for the City of Ventura*. The 606 Studio, California State Polytechnic University, Pomona.

Chow, V. T., editor. 1964. *Handbook of Applied Hydrology*. New York: McGraw-Hill.

City of Ventura. 1994. *Ventura River Estuary enhancement and management final plan*. California Department of Parks and Recreation and California State Coastal Conservancy.

———1994. Ventura River trail, Ventura County, California biological assessment. Department of Public Works.

———2002. Shaping our community's future: Revitalizing the Westside. January 8. http://venturacorporategames.org/files/community_development/planning/planning_communities/resources/westside/Westside_Revitalization_Plan.pdf.

———2005**.** *Economic Development Strategy 2005-2010*. Adopted April 25. http://www.cityofventura.net/sites/www.cityofventura.net/files/community_development/EDStrategy_042505.pdf

———2005. 2005 Ventura General Plan. http://www.cityofventura.net/vision/general_plan.

———2005. *Urban Water Management Plan*. Department of Public Works. July.

———2005. Economic developmentsStrategy 2005-2010. http://www.cityofventura.net/sites/www.cityofventura.net/files/community_development/EDStrategy_042505.pdf.

———2007. 2007 Historic resources survey update: Downtown specific plan area for the City of Ventura. http://venturacorporategames.org/files/community_development/planning/planning_communities/resources/dhrs_survey_report.pdf.

———2008a. Market profile: Labor. http://www.cityofventura.net/market_profile/labor_force.

———2008b. Market profile: Employers. http://www.cityofventura.net/market_profile/employers.

———2008c. Historic sites. Sites.http://www.

ci.ventura.ca.us/depts/arts_culture/historic_sites/index.asp.

———2009. *City manager blog: economic summit*. http://www.cityofventura.net/cmblog/2009/04/ventura-economic-summit.htm.

Coffman, Gretchen. 2007. *Factors influencing invasion of giant reed (Arundo donax) in riparian ecosystems of Mediterranean-type climate regions*. PhD dissertation, University of California, Los Angeles.

Collins, Michael. 2007. Matilija Dam removal OK'd. *Ventura County Star*. September 25. http://www.venturacountystar.com/news/2007/sep/25/matilija-dam-removal-okd/.

Communication Partnership for Science and the Sea (COMPASS). 2006. http://www.compassonline.org.

Conrad-Saydah, Ashley, Dakota Corey and Erin Myers. 2008. *Conservation planning to minimize flood liability in Ventura County, California*. ESM 270.

Conservation International. 2008. Biodiversity hotspots. http://www.biodiversityhotspots.org/Pages/default.aspx.

Conyngham, J., J.C. Fischenich, and K.D. White, 2006. *Ecological and engineering aspects of dam removal— An overview*. EMRRP Technical Notes Collection (ERDCTN-EMRRP-SR-80), Vicksburg, MS: U.S. Army Engineer Research and Development Center. http://el.erdc.usace.army.mil/emrrp.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm (Version 04DEC1998).

Cruden, D.M. 1991. A simple definition of a landslide. *Bulletin of the International Association of Engineering Geology* 43: 27-29.

Dailey, Murray D., Donald J. Reish, and Jack W. Anderson, eds. 1993. *Ecology of the Southern California Bight: A Synthesis and Interpretation*. Berkeley, California: University of California Press.

Daily, Gretchen C. and Susan Alexander, Paul R. Ehrlich, Larry Goulder, Jane Lubchenco, Pamela A. Matson, Harold A. Mooney, Sandra Postel, Stephen H. Schneider, David Tilman, George M. Woodwell. 2008. Ecoystem services: Benefits supplied to human societies by natural ecosystems." http://www.ecology.org/biod/value/EcosystemServices.html#summary.

Daly, H. and Farley, J. 2004. *Ecological Economics. Principles and Applications*. Washington: Island Press.

Davis, F. W., D. M. Stoms, A. D. Hollander, K. A. Thomas, P. A. Stine, D. Odion, M. I. Borchert, J. H. Thorne, M. V. Gray, R. E. Walker, K. Warner, and J. Graae. 1998. *The California gap analysis project-final report*. University of California, Santa Barbara, CA. http://www.biogeog.ucsb.edu/projects/gap/gap_rep.html.

Dennison, M. 1998**.** *Brownfields Redevelopment. Programs and Strategies for Rehabilitating Contaminated Real Estate*. Rockville, MD: Government Institutes.

Dwyer, John F. 1992. Outdoor recreation participation: Blacks, whites, hispanics and asians in Illinois. Paper presented at the United States Department of Agriculture Forest Service, Proceedings of the Symposium on Social Aspects and Recreation Research, February 19-22 in Ontario, California.

Ecological Society of America. 2008. Ecosystem services fact sheet. http://www.esa.org/ecoservices/comm/body.comm.fact.ecos.html.

Elliott, Marta and Lauren J. Krivo. 1991. Structural determinants of homelessness in the United States. *Social Problems* 38: 113-131.

Elmore, Bill. 2001. Testimony on Drinking Water Infrastructure Needs before the Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure, U.S. House of Representatives. March 28, 2001. http://www.win-water.org/legislativecenter/elmore3_28_01.shtml.

Engel, Jonna D. and Angela Lortie. 2008. *Pierpont Beach sand management plan*. City of Ventura.

Federal Emergency Management Agency (FEMA). 2005. Preliminary flood insurance ratea map - Ventura County, California and unincorporated areas. September 16.

Federal Council for Science and Technology Ad Hoc Panel on Hydrology. 1962. Scientific hydrology. Washington D. C. Federal Emergency Management Agency. 2005. Preliminary Flood Insurance Rate Maps -Ventura County, California and Unincorporated Areas.

Ferren Jr, W. R., M. H. Capelli, A. Parikh, D L. Magney, K. Clark, J. R. Haller. 1990. *Botanical resources at Emma Wood State Beach and the Ventura River Estuary, California: inventory and management*. Report to the State of California prepared by Herbarium of the University of California, Santa Barbara.

Food and Agriculture Organization of the United Nations. 2008. Biological diversity in food and agriculture." http://www.fao.org/biodiversity.

Forman, Richard. 1995. *Land Mosaics: The Ecology of Landscapes and Regions*. Cambridge, United Kingdom: Cambridge University Press.

Gallo, John, James Studarus, Elia Machado and Greg Helms. 2005. Regional conservation guide. Conception Coast Project: Goleta, CA.

Gies, Erica. 2006. *The health benefits of parks: How parks help keep Americans and their communities fit and healthy*. The Trust

for Public Land. http://www.tpl.org/tier2_cl.cfm?folder_id=725.

Gilliam, H. 1962. *Weather of the San Francisco Bay Region.* Berkeley, University of California Press.

Green, Nick. 1998. Man Hit, Killed by Train in Effort to Save His Dog. *Los Angeles Times.* May 12. http://articles.latimes.com/1998/may/12/local/me-48812.

The Greenvisions Plan for 21st Century Southern California. 2004. *The Greenvisions Plan for 21st Century Southern California.* http://www.greenvisionsplan.net/.

Greimann, Bruce. 2006**.** *Hydrology, Hydraulics, and Sediment Studies for the Matilija Dam Ecosystem Restoration Project, Ventura, CA - Draft Report.* U.S. Department of the Interior, Bureau of Reclamation Technical Service Center, Denver, Colorado.

Hadly, Scott. 2001. Construction of RV sites at Foster Park upsets neighbors." *Ventura County Star,* January 17.

Harnik, Peter. 2007. Nine Mile Rerun: In Pittsburgh, activists bring a biologically dead stream back to life. *Landscape Architecture* 97 (11): 62-71.

Hester, Randolph. 2006. *Design for Ecological Democracy.* Boston: MIT Press.

Hill, B.R. and C.E. McConaughy. 1988. *Sediment Loads in the Ventura River Watershed, Ventura County, California, 1969-1981.* US Geological Survey Water-Resources Investigations Report 88-4149.

Hitchcock, C.S., Lindvall, S.C., Helms, J.D., Randolph, C.E., Weaver, K.D., and Lettis, W.R. 2000. *Liquefaction hazard mapping, Ventura County, California: Final Technical Report.* U.S. Geological Survey, Award 99-HQ-GR-0117, 21.

Hitchcock, C.S., Lindvall, S.C., Helms, J.G., Randolph, C., Weaver, K., Lettis, W.R., Van Zuyle, and Kada, Lynne. 2001. *GIS application for liquefaction susceptibility mapping, Ventura County, California.* http://gis.esri.com/library/userconf/proc02/pap0535/p0535.htm.

Hong, Marjorie S., Walter F. Farmayan, Ira J. Dortch, and Chen Y. Chiang Hong, M., W. Farmayan, I. Dortch, C. Chiang, S. McMilland, and J. Schnoor. 2001. Phytoremediation of MTBE from a Groundwater Plume. *Environmental Sci.-ence Technology,* 35: 1231-1239.

Housing California. 2005. Expanding opportunity: New resources to meet california's housing needs. *Policy Link Report.* Winter. www.housingca.org.

———2009. Fixing the broken housing market in Ventura, California. www.housingca.org.

Hunt, Lawrence E. 1994. *Ventura River Trail, Ventura County, California Biological Assessment.* Prepared for the City of Ventura.

International Union for Conservation of Nature. 2004. *Species extinction. Species Survival Commission.* http://www.iucn.org/themes/ssc/red_list_2004/Extinction_media_brief_2004.pdf.

Jacobs, Jane. 1961. *The Life and Death of Great American Cities.* New York: Vintage Books.

Jenkin, Paul A. 2002. *Managed shoreline retreat and dam removal: ecosystem restoration to benefit coastal resources.* Surfrider Foundation, Ventura County Chapter. http://www.pages.sbcglobal.net/pjenkin/matilija/CWO02JenkinPaper.pdf.

Jensen, Deborah B., Margaret S. Torn and_ John Harte. 1993. *In Our Own Hands A Strategy for Conserving California's Biological Diversity.* Berkeley: University of California Press.

Keller, Edward A., and Mark H. Capelli. 1992. Ventura River flood of February 1992: A lesson Ignored? *Journal of the American Water Resources Association* 28 (5): 813–832.

LaGro, Jr., James. 2001. *Site Analysis: Linking Program and Concept in Land Planning and Design.* New York: John Wiley.

Lampara, Joe. 2008. Interview by doreen Morrissey and Michael Kelley. Ventura County Watershed Protection District. April 20.

Leopold, Luna B. 1974. *Water: A Primer.* San Francisco: W. H. Freeman.

Leydecker, Allen, PhD. and Leigh Ann Grabowsky. 2006. *Ventura Stream Team 2001-2005: A review of the findings of Santa Barbara Channelkeeper's Ventura Stream Team, January 2001 - January 2006.* Santa Barbara Channelkeeper. http://www.sbck.org.

Library of Congress. 2007. Environmental Justice Act of 2007. http://thomas.loc.gov/cgi-bin/query/z?c110:S.642.

Local Government Commission. 1991. Ahwahnee Principles for Resource-Efficient Communities. http://www.lgc.org/ahwahnee/principles.html.

———2005. The Ahwanee water principles for resource-efficient land use. http://www.lgc.org/ahwahnee/h2o_principles.html.

Lubin, Theresa. Ventura County Parks. Phone conversation with doreen Morrissey. September 30, 2008.

Luymes, Don T. and Ken Tamminga. 1995. Integrating public safety and use into planning urban greenways. *Landscape and Urban Planning,* 33: 391-400.

Lyle, John Tillman. 1999. *Design for human ecosystems: Landscape, land use, and natural resources.* Washington, D.C.: Island Press.

Lyons, Stephen. 2007. *Constructed wetlands: An overview of the full range of water treatment applications.* Unpublished Powerpoint Presentation, February 3, 2007.

Manning, R. E. 2007. *Parks and carrying capacity: commons without tragedy.* Washington: Island Press.

Mathews, D., Massman, J., and Strand, S. 2003. Influence of aquifer properties on groundwater remediation effectiveness. *Groundwater*. 41(1): 51-57.

McClatchy-Tribune Business News. 2009**.** BRIEF: $250,000 in stimulus funds for Matilija Dam demolition. April 30. Washington: Apr 30, http://www.venturacountystar.com/news/2007/sep/25/matilija-dam-removal-okd/.

McEwan, D. and Jackson, T. 1996. *Steelhead trout restoration and management plan for California*. California Department of Fish and Game. https://nrmsecure.dfg.ca.gov/FileHandler.ashx?DocumentID=3490.

McHarg, Ian. 1969. *Design with Nature*. Garden City, New York: Doubleday.

McKibben, B. 2007. *Deep Economy. The Wealth of Communities and the Durable Future*. New York: Times Books.

Meffe, G. 2000. *Nature and human society: The quest for a sustainable world*. National Research Council (NRC).

Merriam-Webster Online Dictionary, s.v. *"hydrology,"* http://www.merriam-webster.com/dictionary/hydrology.

Merrick, Tim. (nd). California floristic province. *Smithsonian Institution*. http://botany.si.edu/projects/cpd/na/na16.htm#references.

Miller, Bruce W. 1988. *Chumash: A Picture of Their World*. Los Osos, CA: Sand River Press.

Morris, Nina. 2003. *Health, well-being and open space: Literature review*. Edinburgh College of Art and Heriot-Watt University. July. http://www.openspace.eca.ac.uk/publications.htm.

M**urphy, Arnold L.**, ed. 1979. *A Comprehensive Story of Ventura County, California*. Oxnard, California: M & N Printing.

Museum of Ventura County. 2008. Exhibit materials on permanent display. City of Ventura.

Nasar, J. L. and K.M. Jones. 1997. Landscapes of fear and stress. *Environment and Behavior*, 29 (3): 291-323.

National Marine Fisheries Service, Southwest Regional Office. 2007. *2007 Federal Recovery Outline for the Distinct Population Segment of Southern Coast California Coast steelhead trout*. September 2007. National Marine Fisheries Service, Southwest Regional Office. http://swr.nmfs.noaa.gov/recovery/FINAL%202007%20Recovery%20Outline%20for%20the%20DPS%20of%20Southern%20CA%20Coast%20steelhead trout%20091407.pdf.

National Marine Fisheries Service (NMFS). 2005. Southern California steelhead trout ESU. Federal Register 70:52488-627 (September 2, 2005). http://www.nwr.noaa.gov/Publications/FR-Notices/2005/loader.cfm?csModule=security/getfile&pageid=33713.

National Oceanic Atmospheric Administration, **Channel Islands National Marine Sanctuary**. 2000. A recommended study area for the CINMS management planning process: Ecological linkages in the marine ecology from Point Sal to Point Mugu, including the Marine Sanctuary. http://channelislands.noaa.gov/manplan/documents.html.

National Oceanic and Atmopsheric Administration. Undated pamphlet. Pacific salmon and steelhead trout Recovery in California. National Marine Fisheries Service Southwest Region.

———Undated. Southern California steelhead trout ESU: Santa Maria River to Malibu Creek. *National Marine Fisheries Service Southwest Region*. http://swr.nmfs.noaa.gov/hcd/soCalHistoric.htm.

National Park Service. Undated. Juan Bautista de Ana national historical trail guide. http://www.solideas.com/DeAnza/TrailGuide.

Noonkester, A. G. (1979). Coastal marine fog in southern California. *Bulletin of the American Meteorological Society* 107 (7); 22.

Noss, Reed F. and Allen Y. Cooperrider. 1994. *Saving Nature's Legacy: Protecting and Restoring Biodiversity*. Washington, DC: Island Press.

O'Brien, Bill and Paul Glenn. 2010. Memorandum: Comments on the Draft Vision Plan for the Lower Ventura River Parkway. Hawkes & Associates, March 1, 2010.

Ornduff, Robert, Phyllis M. Faber and Todd Keeler-Wolf. 2003. *Introduction to California Plant Life*. Berkeley, California: University of California Press.

Percy, Richard G. 1976. E. P. Foster and the Foster family. In Kalvin, S. 2008. *Fragile Sands . . . Community for Conservation*. http://www.fragilesands.com/girdpercy.html.

Pickart, A.J. and J.O. Sawyer. 1998. *Ecology and Restoration of Northern California Coastal Dunes*. California Native Plant Society, Sacramento, CA.

Philips, Kathryn. 2000. *Ventura County: An overview of challenges and opportunities*. Report prepared for The Trust for Public Land.

Quinn, Ronald D. and Sterling C. Keeley. 2006. *Introduction to California Chaparral*. Berkeley and Los Angeles: University of California Press.

Ramanujam, Priti. 2006. *Prospect-refuge theory revisited: A search for safety In dynamic public spaces with a reference to design*. University of Texas at Arlington. http://repositories.tdl.org/tdl/handle/10106/67.

Rancho Santa Ana Botanic Garden. 2003. *Experimental introduction of the Ventura marsh milkvetch (Astragalus pycnostachyus var. Lanosissimus) at Carpinteria Salt Marsh Reserve and*

Mcgrath State Beach. San Diego, CA: South Coast Region Department of Fish and Game.

Remsen, J.V. Jr. 1978. Bird species of special concern in California, cooper's hawk. California Department of Fish and Game. http://www.dfg.ca.gov/habcon/cgi-bin/read_one.asp?specy=birds&tidNum=30.

Riley, Ann. 1998. *Restoring Streams in Cities: A Guide for Planners, Policymakers, and Citizens.* Washington, D.C.: Island Press.

Riley, Seth P. D. and Raymond M. Sauvajot, Todd K. Fuller, Eric C. York, Denise A. Kamradt, Cassity Bromley, Robert K. Wayne. 2003. Effects of urbanization and habitat fragmentation on bobcats and coyotes in southern California. *Conservation Biology, 17:2.*

Riser-Roberts, E. 1998**.** *Remediation of petroleum contaminated soils. biological, physical, and chemical processes.* Boca Raton: Lewis Publishers.

Rochlin, M. J. 1999. *Ancient L.A. and Other Essays.* Los Angeles: Unreinforced Masonry Studio.

Rossi, Robert , and Alesia Montgomery, Eds. 1994. *Educational Reforms and Students At Risk: A Review of the Current State of the Art.* United States Department of Education, Office of Educational Research and Improvement. http://www.ed.gov/pubs/EdReformStudies/EdReforms.

Ryan, Tom. 2005**.** Landscape Architects' Vision for San Jose River. *Landscape Architecture.* 95 (4): 13-16.

San Jose Redevelopment Agency. 2002. Guadalupe River Park master plan, 2002. San Jose, California: San Jose Redevelopment Agency.

Salter David. 2008**.** County of Ventura Environmental Health Division. Project Manager Leaking Underground Fuel Tank Program. Correspondence, October 9.

Schroeder, Herbert W. and L. M. Anderson. 1984. Perception of personal safety in urban recreation sites." *Journal of Leisure Research,* 16 (2); 178-94.

Scott, K. M. and R. P. Wouldiams. 1978. *Erosion and sediment yields in the transverse ranges, southern California.* Geological Survey Professional Paper 1030.

Simonds, J. O. 1997. *Landscape architecture: A manual of site planning and design.* New York: McGraw-Hill.

Singer, M. and Ploetz, A. 2002**.** *Old tools and new measures: Local government coordination of brownfields redevelopment for historic and cultural reuses.* Wash. D.C.: International City/County Management Association, Superfund/Brownfield Research Institute.

Sister, C., J. Wolch, J. Wilson, A. Linder, M. Seymour, J. Byrne, and J. Swift. 2007a. "Park and open space resources in the Green Visions Plan area." *The Green Visions Plan for 21st century southern California* 14. University of Southern California GIS Research Laboratory and Center for Sustainable Cities, Los Angeles, California. http://www.greenvisionsplan.net/html/publications.html.

Sister C., Wilson, J., and Wolch, J. 2007b. "Park congestion and strategies to increase park equity." *The Green Visions Plan for 21st century southern California* 15. University of Southern California GIS Research Laboratory and Center for Sustainable Cities, Los Angeles, California. http://www.greenvisionsplan.net/html/publications.html.

Sister C., Wilson, J., and Wolch, J. 2008. "Access to parks and park facilities in the Green Visions Plan region." *The Green Visions Plan for 21st century southern California* 17. University of Southern California GIS Research Laboratory and Center for Sustainable Cities, Los Angeles, California. http://www.greenvisionsplan.net/html/publications.html.

Snape, William J. and Oliver A. Houck. 1996. *Biodiversity and the Law.* Washington, DC: Island Press.

South Coast Wildlands. 2008. *South Coast Missing Linkages: A Wildland Network for the South Coast Ecoregion.* http://www.scwildlands.org/reports/SCMLRegionalReport.pdf.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. *California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California.* Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

———"Natural Landscape Blocks [CEHC ds621]." Biogeographic Information and Observation System (BIOS). Calif. Dept. of Fish and Game. http://bios.dfg.ca.gov.

———"Essential Connectivity Areas [CEHC ds623]." Biogeographic Information and Observation System (BIOS). Calif. Dept. of Fish and Game. http://bios.dfg.ca.gov.

State Water Resources Control Board. 2008**.** GeoTracker: Ventura River-Lower Ventura River. http://geotracker.swrcb.ca.gov/search.asp?cmd=search&hidept=True&status=&treporttitle=.

Steiner, Frederick. 2000. *The living landscape: An ecological approach to landscape planning.* 2nd Ed. New York: McGraw-Hill.

Stoecker, Matt. 2007. "Ojai Valley Sanitary District Effluent Reuse Feasibility Analysis: steelhead trout Trout Habitat Assessment Comments for Final Report." http://www.stoeckerecological.com/reports/OVSDReuseFinal.pdf.

Steam Team. 2008. Ventura River Stream Team. http://www.stream-team.org/Ventura/main.html.

Stratus Environmental Inc. 2008. Report, Second Quarter 2008. http://geotracker.waterboards.ca.gov/esi/uploads/geo_report/3994963705/T0611141394.pdf.

———2008**.** Letter from Henry B. Ames to David Salter, Leaking Underground

Fuel Tank Program, County of Ventura, Environmental Health Division. July 30, 2008.

Sustainable Sites Initiative. 2008a. About us. http://www.sustainablesites.org/about/.

Tallamy, Douglas. 2007. *Bringing nature home: How native plants sustain wildlife in our gardens.* Oregon: Timber Press.

Tesky, Julie L. 1995. *Lynx rufus.* Fire Effects Information System, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. http://www.fs.fed.us/database/feis.

Thomas, Elizabeth R. and Julian Rapport. 1996. "Art as community Narrative: A resource for social change" in *Myths About the Powerless: Contesting Social Inequity.* Edited by M. Brinton Lykes, Ali Banuazizi, Ramsay Liem and Michael Morris. Philadelphia: Temple University Press.

Timbrook, J. 2007. *Chumash Ethnobotany: Plant Knowledge Among the Chumash People of Southern California.* Berkeley, California: Santa Barbara Museum of Natural History.

Tiner, R.W. 2003. *Correlating Enhanced National Wetlands Inventory Data with Wetland Functions for Watershed Assessments: A Rationale for Northeastern U.S. Wetlands.* United States Fish and Wildlife Service, National Wetlands Inventory Program, Region 5, Hadley, MA.

Tom Richman & Associates, Camp Dresser & McKee, Ferguson, B. 1999. S*tart at the source: Design guidance manual for Storm water quality protection.* Bay Area Storm water Management Agencies Association.

Treib, Mark. 1995. Must landscape mean? approaches to significance in recent landscape architecture. *Landscape Journal,* 14 (1): 47-62.

Treseder, Kathleen K. 2006. Links between plant and fungal diversity in habitat fragments of coastal sage scrub. *Kearney Foundation of Soil Science.* University of California, Davis. https://uckearney.org/2006.

Turner, J. M. 1971. *Geology of the Ventura River system.* Ventura County Water Resources Management Study. Ventura County Department of Public Works, Flood Control District.

United Nations Educational Scientific and Cultural Organization. 1995. Goal six: Improve the quality of education. http://www.unesco.org/en/efa-international-coordination/the-efa-movement/efa-goals/quality-education.

United States Army Corps of Engineers. 2004. Matilija Dam ecosystem restoration feasibility study. http://www.matilijadam.org.

United States Census Bureau. 2000. Census 2000 Gateway: American FactFinder. http://factfinder.census.gov/home/saff/main.html?_lang=en (accessed November 25, 2008).

United States Census Bureau. 2004. State Interim Population Projections 2004. http://www.census.gov/population/www/projections/projectionsagesex.html.

———2006. American Community Survey. http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&t_submenuId=&t_lang=en&t_ts.

United States Department of Agriculture. 2008. National invasive species information center. http://www.invasivespeciesinfo.gov/index.shtml.

United States Environmental Protection Agency. 1999. Ventura Brownfield Fact Sheet, June 1999.

———2008. Functions and values of wetlands. http://www.epa.gov/owow/wetlands/pdf/fun_val.pdf.

———2008. Brownfields and land revitalizaion: brownfields definition. http://www.epa.gov/brownfields/glossary.htm.

———2008. Brownfields and revitalizaion: Brownfield assessment pilot fact sheet, Ventura CA. http://www.epa.gov/brownfields/html-doc/ventura.htm

———2009. Environmental justice: Frequently asked questions. http://www.epa.gov/compliance/resources/faqs/ej/

United States Fish and Wildlife Service. 2001. U.S. Fish and Wildlife Service lists Ventura County plant as endangered." Pacific Region News Release, May 17, 2001.

———2005. Biological opinion for the Matilija Dam Ecosystem Restoration Project, Ojai, Ventura County, California. (CON 1-8-04-F-38). http://www.matilijadam.org/documents/USFWS_Final_BO_2004.01.08.pdf.

United States Geological Survey (USGS). 2007**.** *California Water Science Center. Methyl Tertiary-Butyl Ether (MTBE).* http://ca.water.usgs.gov/mtbe/.

———2008. Landslide hazards rogram. http://landslides.usgs.gov/learning/ls101.php.

URS Corporation. 2000. *Ventura River habitat conservation plan: Preliminary assessment – listed wildlife species.* Ventura.

———2004. *Flood mitigation plan for Ventura County, California.* Ventura County Watershed Protection District.

Ventura Beach RV Resort. 2009**.** *Welcome to Ventura Beach RV Resort.* http://www.venturabeach-rvresort.com/.

Ventura County. 1990. *Flood plain management ordinance for unincorporated areas.* No. 3954. http://publicworks.countyofventura.org/fc/index.htm.

———2005. *Ventura County General Plan.* http://www.ventura.org.

———2007. County of Ventura 2007 homeless count. http://www.vchhc.org/media/reports/07_Ventura_HomelessCount_Report.pdf.

———2008. SOAR questions and answers. Resource Management Agency, Planning Division. Public Information. http://www.ventura.org/rma/planning.

———2010. *Ventura County General Plan: Goals, Policies, and Programs.* Amended on April 6, 2010.

Ventura County Civic Alliance. 2007. 2007 State of the Region Report.

Ventura County Environmental Health Division (CVEHD). 2008. *List of Voluntary Cleanup Program Sites By Address.* PDF. November, 26. http://www.ventura.org/

———2008. *List of Leaking Underground Fuel Tank Program Sites.* http://www.ventura.org/

Ventura County Homeless and Housing Coalition. 2007a. County of Ventura 2007 homeless count. April 13. http://www.vchhc.org/media/reports/07_Ventura_HomelessCount_Report.pdf.

———2007b. County of Ventura 2007 Homeless Survey. http://www.vchhc.org/pdf/2007_Homeless_Survey.pdf.

———2007c. Ten year strategy to end homelessness for Ventura County. http://vchhc.org/media/reports/Ventura_10yrStrategy_REPORT_Aug07.pdf.

Ventura County Resources Management Agency, Planning Division. 2004. *Ventura County General Plan: Goals, policies and programs.* http://www.ventura.org/rma/planning/pdf/plans/Goals_Policies_ Programs_09-9-08.pdf.

Ventura County Star. 2004. Editorial: Camp hope a good start. December 2.

———2004. Growth Control Milestones in Ventura County. *Ventura County Star*, April 4.

Ventura County Transportation Commission. 2009. 2009 Ventura County congestion management program, draft November 17, 2008. http://www.goventura.org/files/CMP%20Chapter%205%20Transit%20System%20Nov%2018%20Draft.pdf.

Ventura County Watershed Protection District. 2004. Flood Mitigation Plan for Ventura County, California. http://www.countyofventura.org/rhmp/docs/FMP-Section%201.pdf (accessed March 2008).

———2006. Ventura river *Arundo donax* removal demonstration project. http://www.cal-ipc.org/symposia/archive/pdf/2006/PosterKanthack06.pdf.

Ventura Hillsides Conservancy. 2008. The Hillsides. Interest Area. http://www.venturahillsides.org/map_area.shtml.

Ventura Police Department. 2008. Crimes reported in reporting districts 16, 19, 20, and 22 -28 in years 2003 through March 5, 2008.

Warner, Richard E and Kathleen M. Hendrix, editors. 1984. *California riparian systems: Ecology, Conservation, and Productive Management.* Berkeley, California: University of California Press. http://content.cdlib.org/xtf/view?docId=ft1c6003wp&doc.view=content&chunk.id=d0e84085&toc.depth=1&anchor.id=0&brand=eschol.

Warrick, Jonathan A, Leal A. K. Mertes, Libe Washburn, and David A. Siegel. 2004. *Dispersal forcing of southern California river plumes, based on field and remote sensing observations. Springer-Verlag.* http://www.icess.ucsb.edu/~davey/MyPapers/warrick-etal-2004-GML.pdf.

Water Resources Council. 1979. *A unified national program for flood plain management.* Washington D.C.

Watersheds Coalition of Ventura County. 2006. Integrated regional water management plan. http://portal.countyofventura.org/portal/page?_pageid=821,3336281&_dad=portal&_schema=PORTAL.

———**2007.** Promoting & implementing integrated regional water Management Planning. http://www.watershednetwork.org/docs/2007/IRWMP_VenturaCountyFlyer.pdf.

Watson, Donald. 2003. "Graphic communication, wayfinding and interpretive planning" in *Time-saver Standards for Urban Design.* Edited by Donald Watson, Alan J. Plattus, and Robert G. Shibley. New York: McGraw-Hill.

Wells, Nancy M. and Lekies, Kristi S. 2006**.** Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youzh and Environments* 16(1): 1-24. http://www.colorado.edu/journals/cye/.

Western Regional Climate Center. 2008. Local Climate Data Summaries. http://www.wrcc.dri.edu/summary/lcd.html.

West Coast Environmental Engineering. 2001. *Historical overview: the Ventura brownfield project, a look at the environmental history of Ventura's Westside.* Prepared for City of Ventura.

Wetlands Research Associates, and Philip Williams Associates.1994. *Ventura River Estuary enhancement and management final plan.* Prepared for California Department of Parks and Recreation and California State Coastal Conservancy.

Whyte, William H. 1988. *City: Rediscovering the Center.* New York: Doubleday.

Wilson, E. O., editor. 1988. *Biodiversity.* Washington, DC: National Academy of Sciences/Smithsonian Institution.

Wilson, Kathleen. 2008. Group plans 'sober stations'. *Ventura County Star,* March 15.

Wolfe, A. and Bjornstad, D. 2002**.** Why would anyone object? An exploration of social aspects of phytoremediation acceptability. *Critical Reviews in Plant Sciences.* 21(5): 429–438.

World Wildlife Fund. 2001. California coastal sage and chaparral. (NA1201). http://www.worldwildlife.org.