

Enhancement & Management Final Plan



## **VENTURA RIVER ESTUARY ENHANCEMENT**

## ENHANCEMENT AND MANAGEMENT FINAL PLAN

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### VENTURA RIVER ESTUARY ENHANCEMENT PLAN

#### **1.0 INTRODUCTION**

The Ventura River Estuary Enhancement Project study area is located at the western end of the City of San Buenaventura and approximately 60 miles west of Los Angeles. The study area covers approximately 110 acres and is comprised of two publicly owned parcels, the Emma Wood State Beach-Ventura River Group Campground (California Department of State Parks) and the Seaside Wilderness Park (City of San Buenaventura) and one privately owned parcel, the Hubbard property. The enhancement project study area and approximate parcel boundaries are shown in Figure 1.

A study of the existing conditions and an analysis of site opportunities and constraints of the study area was completed and submitted in the first phase of the planning effort. A draft plan was then prepared which discussed various optional elements for enhancement and management. The present document outlines the final or preferred enhancement and management plan recommended for implementation at the Ventura River Estuary. It is based on public and agency comments on the draft options plan. These elements also reflect the goal and objectives set forth by the Ventura River Enhancement Project Management Committee to enhance biotic resources and provide appropriate public access for recreational and educational benefits.

#### 2.0 GOAL AND OBJECTIVES

The initial goal and site specific objectives for the Ventura River Estuary Enhancement Plan were developed by the Project Management Committee. These were presented at a public meeting and, following public input, were revised into the final overall goal and objectives.

#### 2.1 ENHANCEMENT GOAL

The Project Management Committee approved an overall goal for the Ventura River Estuary Enhancement Project: Develop an implementation plan that provides phased restoration and management of habitats within the lower Ventura River basin and allows public access and interpretation to be compatible with sensitive habitat areas. The plan will establish the basis for and guide site policy, financing, operational and management decisions.

#### 2.2 ENHANCEMENT OBJECTIVES

The objectives for the Ventura River Estuary were established to implement the overall goal and include recommendations for the river mouth lagoon, the Second Mouth, wetlands, riparian, and dune areas that reflect the existing habitat characteristics of the site and its historic, current and projected physical conditions.

The enhancement objectives are:

- Define alternative flood control measures to protect the long-term integrity of the physical and biological systems of the study/project area.
- Define and prioritize both eradication and re-establishment programs for biological resources in each habitat area. In addition to identifying species, specific optimal conditions and related management requirements should be outlined.
- Describe monitoring programs for each habitat area.
- Identify water quality parameters appropriate to meet the needs of habitat areas. This includes nutrient loading, freshwater input, river flow and other quantitative physical condition limits that can be tolerated by each habitat area. Possible management processes/techniques that could be employed to enhance the quality of water entering the estuary should be proposed.
- Define appropriate public access that is compatible with each habitat area, such as active and passive recreation or nature study. Trails, interpretive themes, and special focus areas should be delineated. Siting and a conceptual floor plan for a small interpretive facility should be included in the overall public access plan.
- Develop a phased implementation program and an interim operational/land management program for periods between phases.



Physical constraints, such as natural flooding, related erosion and sediment deposition, and existing development limit the alternatives that can be implemented within the study area. In light of these constraints, various areas within the project site have been identified that have habitat or recreational values that can be better managed and/or enhanced. The components of the enhancement plan are grouped into three main sections: (1) habitat restoration and enhancement; (2) public access and interpretation; (3) monitoring and management. The preferred elements and corresponding activities are described in each section. The rationale and benefit of each element and interdependency between elements are also discussed. The general location of proposed elements are shown in Figure 2.

#### 3.0 HABITAT RESTORATION AND ENHANCEMENT

The Ventura River Estuary is a dynamic environment and subject to dramatic change as illustrated by the 1992 flood. Nevertheless, it supports a diverse wildlife resource and can be enhanced to improve wildlife habitat for critical species that are wholly dependent upon the unique characteristics of this site. Human activities have severely impacted the estuary through reduction of water quality and quantity, filling of wetlands and riparian habitats, construction of roads and right-of-ways, trampling and destruction of vegetation, planting or spread of non-native plant species, and introduction of feral animals. The primary purpose of the enhancement program is to preserve and expand existing habitat values, especially for species facing critically scarce habitat in the region. The means for achieving this primary purpose include restoring habitats by improving water quality, eliminating or controlling non-native species, installing native plants, and promoting on-going physical processes to sustain natural biological communities. A secondary purpose of the program is to provide public access opportunities by developing trails and interpretive facilities with integrated public education and interpretation programs.

The recommended enhancement and restoration elements are discussed in the following sections and are summarized in Table 1.

Table 1. Preferred Ventura River Estuary Enhancement Plan Summary. Habitat/Location section numbers refer to sections in the report. Elements are various aspects considered necessary to complete the enhancement plan. Elements can be completed independently unless directly dependent on another element. Action describes the activities required to fulfill the element. Rationale/Benefit summarizes why the element is necessary or how the element is of benefit. Project Phase recommends which phase the element should be completed.

Habitat/Location	Element	Action	Rationale/Benefit	Project Phase
3.0 RESTORATION/ ENHANCEMENT				
3.1 Second Mouth	a. Restore fresh/brackish lagoon and wetland habitat	Replace bridge with twin span. Excavate amount of material needed for Interpretative facility only. Revegetate with native plants.	Self-maintaining system. Improved habitat. Increased flow capacity.	3
	b. Reroute/bury existing oil pipeline	Reroute by boring under Second Mouth to meet scouring safety specifications in EIR.	Prevents risk of environmental damage due to rupture during flood.	3
	c. Reroute telecommunication lines	Route across replaced RR bridge.	Original intent.	3
3.2 Riparian	a. Remove non-native invasive plants and replace native plants	Phased removal: 1) remove large colonies using motorized equipment; 2) manually remove small colonies or individual plants. Replace with native plants.	Improved habitat through removal of non-beneficial plants and replacement with beneficial plants.	1
	b. Expand/restore riparian woodland on western floodplain	Plant trees/shrubs to expand woodland westward of existing woodland boundary.	Expanded wildlife habitat	1
	c. Close informal trails	Block informal trails leading off main loop trail using rock/dirt cairns and plantings. Replant wider, open portions of trails.	Improved habitat primarily through less human disturbance and less habitat fragmentation.	1
	d. Animal control (feral)	Trap and remove feral animals (i.e., cats).	Improved wildlife habitat for small mammals and birds.	2

Habitat/Location	Element	Action	Rationale/Benefit	Project Phase
3.3 Dune Strand/Beach	a. Dune stabilization using native plants	Remove non-native plants. Replant native plants.	Stabilized dunes will improve wildlife habitat and control beach erosion.	3
	b. Natural expansion	Remove physical constraints to dune expansion. Minor redistribution of sand to fill gaps.	Improved wildlife habitat.	2
3.4 Seaside Wilderness Park	<ul> <li>Invasive, non-native plant removal and replacement with native plants</li> </ul>	Remove non-native plants. Replant native plants.	Improved wildlife habitat.	1
3.5 Lower Estuary	a. Decrease nutrient loading	Accept OVSD treatment facility upgrade. Identify non-point pollution sources.	Improved water quality for wildlife/fish habitat.	3
	b. Invasive, non-native plant removal	Remove non-native plants, replace with native plants.	Improved wildlife habitat.	2
	c. Fairgrounds buffer planting	Install native buffer plants along river levee.	Reduced habitat disturbance from fairground activities.	2
	<ul> <li>d. Special status species protection at river mouth</li> </ul>	Interpretive and warning signs discouraging public use of river mouth sand bar.	Protection of sensitive species.	1
	e. Bury pipeline deeper	Bury pipeline based on EIR recommendations.	Reduced risk of pipeline damage.	3
3.6 River Channel	a. Increase mature overstory vegetation	Manage channel vegetation to promote mature stands.	Increase flood control and habitat value.	3
	b. Remove debris	Remove trash, shopping carts, car bodies and other debris on floodplain.	Improved wildlife habitat. Minor flood control benefits.	1
	c. Decrease nutrient loading	Same as for Lower Estuary.	Improved water quality.	3

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## Table 1. Preferred Ventura River Estuary Enhancement Plan Summary, continued.

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Habitat/Location	Element	Action	Rationale/Benefit	Project Phase
4.0 PUBLIC ACCESS	·*···	· · · · · · · · · · · · · · · · · · ·		
4.1 Second Mouth	a. View area at Second Mouth	Construct viewing area that looks toward lsgoon habitat. Requires spur trail from Ventura River Group Camp.	Restrict access into aquatic habitat area.	3
	b. Educational displays	Construct educational displays at viewing area.	Provides educational experience	3
4.2 Riparian Trail	a. All-weather, handicap accessible trail	Construct all-weather trail on northern portion of existing maintenance road and along west bank of Ventura River.	Provides wheelchair accessibility.	1 <b>, 2</b>
	b. Educational displays	Construct educational displays and implement trail.	Provides educational experience.	1
	c. Interpretive pamphlet system	Develop interpretive information for pamphlets.	Improved interpretative experience for public.	1
	d. Close informal trails	Use rock and dirt cairns to close informal trails.	Closes trails that are unnecessary for public access. Provide information signs explaining necessity of staying on designated trails.	I
4.3 Dune Strand/Beach	a. Access Trail to Emma Wood State Beach	Construct 5-foot wide boardwalk from Ventura River Group Campground to beach. Provide lower (aesthetically pleasing) barrier fence perpendicular to existing informal trail with information signs to discourage entrance into dune/swale area.	Provide controlled access to beach, reduces impact to easily disturbed habitat. Controls access in easily disturbed habitat while allowing public access.	2
	b. Beach Trail	Designate a trail along the beach that connects Emma Wood State Beach and Seaside Wilderness Park Boardwalk Trails.	Provides access to beach activities. Connects two trail systems. Protects sensitive bird habitat.	1

## Table 1. Preferred Ventura River Estuary Enhancement Plan Summary, continued.

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Habitat/Location	Element	Action	Rationale/Benefit	Project Phase
	c. Dune Swate Trail (Optional)	Construct boardwalk trail only if restoration is successful and/or if public use of area cannot be effectively restricted.	If public access cannot be controlled and causes habitat damage, construct boardwalk to control access.	2
	d. Educational Displays	Construct educational displays along trails.	Provides educational experience.	3
4.4 Seaside Wilderness Park	a. Seaside Wilderness Park Trail	Trail along western bank for views of estuary and sand bar. Trail connects to Riparian Trail through RR undercrossing and to Beach Trail.	Provides access to western bank of estuary. Connects Riparian Loop and Beach Trails.	3
	b. Access to Beach Trail	Provide connection to Beach Trail.	Provides access to areas east and west of Seaside Wilderness Park and completes trail system loop.	3
	c. Educational Displays	Construct educational displays.	Provides educational experience.	3
4.5 Lower Estuary	a. Kiosks at river mouth and Main Street parking lot on east river bank	Construct informational kiosks, barrier railings, directional and regulatory signs along existing bike path.	Provides educational experience. Directs public to other public access areas on approved routes.	2
	<ul> <li>b. Volunteer docent program</li> <li>.</li> </ul>	Implement volunteer docent program during peak-use periods. Improves educational experience and aids public on access routes.	Improved interpretative experience for public.	1
	c. Discourage access across river mouth sand bar	Install interpretive and warning signs.	Protects sensitive bird habitat.	1
4.6 River Channel	Views from Main Street bridge	Place informational sign on bridge railing	Provides educational experience.	2

## Table 1. Preferred Ventura River Estuary Enhancement Plan Summary, continued.

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Habitat/Location	Element	Action	Rationale/Benefit	Project Phase
4.7 Interpretive Facilities	a. Nature Interpretive Center	Construct modest interpretive center with educational displays, adminstrative offices.	Would greatly improve interpretive experience in the Ventura River Estuary.	2
	b. Outdoor amphitheater and classroom	Construct amphitheatre for lecture space or classroom use.	Will encourage education-based group activities in area.	2
4.8 Southern Pacific Railroad Bridge Access	a. Illegal bridge crossing	Place signs prohibiting bridge access and directing public to other routes to west River bank areas.	Public safety benefits	1
4.9 Floodplain Inhabitants	a. Trash reduction.	Trash receptacles and bags provided on occasional basis through homeless services providers.	Reduces trash in floodplain which improves wildlife habitat and water quality.	1
	b. Off-site campground and educational program	Establish campground facility as an option to floodplain camping. Provide educational materials about river/estuary ecosystem protection, campground alternatives.	Provides camping area options to homeless and provides education for ecosystem protection.	3

## Table 1. Preferred Ventura River Estuary Enhancement Plan Summary, continued.

#### 3.1 SECOND MOUTH RESTORATION AND ENHANCEMENT

#### Habitat Description

The Second Mouth of the Ventura River (Figure 2, Area 1) is the terminus of active distributary channels that discharge flood waters during major floods. Prior to the 1970's, the Second Mouth supported a fresh/brackish water lagoon with associated wetlands and riparian habitat that was a self-sustaining system. Cumulative effects of fill activity have since limited self-sustaining processes in the lagoon. The first fill activity occurred in the late 1800's when the railroad was constructed. Further filling occurred during construction of a pipeline project north of the railroad in 1969 and when the western span of the double span railroad bridge was replaced with fill in 1970. These cumulative effects acted against self-sustaining processes and the lagoon all but disappeared. Continuing maintenance of the one remaining railroad bridge, the pipeline, and telecommunication lines (installed in late 1980's) results in re-occurring impacts to the remaining wetlands.

The Second Mouth currently consists of small depressional areas north and south of the Southern Pacific Railroad. North of the railroad, the depression is broad and shallow and has developed into coastal salt marsh. Dominant plants include pickleweed (*Salicornia virginica*), salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and fleshy jaumea (*Jaumea carnosa*); cattail (*Typha* sp.) grows in slightly lower areas. The depression is partially surrounded by scrub/shrub wetland and riparian habitat. South of the railroad the depression is narrow and deep and supports brackish marsh dominated by prairie bulrush (*Scirpus maritimus*) and spiral ditch-grass (*Ruppia chirrhosa*), with fringe areas of salt marsh vegetation. Scrub/shrub habitat extends to the east and west. Scouring of the Second Mouth channel during the 1992 flood removed brackish marsh vegetation and portions of salt marsh vegetation south of the railroad and restoring a portion of the previously filled deep-water habitat. The scoured area beneath the railroad bridge was immediately filled during emergency maintenance activities to protect the failing bridge and buried communication lines.

The restoration of the Second Mouth represents a substantial opportunity to provide a unique fresh/brackish seasonal lagoon habitat in concert with the established objectives for the plan.

## LEGEND

- Second Mouth 1
- Riparian Habitat 2
- Dune Strand 3
- SeasideWilderness Park 4
- Lagoon Mouth 5
- River Channel/Lagoon 6

# Ventura River Estuary PLANNING TEAM Weilands Research Associates Inc. Philip Williams and Associates Ltd. **Enhancement Plan**

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Original Scale ? - 104

Hyden Associates Lawrence Hunt Paul Lehman

Figure 2. Location of enhancement and management areas of the Ventura River Enhancement Project.



This habitat type was once common in the region. Today it is rare and there are few opportunities to achieve significant restoration. Restoration of this habitat would benefit an array of animals including water birds and mammals that would use the habitat for breeding, feeding, resting, and cover. Restoration would be especially beneficial to amphibians whose habitat in the area is severely limited. Several plant species, such as cluster field sedge (*Carex praegracilis*) and Mexican rush (*Juncus mexicanus*), that are either extirpated or declining (Ferren, et. al. 1990) in the area are restricted to this type of habitat.

#### Enhancement Recommendations

The Second Mouth of the Ventura River is the terminus of several distributary channels which drain the delta of the Ventura River during high magnitude floods. Effective restoration of the fresh/brackish water marsh relies on a design that will be maintained by major floods from the Ventura River. This approach is necessary because of the dynamic nature of the delta, where natural sediment scour and fill may rapidly change the dominant flow path during flood events. The benefit of developing a strategy which relies on "self-maintenance" is that flood flows would maintain the configuration of the Second Mouth and result in a design that is self-sustaining. A design that is not self-sustaining would require more complex engineering solutions, would have larger capital cost, more expensive maintenance, and would fight against the dynamic natural processes in the area. In this dynamic area, excavation in areas not naturally scoured would require structural support and rigorous maintenance to achieve stability.

Enhancement of a relatively stable, self-maintaining system is possible, as shown by the 1992 flood. Scour at the Second Mouth during the flood created a deep depression and a temporary tidal connection to the ocean. A brackish/freshwater marsh formed after sediment transport in the littoral zone closed off the mouth with a sand bar. The small lagoon was then probably recharged by groundwater flow or when sea water entered the lagoon during sand bar overtopping by storm waves (Ferren, et al. 1990).

Ventura River Estuary Enhancement Plan

Recommendations for enhancement of the Second Mouth are described below.

a. Restore fresh/brackish lagoon and wetland habitat - An area more similar to the historic condition with continuous wetland habitat north and south of the railroad should be restored. This requires restoring the 300-foot twin span bridge that existed prior to replacement of the western bridge span with fill in 1970. Twin, clear span bridges would allow greater flood flow capacity and allow natural scour at the Second Mouth during high magnitude floods. The design of the restored bridge would need to convey high velocity flood flows without post-flood bridge maintenance (e.g., fill or rip-rap support). The benefit of this element would be development of a self-maintaining system with enhanced habitat value. Cost of bridge replacement would be high, but would be appropriately borne by the Southern Pacific Railroad as mitigation for past filling. A disadvantage of this element is the disturbance that will occur to existing habitat during construction.

Once the twin span bridge is restored, a fresh/brackish lagoon and wetland restoration should be implemented. This will initiate habitat restoration sooner than waiting for a scouring flood event (the expected flood recurrence level that caused scouring during the 1992 flood is 22 years). The restoration area (Figure 3) should be sized (approximately  $\frac{1}{2}$  acre) to the amount of excavated material which could be used on site (e.g., at the interpretive center). The initial restoration would require removal of fill and sediment deposits (up to 5 feet) to intersect the water table which fluctuates between approximately +1.7 feet (Wetlands Research Associates 1992) and +3.5 feet (Meisenbach 1975) in the area. Following initial excavation, natural deposition/scouring would maintain (or change) the shape of the lagoon during future flood events. Benefits of the initial restoration would include immediate expansion of wildlife habitat (especially for native amphibians), enhanced aesthetic/public use value, and increased flood flow capacity. Pickleweed habitat could potentially be expanded to attract Belding's savannah sparrow, a California listed endangered and Federal Category 2 Candidate species. Initial construction cost (excavation of approximately 2000 yd<sup>3</sup>) would be approximately \$20,000. There would be short term impacts to existing habitat during construction. Construction would be on State Parks property and in Southern Pacific Railroad right-of-way.

Following excavation the lagoon shoreline should be planted with native plants. A suggested list of appropriate native plants is given in Table 2. Installation of native plants using salvaged (prior to construction) or collected specimens, container stock, and/or seed would promote rapid vegetative establishment on the restored lagoon shoreline. The benefits of plant installation would include creation of a diverse plant community of desirable plants (vs. a few dominant exotic species), rapid establishment of wildlife habitat, and aesthetic value. Planting/maintenance costs would be approximately \$15,000 per acre. Dominant geomorphic processes (e.g., scouring) expected to later maintain the area may alter the marsh configuration and rip-out vegetation during subsequent floods.



b. Bury oil pipeline to safe depth -Pacific Pipeline Systems, Inc. is proposing to transport heated (140° F) crude oil through an existing, uninsulated 22 inch pipeline running along the north side of the railroad. pipeline is buried The at approximately -5.0 feet (NGVD) at Mouth the Second (Mobil Engineering Department 1970) or approximately 7 feet below the soil Restoration of a self surface. maintaining system could produce scour depths which would expose the pipeline and potentially cause The Pacific Pipeline rupture.

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Table 2.	List of	native	plant	species	for	installation
at Second	Mouth	restora	ation.			

Species	Common Name
Anemopsis californica	Yerba mansa
Baccharis douglasii	Salt marsh baccharis
Distichlis spicata	Salt grass
Juncus acutus var.	-
sphaerocarpus	Spiny rush
Juncus mexicanus	Mexican rush
Salicornia virginica	Pickleweed
Salix spp.	Willow
Scirpus californicus	California bulrush
Scirpus maritimus	Prairie bulrush

Project EIR (Aspen 1993) recommends "safe" pipeline depths for various types of stream crossings. Generally, a safe depth is considered to be 4 feet deeper than expected scour depth or 1.3 times the expected scour depth, which ever is greater. Since scour depths of several feet were experienced during the 1992 flood, it is clear that the pipeline would need to be buried deeper under a restored, self maintaining system. The cost of burial would be borne primarily by Pacific Pipeline Systems, Inc. Short term damage to existing habitat during construction would occur. Construction would be (presumably) within Southern Pacific Railroad right-of-way.

c. Reroute telecommunications lines - Telecommunication lines are buried approximately 4 to 6-feet deep north of the railroad at the Second Mouth (Patrick Richardson, per. comm.). These lines face potential damage during floods. The lines should be rerouted across the new railroad bridge when it is constructed. The benefit of rerouting is reduced disturbance from maintenance to habitat (habitat damage was noted following 1992 flood maintenance activities) and increased communication line reliability. Cost would be borne primarily by telecommunication companies involved. Telecommunication lines would be routed on the Southern Pacific Railroad property (the bridge).

Bridge replacement, burying the oil pipeline, and rerouting communication lines would improve natural habitat and provide flood control in the study area. However, these utilities are privately owned entities and operation of them, including replacement or upgrade, is somewhat independent of the objectives of the restoration plan. These entities do, however, traverse public lands on which habitat restoration and enhancement is strongly recommended. Agencies with proper

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authority to regulate public utilities (California Public Utilities Commission) and protect coastal habitat (California Coastal Commission) should adopt policies requiring that recommended bridge, pipeline, and communication line improvements be made.

#### 3.2 RIPARIAN ENHANCEMENT/RESTORATION

#### Habitat Description

Riparian scrub and woodland on the site (Figure 2, No. 2) is important wildlife habitat. It is found primarily on the western bank and flood plain of the Ventura River within the Emma Wood State Beach-Ventura River Group Camp and on the Hubbard property. Characteristic plants include broad-leaved deciduous and evergreen woody species such as mule fat, arroyo willow, sand bar willow, coyote brush, and upland shrubs such as California sagebrush and hoary ceanothus. Deciduous woodland species such as white alder, red willow, arroyo willow, black cottonwood, and California walnut are found on floodplain soils adjacent to the permanently flooded river channel. Based on historical photographs, the density of riparian vegetation in the project area appears to have increased over the past 30 years, probably due to less frequent flooding during drought periods and cessation of floodplain agricultural operations (Ferren, et. al. 1990). The river delta mouth is an outstanding habitat for resident and migratory birds as evidenced by the bird observations recorded for this study. A number of unique reptiles and mammals also use this area (WRA 1990).

Riparian habitat should be enhanced and expanded on the western floodplain. Protection and enhancement of the estuary and riparian woodlands in the study area and adjacent properties are critically important to the continued, albeit infrequent, establishment of territories and breeding of obligate riparian and shorebird species which are regionally declining. For example, the state and federally endangered Least Bell's Vireo (*Vireo bellii pusillus*) was recently documented nesting in the project area approximately 0.75 miles north of the Main Street Bridge in 1993 (Jim Greaves, pers. comm.). Removal of exotic vegetation and replacement with California native plants would improve the quality of habitat for all wildlife. Areas of historic riparian vegetation that were removed by agriculture and other development should be replaced. Restricted human use would also increase habitat value because many of the species using riparian areas are sensitive to human disturbance.

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#### Enhancement Recommendations

Remove invasive non-native plants and re-vegetate with native species - Some nonа. native plants, such as giant reed (Arundo donax) and castor bean (Ricinus communis), are especially invasive and offer limited habitat value. These types of plants should be targeted for removal and replaced with suitable native plants (Appendix A), such as willow (Salix spp.) and sycamore (Planatus racemosa). Plant community diversity should be increased with plants once found in the area, such as Plummer's baccharis (Baccharis plummerae), Jones' cryptantha (Cryptantha muricata var. jonesii), and Herman's tarweed (Holocarpha hermannii) (Ferren, et. al. 1990). Native plantings should include installation of cuttings, liner or gallon sized plants, and a seed mixture. Propagules should be collected on site as much as practical. Plant installation densities need to be sufficient to allow 20 percent mortality and still have appropriate coverage. Installation should occur as early in the fall as possible, following on-set of the wet season. The cost of non-native removal and native replacement would be approximately \$12,000 per acre. The benefit would be increased habitat value for locally declining birds, such as Tree Swallow, Warbling Vireo, Least Bell's Vireo, Yellow-breasted Chat, and regionally declining migrants such as the Yellow Warbler.

The most practicable method of invasive plant removal would be on a phased basis. Use of motorized equipment, such as loaders or back-hoes, should be used in the first phase removal of large areas of non-native plants, such as giant reed. Heavy equipment should only be used where damage to surrounding habitat will be minimal. Subsequent phases of non-native plant removal, such as small colonies or individual plants, should be by manual methods as much as practicable. These methods are less damaging to surrounding habitat than removal by heavy equipment or use of herbicides. In addition, control of upstream propagule sources of non-native plant species should be considered.

A maintenance program consisting of protective herbivore screen repair and subsequent removal (as plants grow), weed control, replacement plants, and reporting should last five years. Plant establishment maintenance costs would be included in the \$12,000 per acre unit price. Temporary disturbance and displacement of wildlife during non-native plant removal should be expected.

b. Expand/restore riparian woodland on western floodplain - Riparian area should be expanded west of the existing riparian border into ruderal areas of the Ventura River Group camp. This area is approximately four acres. The plant installation and maintenance program during plant establishment would require similar techniques described above (a). Costs would be approximately \$18,000 per acre. The benefit would be expanded wildlife habitat and restoration of riparian areas.

- c. Close existing informal trails Existing informal trails should be scarified and closed to prevent public access into interior portions of riparian woodland. Rock/dirt cairns should be used as barriers at trail entry points. Native plants should be installed around the cairns and along the informal trails. Many informal trails already have vegetative growth along both sides. Wider portions (>10 feet) of the trails should be revegetated with native plants using similar methods as described above (a); narrower portions (<10 feet) should be allowed to close naturally with vegetative growth (e.g., tree or shrub branches growing toward the center. The naturally closed trails should also create an open understory corridor for wildlife movement. Costs of closing trails using these methods would be approximately \$600 per trail (assuming a trail is 10 feet wide and 100 feet long). Benefits include protection of wildlife habitat from human intrusion and destruction. Rock/dirt cairns would be constructed on State Parks property.</p>
- d. **Control pets, trap and remove feral animals (cats) present on site** Domestic pets running unattended and feral animals, especially cats, pose a threat to wildlife including small mammals and birds that use the riparian habitat. Pets should be controlled on leashes and feral animals removed by trapping twice per year (once in February prior to the nesting season). Yearly costs would be approximately \$15,000. The benefit would be improved habitat value for wildlife through the removal of non-native predators.

#### 3.3 DUNE STRAND RESTORATION

#### Habitat Description

Dune strand in the study area (Figure 2, No. 3) is found landward from the ocean beach primarily along the Emma Wood State Beach. Dune strand includes both southern coastal dune and dune swale wetland habitats.

The ocean beach in the study area is situated on the seaward face of a wave dominated marine delta, and is composed of cobble derived from alluvial deposits of the Ventura River. The beach is seasonally covered by sand derived from both up-coast littoral currents and river flows. Littoral drift transports sand from up-coast sources eastward along the beach to down-coast beaches. Comparisons of historic and recent maps indicate the shoreline is moving landward. This landward migration of the beach is thought to be a regional problem caused by reduction of alluvial materials deposited by rivers on up-coast ocean beaches. The landward migration of the beach also results in loss of coastal dune and dune swale habitat.

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The beach provides habitat for shorebirds that feed on sand dwelling invertebrates. With the loss of sandy beaches at Emma Wood State Beach (e.g., converted naturally to cobble stone or artificially to rip-rap or concrete seawall), shorebird feeding habitat is being lost (along with public beach use). In addition, nesting and roosting habitat for the Federally endangered California least tern (*Sterna antillarnum browni*) and the Federally threatened western snowy plover (*Charadrius alexandrinus nivosus*) will become restricted to the immediate river mouth. Habitat suitable for the California legless lizard (California species of special concern) is also being lost.

Coastal dunes, occurring between wave-swept ocean beaches and back dune swales, have declined in the project area and throughout Southern California. Causes for decline include urban expansion, coastal development, and human disturbance. Foot traffic and off-road vehicle traffic destroy dune vegetation causing de-stabilization and drift. Past attempts to stabilize dunes using non-native plants such as hottentot fig (*Carpobrotus edulis*) and common iceplant (*Mesembryanthemum crystallanium*), have resulted in displacement of native vegetation and wildlife. Where native dune vegetation, such as evening primrose (*Camissonia cheiranthifolia* ssp. *suffruticosa*) and beach-bur (*Ambrosia chamissonis*), can gain a tenuous hold on the sand, it can provide habitat for small mammals and reptiles. Special status species present or once present in the study area, such as least tern, western snowy plover, and the California legless lizard, commonly utilize coastal dunes and prefer native vegetation.

The dune swale wetlands provide habitat for numerous small mammals that rely on a relatively continuous cover of vegetation for protection from predators. Restoration of gaps in the vegetation mosaic created by trails and other impacts through controlled public access and planting with California native plants can greatly improve this habitat.

#### Enhancement Recommendations

a. Enhance coastal dune strand vegetation - Existing dune and swale habitat should be enhanced by replacing invasive non-native plants with native species. Non-native plants that should be removed and California native plant replacements are given in Appendix A. The list contains some extirpated plants, such as bush lupine (*Lupinus arboreous*) and California sea rocket (*Cakile edentula* var. *californica*), that could be

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re-established. Removal of invasive species and establishment of natives should be completed in patches to avoid excessive dune de-stabilization. Plant establishment should be based on procedures for dune restoration given in the local dune restoration project (James Dean Group 1991) with modifications based on final results of the project. Generally, revegetation should include installation of rooted liner plants and spreading of a seed mixture. Installation should be conducted in fall, following on-set of the wet season. A maintenance program would be necessary to discourage nonnative re-establishment and to optimize native establishment success. Dune restoration/enhancement costs would be approximately \$20,000 per acre.

One benefit of the dune restoration would be increased habitat value for wildlife, especially the silvery legless lizard (California Species of Special Concern) which is either scarce or has been extirpated from the site, the California least tern (State Endangered/Federal Endangered) which is known to roost and feed in the area and perhaps would nest, the western snowy plover (California species of special concern/Federal Threatened Species) that is known to roost and perhaps would nest on the site, and the white-faced ibis (California species of special concern/Federal Category 2 Candidate) that has been seen on the site. Another benefit is a more stable dune system that would minimize the inland migration of the dune field into dune swale wetland habitat.

b. Natural expansion and stabilization of dune habitat - Dune expansion and stabilization should be encouraged by removing constraints to natural processes, such as secondary trails, unnecessary roadways, and removal of non-native vegetation. Expansion would also include supplementing or redistributing beach sand to fill gaps created by disturbance between existing dunes. Benefits would be increased dune habitat area suitable to species of special concern (listed above) and provide additional protection and stabilization to surrounding habitats. Costs would be approximately \$10,000. Disturbance of existing habitat would occur in some areas during revegetation efforts.

#### <u>3.4 RESTORATION OF SEASIDE WILDERNESS PARK</u>

#### Habitat Description

The Seaside Wilderness Park (Figure 2, No. 4) includes portions of the lower Ventura River Estuary and vegetated areas along the western river bank-between the Southern Pacific Railroad and the Pacific Ocean. Since the river mouth/lagoon is treated separately in this report, this portion deals directly with the area along the western river bank. Historically, the Seaside Wilderness Park consisted of southern coastal dune and coastal scrub habitat (Ferren, et. al. 1990). Efforts to create a public park began around 1913. Monterey pine, eucalyptus, and date palm were planted. These efforts were abandoned in the 1930's. Since then, the park has been reverting slowly to coastal dune and shrub habitat and many of the Monterey cypress are dying. Continued disturbance has probably contributed to the present ruderal nature of the area by indirectly encouraging non-native plants and discouraging colonization and establishment of native plants.

#### Enhancement Recommendation

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a. Non-native plant replacement - The City of Ventura has received a grant from the Habitat Conservation Fund for removal of non-native plants in the Seaside Wilderness Park. Several habitat types, including southern coastal dune, dune scrub, and dune swale, are involved in this maintenance effort. The grant proposal recommended removal of existing trees (some which are California natives, such as Monterey cypress, but were artificially planted), however, they should be removed only if they become a hazard. The grant proposal does not provide replacement of native plants, however, plant replacement should be integrated with this program. Appendix A lists California non-native plants that should be removed and native plants replacements that should be used to re-vegetate this area. Costs would be approximately \$15,000 per acre including plant establishment maintenance lasting five years or less. Benefits would be enhanced wildlife habitat (especially for Silvery legless lizard) and returning the area to more natural conditions.

#### 3.5 LOWER ESTUARY

#### Habitat Description

Improvement of the lagoon habitat (Figure 2, No. 5) is largely dependent on the water quality and quantity. Water quality depends on whether the river mouth sand bar is open or closed and the quantity and quality of fresh water river flow.

Under existing conditions the Ventura River Estuary-provides important primary and nursery habitat for fish and foraging and roosting habitat for birds. Anadromous and catadromous fish use the river and estuary to access freshwater and saltwater habitats at appropriate times during their lifehistory cycles, including the tidewater goby (*Eucyclogobius newberryi*), a California species of special concern and Federal endangered species. Various water and shore birds use the estuary, including several regionally declining and special status species such as the California least tern (*Sterna antillarum*), a California State and Federal endangered species, and the western snowy plover (*Charadrius alexandrinus*), a California species of special concern and Federal threatened species.

The sand bar which impounds water at the mouth of the Ventura River opens and closes depending on the interactions between the river flow and wave action. During periods when the relative contribution of sand to the sand bar from wave action exceeds the scouring action of the river to maintain an open inlet, the sand bar will build up and the mouth will close. This typically occurs in late spring after the cessation of winter high flows. In contrast, during periods of relatively high river flows, primarily during the winter and early spring, the inlet is maintained in an open condition. Periodic opening of the lagoon may occur during the late spring, summer, and fall, as river flow impounded behind the sand bar either overtops the sand bar causing rapid downcutting and breaching, or as flow seeps through the closed sand bar and weakens it by seepage erosion. The pattern of opening and closing of the sand bar is altered in any given year depending on local precipitation, runoff, and wave climate.

A significant portion (approximately 2 million gallons/day) of river flow during summer is effluent discharged from the Ojai Valley Wastewater Treatment Facility (OVWTF) (Montgomery 1991). However, fresh water flow in the river and lagoon is important to maintain riparian vegetation and to decrease salinity in the lagoon for fish, such as the tidewater goby and juvenile fish, that are adapted to fresh/brackish water salinities.

Nutrient loading is present in the river flow. A significant portion of nutrient loading of river water has been attributed to the OVWTF (Montgomery 1991) with additional amounts of nutrient (and probably pollutant) loading from various storm drains (approximately 13) along the river (undocumented). High nutrient concentrations in river water and the estuary below the Main Street bridge were measured in 1991 (WRA 1992). Nutrient loading reduces water quality due to eutrophication and increased biological oxygen demand.

During the winter, water quality is of less concern. Significant fresh water flows from the watershed following winter rains. High flows dilute nutrient concentrations from the OVWTF discharge and storm drains and keep the estuary open to daily tidal flushing. During open conditions fresh/brackish water fish, such as the Tidewater Goby and juvenile fish, move to the area where fresh water and salt water mix.

During the summer, water quality of upstream inflow becomes increasingly important. With reduced flows, the river mouth sand bar closes and the lagoon fills with brackish/fresh water. Fish adapted to these conditions spread throughout the lagoon. This provides foraging for fish eating birds, such as the least tern. However, fresh water flow with high nutrient concentrations eventually leads to eutrophication and algal blooms with subsequent algal die-offs and reduced dissolved oxygen (DO) levels. If the DO level falls below levels tolerated by fish, fish kills will occur.

To increase water quality in the lagoon, water flow during the summer must be maintained. However, nutrient loading in the river and lagoon must be reduced. Methods for reducing nutrient loading and several additional enhancement recommendations for the Lower Estuary are discussed below.

#### Enhancement Recommendations

a. Decrease nutrient loading - The Ojai Valley Sanitation District is presently upgrading the water treatment facility as required by a NPDES permit. Nutrient removal by the new facility is expected to significantly improve water quality of the effluent (Montgomery 1991). Minimum water quality requirements in the river set by the permit are also expected to be met. These changes will significantly improve water quality and habitat value in the river and the lower estuary. Discharge of this cleaner water should be continued which would benefit the lower estuary by increasing Tidewater goby habitat and habitat for rearing juvenile Steelhead rainbow trout.

Non-point pollution sources also lower water quality. Although improvements to the OVWTF will greatly improve water quality, efforts should be continued to identify and cleanup non-point sources of effluent. The City of Ventura is in the process of obtaining a stormwater NPDES permit that will require the City to take specific

action, such as community education programs, to clean up non-point source pollution in watersheds tributary to the Ventura River.

- b. **Removal of invasive, non-native vegetation and replace with natives** Removal of non-native vegetation, especially giant reed and kikuyu grass (*Pennisetum clandestinum*) from along the estuary shoreline south of the Southern Pacific railroad would improve habitat conditions. Giant reed should be replaced with bulrushes (*Scirpus* spp.). Kikuyu grass should be replaced with salt grass (*Distichlis spicata*) which would improve habitat value for small mammals. This plant removal and replacement should be integrated with native vegetation replacement on the western river bank within the Seaside Wilderness Park. Costs would be approximately \$12,000 per acre.
- c. Install fairgrounds buffer vegetation using California native plants California native shrubs and trees (such as coyote brush, quail bush, and Monterey cypress) should be installed along the eastern edge of the bicycle trail and at the base of the east bank river levee near the fairgrounds area. Native vegetation would act as a natural barrier to buffer noise and night lighting from the fairgrounds. The benefit would be improved wildlife habitat through reduced disturbance and increased feeding, roosting, and nesting area. The cost for this project would be approximately \$5,000.
- d. **Protection of Sensitive Species Habitat on River Mouth Sand Bar** Access across the sand bar should be discouraged to prevent disturbance to sensitive California least tern and western snowy plover habitat (from the beach backshore across the sand bar to the lagoon). Discouragement of access should be through informational signs on the beach trail (section 4.3a) and the river mouth kiosk (section 4.5a). Costs would be integrated with interpretive signs, such as at the kiosk. Structures constructed would be on City property.
- e. **Bury oil pipeline to safe depth** The Pacific Pipeline Project EIR reports that the pipeline is exposed near the western river bank and has a high risk of rupturing during floods. Pipeline rupture could cause severe environmental damage to sensitive habitat areas. The EIR recommends deeper burial of the pipe to minimize risk of pipeline rupture during floods. The cost would be borne primarily by Pacific Pipeline Systems, Inc. The disadvantage is the short-term disturbance to the project site. Construction would be (presumably) within Southern Pacific Railroad right-of-way.

#### 3.6 RIVER CHANNEL HABITAT MANAGEMENT

#### Habitat Description

The main river channel (Figure 2, No. 6), consisting of the low flow channel and adjacent

floodplain, is important for fish and other wildlife. However, the channel has been and continues to be subjected to disturbance by both natural and human causes, including periodic flooding (a natural, uncontrollable element of the river system), channel constriction, flood control maintenance operations, water diversion, and poor water quality due to watershed erosion and pollution and instream sand and gravel mining. Upstream sand and gravel mining operations have ceased recently, and a stream channel restoration project is being implemented.

Flood control measures often include channel grading and vegetation removal to decrease channel "roughness". Grading destroys river bed pool and riffle sequences and reduces water quality by increasing water turbidity and thereby reduces habitat for fish breeding, feeding, and refuge. It also results in invasion by non-native plant species. Graded channels and river bed levees are often destroyed during flooding (requiring frequent repair) as natural channels are recreated.

Removal of riparian vegetation as a flood control practice is a temporary solution and it degrades fish and wildlife habitat. Mature riparian vegetation, such as willow, usually has a relatively open understory which allows flood flows to pass. Removal of vegetation may decrease channel roughness in the first year, but brushy immature growth in subsequent years may actually increase roughness to levels higher than prior to vegetation removal. Therefore, once mature vegetation is removed frequent removal of immature vegetation mechanically or by use of herbicides is required. Selective maintenance, which allows a mature overstory to develop, shades and retards understory growth and is thought to be beneficial for flood control. This type of maintenance has recently been recommended in the Santa Barbara County Flood Control District EIR on creek maintenance.

#### Enhancement Recommendations

a. Minimize stream channel roughness - Beneficial vegetation removal that would reduce roughness and provide lower-flood inundation levels should include selective removal of large colonies of giant reed (*Arundo donax*). This plant grows in dense tufts and acts as a barrier to flood waters, unlike the open understory of mature willow. The benefits of reduced flood control maintenance operations would be reduced maintenance costs and less impact to habitat. Costs associated with initial

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removal of undesirable vegetation would be approximately \$10,000. Subsequent removal of colonizing plants would be conducted using volunteer labor at a cost of approximately \$1,000 per year or less.

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- b. **Remove debris** Consistent removal of foreign materials from the river channel which could block floodflows, such as trash, shopping carts, and car bodies should be conducted. Annual costs would be approximately \$1,500 or less. Benefits include improved wildlife habitat and increased floodflow capacity.
- c. **Improve water quality** Recommendations a and b in the Lower Estuary Section would also improve water quality in the river channel.

#### 4.0 PUBLIC ACCESS AND INTERPRETATION

The objective of this section of the report is to outline the various public access elements recommended for implementation. Recommendations are given for the location and construction of an interpretive/educational facility, riparian trail, Second Mouth viewing area, beach access, Seaside Wilderness Park access, bike paths, river mouth access, and the Main Street parking lot kiosk. Also discussed are recommendations for mitigating impacts of the floodplain inhabitants on wildlife resources and a review of possible management and maintenance of public access elements. A summary evaluation of these various elements is provided in Table 1.

#### 4.1 SECOND MOUTH VIEWING STATION

- a. Second Mouth Spur Trail A trail (Figure 4) leading from the Ventura River Group Camp should be constructed into the restored Second Mouth area, ending at a viewing station. The paved trail would cost approximately \$30,000.
- b. Second Mouth Viewing Station A viewing station at ground level should be constructed to provide views into the restored Second Mouth habitat. Benches, interpretive signs, and railings would provide individuals and small unorganized groups a view and basic education of the natural processes and wildlife that inhabit the Second Mouth area, and also be available to larger organized groups led by a docent. The viewing station should be designed to maximize views of the Second Mouth and minimize the disturbance created by visitors. The station should blend into the natural environment, be durable and easily repaired or replaced. The construction cost estimate for the viewing station is \$13,000. All structures constructed would be on State Park property.



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#### 4.2 **RIPARIAN TRAIL**

- a. Handicap-accessible Trail A handicap accessible interpretive trail (Figure 4) approximately six feet wide should be constructed along portions of the existing trail in the riparian area. The surface should be designed to accommodate wheelchair access (e.g., soil cement) and support maintenance and security vehicles (Figure 5). The design should meet the requirements of the State and Federal accessibility regulations. The alignment would allow optimal viewing of the habitat diversity and scenery of the area, while controlling public access and associated negative impacts. In addition, the trail would create an opportunity for hands-on education through placement of educational displays located along the path. Estimated cost for construction of the paved trail is \$70,000. Additional costs would be expected for maintenance. Construction of this trail would be entirely on State Park property.
- b. Interpretive Displays Interpretive displays should be located along the trail covering themes from the study "Botanical Resources at Emma Wood State Beach and the Ventura River Estuary, California: Inventory and Management" (Ferren, et. al. 1990). This would provide the public with greater opportunities for education while allowing them to explore the habitat at their own pace. This would also eliminate the need to have staff available to teach interpretive themes in the area. The cost for installation would be approximately \$14,400. Constructed displays and other structures would be on State Park property.
- c. Interpretive Pamphlet System An interpretive pamphlet and sign post system should be designed for the Riparian Trail. The cost for this type of interpretive education would be minimal. Costs would be approximately \$3,000 but would be offset with a voluntary fee requested for the pamphlets. Structures associated with the pamphlet system would be on State Park property.
- d. **Close existing informal trails** Existing informal trails in the riparian area should be eliminated and replanted with native vegetation. Vegetation and/or rock and dirt cairns would block informal trail access from the Riparian Trail. This would discourage public access in sensitive habitat and decrease maintenance costs for litter control and trail repair. These measures should be supplemented with information signs explaining the importance of staying on the trail. Placement of rock/soil cairns would be on State Park property.

#### 4.3 DUNE STRAND/BEACH ACCESS

a. Access Trail to Emma Wood State Beach - Access from the Ventura River Group Campground to the beach (Figure 4) is a main recreation route. A boardwalk (Figure 5) should be constructed along this route and would facilitate access to the beach and lessen human impacts to the sensitive dune habitat. The boardwalk should be a standard width of five feet and similar to other State Park coastal boardwalks. Estimated cost for construction is approximately \$26,000. Additional costs to monitor

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effectiveness of the trail may be considered. Construction of the boardwalk and associated structures (e.g., benches) would be on State Park property.

- **b**. Beach Trail - The ocean beach should be designated as part of the enhancement trail system by connecting the Emma Wood State Beach and Seaside Wilderness Park boardwalk trails. The trail should end at the Ventura River Mouth to protect sensitive least tern and snowy plover habitat on the sand bar at the Ventura River mouth. Signs should be posted along the trail designating trail restrictions. Costs would be approximately \$3,000. Signs, the only structures needed for this trail, would be located on State Parks and City property.
- Limited Access or Boardwalk Dune Trail Pedestrian access should be limited to C. docent led excursions only. This would protect the dunes from destabilization. especially during the first several years after revegetation of the dunes. Limiting public access would require more substantial railing barriers along the boardwalk between the Ventura River Group Campground and the beach, as well as regulatory signs. Additional security surveillance may be necessary to prevent dune trespass. However, if excessive public access impedes the success of the restoration effort, then a boardwalk along the dunes should be constructed since boardwalk paths for beach visitors are very effective in controlling foot traffic in sensitive habitats. The boardwalk should be placed along the existing trail. Beach visitors would be informed about sensitive habitat issues by the placement of informational signs at strategic points. The lack of security in this area may lead to boardwalk vandalism. The estimated cost to limit beach access to volunteer docent lead tours is \$7,000. This does not include administration costs of the docent program. Construction of a boardwalk along the dunes would cost approximately \$110,000. A boardwalk, if constructed, would be on State Park property.
- d. Educational Displays - Displays containing information about the dune strand habitat would be placed at Beach Trail junctions. Additional information about trail designations and restrictions would also be included. Costs would be approximately \$7,200. Displays established at trail junctions would be on State Parks and City property.

#### 4.4 SEASIDE WILDERNESS PARK TRAIL

Seaside Wilderness Park Trail - A compacted earth trail (Figure 4) four feet wide a. should be constructed. The trail would offer views of various habitats including the Ventura River mouth, coastal dunes, and the ocean, and would have interpretive displays similar to those used on the Riparian Trail. Interpretive themes would include biological, geological and historical site information. Trail access points should avoid sensitive least tern roosting and nesting areas. Removable regulatory signs at entry points and the development of an honor system for trail visitors via informational, interpretive, and regulatory signs should be implemented to inform visitors and control access during nesting season. The Seaside Wilderness Park Trail

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should join the Riparian Trail through a railroad undercrossing to the north and the Beach Trail to the south. The undercrossing would ensure greater public safety than an at-grade crossing, but poses flood hazards and construction integrity of the tunnel would have to be monitored following floods. Erosion would be a particular problem during major flood events as flood flows may be directed through the undercrossing. Permission from and coordination with Southern Pacific would be necessary to implement the undercrossing. Costs for the park trail would be approximately \$17,000; costs for the undercrossing would be approximately \$120,000. The trail and associated structures, such as benches, would be constructed on City property; the railroad undercrossing would be constructed on railroad right-of-way.

#### 4.5 LOWER ESTUARY

- a. Kiosks at River Mouth and Main Street Parking Lot Kiosks should be constructed with several interpretive panels and maps showing alternative access routes to points west of the river (Figure 4). A barrier railing, regulatory signs, and benches would be incorporated into the kiosk design. The kiosks would be designed in the early adobe architecture of the Ventura area (Figure 6). Kiosk construction at the river mouth and the Main Street parking lot would cost approximately \$35,000 each. Construction of these kiosks would be on City property once the parking lot is transferred to the City from its current owner.
- b. Volunteer Docent Program A volunteer docent should be stationed at kiosk locations during peak use times to interpret the natural features of the area and to direct beach visitors to alternate access routes. The cost of this program would be approximately \$1,200.
- c. **Discourage River Mouth/Beach Access** Access at the river mouth (Figure 4) should be discouraged through an interpretive program that would educate beach visitors about the dynamic and sensitive nature of the river mouth habitat. The river mouth is dynamic and during open conditions is dangerous to cross. The river mouth sand bar should be closed to public use to protect least tern and snowy plover habitat. Interpretive and warning signs should be posted to inform visitors of these restrictions. Costs to install signs would be approximately \$600. Signs would be posted on City property.

#### 4.6 **RIVER CHANNEL**

a. Interpretive Display - Views of the Ventura River above the lower estuary are generally blocked by riparian vegetation. Views of the free flowing river would be possible from the Main Street Bridge (Figure 4). Interpretive displays attached to the bridge would provide educational insights to river functions and values. Costs to install this display would be approximately \$3,500. This would be on City property.


## 4.7 INTERPRETIVE/EDUCATIONAL FACILITY

a. Interpretive Center - A covered outdoor interpretive center (Figure 4), should be constructed, 1,500 to 2,000 square feet in size (Figure 7). The structure should be a post and beam, stucco finish design with open sides (Figure 8). The design would provide the necessary functions for a year round unstaffed display system as well as a seasonal or special occasion display system that would require docent staffing.

The primary interpretive element of this structure should be a permanent, all season structure with interpretive panels and display cases (Figure 9). These should be supplemented with a system of displays that would provide hands on experience for visitors on special occasions when the center is staffed with docents. The hands-on display system should be designed to be stored on-site when not in use.

The design of this facility along with proper siting, both in elevation and location (Figure 10) should minimize the impacts of potential flooding to the facility. Raising the Interpretive Center on a fill pad to approximately 19 feet would keep the facility above most flood levels (100-year flood level elevation is approximately 15 feet). The facility may receive rare flooding (greater than a 100-year flood event), but with proper design and construction, damage would be minimal. With selection of an appropriate architectural style (e.g., rustic state park) and appropriate screen planting with native plants which blend with the riparian woodlands to the east, visual impacts of the structure on the area would be minimized. The costs of this design would be approximately \$160,000. Operation and maintenance costs would be additional. Construction of this facility would be on State Parks property.

b. **Outdoor Amphitheater and Classroom** - An amphitheater designed as a lecture space or outdoor classroom should be placed in the vicinity of the Interpretive Center Complex, providing space for outdoor lectures and demonstrations. It would also serve as a staging area for docent-led trips into the estuary. The amphitheater would add to the public's interpretive experience, and encourage more group activity in the area. Design and construction materials (e.g. concrete) used should be resistant to flood damage and easily cleaned following floods. Costs for the amphitheater construction would be approximately \$55,000. Construction of the amphitheater would be on State Parks property.

## 4.8 SOUTHERN PACIFIC RAILROAD BRIDGE/BIKE PATH

a. **Illegal bridge crossing** - A series of warning and regulatory signs could be placed at the intersection of the railroad bridge and bike path to prevent/control access across the bridge. Signs would cost approximately \$1,200. Structures (signs) would be at the crossing on railroad property.





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#### 4.9 MITIGATING IMPACTS OF FLOODPLAIN INHABITANTS

- a. **Trash Reduction** Distribution of trash bags to floodplain inhabitants and coordinated trash pickup should be conducted on a periodic basis. This would reduce adverse impacts on natural resources by human inhabitants. This element would have the added benefit of improving the living conditions of the floodplain inhabitants. Coordination would be the responsibility of the City of Ventura. Costs would be approximately \$3,000 per year.
- b. **Off-site Campground** A location outside of the Ventura River floodplain should be investigated, and if feasible, acquired and developed to provide camping facilities for floodplain inhabitants. Social service providers should talk to inhabitants and educational pamphlets should be distributed to help inform floodplain inhabitants about the alternative off-site campground and other services available to them. In addition, an educational program in the river mouth area should be implemented to direct additional itinerant campers to the off-site campground. Participation by social service personnel, non-profit personnel, State Parks employees, and City staff would be necessary to implement and sustain the relocation. An off-site campground is desirable because it would greatly reduce the impact of human disturbance on the area's resources. It would also improve the living conditions of those being relocated. However, it would be expensive to implement and continued outreach would be time consuming and could be costly.

#### 4.10 PUBLIC ACCESS AND FACILITIES SUMMARY

The public access and facilities concepts presented in this plan all have the goal of creating an acceptable balance between public access and recreation, resource preservation and enhancement, public safety and security. With strong emphasis on interpretation and education, these recommendations would promote a positive relationship between visitors and the natural resources of the study area. In addition, the knowledge and respect the park visitors achieve through these programs will be passed on to others. Construction cost and operations and maintenance costs are also considered.

Project recommendations consist of a well integrated public access system which facilitates all existing public access uses, patterns, and programs. This system includes the following elements:

- 1. Interpretive Center Complex with outdoor amphitheater/classroom
- 2. Handicap accessible trail in the riparian area of Emma Wood State Park
- 3. Second Mouth viewing station
- 4. Boardwalk Beach Trail from Emma Wood State Park
- 5. Interpretive trail consisting of informational and regulatory signs in the Seaside Wilderness Park.
- 6. A trail connection between the Riparian Trail and Seaside Wilderness Park Trail under the Southern Pacific railroad tracks.
- 7. An interpretive kiosk with barrier railing at the river mouth and Main Street parking lot, with a volunteer interpretive/security attendant during peak visitor season.
- 8. Periodic trash pickup at the Main Street Parking area which would reduce impacts on the river habitats and improve living conditions of the floodplain inhabitants.

These recommendations have a strong emphasis on protection of natural resources and on public access, and it organizes and facilitates existing use patterns. Natural resource aspects would be greatly enhanced by creating facilities that accommodate existing interpretive programs, and that would provide extensive self-guided interpretive experiences. These programs and experiences would be highly accessible to the physically handicapped park visitors.

The proposed interpretive center, outdoor classroom, and interpretive trails increase the opportunity for on-site education and interpretation. However, these elements would also increase the construction and operations costs of the park. Impacts on visual resources altered by the proposed interpretive center and amphitheater would be mitigated by architectural treatments, placement, and plant screening.

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These recommendations deal practically with human disturbance of the study area. Minimum refuse pickup facilities in the area of the Main Street parking lot would be available through coordinated efforts between the City and homeless services providers. Mitigation of the impacts of the floodplain inhabitants is accomplished within the scope of a public access plan. Floodplain inhabitants would be encouraged to use alternate areas for camping, such as an off-site campground, if available, and protect habitat. This would be stressed through an educational program consisting of an instruction pamphlet for river floodplain inhabitants and outreach by social service providers. This solution addresses the issues within realistic physical, financial, and operational constraints.

The high degree of improved public access and interpretation proposed by this alternative would have a substantial impact on construction costs and operations and maintenance budgets. This impact would be reduced by restructuring user fees and phasing of the proposed improvements, particularly the interpretive center.

Optimum operations and maintenance system for this alternative would be achieved under one agency. Goals, objectives, and policies for the entire study area could be easily refined and implemented. This is particularly important for design elements impacting both State and City Parks. Operations and maintenance functions would probably be more efficient and economical. The City is the preferred entity to manage the study area. The State has reached similar agreements in comparable situations which have worked well.

#### 5.0 MONITORING AND MANAGEMENT

Implementation of the enhancement plan will require initiation of monitoring and management programs to guide the enhancement toward overall success. Monitoring is important for two reasons. First, to assure compliance with grants, contracts, and permits. Second,

Ventura River Estuary Enhancement Plan

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monitoring can guide future phases of the project through the experience tested and gained in initial phases. Vegetation monitoring programs would consist of evaluating plant survival, estimating percent cover, or checking re-establishment of non-native plants at revegetation sites. Wildlife use would be monitored by conducting bird counts, small mammal trappings, or catches of fish, amphibians, and reptiles. Water quality monitoring would require periodic analysis of water samples.

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Management would include guiding the implementation of phased elements, addressing problems identified by enhancement monitoring programs, regulating and operating public use areas and facilities, administration of volunteer programs, working to lessen impacts from floodplain inhabitants, and other issues. A coordinating management entity is necessary to accomplish these objectives.

Descriptions of monitoring and management activities, methods, performance criteria, and costs for various habitats and locations are described below. This information is also summarized in Table 3. Cost for monitoring is calculated at two percent of the implementation costs (Table 4).

## 5.1 SECOND MOUTH

- a. Monitor Revegetation and Habitat Use Revegetation efforts should be monitored by conducting survival counts of trees and shrubs and estimating percent cover of groundcover plants, such as grasses. Monitoring should be conducted 90 days, 180 days, and one year following plant installation to determine plant mortality and replacement quantities. Contractors installing plants should be responsible for the survival of plant materials in the first year. Wildlife monitoring should involve appropriate levels of observation to determine general benefits derived from the revegetation effort. Results of monitoring would determine whether performance criteria, set prior to initiation of monitoring, were being met. The initial monitoring period should be five years with yearly reports that discuss monitoring methods, results, and successes and problems being submitted at the end of each year.
- b. **Promote Native Vegetation** Following initial revegetation efforts, enhancement of the area should continue by promoting natural establishment of native vegetation.

This should involve periodic surveys of the area to assess re-establishment or invasion of non-native plants, their removal, and installation of native plants. More effort would be required to remove non-native plants initially. However, as more native plants become established and the Second Mouth area develops into a self-maintaining system, a sustainable habitat which resists invasion of non-native plants would be created. The overall estimated cost of this activity is \$5,000, but this amount could be spread over a number of years depending on availability of funds.

c. Manage Public Use Areas - Management of the public and public use areas and facilities would be required to fulfill habitat enhancement objectives and provide useable and long lasting facilities. Occasional site inspections to discourage development of new or re-development of old informal trails would be required. Maintenance of the trail, viewing area, and interpretive displays due to general use or following floods would be required.

## 5.2 **<u>RIPARIAN HABITAT</u>**

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- a. Monitor Revegetation/Habitat use See 5.1a
- b. Promote Native Vegetation See 5.1b.
- c. Feral Animal Control Feral animals, mainly cats, in the study area should be removed approximately every six months. The preferred method would be trapping the animals and removing them for adoption (if tame) or destroying them in a humane manner. This would be conducted by county animal control with an annual cost of \$15,000. Volunteer organizations might also handle feral cat and dog removal.
- d. Manage Public Use Occasional site inspections to discourage development of new or re-development of old informal trails would be required. Maintenance of the trail, viewing area, and interpretive displays due to general use or following floods would be required. Interpretive trail pamphlets would need to be restocked and pamphlet donations collected on a weekly basis. The pamphlet would also need to be revised approximately once per year to update old and incorporate new information.

#### 5.3 DUNE STRAND

- a. Monitor Revegetation/Habitat Use See 5.1a.
- b. Discourage Public Access and Implement Volunteer Docent Program Public access should be discouraged during the dune enhancement program. Volunteer docents leading small groups into the restoration area would need to be organized and trained. Occasional site inspections should be conducted (by volunteer docents) to determine

Table 3. Monitoring and Management Recommendations for the Ventura River Enhancement Plan. Habitat/Location section numbers refer to sections in the report. Summarized by habitat or location, the monitoring or management activity, method for conducting the activity, and desired performance criteria. Project Phase recommends which phase the activity should be completed.

Habitat/Location		Activity	Method	Performance Criteria	Project Phase
5.0 MANAGEMENT/ MONITORING					
5.1 Second Mouth	a.	Monitor revegetation/habitat use	Plant survival; fish and wildlife use.	Initial revegetation success. Quantity, variety and activities of wildlife use.	3
	b.	Promote native vegetation	Remove non-native plants and replace with natives.	Sustainable habitat with continuing wildlife use.	3
	c.	Manage public use	Occasional site inspections and discouragement of informal trails into restored habitat. Maintain interpretative displays.	Second Mouth would eventually be self- maintaining system requiring minimum management.	3
5.2 Riparian	a.	Monitor revegetation/habitat use	Plant survival; wildlife use.	Initial revegetation success.	1
	b.	Promote native vegetation	Remove non-native plants and replace with natives.	Sustainable habitat with continuing wildlife use.	1
	c.	Feral animal control	Trapping and removal from the site.	Decreased feral animal pressure on wildlife.	2
	d.	Manage public use	Occasional site inspections and discouragement of informal trails into restored habitat.	Vegetation growth becomes dense, discouraging access to sensitive habitat and requiring minimum management.	1
			Maintain interpretative displays.	Clean, readable displays.	1
			Restock interpretative trail pamphlets; revise pamphlets as conditions change; collect pamphlet donations.	Informative and self-supporting trail pamphlet program with high visitor use.	1

Habitat/Location		Activity	Method	Performance Criteria	Project Phase
5.3 Dune Strand	a.	Monitor revegetation/habitat use	Plant survival; small mammal and reptile use.	Quantity, variety, and activity of wildlife use.	3
	b.	Discourage public access during restoration process. Implement volunteer docent lead excursion program. Periodically assess need for public access; if need is too high to control, construct boardwalk trail.	Occasional site inspections and discouragement of public use except for docent led tours.	Low impact to habitat from public use.	2
5.4 Seaside Wilderness P	ark	Monitor revegetation/habitat use	Plant survival; mammal and bird use.	Sustainable habitat.	1
5.5 Lower Estuary	a.	Remove non-native plants and replace with natives	Plant survival or percent cover.	Sustainable habitat.	2
	b.	Monitor water quality	Nutrient levels, pH, temperature, dissolved oxygen.	Improvement of water quality following OVSD facility upgrade.	3
	C.	Monitor fish and bird use	Fish and bird counts.	Increased variety and number of fish; increased variety and number of birds.	3
5.6 River Channel/ Floodplain	a.	Monitor water quality	Nutrient levels, pH, temperature, dissolved oxygen.	Improvement of water quality following OVSD facility upgrade.	3
	b.	Monitor fish and amphibian use	Fish and amphibian counts.	Increased fish and amphibian diversity and number.	2
	c.	Promote non-point discharge cleanup	Investigate non-point sources.	Increased water quality.	3
	d.	Removal of non-native plants, especially large colony-forming species such as Arundo donax.	Periodic inspections to determine extent of invasion and need for removal.	Increased flood flow capacity and native vegetation; self-maintained flood channel.	1
	e.	Discourage flood control practices such as general vegetation removal and grading.	Promote maturation of floodplain vegetation.	Increased flood flow capacity and eventual self-maintained flood channel.	1

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# Table 3. Monitoring and Management Recommendations for the Ventura River Enhancement Plan, continued.

Habitat/Location		Activity	Method	Performance Criteria	Project Phase
	f.	Maintain Floodplain Inhabitant trash removal and educational programs; alternate campground facility.	Periodic assessment of floodplain population demographics. Adjust trash pickup frequency and elements of educational materials.	Reduced human population in floodplain; cleaner habitatwith increased wildlife use; use of alternate campground.	1, 3
	g.	Determine need to collect fees.	Implement fee collection system if needed. Need-based on general fund grants and other resources.	Level of public access use vs. revenues generated.	2
5.7 Intrepretative Center/ Amphitheatre	a.	Educational/Interpretaive programs and activities	Promote use at regional educational institutions.	Use by individuals and educational groups.	3
	b.	Operations	Scheduling, coordination, maintenance.	On-going use.	3
5.8 Volunteer Docent Program		Develop and manage volunteer docent training and support program.	Solicit volunteer docents from local environmental groups. Provide training and program materials.	Participation of public in docent-led programs.	1

# Table 3. Monitoring and Management Recommendations for the Ventura River Enhancement Plan, continued.

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the effectiveness of interpretation and warning signs to keep visitors out. The impacts from public access should be assessed periodically. If use of the area is too great to control, a boardwalk behind the dunes should be considered to focus public access onto a less damaging trail.

## 5.4 SEASIDE WILDERNESS PARK

a. Monitor Native Plant Replacement - Monitoring establishment of native plants and checking recolonization of removed non-native plants should be conducted on a yearly basis. This will assure success of native plant establishment that will lead to increased resistance to non-native recolonization.

#### 5.5 LOWER ESTUARY

- a. Monitor Revegetation/Habitat Use See 5.1a
- b. Monitor Water Quality Water should be sampled in the Lower Estuary to monitor improvement or decline in water quality. Nutrient levels, turbidity, pH, temperature, and dissolved oxygen are water quality parameters that could be easily monitored. Monitoring should be conducted monthly during the summer under closed estuary conditions and every other month under open conditions. Water samples should be collected near the surface and near the bottom of the water column, preferably in the morning. Monitoring should be conducted by a qualified firm. The cost of this program for quarterly assessments would be approximately \$20,000 per year.
- c. Monitor Fish and Bird Use Fish and bird use of the Lower Estuary should be monitored to assess trends in overall habitat quality. Fish seining (catch and release) could be conducted periodically to determine the types of fish that are using the habitat; the tidewater goby would be one fish that should be closely monitored. Observations for larger anadromous fish, such as steelhead trout could be conducted from shore or from bridges. Bird use, especially the least tern and snowy plover as well as migratory and resident birds, should be monitored. The numbers of birds should be estimated and their activity, such as feeding, nesting, roosting, should be noted. Periodic fish and bird monitoring should be conducted by qualified biologists. However, informal monitoring could be conducted through an interpretive program which encourages fishermen and bird watchers to report their observations.

#### 5.6 **<u>RIVER CHANNEL/FLOODPLAIN</u>**

a. Monitor Water Quality - Water-should be-sampled in the River Channel to monitor improvement or decline in water quality. Nutrient levels, turbidity, pH, temperature, and dissolved oxygen are water quality parameters that could be monitored. Monitoring should be conducted quarterly, preferably in the morning.

- b. Monitor Fish, Amphibian, and Bird Use Fish, amphibian, and bird use of the Lower Estuary should be monitored to assess trends in overall habitat quality. Fish seining (catch and release) could be conducted periodically to determine the types of fish that are using the habitat. Observations for larger anadromous fish, such as steelhead trout could be conducted from shore or from bridges. Amphibians should be monitored to determine if numbers and diversity increases. Bird use, especially the least Bell's vireo as well as migratory and resident birds, should be monitored. The numbers of birds should be estimated and their activity, such as feeding, nesting, roosting, should be noted. Periodic monitoring should be conducted by qualified biologists. However, informal monitoring could be conducted through an interpretive program which encourages fishermen and bird watchers to report their observations.
- c. **Promote Non-point Discharge Cleanup** Non-point pollution sources also lower water quality. Although improvements to the OVWTF will greatly improve water quality, efforts should be continued to identify and cleanup non-point sources of effluent. Educational programs should be implemented in the community, including businesses, schools, and the media. Business and school programs would encourage businesses and students to recycle or properly dispose chemical waste, such as used motor oil. The media (newspaper, radio) should be encouraged to publish or broadcast feature articles or programs encouraging recycling.
- d. Promote Native Vegetation See 5.1b
- e. Manage Vegetation for Flood Control Management of floodplain vegetation should lead to stands of mature riparian forest with an overstory that shades and retards understory growth. Minimizing understory growth should have flood control benefits.
- f. Floodplain Inhabitant and Trash Removal Program The population demographics of floodplain inhabitants should be periodically assessed, primarily to determine the numbers of inhabitants and secondarily to determine the types of inhabitants. Coordination should continue between the City, State Parks, and social service providers to monitor the floodplain population, and determine the effectiveness and management of the campground relocation program, content and distribution of educational materials, and the trash removal program. Periodic site visits would be required to determine whether the trash removal program was effective.
- g. Assess Need to Collect Fees Managers of the area should periodically assess the need to collect fees to various public access-facilities or activities. Fees would support various interpretive programs and public access facilities. Need to collect fees would be based on budget short falls from grants and other resources.

#### 5.7 INTERPRETIVE CENTER/AMPHITHEATER

- a. Interpretive Programs The Interpretive Center/Amphitheater should be promoted in the immediate area as well as regionally at educational institutions. Use of the facilities by school and other educational based groups would add validity to the need for public facilities, volunteer docent programs, and funding.
- b. Operations and Maintenance Operation of the Interpretive Center should include coordination of groups using the site as well as scheduling events for residents of the area. Maintenance of the facilities will assure effective and continued use of the facility.

#### 5.8 VOLUNTEER DOCENT PROGRAM

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a. Volunteer Docent Program - A Volunteer Docent training and support program should be developed. Volunteers should be solicited from local environmental groups, such as the Audubon Society. Interpretive program themes offered by volunteer docents will require periodic revision to change information content for the benefit of repeat visitors and as habitat conditions change.

### 6.0 PHASING PLAN FOR PREFERRED ALTERNATIVE

The success of the preferred alternative for the Ventura River Estuary restoration and enhancement is based on three factors. The primary factor is the need for undertaking the restoration following a procedure of adaptive management. Adaptive management is defined as using the initial stages of a restoration or enhancement effort to guide subsequent phases or stages. The initial phases are monitored to determine their effectiveness, modifications in the restoration approach or techniques are made based on that monitoring, and subsequent phases are improved as a result. The second factor in adopting a phased approach is that different parties may engage in the restoration plan at different times. For example, full restoration of the Second Mouth must wait for the implementation of the bridge replacement project. Given the expense of bridge replacement, it may take several years before Second Mouth restoration is implemented. The third factor is cost for restoration and enhancement project implementation. Both state and local funding for restoration are currently limited and may be severely limited in the future. Innovative funding programs may be required and they will have thresholds in total dollars available. Phasing will allow for individual grants or contracts to be implemented over time.

Three phases are described in this section. The first phase are projects that should be implemented as soon as the plan is approved and funding is available. Final design, engineering, and other specifications should be developed following approval of the conceptual plan. Once implemented, these projects should be monitored for their success and effectiveness. All of these activities will provide important information to subsequent projects. The second phase activities will be completed as funding becomes available and as experience from the first phase can be incorporated into the final design for these activities. Third phase activities generally require substantial involvement of outside parties. Although these activities must be integrated into the overall conceptual plan, implementation will likely involve regulation by permitting agencies for activities either promoted by the project's managing entity or required as the result of forced mitigation.

## <u>6.1 PHASE 1</u>

#### **Restoration and Enhancement**

Activities which would increase habitat value and should be implemented in Phase 1 are listed below.

#### Riparian habitat

Three activities to be implemented in this phase include: (1) closing informal trails; (2) removal of non-native, invasive plants on the western river bank floodplain; and (3) installing native plants in areas where non-native plant have been removed. It is recommended that the most extensive stands of non-native plants be removed in this first phase to eliminate large seed sources and to provide an opportunity to undertake significant revegetation. Native plants should be installed in the fall without irrigation, however, monitoring success will determine if this is a desired practice in subsequent phases. The revegetation program will require on-going weeding of invasive species and signs and/or fencing to keep the public outside the revegetation area.

#### Seaside Wilderness Park

Similar activities as proposed for the riparian area should be undertaken in Seaside Wilderness Park. The City has been awarded a Habitat Conservation Fund grant for this activity.

#### Lower Estuary

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A system for trash and debris removal should be instituted for the lower estuary and river mouth area.

#### Public Access

Activities which would improve public access in Phase 1 are listed below.

#### Riparian Trail

Only trail segment 3 will be completed under this phase. The trail begins at the Ventura River Group Camp, winds through riparian habitat on the western river bank, and ends at a viewpoint overlooking the Ventura River estuary just north of the railroad. Where required, informal trail connections will be closed. The alignment of the trail in this phase should be established to accommodate the necessary features for upgrading to a handicap accessible trail in the second phase of the project. Educational displays and an interpretive trail pamphlet will be provided at the trail head with additional displays along the trail and at the river viewpoint.

#### Beach trail

A trail will be designated along the beach in Emma Wood State Beach and Seaside Wilderness Park. The trail will be restricted to the unvegetated foreshore up to the Ventura River mouth and signage will be installed to restrict access to least tern nesting areas on the river mouth sand bar.

#### Monitoring and Management

A monitoring program will be established for the plant removal/revegetation program. This program will investigate the effectiveness of various techniques and procedures used to remove non-native plants and reestablish native plants. A program monitoring water quality in the lower estuary should be initiated when new water treatment levels are instituted by any dischargers to the Ventura River.

During Phase 1 implementation, project management will be required for all phases of the project. After construction, management will be required to police the trail system, repair/maintain the signs and displays on trails, determine trash and debris removal needs, and enforce restrictions on entry to revegetation and least tern nesting areas.

## <u>6.2</u> <u>PHASE 2</u>

All new activities covered under Phase 2 are described below. It is also possible that activities in Phase 1 will be continued as needed to respond to the findings from the monitoring results.

#### **Restoration and Enhancement**

#### Riparian habitat

An animal control program focusing on feral and/or non-native animal pests will be instituted to trap and remove these animals. This program will improve wildlife habitat, especially in the newly established revegetation areas.

#### Dune restoration

All physical constraints, such as informal trails, to natural dune expansion will be removed. Some sand placement may be required in areas of erosion.

#### Lower estuary

A non-native plant removal and native plant replacement program will be instituted in areas immediately surrounding the river mouth and lagoon. In addition, fairground buffer plantings on the river levee will be completed.

#### Public Access

Phase 2 public access activities will provide upgrades to Phase 1 activities as well as adding new features.

#### Riparian Trail

The riparian trail will be upgraded to an all-weather, handicap accessible trail.

#### Dune Strand/Beach

A boardwalk will be constructed along the dune swale trail.

#### Interpretive facilities

The interpretive center and amphitheater will be constructed and opened.

#### Monitoring and Management

On-going monitoring, especially of the plant removal/re-establishment program will be undertaken. Management efforts will focus on the expanded public access and interpretive facilities.

#### <u>6.3 PHASE 3</u>

Phase 3 activities may be accomplished in conjunction with earlier phases, if funding is available or regulatory actions require compliance or mitigation. Otherwise, phase 3 activities must be postponed given the need for substantial funding and/or earlier monitoring to assure effectiveness.

#### **Restoration and Enhancement**

Phase 3 activities are described below.

#### Second Mouth

All enhancement measures at the Second Mouth are dependent upon the ability of the various entities involved (e.g., bridge, oil pipeline, telecommunications) to contribute to the overall enhancement. Although each entity is independent in their permitting needs, agencies responsible for permitting should be cognizant of the needs to protect and expand habitat at the Second Mouth.

#### Dune Strand

After establishment of the boardwalk in phase 2, a dune enhancement program involving removal of non-native plants and re-establishing native plants will be instituted. This program will lead to increased habitat value.

#### Lower Estuary

Decreases in nutrient loading will be an outcome of regulatory actions on various dischargers to the lagoon. The effectiveness of these actions should be monitored.

#### Public Access

Trail linkage will be an important aspect of Phase 3.

### Second Mouth

With the expansion and enhancement of the Second Mouth, trail segment 4 will be constructed to a viewpoint at the Second Mouth. In addition, the informal trails between the Second Mouth and the river will be evaluated and a determination made to either link the Second Mouth to the proposed railroad underpass or eliminate it. The determination will be based on observed impacts to vegetation in this area.

## Seaside Wilderness Park/Beach Trail

A major need before completing the trail linkages is for a pedestrian underpass beneath the railroad at the river. The underpass will provide a safe crossing for users of the trail system.

#### Monitoring and Management

A water quality monitoring program should be instituted after nutrient removal activities are completed.

#### 6.4 PHASE 1 IMPLEMENTATION COST ESTIMATE

The cost estimate of implementing Phase I activities is given in Table 4. Estimated costs are based on current industry standards. Components of each element and/or activity included in the cost estimate are as follows:

Native plant replacement

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- Remove invasive non-native plants
- Prepare planting holes (amendments included)
- Install native trees and shrubs (cost of plant and protective screen included)
- Apply native grass and forb seed mix
- Install temporary irrigation

Riparian woodland expansion

- Clear and grub area/some minor grading
- Prepare planting holes (amendments included)
- Install native trees and shrubs (cost of plant and protective screen included)
- Apply native grass and forb seed mix
- Install temporary irrigation

Close informal trails

- Place rock/dirt cairn at trail head
- Prepare planting holes (amendments included)
- Install native trees and shrubs around cairn and approximately 100 feet along trail (cost of plant and protective screen included)
- Apply native grass and forb seed mix
- Install temporary irrigation

Interpretive monument

- Design and fabricate interpretive display
- Install monument

Warning or Directional signs

- Verbiage printed on heavy gauge aluminum plate
- Install sign on metal or wooden post

Debris removal

- Remove unsightly, discarded debris such as shopping carts or tires
- May involve one time removal of a car body observed under Highway 101 bridge

Volunteer docent program

- Design and printing of brochure or other educational materials
- Provide educational equipment such as binoculars

Trash Reduction

• Dispense trash bags and pick-up every other week

Table 4. Ventura River Estuary Enhancement Project. Phase 1 cost estimate by jurisdiction.

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PHASE 1 ACTIVITY	ESTIMATED QUANTITY	<u>UNIT</u>	UNIT <u>PRICE</u>	ITEM <u>SUBTOTAL</u>	<u>TOTAL</u>		
CALIFORNIA DEPARTMENT OF STATE PARKS							
RESTORATION/ENHANCEMENT	r						
Riparian							
Native plant replacement	20	80	\$12,000	\$240,000			
Riperian woodland expansion	1 <b>4</b>	ac	18,000	72,000			
Close informal trails	20	69	600	12,000	\$324,000		
PUBLIC ACCESS							
Riparian							
Interpretive trail							
Construction (unpayed)	18.000	र्श्व	05	9.000			
Internative monument	4	69	3 600	14 400			
Directional sign		69	300	1 200			
Pemphiat system	1	la la	3 000	3,000	\$ 27 600		
Dune Strand/Beach	•	~	0,000	0,000	¥ 27,000		
Boseb trail							
Deach liall	4	~~	2 600	2 600			
	1	69	3,800	3,000	• • • • • • •		
Directional sign	10	69	300	3,000	\$ 6,600		
SUBTOTAL					\$358,200		
CITY OF SAN BUENAVE	NTURA						
RESTORATION/ENHANGEMENT	<b>r</b>						
RESTORATION/ENMANCEMENT	•						
Seaside Wilderness Park							
Native plant replacement	13	80	15,000	195,000	\$195,000		
Lower Estuary							
Special status species protec	tion						
Interpretive monument	1	63	3,600	3,600			
Warning sign	2	63	300	600	\$ 4,200		
PUBLIC ACCESS							
Lower Estuary							
Volunteer docent program	1	ls/yr	1,200	1,200	\$ 1,200		
Floodplain Inhabitants							
Trash reduction	1	ls/yr	3,000	3,000	\$ 3,000		
		-			•		
SUBTOTAL					\$203,400		
STATE DADKS and CIT	~						
STATE PARKS and CIT	T						
RESTORATION/ENHANCEMENT	r						
REGIORATION/ENTANOEMENT	1						
		4-4	4.000	4 6 6 6			
Debris removal	1	ls/yr	1,800	1,800	\$ 1,800		
PUBLIC ACCESS							
Southern Pacific Bridge Cro	ssing						
warning sign	4	<b>6</b> a	300	1,200	\$ 1,200		
SUBTOTAL				•	\$ 3,000		
TOTAL PHASE 1 IMPLEMENTATION \$564,							
PHASE 1 MONITORING							
Revegetation/Public Access (yrs 1, 2, 3, 5, 7, 10 @ 2%/vear of total implementation costs)							
STATE PARKS	w	<b>~</b> , .		\$ 43 200			
CITY				24 600	\$ 67 900		
Water Quality (quart	artv assessmente in um	1 2 3 5 7	10)	6-1,444	\$120,000		
	City abacoonticitto ili yla	., ., ., ., ., /	,,		φ120,000		

## 7.0 MANAGEMENT OF THE ESTUARY AS A UNIT

The Ventura River estuary is a natural system linked by overlapping species distributions, water quality and quantity considerations, and human use. The studies prepared for this plan have demonstrated the interdependencies of these factors. The current land management based on ownership fails to consider the means by which a uniform set of policies can be implemented. In addition, external considerations such as sand and gravel mining, flood control management, and treated wastewater discharge need to be addressed in terms of an overall approach to ecological management of the estuary.

A management "unit" should be created for the implementation of the final enhancement plan. The role of the management unit would be to:

- 1. Protect, enhance, and manage the natural resources of the Ventura River estuary and delta.
- 2. Increase public awareness of the natural resource values of the region.
- 3. Coordinate reviews and comments on impacts to the estuary from upstream and adjacent land uses.
- 4. Solicit funding for high priority projects.
- 5. Provide a base for volunteer programs promoting the protection and natural resource management of the estuary.

The need for one management authority has been recognized in previous studies of the estuary by Ferren, et. al. (1990). Possible options are discussed below:

1. Joint Powers Authority - Joint Powers Authority might be serve as a vehicle for a single management unit. A JPA is an independent governmental agency with power to acquire land, plan, improve, operate, and ominatian property. Under federal tax laws, contributions to the JPA are as tax deductible as contributions to a private charitable 501(c)(3) organization. For example, the JPA for the San Dieguito River Valley in northern San Diego County has established various funds for restoration and recreational enhancement, has initiated an education program, and sponsors programs for estate planning and giving. It is not likely that any of the existing landowners would be willing to transfer their properties to the JPA without compensation; therefore, it is assumed that ownership of the separate parcels would remain the same (unless an agreement is reached

for a transfer of property). Generally, JPA's are established among local authorities and consideration of the potential for uniting state and local agencies needs to be explored.

- 2. Transfer to State Parks Another management option would be the consolidation of the properties under the management of the California Department of Parks and Recreation as recommended by Ferren, et. al. (1990). This would require that DPR acquire privately held lands and take responsibility for management of the Seaside Wilderness Park. The latter should be combined with the Ventura River Group camp as an Ecological Preserve so that appropriate management policies can be set for these areas consistent with the findings of this report. A disadvantage of transfer of management responsibility to DPR is the uncertain future as state budgets for parks are cut. While this may only be a short-term issue, the funds for the management of the Ventura River mouth could easily be lost in the General Fund and not be retrievable. This is true even for funds generated by the campground itself. Given that the project is likely to occur over many years, the "see-saw" nature of the state budget in recent years does not bode well for a state take-over of the project site.
- 3. Operation by City of Buenaventura A third alternative is the transfer of management to the City of Buenaventura. While the City is also faced with budget shortfalls, it has a more direct interest in the area since it serves City residents as well as brings tourists to the area. The City has an important role in the management of the public access and homeless issue in the project area. The City could also manage the campground and use those funds directly for the management of the river mouth restoration plan. The City could more easily grant a concessionaire the right to operate the campground in exchange for funds to enhance the river mouth. The City is also eligible to receive grant funds from the State Coastal Conservancy whereas other state agencies are not eligible. The Conservancy is likely to be a major source of funds to this project. The City could also oversee mitigation efforts and funds from the Southern Pacific RR, CalTrans, and the pipeline and telecommunications companies that may be required to provide mitigation for their activities.
- 4. Memorandum of Understanding A fourth alternative is a weaker union of all landowners through a memorandum of agreement (MOA). The MOA would coordinate activities among the various landowners. An MOA would need to be signed so that the landowners could agree on the basic goals for the management of the estuary. It is recommended that the goals and objectives within this plan be included in the MOA.

The selection of a management agency is largely a policy decision among the various parties. It is recommended that a single agency be charged with overall responsibility and that the key criteria of selection of a preferred arrangement be one in which the funding for implementation is assured

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to be maintained in a single account dedicated to the use of the Ventura River Estuary Enhancement Program. In addition, the staffing for oversight needs to be guaranteed if the program is to be effective over the long-term.

### **8.0 COOPERATIVE OPPORTUNITIES**

"The biological richness of the study area is directly related to the interfacing of four wetland systems (Marine, Estuarine, Riverine, and Palustrine) and adjacent uplands" (Ferren, et. al. 1990). The botanical richness of the area in turn leads to high faunal diversity despite urbanization and transportation corridors that have fragmented and reduced the size of the Ventura River delta. Studies such as this have contributed to the biological understanding of the area. However, cooperative efforts should be made to provide additional understanding and detail to specific subjects, such as the following:

- 1. Documenting the seasonal species diversity and density of aquatic invertebrates in the lower Ventura River and estuary on a seasonal basis and in relation to temporal changes in salinities and periodic flooding. These organisms form the food base for all fish and a number of semi-aquatic and terrestrial reptiles, birds and mammals and are an important means of assessing the biological conditions of a river system.
- 2. Documenting species diversity of terrestrial insects, including a number of sensitive species that may inhabit coastal dune and riparian woodland habitat on the study area, such as the Monarch Butterfly (*Danaus plexippus*), Globose Dune Beetle (*Coelus globosus*) a Federal Category 2 taxon, and the Sandy Beach Tiger Beetle (*Cindindela hirricollis gravida*) which, according to Ferren, et. al. (1990), historically occurred in the coastal dunes of the region (NDDB 1988). Restoration of the coastal dunes on the study area could be documented by monitoring the presence and densities of dune obligates, such as the Globose Dune Beetle. If this species is found to be absent from the site, it could be reintroduced from nearby populations. Its continued presence in dunes is an indicator of "healthy", stabilized dune habitat (R. Arnold, pers. comm.). Riparian woodlands adjacent to the Ventura River provide suitable winter roosting sites for Monarch Butterflies (Hunt 1991). Eucalyptus windrows north of the Main Street bridge and immediately west of the river functioned as important winter roosts for Monarchs. These windrows were removed in March 1991 following a severe freeze the preceding December (Hunt, per. obs.).
- 3. The Main Street bridge is the largest known bat roost in the area. Additional regional surveys would provide perspective on the regional importance of this roost site. More accurate counts of bats leaving this roost site at dusk should be conducted in conjunction with mist-netting at different seasons and at points farther upstream. Bat use of the Main Street bridge should be monitored on a seasonal basis to determine if the species found

to date remain in this area and are active year-round. The three species of bats found during the 3 July 1992 bar survey are migratory at many coastal localities, moving to the coast in the spring and inland in the fall and winter where they retreat to deeper crevices to hibernate (P. Brown, pers. comm.). Use of a bat detector at different times of the year would establish baseline information on species presence in the study area. It is likely that the river mouth, estuary and adjacent riparian and scrub habitats provide foraging habitat for a large number of bat species (P.Brown, pers. comm.). If *Plecotus townsendii* or *Eumops perotis* are ever captured in mist nests in the area, they should be radio-tagged and tracked back to their respective roosts.

- 4. Conduct more extensive trapping to determine the status and distribution of shrews at the project site.
- 5. Further survey work to determine on-site presence of Gray Fox (Urocyon cinereocargenteus) and/or Red Fox (Vulves vulpes). The latter species may need to be controlled if it becomes prevalent within the project area.
- 6. Document the number, timing, and spawning patterns of adult steelhead entering the Ventura River and the rearing and instream movement of juvenile steelhead, including downstream smolt movement. This investigation should utilize accepted survey techniques, such as Fyke nets and electro-fishing and should include a comparative genetic analysis of fishes to identity significant genetic differences between southern, central, and northern California populations.
- 7. Monitor the upstream revegetation project being conducted by S.P. Milling. Lessons learned, both successful and unsuccessful, can be useful in improving success in the study area.
- 8. The California State Park and Recreation Commission should consider designating portions of the study area as a Natural Preserve. The purpose of natural preserves is to preserve such features as rare or endangered plants and animals and their supporting ecosystems, representative examples of natural communities existing prior to civilization, and geological features representative of geological processes. The presence of these features in the study area, some of which are the only remaining examples in the region, warrants consideration as natural preserve status.
- 9. The City of Ventura Utilities Division and the Casitas Municipal Water District are both beginning watershed sanitary surveys of the Ventura River, which is their primary water source. The primary goals of the EPA mandated watershed surveys are to identify upstream land uses that could significantly-lower-the river's water-quality and create a watershed management program to protect the water supply. Both agencies plan to coordinate their studies since they both must study the upper Ventura River.
- 10. The City of Ventura will initiate master planning for its Avenue Treatment Plant and Foster Park Diversion on the Ventura River. The master plan effort will be an interdisciplinary study that considers the diversion and treatment facility capacities and

. 1 condition, reliability of the Ventura River water source, and the river ecosystem at Foster Park. One important element will be refining the existing river hydrologic model.

11. To comply with the Non-Point Source National Pollution Discharge Elimination System (NPDES) permit requirements, the City of Ventura and the County of Ventura are two of the agencies developing a cooperative storm drainage monitoring and management program for Ventura County. Elements of this program will improve Ventura River water quality in the urbanized permitted area by reducing contamination in stormwater runoff.

#### 9.0 POTENTIAL PROJECT FUNDING SOURCES

There are a variety of funding sources available to implement some or all of the recommendations contained in this report. It is anticipated that a majority of the needed funding will come from public sources such as the Coastal Conservancy, State Parks, the City of Buenaventura, and various state and local bond acts. However, there is also the opportunity to tap private funds, especially as mitigation for existing or planned activities. Replacement of the railroad bridge and the pipeline represent projects that may require mitigation for environmental impacts. These mitigation measures would be addressed in the permitting process and would be required by the Coastal Commission or the Corps of Engineers. The implementation of the mitigation measure would be the responsibility of the applicant; however, the public management agency for the Ventura river mouth could be contracted to conduct the monitoring and management of the restoration measure.

Possible public funding sources include:

#### FEDERAL

#### Land and Water Conservation Fund

This program provides local grants (50 percent matching funds) which are from congressional appropriations and are for acquisition and development of community or regional parks and facilities supporting outdoor recreation activities. Multiple-use trails are a Priority 1 Category under this program. Contact California Department of Parks and Recreation, Sacramento, CA (916) 653-7423.

#### Symms National Recreational Trails Act

This program is part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and provides funding for trail projects. Contact California Department of Parks and Recreation, Statewide Trails Coordinator, Sacramento, CA (916) 653-8803

#### STATE

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#### **Caltrans Environmental Enhancement and Mitigation Program**

Recently enacted in 1989, this program provides funding for trails and habitat restoration projects that provide mitigation for the environmental effects of new or expanded transportation facilities. Funds are available if recent transportation improvements/developments have had impacts in the general area (i.e., not necessarily on-site). Funds are available for planning, acquisition, development, and restoration activities for local, state, federal, and non-profit agencies. The maximum grant for a single project is 5 million dollars. Contact Harold F. Waraas, Environmental Enhancement and Mitigation Program, The Resources Agency, 1416 9th Street, Sacramento, 95814.

#### **California Department of Parks and Recreation**

The Habitat Conservation Fund was created in 1990 under the California Wildlife Protection Act to provide funds to local public agencies for habitat acquisition, enhancement, and restoration. Funding applies to habitat for threatened and endangered species, wildlife corridors, trails, fish, wetland and riparian habitat. Contact Betty Ettinger, Habitat Conservation Fund, California Department of Parks and Recreation, P.O. Box 942896, Sacramento, 94296-0007, (916) 653-8776.

#### **California State Coastal Conservancy Grants**

The Coastal Conservancy awards grants to public agencies and appropriate non-profit organizations to acquire land, restore resources, provide recreational features, and enhance coastal/bay access. The Conservancy only undertakes projects that impact coastal/bay resources. Contact Joan Cardellino (Shoreline and Public Access Projects) or Reed Holderman (Wetland Enhancement), California State Coastal Conservancy, 1330 Broadway, Suite 1100, Oakland, 94612, (510) 464-1015.

#### Wildlife Conservation Board

Funding is provided through the Fish and Wildlife Enhancement Bond Act to correct more severe deficiencies in fish and wildlife habitat in California. Funds are available only for threatened and endangered species. Funds may be used by public agencies only to enhance, develop, or restore flowing waterways for the management of fish outside the coastal zone. Contact John Schmidt, Wildlife Conservation Board, State Department of Fish and Game, 1416 9th Street, Sacramento, 95814.

#### **California Department of Water Resources**

Environmental Water Program - created by the Environmental Water Act of 1989 provides funding for enhancement and restoration projects (not studies) which will contribute significant environmental benefits to the state. Grant monies must be matched by either an equal amount of cash, or a combination of cash and in-kind-services. -Eligible projects-include fisheries habitat restoration and enhancement, riparian habitat acquisitions, restoration or enhancement, and wetland habitat acquisitions, restoration of enhancement. Funds are presently allocated for flood control measures (until 1994). For further information contact Phil Wendt (916) 327-1660, Dale Hoffeman-Floerke (916) 327-1661, 1020 9th Street, Sacramento, 95814, or P.O. Box 942836, Sacramento, 94236-0001.

## **Resources Agency**

Environmental License Plate Fund - Offers grants to state agencies, boards or commissions, city or county agencies, the University of California, or private non-profit research organizations to support projects that help preserve or protect California's environment. Eligible projects include acquisition, restoration or enhancement of resource lands and endangered species, and development of interpretive facilities. All funds are presently allocated for mountain lion/dear habitat. The filing date for application is July 15 each year. For information and applications contact Michelle Mercado, Resources Agency, 1416 9th Street, Suite 1311, Sacramento, 95814, (916) 653-5656, FAX (916) 653-8402.

#### State Water Resources Control Board

Water Quality Management Planning - The State Water Resources Control Board provides water quality management planning grants to state, local, and regional agencies to address a variety of surface and groundwater quality problems. These grants require a 25% non-federal match. Projects most likely to receive funding will focus directly on corrective or preventative actions for water bodies identified as "impacted" in the State's Water Quality Assessment, proposed by agencies with the capacity to perform and complete the proposed work. Projects that are primarily research oriented will not normally be funded. For more information contact Paul Lillebo, State Water Resources Control Board, Division of Water Quality, Water Quality Planning Program, P.O. Box 100, Sacramento, CA 95801-0100, (916) 657-1031

### **California Department of Conservation**

Funding is provided through the California Beverage Container Recycling and Litter Reduction Act. Projects related to market development, recycling activities, and litter reduction are eligible for funding. Statewide non-profits and local conservation organizations, cities, counties, and special districts are eligible to apply. Awards may constitute up to 50 percent of the total project cost, matching other funding sources. Applications are due by June 22. For more information contact Division of Recycling, Program Development and Local Assistance Branch, 801 K Street, 18th Floor, MS-55, Sacramento, CA 95814.

#### **California Department of Boating and Waterways**

This concerns funding for a possible beach erosion reduction program, including structural and non-structural techniques, for the study area. A local community or agency can formally request funding assistance from CDBW by submitting a project feasibility report. Criteria for selection is evaluated followed by potential funding. Contact California Department of Boating and Waterways, Beach Erosion Branch, 1629 "S" Street, Sacramento, CA 95814.

#### **Future Environmental/Conservation Bond Measures**

The Planning and Conservation League is sponsoring a bond act CALPAW to be included on the June 1994 election ballot. -Other bond measures may also be initiated. - Bond measures require voter approval, however, and can not be relied upon given the economic climate in California.

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- Montgomery, James M. Consulting Engineers. 1991. Ventura River study plan. Submitted by Ojai Valley Sanitation District.
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# **APPENDIX A**

Appendix A. Invasive California non-native plants recommended for removal at the Ventura River Estuary properties. Possible replacement plants and propagule types are given. Plant types are as follows: tree (T); shrub (S); forb (F); grass (G).

Plant Type	Non-native Species	Common Name	California Native Replacement Species	Propagule Type
Southern Coa	astal Dune			
F F	Carpobrotus edulis, Mėsembryanthemum crystallinum,	Hottentot fig, Common iceplant,	Abronia maritima, Abronia umbellata Ambrosia chamissonis bipinnatisecta Atriplex leucophylla, Calystegia soldanella	a, Seed, nursery a, seedlings
S/T Nicotiana glauca		Tree tobacco	Tree tobacco Camissonia cheiranthifolia suffruticosa, Distichlis spicata, Haplopappus venetus, Lupinus arboreus, Cakile edentula var. californica,	
Western Floo	dplain Riparian			
G/S	Arundo donax	Giant reed	Salix spp., Juglans hindsii, Planan	s Seed, nursery
Т	Ricinus communis	Castor bean	racemosa, Glycyrrhiza lepidota va	r. seedlings, rooted
F	Fo'eniculum vulgare	Sweet fennel	glutinosa, Persicaria lapathiflora	, cutting, pole cutting
F	Senecio mikanoides	German ivy	Baccharis plummerae, Cordylanthus rigidu	ıs
G	Cynodon dactylon	Bermuda grass	spp. rigidus, Cryptantha muricata va	r.
G	Cardus pycnocephalus Nicotiana glauca	Italian thistle Tree tobacco	jonesii, Holocarpha hermannii	

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Appendix A, continued.

Plant Type Dune Swale	Non-native Species	Common Name	California Native Replacement Species Pro	pagule Type
F F	Cardaria draba Tetragonia tetragonoides	Hoary cress New Zealand spinach	Juncus acutus var. sphaerocarpus, Salix spp., Carex pansa, Carex barbarae, Carex praegracilis, Juncus mexicanus, Ericameria ericoides, Amblyopappus pusillus, Camissonia micrantha, Cryptantha clevandii var. florosa, Lepidium nitidum, Plantago bigelovii ssp. californica	Seed, nursery seedling, division, root mass
Lower Estuary				
S/T G T G G/S	Cortaderia jubata Tamarix ramosissima Pennisetum clandestinum Arundo donax	Pampas grass Salt cedar Kikuyu grass Giant reed	Potamogeton pectinatus, Zannichellia palustris, Carex praegracilis, Scirpus acutus, Juncus mexicanus, Distichlis spicata, Salix spp.	Seed, nursery seedling, container plant, root mass, cutting, pole cutting
Main river cha	nnel			
T G T F G/S T F	Tamarix ramosissima Cynodon dactylon Spartium junceum Ludwigia uruguayensis Arundo donax Ricinus communis Foeniculum vulgare	Salt cedar Bermuda grass Spanish broom Uruguay water primrose Giant reed Castor bean Sweet fennel	Salix spp., Juglans hindsii, Glycyrrhiza lepidota var. glutinosa, Persicaria lapathiflora, Baccharis plummerae, Cordylanthus rigidus spp. rigidus, Cryptantha muricata var. jonesii, Holocarpha hermannii	Seed, nursery seedling, container plant, root mass, cutting, pole cutting

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## Ventura River Estuary Enhancement Plan

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