CITY OF CARPINTERIA

CREEKS PRESERVATION PROGRAM
FINAL DOCUMENT
Volume One

September 2005

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Acknowledgements

The Carpinteria Creeks Preservation Program (Program) was developed and adopted by the City of Carpinteria with the assistance of Padre Associates, Inc. A grant award from the California Coastal Commission LCP Grant Program provided the majority of the funding for the Program. The City funded the remainder of the project. The following people were instrumental in the development and adoption of the Program.

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

FIGURES

TABLES

TABLE OF CONTENTS (Continued)

VOLUME TWO - APPENDICES

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1.0 INTRODUCTION

The Carpinteria Creeks Preservation Program (Program) has been prepared as an implementation program to the City of Carpinteria General Plan/Local Coastal Plan, to guide the preservation and restoration of creeks located within the City of Carpinteria. Carpinteria is located in coastal Santa Barbara County, approximately 10 miles southeast of the City of Santa Barbara, and 16 miles northwest of the City of Ventura (see Figure 1-1). Program creeks drain a combined watershed area of approximately 24 square miles, and include Carpinteria Creek, Franklin Creek, Santa Monica Creek, and Lagunitas Creek. Program creeks and their watersheds are delineated on Figure 1-2.

Local creeks are sensitive resources that provide many important benefits. For example, local creeks support essential aquatic and riparian biological communities, including species such as steelhead trout, tidewater goby, and monarch butterfly that are listed as endangered, threatened, rare, sensitive, or of concern by various federal, state, and local government agencies. Local creeks and adjacent wetlands and riparian areas also convey surface water, transport sediments and nutrients (nourishing floodplains, farmland and beaches), improve water quality by filtering sediments and pollutants from runoff, recharge aquifers, and provide people with water supply, recreational and visual amenities, and opportunities for scientific research.

Local creeks and riparian areas have been substantially degraded by a number of human activities. Impacts that have resulted include the following:

- Alteration of natural hydrologic and geomorphologic processes due to withdrawals and inputs of surface and ground waters, clearing of natural vegetation, changes in topography, alterations to runoff patterns, introduction of impervious surfaces, and direct modification of creek beds and banks for flood control.
- Degradation of potable and ocean and recreational water quality due to increased sediment loads and pollution inputs from agricultural and urban developments, clearing of vegetation, and increased scouring of creek beds and banks.
- Loss and degradation of biological habitat due to the conversion of natural areas to agriculture and suburban/urban developments, alteration of creek habitat and adjacent stream banks, habitat fragmentation, indirect impacts (e.g., noise, lighting, and introduction of non-native species) and impacts to hydrology, geomorphology, and water quality.

These impacts have seriously diminished biological communities supported by local creeks, subjected people and property to increased flooding and erosion, and hindered the use of local surface and ground waters for public water supply. Recreational use and aesthetic enjoyment of local creeks and coastal areas (i.e., beaches) has also been diminished. Existing and future development threaten to cause continued and increased degradation of local creeks,

and prevent natural recovery of creek ecosystems from the damage that has already been done.

There is an extensive framework of federal and state regulations that provide a level of protection to local creeks. Some of the most important regulations include the Federal Clean Water Act, Federal Endangered Species Act, California Porter-Cologne Water Act, California Fish and Game Code, and California Environmental Quality Act. In addition, there are numerous regulations in the City's General Plan/Local Coastal Plan and the Carpinteria Municipal Code that facilitate the protection and restoration of local creeks. However, more detailed City regulations are needed to ensure creek protection and restoration. In addition, regulations are needed to ensure that the City complies with federal Phase II NPDES (National Pollutant Discharge Elimination System) stormwater regulations. The Phase II NPDES stormwater regulations, mandated by the U.S. Environmental Protection Agency (EPA) per the Federal Clean Water Act, have been imposed on small municipalities across the nation to reduce water pollution impacts from municipal storm water runoff.

This Program has been developed by the City to characterize local creeks, and provide the detailed regulations needed to ensure the protection and restoration of local creeks, and City compliance with regulatory requirements. More specifically, the Goals of this Program are the following:

Goal 1 Preserve, restore and enhance local creek and riparian ecosystems, including geomorphology, hydrology, water quality and biological communities. This will ensure the preservation and enhancement of beneficial uses of local creeks, including biological habitat, surface water conveyance, sediment and nutrient transport, floodplain and beach nourishment, water filtration, water supply, recreational and aesthetic enjoyment, educational and interpretive opportunities and scientific research.

Goal 2 Establish regulations to guide the City towards compliance with federal, state, and local regulations that pertain to local creeks, including Phase II NPDES stormwater requirements.

Goal 3 To the greatest degree feasible, balance competing interests between beneficial uses of local creeks.

Goal 4 To provide background information and mitigation measures for use in the environmental clearance document required by the guidelines established under the California Environmental Quality Act (CEQA).

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REGIONAL MAP
FIGURE 1-1

Backside of Figure 1-1

Figure 1-2 Watershed Map (11x17 color)

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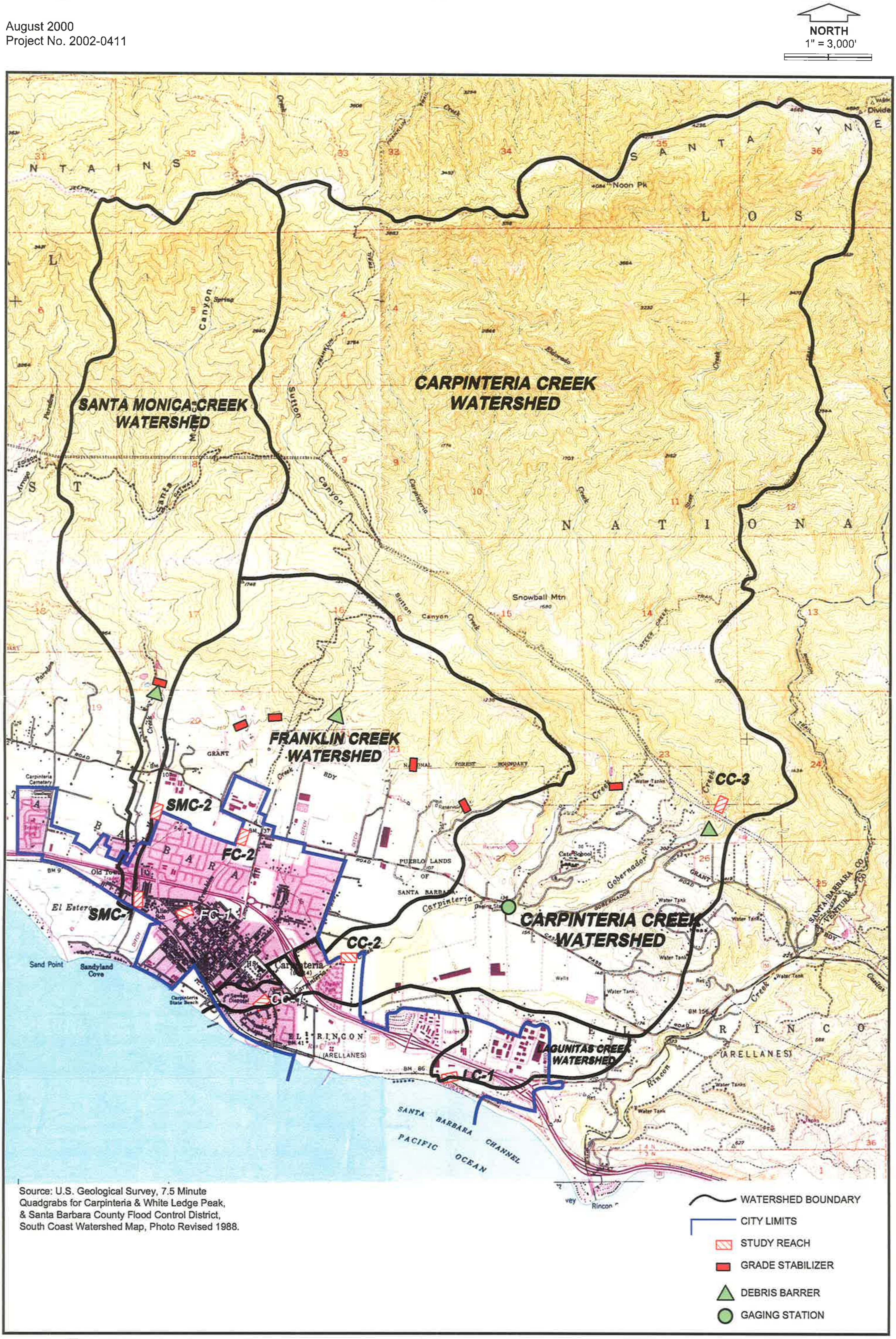
Project No. 2002-0411



Source: U.S. Geological Survey, 7.5 Minute Quadgrabs for Carpinteria & White Ledge Peak, & Santa Barbara County Flood Control District, South Coast Watershed Map, Photo Revised 1988.

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WATERSHED MAP
FIGURE1-2

Backside of Figure 1-2

In order to foster the attainment of Program Goals, the following work has been completed:

- Extensive research of baseline environmental conditions to provide a detailed characterization of local creeks;
- Review of federal, state, and local regulations that pertain to local creeks;
- Evaluation of existing City regulations for deficiencies in meeting Program Goals, and;
- Development of regulations to ensure that Program Goals are achieved. The Program regulations are intended to provide the detail needed to achieve Program Goals, and to build on, rather than replace, the existing regulations provided in the City's General Plan/Local Coastal Plan and Municipal Code.
- Completion of a comprehensive environmental review of the Program, pursuant to the California Environmental Quality Act (CEQA). A Negative Declaration was prepared, circulated for public comment and certified by the Carpinteria Planning Commission on June 17, 2002.
- The City of Carpinteria City Council then reviewed the subject Program in light of the Planning Commission recommendations and additional public comment and approved the proposed Program for its submittal to the California Coastal Commission pursuant to Public Resources Code Section 30510 and the California Code of Regulations Section 13551 (b)(2).
- On July 14, 2004, the California Coastal Commission approved the City of Carpinteria Local Coastal Program amendment to implement the proposed Carpinteria Creeks Preservation Program with suggested modifications.

This final document (the Program) provides the amendments to the Carpinteria Creeks Preservation Program as outlined in the June 25, 2004 California Coastal Commission staff report (Item W7a, LCP Amendment 1-04) and approved by the Commission on July 14, 2004.

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2.0 SETTING

2.1 INTRODUCTION

This section describes environmental conditions that are present in local creeks and watersheds. The discussion of existing conditions is divided into the following subsections: Geology, Hydrology, and Geomorphology; Water Quality; Biological Resources; and Watershed Land Uses. These sections also include brief discussions of federal, state, and local regulations that pertain to the subject.

2.2 GEOLOGY, HYDROLOGY, AND GEOMORPHOLOGY

2.2.1 Geology

Carpinteria is located in the western portion of the Transverse Ranges geomorphic province of southern California. The Transverse Ranges province is oriented in a general east-west direction, which is transverse to the general north-northwest structural trend of the remainder of California's coastal mountain ranges. The Transverse Ranges province extends from the San Bernardino Mountains in Riverside County (east) to Point Arguello (west). The province is bounded to the north by the San Andreas and Santa Ynez faults, the east by the Mojave geomorphic province, the south by the Peninsular geomorphic province and Pacific Ocean, and the west by the Pacific Ocean.

The western Transverse Ranges are composed of sedimentary, volcanic, and metamorphic rocks ranging in geologic age from the Jurassic (144- to 208-million years ago) to Holocene (recent). North-south tectonic compression has resulted in regional east-west trending faults and folds within rocks of the western Transverse Ranges (Norris and Webb, 1990). The Santa Ynez Mountains are one of the east-west trending mountain ranges of the western Transverse Ranges province. These mountains are formed by a large east-west trending anticline (a fold in the rocks creating a mound or ridge) that has been complexly faulted. The Santa Ynez Mountains have been tectonically uplifted, and are composed mainly of marine sandstone and shale rock formations that range in geologic age from Eocene (36 to 57 million years ago) to Holocene (recent). The highest elevation of the local mountains is at Divide Peak, 4,690 feet above sea level.

The lower watersheds of local creeks include portions of the Carpinteria Basin and adjacent coastal lowlands. The Carpinteria Basin covers an area of approximately 12 square miles. The basin is bordered to the north by the Santa Ynez Mountains and the south by the east to west trending Carpinteria Fault (See Figures 1-2 and 2-1). The basin extends from near Highway 150 and Rincon Creek (east) to offshore of Summerland (west).

The Carpinteria Basin is a syncline, a basin-like formation of sedimentary bedrock that has been filled over time by marine and non-marine alluvial sediments. The alluvial deposits are between several hundred and several thousand feet thick, and have been eroded from the

northerly mountains by existing and ancestral creeks (Jackson and Yeats, 1982). The basin was formed during the Pleistocene, or within the last two million years, which is relatively recent in geologic time. Within the Pleistocene, complex faulting of the basin began forming geographically significant areas such as Shepard Mesa (Figure 2-1, lower Carpinteria Creek Watershed) and the Summerland Hills (west of area shown in Figure 2-1). Major faults include the east-west trending Carpinteria fault, which forms the basin's southern boundary, and the Rincon Creek fault, which is also east-west trending, and divides the basin into southern and northern units (see Figures 1-2 and 2-1). (The colored areas in Figure 2-1 represent different geologic formations. A detailed discussion of the different formations in each watershed is presented in Section 2.2.5.)

Major faults that traverse the local area are shown on Figure 2-1. The largest of these faults are the Red Mountain fault, located about one to two miles offshore of Carpinteria, and the Arroyo Parida fault system, located about two miles north of Carpinteria. The Red Mountain fault is designated as an "active" fault by the California Division of Mines and Geology (CDMG). A fault is considered active if it can be substantiated that the fault has experienced rupture of the ground surface during the Holocene (within the last 11,000 years). The Arroyo Parida fault is designated by CDMG as potentially active. A fault is considered potentially active if it can be substantiated that it has experienced surface rupture during the Quaternary (between 11,000 and two million years ago), but not the Holocene. Other faults in the study area include the Carpinteria, Holloway, and Rincon Creek faults. These faults are considered splays of the Red Mountain fault (Jackson and Yeats, 1982). The Carpinteria, Holloway, and Rincon Creek faults are all zoned as potentially active.

2.2.2 Hydrology

2.2.2.1 Surface Waters

In general, creeks in the local area drain small, steep watersheds that originate in the Santa Ynez Mountains and continue through foothills and coastal terrace areas before emptying into the ocean (see Figure 1-2). Before reaching the ocean, the flows of some creeks may pass through wetlands such as the Carpinteria Salt Marsh (El Estero). Flow levels in local creeks exhibit a high degree of variability through time due to a combination of factors. These include the small size and steep gradient of local watersheds, and the highly seasonal pattern of rainfall that occurs in the local area and throughout southern California as a whole. High creek flows occur during and immediately after heavy rainfall events, which occur almost exclusively between November and April in the local area. Generally, low surface flows or dry conditions exist between rainy periods. Some local creeks are also fed by mountain springs, seeps, and groundwater, and maintain perennial (year-round) flow. Perennial creek sections are usually in the mountains and foothills, where seeps and springs are typically located. Lowland creeks and higher elevation creeks without substantial inputs from springs, seeps, and groundwater typically have intermittent (i.e., seasonal) flow.

Figure 2-1 Geologic Map (11x17 color)

Backside of Figure 2-1

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Project No. 2002-0411

NORTH
1" = 3,000'

SANTA MONICA CREEK WATERSHED

CARPINTERIA CREEK WATERSHED

FRANKLIN CREEK WATERSHED

CARPINTERIA CREEK WATERSHED

LAGUNITAS CREEK WATERSHED

SMC-1
SMC-2
FC-1
FC-2
CC-1
CC-2
CC-3
LC-1

Source: Thomas W. Dibblee, Jr., Geologic Maps of the Carpinteria and White Ledge Peak Quadrangles, 1986 & 1987.

SYMBOLS

FORMATION CONTACT
MEMBER CONTACT
CONTACT BETWEEN SURFICIAL SEDIMENTS
FAULT
ANTICLINE
SYNCLINE
STRIKE AND DIP OF BEDDED ROCKS
DIRECTION OF LANDSLIDE MOVEMENT
SANDSTONE BED
CONGLOMERATE BED
FOSSIL LOCALITY
TAR SEEP
SPRING
ABANDONED EXPLORATORY OIL (OR GAS) WELL

ROAD CLASSIFICATION
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
U.S. Route
State Route

WATERSHED BOUNDARY
CITY LIMITS
STUDY REACH
GRADE STABILIZER
DEBRIS BARRER
GAGING STATION

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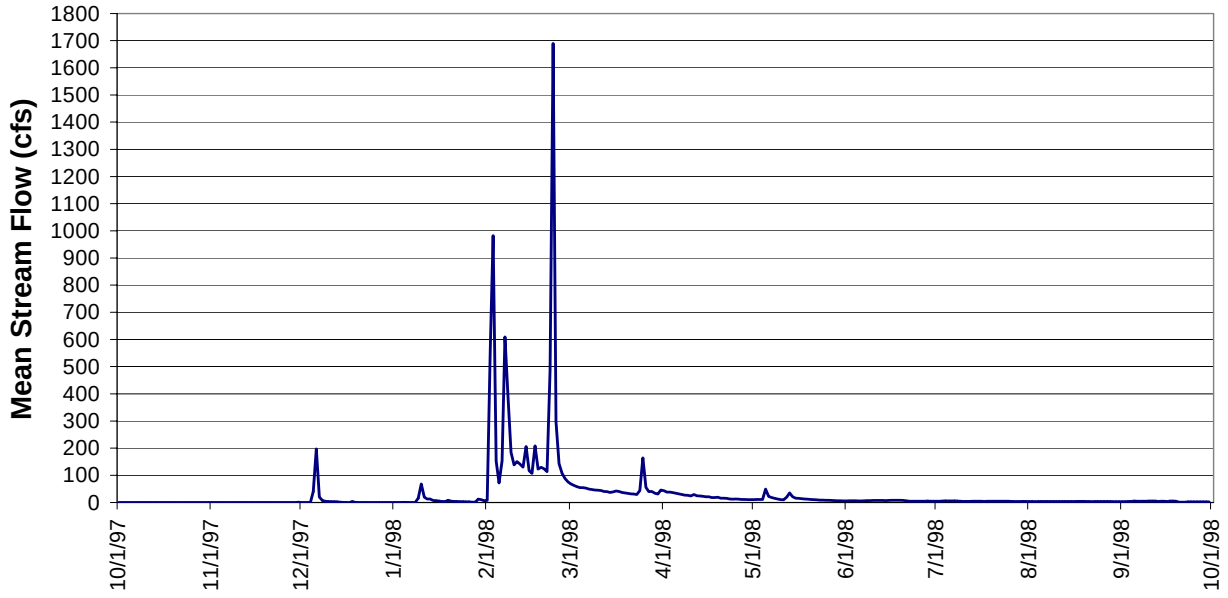
GEOLOGIC MAP
FIGURE 2-1

Figure 2-2. Mean Daily Stream Flow, Carpinteria Creek Gauging Station (11119500), 10/1/97 to 9/30/98



(Source: USGS 2000a)

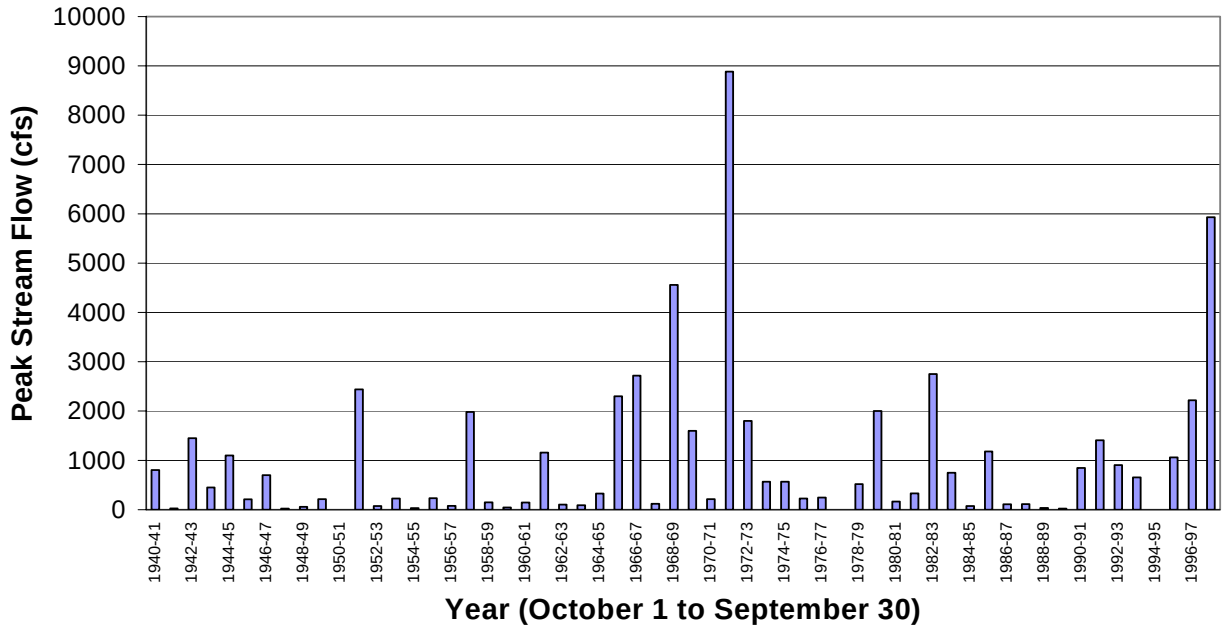
The seasonal flow pattern described above is illustrated in Figure 2-2, which shows mean daily flow data from the United States Geologic Survey (USGS) gauging station on Carpinteria Creek. This gauging station is located between Foothill Road and the confluence of upper Carpinteria Creek and Gobernador Creek (see Figure 1-2). The gauging station continuously records creek flow, and has been providing data since 1941. Flow data presented in Figure 2-2 are from October 1, 1997 through September 30, 1998, or one full year. During this period, mean daily creek flow levels varied from a low of zero at the end of the dry season in 1997 (October and November), to 1,690 cubic feet per second (cfs) during the peak of the rainy season (February 23, 1998). After the rainy season, creek flow decreased considerably, and remained at low levels throughout ensuing summer and fall.

In addition to seasonal differences, creek flows vary considerably between years. This is caused by large fluctuations in annual rainfall. Locally, rainfall averages between 16 and 18 inches per year on the coastal plain, and increases north and up the slopes of the Santa Ynez Mountains, to between 28 and 30 inches per year at peak elevations. However, in some years, rainfall may exceed 40 inches locally. In other years, total rainfall is less than 10 inches. This results in a high level of variability in creek flow levels between years.

The following example illustrates the year-to-year variability in local creek flows. The winter of 1997-1998 brought heavy rainfall to the local area. Mean daily flows in Carpinteria Creek at the gauging station reached 1,690 cfs in February 1998, and flowing water was present at the gauging station through the dry season and into the next winter. However, the winter of 1998-1999 brought little rain. During the 1998-1999 winter, mean daily flows did not exceed 12 cfs at the gauging station. The creek was dry at the gauging station from June 22, 1999 until the following winter.

The year-to-year variability in local creek flows is further illustrated by Figure 2-3, which shows peak (maximum instantaneous) flow data from the Carpinteria Creek gauging station for each year between 1941 and 1998. Peak flows in a given year have varied from a peak of 0.8 cfs during 1951 to a peak of 8,880 cfs during 1971. Note that the peak instantaneous flow for a year will be higher than the peak daily mean flow (compare 1997-98 in Figures 2-2 and 2-3).

Figure 2-3. Peak (Maximum Instantaneous) Stream Flows by Year, Carpinteria Creek Gauging Station (11119500)



* data not available for 1950-51 and 1994-95
(Source: USGS 2000b)

2.2.2.2 Floodplain Boundaries

As indicated in the discussion of flood control regulations (later in this section), the Federal Emergency Management Agency (FEMA) maps flood hazard boundaries for the nation's water bodies. One hundred-year flood boundaries for local creeks were determined in

the flood insurance study conducted for the City of Carpinteria by FEMA in 1985. FEMA has mapped these boundaries for local creeks based on estimated rainfall, runoff, and creek flow rates that would occur during the 100-year storm (Figure 2-4). The 100-year storm is a high-magnitude rainfall event that, in theory, occurs an average of once in a 100-year period.

2.2.2.3 Groundwater

Local creeks are intimately linked to groundwater. As indicated above, springs and seeps are important sources of surface water flow in local creeks, especially in the upper watersheds. Likewise, surface water flow from local creeks is an important source of groundwater recharge, most notably during high creek flows.

The most extensive local groundwater aquifers exist in the Carpinteria Basin, which encompasses the lower portions of several local watersheds, including those of Rincon, Carpinteria, Franklin, Santa Monica, Arroyo Parida, and Toro Canyon Creeks. The mountainous upper watersheds of local creeks are characterized by consolidated bedrock, and are principally areas of surface water runoff. The principal zone of groundwater recharge occurs along the southern base of the mountains, which are underlain by porous unconsolidated deposits of the basin. These margin areas are termed the upper groundwater basin, and hold a significant amount of groundwater. The upper basin covers approximately seven square miles. Available hydrologic data strongly suggests that the Rincon Creek fault acts as an impermeable barrier between the upper and lower portions of the groundwater basin (see Figure 2-1). The lower groundwater basin extends southerly from the Rincon Creek fault, and covers approximately five square miles. This area is also underlain by unconsolidated deposits. However, there are impermeable beds of clay near the ground surface that generally prevent the downward movement of water into deeper strata. This separates shallow, perched groundwater deposits near the surface from groundwater aquifers present in deep strata.

2.2.3 Geomorphology

As indicated above, local creeks originate in steep mountains and pass through foothills and flat coastal plains moving downstream. There is a dramatic difference in the geomorphology of creeks in steep mountains compared to those in flat coastal plains. Representative photographs of local creeks in mountainous areas and foothills are provided in Figures 2-5 and 2-6. Creeks in the mountains are generally high gradient, flowing through narrow canyons with steep slopes composed largely of sedimentary bedrock formations and thin topsoil layers. Creek banks are typically steep, and are often continuous with the canyon walls. Steep gradients generate high velocity creek flows, which scour and erode sediments from the mountains and transport them downstream. Erosion and transport of sediments is especially prevalent during heavy rainfall and corresponding high creek flows. In fact, more erosion and transport of sediments can result in a given watershed during a few days of exceptionally heavy rains and creek flows compared to several years of low to normal flows.

The scouring action of high gradient creeks creates sequences of steep riffles, falls, and pools of varying depths within the creek channel. Creek banks and channels are typically dominated by exposed bedrock and large boulders, some of which are tens of feet in diameter (see Figures 2-5 and 2-6). Creek bottoms also contain smaller boulders and deposits of cobble and gravel. Sand and finer sediments (i.e., silt and clay) are less common.

As creek gradient lessens through the foothills and coastal plain areas, creek velocity and sheer strength (i.e., erosive capability) are also reduced. Due to lower creek velocity, lowland creeks are typically areas where sands and fine sediments are deposited, rather than scoured. During high flows, lowland creeks flood over their banks, lose velocity, and deposit large volumes of cobble, gravel, sand, and finer sediments (i.e., silts, clays) that have been eroded from the mountains and foothills. This deposition creates flat, wide floodplains, which were historically covered with dense riparian forests and oak woodlands. Local floodplains have fertile soils, and have been largely encroached upon by agriculture and urban uses.

Representative photographs of local lowland creeks are provided in Figures 2-7 and 2-8. Large boulders and exposed bedrock are usually infrequent or absent along the banks and channels of lowland creeks. Creek banks and channels typically consist of alluvial (i.e., creek-deposited) materials, including a mix of small boulders, cobble, gravel, sand, and finer sediments. Creek bottom features are less distinct than in high gradient creeks, and typically consist of alternating sections of gentle riffles and shallow pools.

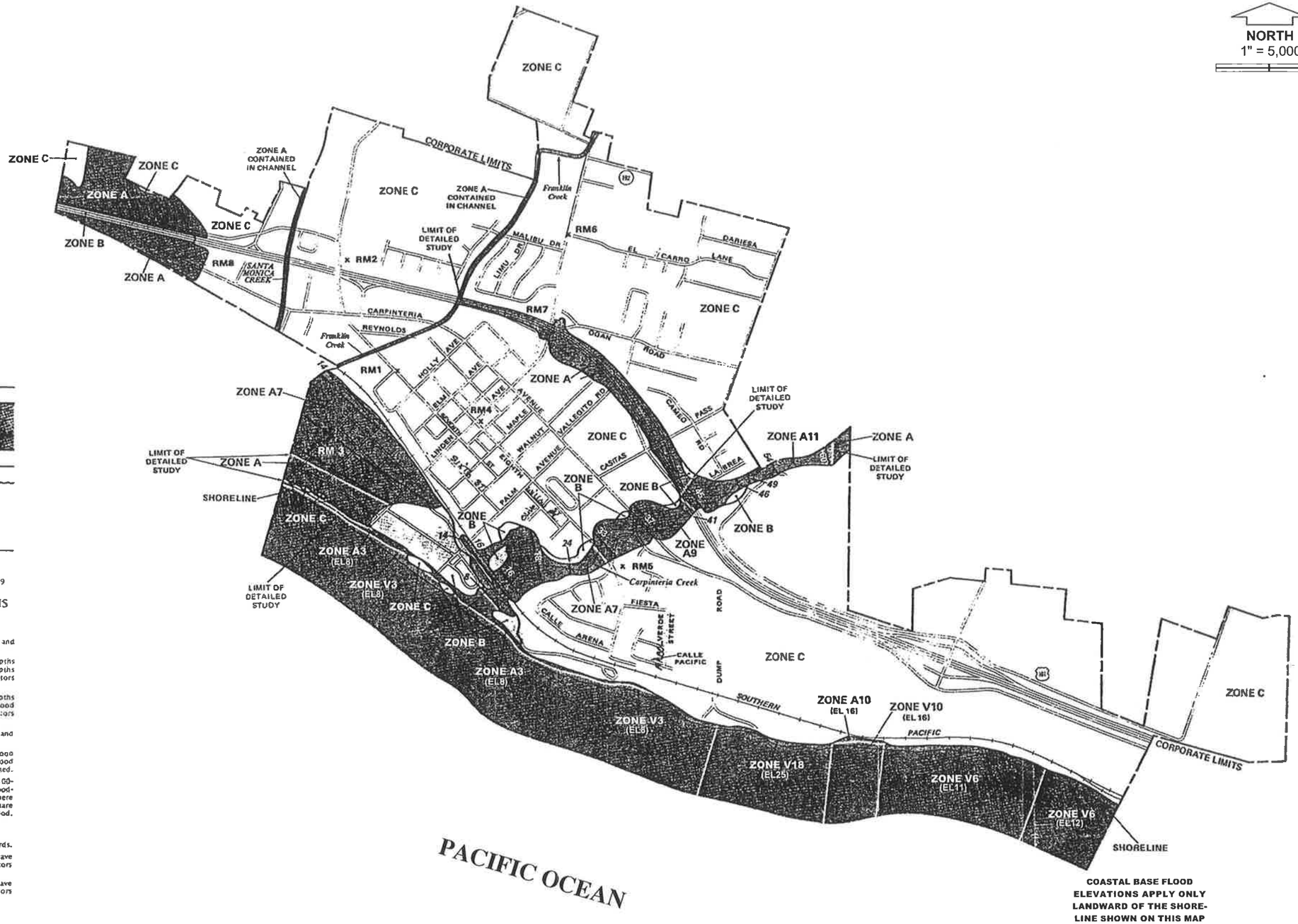
2.2.4 Human Alterations to Local Creeks and Watersheds

Local creeks and their watersheds have been altered by a number of human actions. Urban development has eliminated natural vegetation and paved much of the lower portions of local watersheds. Minor changes in topography and drainage patterns have also resulted. Loss of natural vegetation has eliminated its water absorption capabilities, while the introduction of pavement has prohibited the percolation of water into soils. As a result, urbanization has increased runoff rates (volume and velocity) and inhibited groundwater recharge in the lower watersheds. This has increased the flashiness of the creek flows, as rainwater that once entered the soil and was gradually released to creeks now is quickly conveyed to creeks over the ground surface.

Altered drainage patterns and rates have also changed the patterns and rates of erosion and deposition in local creeks and their watersheds. Increases in runoff have resulted in greater erosion of hillsides, floodplains, and creek banks. This problem has been exacerbated by the loss of riparian/upland vegetation and its soil binding properties, and conversion of floodplains and hillsides to agricultural areas, which expose large areas of soils to erosion by storm water flows. In addition, channelized and straightened creeks convey flow at higher velocities, which increases erosion of creek banks. Also, increased erosion of upstream areas has created higher sediment loads in local creeks, and thus greater sediment deposition in downstream areas.

Figure 2-4 Floodplain Map (11x17 black and white)

Backside of Figure 2-4



KEY TO MAP

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	
Zone Designations	
100-Year Flood Boundary	ZONE B
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation in Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7×
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

SOURCE: FEMA, 1985.

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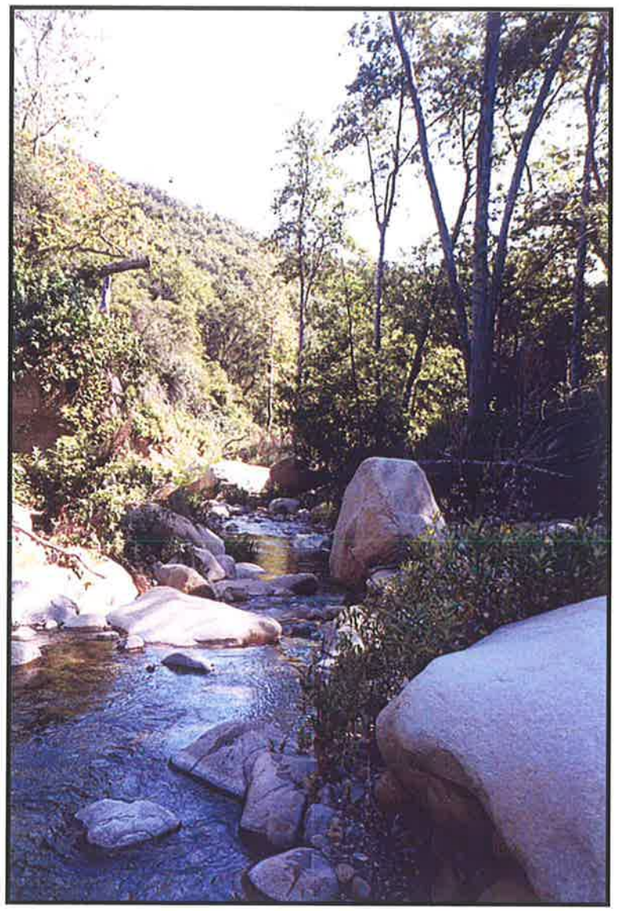
FLOODPLAIN MAP
FIGURE 2-4

Figure 2-5 Photographs of Local Creeks (11x17 color)

Backside of Figure 2-5

August 2000
Project No. 2002-0411



The photographs above and to the left are of a medium to steep gradient section of El Capitan Creek, which is located along the Gaviota coast approximately 15 miles west of Santa Barbara. Notice the narrow canyon this stream passes through. The banks are steep, and are composed largely of bedrock and boulders, as is the streambed. The stream has alternating sections of riffles, most of which are steep and fast, and pools, some of which are large and deep. Most of the stream bed is free of vegetation due to the scouring action of high velocity flows. The stream banks and canyon walls are densely covered with pristine riparian and upland vegetation. This reach of El Capitan Creek is an excellent example of an undisturbed, medium to steep gradient coastal stream.

Gobernador Creek approximately 1/4 mile above detention basin, at 400 ft. elevation (Study Reach CC-3, see Figure 1-2 for location). This stream reach is medium gradient. The channel is formed by bedrock and boulders, with deposits of cobble, gravel, and sand. The banks are steep canyon walls, which are largely covered with dense riparian and upland vegetation.

PHOTOGRAPHS OF REPRESENTATIVE STREAM REACHES
FIGURE 2-5

Figure 2-6 Photographs of Local Creeks (11x17 color)

Backside of Figure 2-6

August 2000
Project No. 2002-0411

Photographs of Gobernador Creek, Study Reach CC-3 (See Figure 1-2 for location). Notice that bedrock sections and medium to large boulders dominate the stream channel. There are also deposits and bars consisting of small boulders, cobble, gravel, and sand. There are alternating sections of riffles and pools. The pool shown in the photograph to the far right is approximately 30 feet in diameter and 6 feet deep. The riparian vegetation is dense, and consists mostly of native species. Dominant riparian trees include white alder, western sycamore, coast live oak, and arroyo willow.

PHOTOGRAPHS OF REPRESENTATIVE STREAM REACHES
FIGURE 2-6

Figure 2-7 Photographs of Local Creeks (11x17 color)

Backside of Figure 2-7

August 2000
Project No. 2002-0411

Looking west along the Main Channel of Franklin Creek, from near the Foothill Rd. / Linden Ave. intersection. The West Branch of Franklin Creek enters the Main Channel in the mid-ground of the photograph. These formerly natural creeks have been converted to concrete box channels.

Photographs of lower Carpinteria Creek (above) and Gobernador Creek (below), near the confluence of upper Carpinteria Creek and Gobernador Creek (approximately 150-160 ft. elevation). These stream sections are low to medium gradient, and maintain a bed composed of medium to small sized boulders, and deposits of cobble, gravel, and sand. These stream sections have alternating riffles and pools of shallow to medium depth, and fairly low, gently sloping banks composed of alluvial material and topsoil. A narrow corridor of riparian vegetation is present. Dominant riparian trees are California sycamore, black cottonwood, arroyo willow, and coast live oak.

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PHOTOGRAPHS OF REPRESENTATIVE STREAM REACHES
FIGURE 2-7

Figure 2-8 Photographs of Local Creeks (11x17 color)

Backside of Figure 2-8

These photographs are of Carpinteria Creek. The top and bottom left photographs were taken at Study Reach CC-1, at an elevation of approximately 25-30 feet. The top right photograph was taken farther downstream towards the creek's outlet to the ocean. This section of the creek is low gradient. Creek bed and banks are composed largely of sand, silt, and clay. There are also small boulders, cobbles, and gravels in the channel. Human impacts are evident in this section of the creek, including pipe and wire revetment (bottom left), non-native vegetation (blue gum, giant reed, various herbs and grasses), trash, debris, and algal blooms (bottom left). This section of the creek is also periodically cleared of excess vegetation, sediments, and debris by the Santa Barbara County Flood Control District.

PHOTOGRAPHS OF REPRESENTATIVE STREAM REACHES
FIGURE 2-8

Other human actions have reduced the amount of water and sediments being conveyed by local creeks. Lower surface water flows and groundwater levels have resulted from creek diversions and the operation of groundwater wells. Detention basins located along Gobernador, Franklin, and Santa Monica Creeks trap sediments that would otherwise be conveyed downstream, inhibiting sediment transport to local beaches. In addition, streams containing sediment basins can experience increased downstream creekbed erosion because stream flows with lower entrained sediment levels will continue to pick up sediment until they reach their velocity-based carrying capacity.

Another important factor affecting local creeks is return flows from urban and irrigated agricultural areas, which enter local creeks through street gutters and storm sewers. The input of return flows can create low flow conditions at times when the affected creek would otherwise be dry.

The net result of the human activities mentioned above is complex. Some creek reaches have experienced increased flows, while others have experienced decreased flows. Some creek reaches have experienced increased erosion, while others have experienced increased sedimentation. However, it can be said that human-induced changes have significantly altered the hydrologic and morphologic conditions in local creeks.

2.2.5 Study Watersheds

The following provides details on geology, hydrology, and geomorphology specific to Carpinteria, Franklin, Santa Monica, and Lagunitas Creeks.

Carpinteria Creek drains a watershed of approximately 15.0 square miles (approximately 9,600 acres). The Carpinteria Creek watershed is delineated in Figure 1-2. The main channel of Carpinteria Creek has two major tributaries: upper Carpinteria Creek and Gobernador Creek. The confluence of these tributaries is just upstream (north) of Foothill Road (see Figure 1-2). The upper Carpinteria Creek watershed includes upper Carpinteria Creek and Sutton Canyon Creek. The Gobernador Creek watershed includes El Dorado Creek and Steer Creek. The Carpinteria Creek watershed reaches a peak elevation of approximately 4,690 feet. Headwater tributaries drain steep hillsides and canyons of the Santa Ynez Mountains. In the foothills and coastal plain, Carpinteria Creek passes through agricultural and urban areas. The creek passes under bridge crossings at U.S. 101 and Carpinteria Avenue, and continues south between the Concha Loma residential tract to the east and downtown area to the west. Farther downstream, the creek passes under the Union Pacific Railroad bridge, and empties into the ocean at Carpinteria State Beach.

Geologic formations in the mountainous upper watershed, and the Santa Ynez Mountains in general, consist of east-west trending bands of sedimentary bedrock. Geologic formations in the upper watershed are shown in Figure 2-1, and include the following: Matilija Sandstone (Tma, Tmash), Cozy Dell Shale (Tcd, Tcdss), Coldwater Sandstone (Tcw, Tcwsh), and Sespe Formation (Tsp, Tspss) (Dibblee, 1986 and 1987). Topsoils within the upper watershed are shown in Figure 2-9, and include the following: Lodo-Rock Outcrop complex, 50

to 75 percent slopes (LbG), Lodo-Sespe complex, 50 to 75 percent slopes (LcG), Gaviota-Rock outcrop complex, 50 to 75 percent slopes (GbG), Todos-Lodo complex, 30 to 50 percent slopes (TdF2), Maymen-Rock outcrop complex, 50 to 100 percent slopes (MbH), and Rock outcrop-Maymen complex, 75 to 100 percent slopes (Rb) (USDA, 1981).

The lower portion of the Carpinteria Creek watershed includes foothills and coastal terrace areas of the Carpinteria Basin. Much of the lower watershed has been converted to agriculture (orchards, row crops) and urban uses. Geologic formations in the lower watershed are shown in Figure 2-1, and include Older Alluvium (Qoa, Qog) in the gently sloping foothills, and Recent Alluvium (Qa) in the coastal lowlands (Dibblee, 1986 and 1987). Topsoils within the lower watershed are shown in Figure 2-9, and include the following: Orthents, 50 to 75 percent slope (OAG), Milpitas stony fine sandy loam, 15 to 30 percent slopes (MdE), Elder sandy loam, 2 to 9 percent slopes (Eb), Todos clay loam, 9 to 15 percent slopes (TbE2), LcG, TdF2, Milpitas-Positas fine sandy loams, 15 to 30 percent slopes (MeE2), Milpitas-Positas fine sandy loams, 2 to 9 percent slopes (MeC), Goleta fine sandy loam, 0 to 2 percent slopes (GcA), Metz loamy sand (Mc), Milpitas-Positas fine sandy loams, 30 to 50 percent eroded slopes (MeF2), Milpitas-Positas fine sandy loams, 9 to 15 percent eroded slopes (MeD2), Camarillo Variant, fine sandy loam (Cb), Goleta loam, 0 to 2 percent slopes (GdA), and Aquents, fill areas (AC) (USDA, 1981).

Peak flow data from the USGS gauging station located just upstream of Foothill Road are provided in Figures 2-2 and 2-3. As discussed previously, Carpinteria Creek, like other local creeks, exhibits a high degree of variability in seasonal and year to year flow rates. However, the Carpinteria Creek watershed is fairly large in the context of local watersheds, and is fed by several springs. As such, this watershed has year-round creek flows more frequently than do some of the smaller watersheds, such as those of Franklin and Santa Monica Creeks.

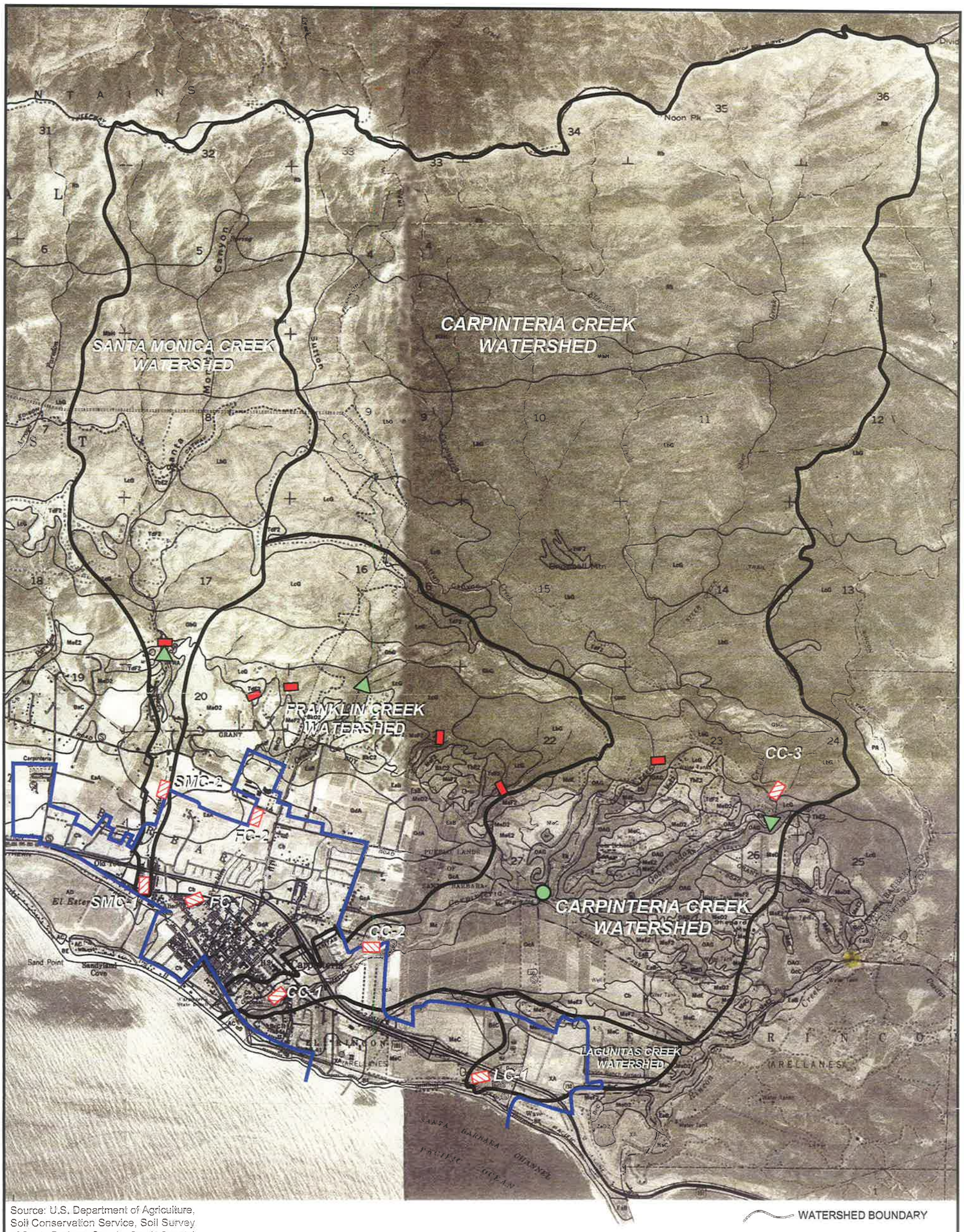
Creeks in the Carpinteria Creek watershed generally have natural beds and banks along their length. However, creek channelization has occurred, primarily in the coastal lowlands. Alterations to the creekbed and banks of lower Carpinteria Creek have been carried out with the primary intention of protecting developed areas, roads, bridges, etc. that encroach upon the creek from flooding, bank erosion, and related hazards. Major flood control facilities in the Carpinteria Creek watershed are shown in Figure 1-2. There is a large detention basin on Gobernador Creek, approximately 1.5 miles upstream the Gobernador Creek/upper Carpinteria Creek confluence. This basin fills with sediments over the course of several years, and is regularly re-excavated and maintained by the Flood Control District. There is a grade stabilizer along upper Carpinteria Creek approximately 1.5 miles upstream of the confluence. Other creek modifications include bank protection structures (pipe and wire revetment, rip rap), at-grade concrete road crossings (summer crossings), and roadway bridges. Some sections of Carpinteria Creek in the coastal lowlands have been straightened. In addition, the Flood Control District regularly conducts minor grading and shaping of the bed and banks of lower Carpinteria Creek to protect development from flooding and bank erosion.

Figure 2-9 Soils Map (11x17 color)

Backside of Figure 2-9

August 2000
Project No. 2002-0411

NORTH
1" = 3,000'



Source: U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Santa Barbara County, South Coastal Part, 1981.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS
Carpinteria Creeks Preservation Program

SOILS MAP
FIGURE 2-9

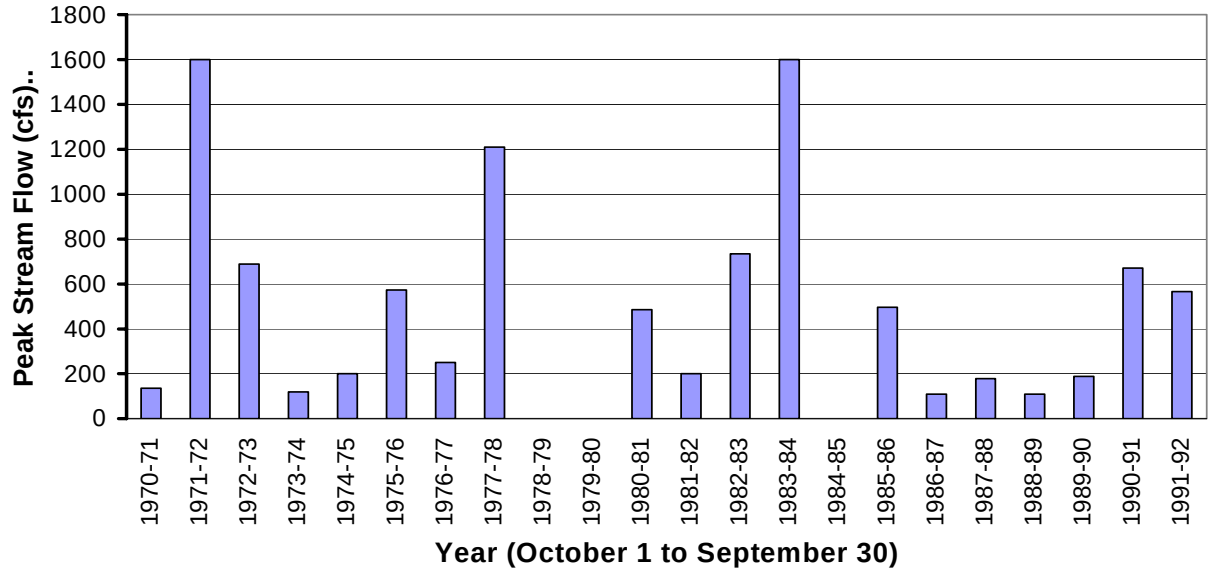
Franklin Creek drains a watershed of approximately 5.0 square miles (3,200 acres), and reaches a peak elevation of 1,746 feet. Major tributaries to the main channel of Franklin Creek include the East Branch, West Branch, and High School Creek. The Franklin Creek watershed is outlined on Figure 1-2. Through the mountains, the tributaries flow through relatively undisturbed National Forest lands. Through the foothills and coastal terrace, the tributaries and main channel of Franklin Creek are flanked by agricultural and urban areas. Franklin Creek empties into the 230-acre Carpinteria Salt Marsh (El Estero), an important coastal wetland.

Geologic formations in the mountainous upper watershed are shown in Figure 2-1, and include Tcw, Tsp, and Tspss (Dibblee, 1986 and 1987). Topsoils within the upper watershed are shown in Figure 2-9, and include the following: LcG, LbG, GbG, TdF2, and MeF2 (USDA, 1981). The lower portion of the watershed passes through the Carpinteria Basin. Geologic formations in the lower watershed are shown in Figure 2-1, and include Qog in the foothills, and Qa in the coastal lowlands (Dibblee, 1986 and 1987). Topsoils within the lower watershed are shown in Figure 2-9, and include TbE2, GcA, TdF2, MeF2, Botella Variant silty clay loam, 2 to 9 percent eroded slopes (BkC2), Botella Variant silty clay loam, 9 to 15 percent eroded slopes (BkD2), MeD2, Elder sandy loam, 2 to 9 percent slopes (EaB), Eb, elder sandy loam, 0 to 2 percent slopes (EaA), GdA, Cb, and Aquepts, flooded (AD) (USDA, 1981).

A USGS gauging station was maintained along Franklin Creek for a 22-year period from late 1970 until early 1992. The gauging station location is approximately 1,500 feet upstream of U.S. 101. Available information from this station is limited to peak yearly flows. These data are shown in Figure 2-10. Like other local creeks, Franklin Creek exhibits a high degree of variability in seasonal and year to year flow rates. During the 22 years of data obtained from the gauging station, peak flows during a given year varied from lows of 109 cfs in 1986-87 and 1988-89 to 1,600 cfs in 1971-72 and 1983-84. Creek flow is dominated by storm water inputs in the rainy season. There are usually year-round low flows in the concrete channel sections of Franklin Creek due to return flows from adjacent urban and agricultural areas.

The main channels of Franklin Creek and its tributaries have been heavily modified in the coastal lowlands. Major flood control facilities are shown in Figure 1-2. A detention basin has been constructed along the West Branch, in the foothills approximately one mile upstream of Foothill Road. Grade stabilizers have been constructed along four tributary creeks in the foothills, including the East Branch. The creek channels have been converted to open, straightened, concrete box channels from the base of the foothills downstream through the coastal terrace (see photograph in Figure 2-7). Natural creek beds, banks, and riparian habitats were destroyed during the construction of these facilities, which were completed as part of the Carpinteria Valley Watershed Project. This project was undertaken in the late 1960's and early to mid-1970's by the United States Soil Conservation Service, Santa Barbara County Flood Control District, and the City of Carpinteria. The project was initiated after a series of major flooding events that occurred along Franklin and Santa Monica Creeks in the 1960's caused heavy damage to adjacent developments.

Figure 2-10. Peak (Maximum Instntaneous) Stream Flows by Year, Franklin Creek Gauging Station (11119530)



* data not available for 1978-79, 1979-80, and 1984-85.

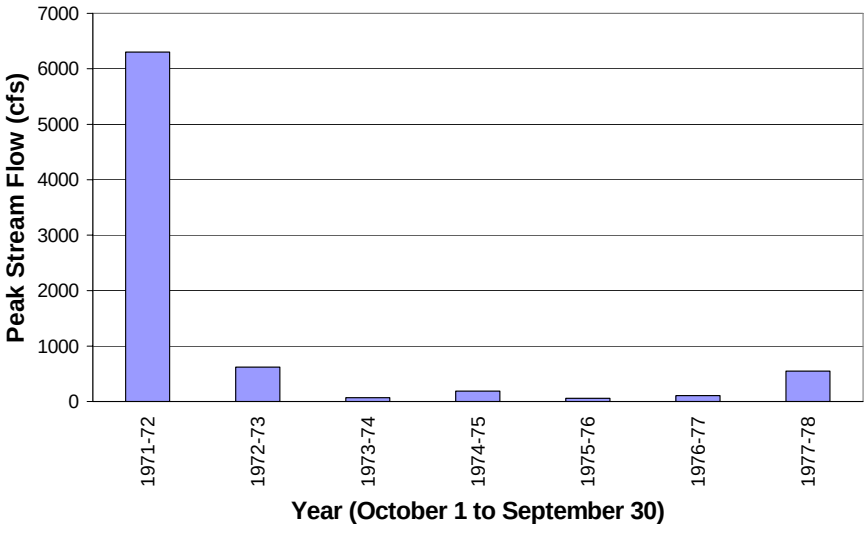
Santa Monica Creek drains a watershed of approximately 3.8 square miles (approximately 2,400 acres) with a peak elevation of 3,835 feet. The main channel of Santa Monica Creek has several unnamed tributaries. The watershed of Santa Monica Creek is outlined on Figure 1-2. Through the mountains, the tributaries and main channel flow through relatively undisturbed National Forest lands. Through the foothills and coastal terrace, Santa Monica Creek is flanked by agricultural and urban areas. Like Franklin Creek, Santa Monica Creek empties into the Carpinteria Salt Marsh.

Geologic formations in the mountainous upper watershed are shown in Figure 2-1, and include Juncal Formation (Tjss), Tma, Tcd, Tcw, Tcwsh, Tsp, and Tspss (Dibblee, 1986 and 1987). Topsoils within the upper watershed are shown in Figure 2-9, and include the following: GbG, LcG, TdF2, TbE2, LbG, MbH, and Rb (USDA, 1981). The lower portion of the watershed passes through the Carpinteria Basin. As shown in Figure 2-1, geologic formations in the lower watershed include Qog in the foothills, and Qa in the coastal lowlands (Dibblee, 1986 and 1987). Topsoils within the lower watershed are shown in Figure 2-9, and include the following: MeD2, TdF2, OAG, Ballard fine sandy loam, 2 to 9 percent slopes (BaC), Riverwash (RA), Eb, EaA, Cb, and AD (USDA, 1981).

A USGS gauging station was maintained along Santa Monica Creek from 1971 to 1978. The data available from this station is limited to peak flow data for these years. The data are

shown in Figure 2-11. During the seven years of data obtained from the gauging station, peak flows in a given year varied from a high of 58 cfs in 1975-76 to a high of 6,300 cfs in 1971-72.

Figure 2-11. Peak (Maximum Instantaneous) Stream Flows by Year, Santa Monica Creek Gauging Station (11119540)



Creek flow in Santa Monica Creek is dominated by storm water inputs in the rainy season. The steep headwater section of the creek is also fed by at least two springs (USGS, 1988). There are usually year-round low flows in the concrete channel section of the creek (lower watershed) due to return flows from adjacent urban and agricultural areas.

Like Franklin Creek, the main channel of Santa Monica Creek has been heavily modified. Major flood control facilities are shown in Figure 1-2. A detention basin has been constructed along the creek near the base of the foothills. Downstream of the detention basin, the creek has been converted to an open, straightened, concrete box channel. The natural bed, banks, and riparian habitat of the creek were destroyed during the construction of these facilities, which, like those of Franklin Creek, were completed as part of the Carpinteria Valley Watershed Project.

Lagunitas Creek drains a small, approximately 300-acre watershed consisting of coastal terrace and foothills in the southeast portion of the City (see Figure 1-2). The peak elevation of the watershed occurs at Mark Hill, approximately 243 feet above sea level. As shown in Figure 2-1, geologic formations in the watershed include Qog in the foothills, and Qoa in the coastal lowlands (Dibblee, 1986 and 1987). Topsoils within the watershed are shown in Figure 2-9, and include MeC, Baywood loamy sand, 2 to 9 percent slopes (BcC), MeD2, Xerorthents, cut and fill areas (XA), and MeE2 (USDA, 1981).

Flow data are not available for Lagunitas Creek. Sources of flow include surface runoff during the rainy season, and return flows from developed areas of the watershed throughout the year. Due to the small size of the watershed, measurable surface water flows in Lagunitas Creek are very intermittent in nature. The creek typically dries up within a few days to a few weeks after major rainfall.

North of U.S. 101, this watershed includes agricultural lands, low-density residential, commercial, and industrial areas. These areas are drained by a network of storm drains and earthen ditches, which convey storm water to a 54" reinforced concrete pipe that crosses under U.S. 101 and Carpinteria Avenue. Immediately south of Carpinteria Avenue, the pipe feeds into Lagunitas Creek, an earthen creek channel that winds through Carpinteria Bluffs Area II. At its downstream end, the creek enters a pipe passing underneath the railroad to the coastal bluffs. Flows are discharged from the pipe down the bluff face to the beach and ocean.

The development of agricultural and urban uses in this watershed has increased runoff rates, erosion, and sediment loads. Increased creek flows and velocities in Lagunitas Creek have caused substantial erosion of the creek banks south of U.S. 101 and Carpinteria Avenue. This has exposed sewer lines and manholes located along the creek corridor. In fact, the Carpinteria Sanitary District recently had to relocate a sewer line that had been exposed by erosion of the creek bank and bed.

2.2.6 Flood Control Regulations

A framework of Federal, State, and local regulations has been established with the intent of protecting against the loss of life and property due to flooding hazards. Those that apply to local creeks are discussed below.

2.2.6.1 National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes Federally backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce the potential for future flood damage. Enactment and enforcement of floodplain management ordinances nationwide has been shown to substantially reduce flood damage. The NFIP is managed by the Federal Emergency Management Agency (FEMA). As part of the NFIP, FEMA oversees the preparation of flooding studies in local jurisdictions throughout the nation. These flooding studies include the delineation of flood hazard boundaries based on existing hydrologic, geologic, and topographic data. A flood hazard study was prepared by FEMA for the City of Carpinteria in 1985. Figure 2-4 (Flood Insurance Rate Map) shows areas at risk from 100-year and 500-year floods.

2.2.6.2 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 establishes national policies and goals for the protection of the environment. NEPA also establishes a review process that must be carried out by all Federal agencies to disclose the environmental effects of their decision-making. This involves the preparation of detailed environmental reports for legislation and other major Federal actions. These reports disclose the environmental impacts that would result from the proposed action(s), and discuss measures that can be employed to mitigate or minimize such impacts. Flooding impacts, whether they involve development in flood hazard zones, or

the worsening of flooding conditions, are among those that must be assessed in the NEPA review process. Although NEPA requires Federal agencies to document the environmental consequences of their actions, it does not force them to approve the most environmentally sound alternative action. NEPA applies only to actions that would be carried out, funded, or permitted by Federal agencies.

2.2.6.3 California Water Code, Division 5

Division 5 of the California Water Code provides counties and cities with the authority to enact ordinances for the purpose of protecting the community from flooding hazards. In order to provide flood protection, Division 5 allows cities and counties to form flood control districts or divisions, conduct hydrologic studies, and construct, alter, repair and maintain flood conveyance facilities such as natural and manmade drainage channels, banks, detention basins, etc. Division 5 also allows cities and counties to appropriate and expend money from their general fund, and in some cases levy and collect taxes, to finance flood control activities.

2.2.6.4 California Environmental Quality Act

The California Environmental Quality Act (CEQA) was enacted by the State Legislature in 1970, and serves as the primary body of law guiding the environmental review process for proposed projects in California. The basic goal of CEQA is to preserve and restore California's environment for current and future generations. In order to facilitate environmental protection, CEQA requires public agencies in California to disclose the "significant" environmental effects of their actions, which include decisions to approve and/or issue permits for proposed projects that are subject to their jurisdiction. CEQA also requires public agencies to avoid or mitigate any "significant" environmental effects where feasible. Flooding impacts must be assessed and mitigated where feasible for proposed actions that are subject to CEQA.

2.2.6.5 California Coastal Act

The California Coastal Act (CCA) (California Public Resources Code § 30000 et seq.) was enacted by the State Legislature in 1976 to provide long-term protection of California's 1,100-mile coastline for the benefit of current and future generations. CCA created a unique partnership between the State and local governments to manage the conservation and development of coastal resources through a comprehensive planning and regulatory program. The provisions and policies set forth by CCA apply to all areas within the "Coastal Zone." In 1976, the California Legislature officially mapped the boundaries of the Coastal Zone based on a number of criteria. The Coastal Zone encompasses some 1.5 million acres of land and reaches from three miles offshore to an inland boundary that varies from a few blocks in the more urban areas of the State to about five miles in less developed regions. The entire City limits of Carpinteria are within the Coastal Zone, which extends to the foothills. Carpinteria's Planning Area extends beyond the Coastal Zone and includes the watershed areas of Carpinteria's creeks.

Pursuant to CCA, the bulk of California's Coastal Zone is within the jurisdiction of the California Coastal Commission (CCC). CCC certifies Local Coastal Programs (LCPs) prepared by local governments such as the City of Carpinteria and County of Santa Barbara. Each LCP includes a land use plan and its implementing measures (e.g., zoning ordinances). LCPs govern decisions that determine the conservation and use of coastal resources. While each LCP reflects unique characteristics of individual local coastal communities, regional and Statewide interests and concerns must also be addressed in conformity with CCA goals and policies. Working with local government, CCC helps shape each LCP and then formally reviews them for consistency with CCA standards.

Certification of a LCP by CCC allows the local government to issue Coastal Development Permits within its jurisdiction. The Commission maintains the authority to decide the fate of local Coastal Development Permits that are appealed by interested parties. CCC also exercises original permit jurisdiction on State Tideland and Public Trust lands, and all lands seaward of the mean high tide line out to three miles.

New development which requires a Coastal Development Permit either from CCC or the appropriate local government includes, but is not limited to, any " ... change in the density or intensity of use of land ... [or] change in the intensity of use of water, or of access thereto...." Many types of development are exempt from coastal permitting requirements, including (1) most repairs and improvements to single-family homes; (2) certain types of development in areas subject to "categorical exclusions"; (3) certain "temporary events"; under specified conditions, and (4) the replacement of any structure destroyed by natural disaster.

CCA policies, the heart of California's coastal protection program, are the standards used by CCC in its coastal development permit decisions, and for the review of LCPs prepared by local governments. These policies are also used by CCC to review Federal activities that affect the Coastal Zone. Coastal cities and counties must incorporate CCA policies into their individual LCPs. Several policies in CCA apply directly to coastal creeks, estuaries, wetlands, riparian corridors, and associated habitats. Some are directly applicable to flood control activities.

2.2.6.6 Carpinteria Salt Marsh Reserve Management Plan

This document, prepared by the University of California Natural Reserve System, establishes a long-range management and preservation plan for the Carpinteria Salt Marsh Reserve. The Management Plan contains a discussion of historical and existing environmental conditions in the marsh and its watersheds (including Franklin and Santa Monica Creeks), and the many regulatory agencies that are in some way involved with the marsh. The Management Plan also contains goals, policies, and actions intended to bring the various landowners together as a united management entity, and preserve and restore the sensitive biological habitat at the marsh while allowing for scientific research, recreational opportunities, and necessary management activities (e.g., flood control, pest control, etc.). Numerous goals, polices, and actions in the Management Plan relate to the Franklin Creek and Santa Monica Creek watersheds, including flood control issues.

2.2.6.7 County of Santa Barbara Regulations

Through various controls and departments, the County of Santa Barbara is responsible for conducting environmental review of proposed projects, regulating development, and providing and maintaining public facilities and infrastructure within unincorporated Santa Barbara County. In general, creeks within the City limits are not directly subject to the policies and authority of the County, with some exceptions. One such exception is the Santa Barbara County Flood Control District (SBCFCD).

SBCFCD was created in 1955 to provide the County's residents with protection from flooding hazards. SBCFCD's major programs involve administration of the County Flood Plain Management Ordinance, maintenance and operation of existing flood control facilities, design and construction of new facilities, collection of hydrological data, and operation of a flood warning system.

Through administration of the County Flood Plain Management Ordinance, the Flood Control District reviews proposed subdivisions and single building permit applications for areas within 100-year flood plains in unincorporated county areas. Although the County Flood Plain Management Ordinance does not apply to incorporated cities such as Carpinteria (cities have their own flood plain management ordinances), SBFCD's guidance is regularly sought by the cities on flood protection issues.

SBCFCD also maintains and repairs flood control facilities, several of which are located within Carpinteria, Santa Monica, and Franklin Creeks in the City limits. Maintenance activities include clearing obstructive vegetation, deposited sediments, trash and debris from flood channels and storm drains in order to allow flood waters to flow unhindered. In addition, a series of debris basins are maintained and periodically excavated to remove deposited sediments.

The District collates its maintenance activities into an Annual Routine Maintenance Plan that contains information necessary for regulatory agency review. The District's maintenance and construction activities are reviewed for their environmental impacts in compliance with CEQA requirements. District maintenance activities are also typically regulated by the U.S. Army Corps of Engineers and California Water Quality Control Board, Central Coast Region pursuant to the Federal Clean Water Act, the California Department of Fish and Game pursuant to Section 1601 of the California Fish and Game Code, and the California Coastal Commission, County of Santa Barbara, and City of Carpinteria pursuant to the California Coastal Act and corresponding Local Coastal Programs.

In addition to maintaining existing facilities, the Flood Control District is responsible for designing and implementing new facilities as they are needed. New flood control projects near the City of Carpinteria include the Franciscan Channel Lining and Culvert Extension Project and the Carpinteria Marsh Project. The Franciscan Channel Lining and Culvert Extension Project involves the construction of a concrete box culvert underneath U.S. 101 immediately downstream of Kim's Basin, which is located near Cravens Lane. This work was completed in

2000-2001. This project also includes construction of a concrete lined channel and a sedimentation basin upstream of the existing basin adjacent to Kim's Market. The Carpinteria Marsh Project involves improvements to Santa Monica and Franklin Creek channels through the Carpinteria Salt Marsh, and construction of earthen levees and floodwalls to protect adjacent developed properties from flooding.

2.2.6.8 City of Carpinteria Regulations

The City is responsible for regulating development, providing and maintaining public services and infrastructure, and reviewing and approving or denying proposed projects within the City limits. Portions of the Carpinteria Creek, Franklin Creek, Santa Monica Creek, and Lagunitas Creek watersheds within the City limits are directly under the City's jurisdiction. City flood regulations can be found primarily in the General Plan/Local Coastal Plan and Flood Damage Protection Ordinance of the Carpinteria Municipal Code.

The City prepared an updated General Plan/Local Coastal Plan in April 2003. The General Plan/Local Coastal Plan serves as the primary planning policy document for the City. The Safety Element of the General Plan/Local Coastal Plan contains several goals, policies, and implementation measures aimed at minimizing the potential for loss of life and property from flood hazards.

The Carpinteria Municipal Code establishes laws and regulations pertaining to all aspects of the local community. The Municipal Code is divided into a number of chapters that deal with particular issue areas. The Flood Damage Protection Ordinance (Title 15, Chapter 15.50) deals with flooding issues. The Ordinance applies to all Special Flood Hazard Areas within the city limits. Special Flood Hazard Areas are generally defined as an area within a 100-year flood zone, as identified by FEMA in the report entitled "Flood Insurance Study for the City of Carpinteria, California, September 18, 1985," and an accompanying Flood Insurance Rate Map (see Figure 2-4). In order to accomplish its purpose of minimizing flooding hazards and damage from floods, the ordinance includes methods and provisions for:

- Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Requiring that uses vulnerable to floods are protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, creek channels, and natural protective barriers, which help accommodate or channel flood waters;
- Controlling filling, grading, dredging, and other development which may increase flood damage, and;
- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Before development projects within a Special Flood Hazard Area are approved, the project plans must first be reviewed by the floodplain administrator to determine whether the requirements of the ordinance will be satisfied. The floodplain administrator is also responsible for taking action to remedy violations of the ordinance. The City Manager or his/her designee serves as the administrator of the ordinance.

Decisions regarding actions in and around Carpinteria's creeks can be affected by or can affect flood control programs in at least two ways. In general, the recommendations of this Creeks Preservation Program and the protection of Environmentally Sensitive Habitat Areas (ESHA) lessen flood dangers by providing natural areas (riparian habitat) to absorb run-off and reduce flow velocities. On the other hand, protecting property by concrete lining to eliminate stream bank erosion reduces opportunities for absorption, thereby increasing downstream risks of higher peak flood flows. It has become increasingly important that the City work closely with the Flood Control District to ensure that stream corridor maintenance programs are conducted in such a way that habitat preservation is balanced by the need to maintain adequate flood flow conveyance through urbanized areas.

2.3 WATER QUALITY

2.3.1 Introduction

In the most basic sense, the "quality" of water is defined by its ability to support biological communities and human uses (i.e., drinking water supply, fishing, and water contact recreation) that it normally supports in natural conditions. Water quality is determined by the whole of the water's numerous properties, including physical properties (e.g., temperature, color, clarity), chemical properties (e.g., the concentrations of dissolved ions, nutrients, and other chemicals) and biological properties (e.g., bacteria levels). Water quality can be improved or degraded by alterations to one or more of its properties.

Water pollution is caused by inputs of trash and debris, sediments, nutrients, petroleum hydrocarbons, heavy metals, pesticides, organic and inorganic chemicals, pathogens (e.g., fecal coliform bacteria), and countless other materials. Water pollution can also be caused by changes in water temperature. Pollution has, to varying degrees, altered the physical, chemical, and biological properties of a great number of the nation's water bodies, including creeks, lakes, estuaries, coastal ocean waters, and groundwaters. Water quality degradation has adversely impacted sensitive aquatic and terrestrial biological communities, as well as human uses. Pollution has made rivers, lakes, and coastal waters unsightly, unsafe for human contact or use as drinking water, and has negatively impacted recreation, commercial fishing, and tourism.

Sources of water pollution are often classified as either "point sources" or "nonpoint sources." Point sources have easily recognized pollution outlets, and are often located along the margins of creeks, lakes, bays, and coastal waters. Examples of point sources include sewage treatment plants, power plants, and industrial factories (paper mills, mining operations, manufacturing plants, etc.) that have wastewater effluent outlets. Since the early 1970's, point sources have been subject to fairly extensive regulation by Federal and State laws. Nonpoint

sources are also an important, albeit somewhat nebulous contributor to water pollution. Non-point sources do not have easily defined pollution outlets, and include surface runoff from urban, suburban, and agricultural areas, littering, and atmospheric deposition. Due to the difficulty in managing the seemingly countless contributors to nonpoint source pollution, nonpoint sources have generally been less regulated compared to point sources. However, nonpoint source pollution is now recognized as being a major contributor to water quality degradation, and is becoming a major focus of regulatory efforts.

It is important to realize that water quality is highly variable through space and time, and is dependent on a number of factors. To illustrate the complex nature of water quality, consider the multitude of factors that affect suspended sediment concentration, which is just one of the many water quality parameters of importance in local creeks. Natural factors affecting suspended sediment loads include watershed topography, geology, climate, and vegetation. In combination, these factors determine the amount of sediments and water that reach a given creek channel. Also, local creek discharges and suspended sediment loads vary with rainfall, which occurs almost exclusively during the winter months locally. During the rainy season, local creeks often experience high flows, and large quantities of sediments are set into motion, thus greatly increasing the suspended sediment concentration in the water column. During the dry season, creek flows and velocities are normally low, and suspension of sediments is minimal. Human factors affect runoff and erosion rates, which are heavily influenced by the degree to which the watershed has been developed with agricultural and urban uses.

2.3.2 Local Creek Water Quality

In general, local creeks have excellent water quality in their upper reaches within the relatively undeveloped Santa Ynez Mountains. Due to their relatively undisturbed condition and excellent water quality, many local mountain creeks support diverse biological communities, and are generally safe for human contact and drinking. Downstream through the foothills and coastal plain, the intensity of human development increases. Predictably, pollution inputs increase, creek water quality worsens, and beneficial uses of creeks (i.e., biological habitat, water contact recreation, and drinking water supply) are impaired to varying degrees. Also, because local creeks recharge groundwater and flow into the ocean, the quality of local groundwater and coastal ocean waters is degraded.

Generally, the pollutants of greatest concern in local creeks are suspended sediments, nutrients, and bacteria. Other pollutants of concern include oil, grease, pesticides, and organic wastes. The primary source of pollution in local watersheds is surface water runoff from urban and agricultural areas, including effluent from greenhouses. Individual septic systems have been identified as contributing nutrients and bacteria in areas that do not have sanitary sewer service. There are not a large number of industrial point sources in the local watersheds. Water quality impacts from increased pollution loads have been compounded by the loss of upland, riparian, and wetland habitats, which would normally provide a greater degree of trapping and filtering of sediments, nutrients, and other pollutants from surface water.

Increased suspended sediment loads in local creeks can result in adverse changes in creek channel morphology, such as burial of creek bottom features (e.g., gravel, cobble, boulders, and woody debris) that provide habitat for fish, amphibians, and other aquatic organisms. Increased suspended sediment loads also result in detrimental effects to water quality, including increased turbidity, lower dissolved oxygen content, and suspension of organic and inorganic pollutants that become trapped in sediments. These effects harm aquatic organisms due to decreased visibility in the water column, clogging of gills and other organs with sediment particles, asphyxiation, physiological effects from toxins, etc. Physiological impacts to aquatic organisms also result from inputs of pesticides, herbicides, and other toxins.

Nutrient levels in local creeks are low in natural conditions, which limits algae growth. Increases in nutrient concentrations (primarily due to runoff of fertilizers from agricultural areas) can result in algae blooms, which greatly increase the amount of organic material in the creek that must eventually be decomposed. Decomposing bacteria use up oxygen. Thus, increases in nutrients can result in depressed dissolved oxygen levels. Decreased dissolved oxygen levels can also result from increased inputs of oil, grease, and other organic wastes, which can become trapped in local creeks, where they are decomposed. Decreased oxygen levels can have detrimental effects on aquatic wildlife such as fish, amphibians, and invertebrates.

Bacteria levels have become elevated in some local creeks due to increased inputs of organic wastes (i.e., animal waste, human waste, manure, yard cuttings, etc.), which the bacteria decompose. Fecal coliform bacteria are found in human and animal feces, and are of particular concern with respect to health issues. They are some indicators of untreated fecal material that could contain strains of fecal coliform bacteria that are pathogenic, as well as viruses such as hepatitis, and could cause infections in animals and humans that engage in contact with the contaminated water.

Elevated water temperatures are another common problem in local creeks. Elevated water temperature primarily results from the loss of riparian vegetation, which provides shade. Dissolved oxygen saturation levels decrease with increased water temperature, thus elevated water temperatures can impact species such as steelhead and rainbow trout that are sensitive to changes in dissolved oxygen levels.

The following summarizes data collected from a number of water quality monitoring studies that have been conducted in local surface waters. This includes water quality monitoring conducted by Padre Associates, Inc. biologists during creek surveys that were done at several points along Carpinteria, Franklin, Santa Monica, and Lagunitas Creeks. Recent water quality monitoring studies conducted by the County of Santa Barbara Division of Environmental Health Services, Project Clean Water, and researchers from the University of California, Santa Barbara (UCSB) are also discussed. It should be noted that conditions affecting water quality vary greatly, as such data presented here is only representative of conditions at the time of collection.

2.3.2.1 Recent Creek Monitoring Results

As part of the development phase of this program, Padre Associates conducted creek surveys and water quality monitoring in May 2000 at a total of eight study reaches: three in the Carpinteria Creek watershed (CC-1, CC-2, and CC-3), two along Santa Monica Creek (SMC-1, SMC-2), two along Franklin Creek (FC-1, and FC-2), and one along Lagunitas Creek (LC-1). The study reach locations are shown in Figure 1-2. CC-1, SMC-1, FC-1, and LC-1 are generally located near the southern end of the City limits along the respective creeks. CC-2, SMC-2, and FC-2 are located at the northern City limits along the respective creeks. These upstream study reaches are intended to provide information on the water quality conditions that are present just before the creeks enter the City, and thus serve as points of comparison with the downstream study reaches, which are affected by land uses within the City limits. CC-3 is located well upstream of the City limits along Gobernador Creek. This site is located upstream of the major developed areas (urban and agricultural) in the Carpinteria Creek watershed. This study reach is intended to provide information on the water quality conditions that are present at a relatively undisturbed creek segment, and thus serve as a point of comparison with downstream reaches that have been impacted by human activities.

Water quality parameters measured in the creek at each study reach included dissolved oxygen (DO), pH, temperature, and conductivity. Conductivity is a measure of the ability of the water to pass an electrical current, and indicates the concentration of dissolved ions (e.g., metals, salts, etc.) that are present in the water. The higher the conductivity, the higher the concentration of dissolved ions, and vice versa. Three measurements of each water quality parameter were taken per study reach.

In addition to the instream measurements, three water samples were taken per study reach for analysis of suspended sediment and nutrient concentrations. Suspended sediment and nutrient analysis was conducted in laboratories at UCSB. Nutrients analyzed included phosphorus (PO_4), nitrate (NO_3), nitrite (NO_2), and ammonium (NH_4). The results of the water quality monitoring are provided in Table 2-1 and discussed below. Creek flow levels estimated during the surveys are also given in the table. Based on the estimated flow levels, these water monitoring results should be considered to be representative of low creek flow conditions. Methodology and equipment used to conduct the creek surveys are provided in Appendix A, as are data sheets completed during the field surveys.

Carpinteria Creek

Water temperature was lowest in the upstream study reach CC-3, ranging from 15.9 to 16.1° Celsius (°C) (60.6°-61.0° Fahrenheit [°F]). Water temperature increased moving downstream to some degree, but was below 20°C (68 °F) in five out of six measurements taken at reaches CC-2 and CC-1.

Table 2-1. Water Quality Monitoring Results at Local Creek Study Reaches

Parameter		Study Reaches							
		CC-1	CC-2	CC-3	LC-1	FC-1	FC-2	SMC-1	SMC-2
Temperature (°C)	1	19.3	21.0	16.1	23.1	20.4	23.8	25.0	23.4
	2	17.6	19.6	15.9	17.8	20.4	21.9	25.0	22.9
	3	17.4	19.9	15.9	17.1	20.0	22.7	24.7	22.6
pH	1	7.6	6.6	8.6	7.5	8.0	8.0	9.2	8.2
	2	8.0	7.0	8.6	7.5	8.8	7.5	9.0	8.3
	3	8.3	7.2	8.4	7.5	8.3	8.5	9.3	8.0
Conductivity (μS)	1	1,252	1,127	552	950	1,520	1,260	590	580
	2	1,227	1,039	526	855	1,448	1,152	590	576
	3	1,234	1,037	524	1025	1,450	1,195	561	571
Dissolved O_2 (mg/l)	1	13.2	12.6	7.6	5.5	14.6	11.9	12.4	8.5
	2	10.2	11.2	8.2	3.4	17.5	7.5	11.6	8.6
	3	11.8	11.3	7.3	2.9	13.3	11.3	11.5	8.3
Sediments (mg/l)	1	4.9	--	6.4	20.4	15.3	18.1	6.8	5.7
	2	4.7	11.8	5.0	26.8	13.9	10.9	5.8	7.6
	3	--	9.4	5.4	24.3	22.1	11.9	6.4	6.3
PO_4 (μmoles/l)	1	0.17	0.33	0.21	3.33	18.57	0.79	0.87	0.16
	2	0.20	0.38	0.16	2.47	36.59	0.58	0.67	0.18
	3	0.20	0.33	0.18	0.23	46.95	0.35	0.85	0.17
NO_3 (μmoles/l)	1	344.81	1,126.91	1.37	2.64	2,025.12	2,982.68	0.55	0.06
	2	312.79	1,146.61	1.02	17.83	2,592.31	985.42	0.56	1.66
	3	309.39	1,136.85	1.13	0.20	1,779.12	2,913.14	0.26	0.18
NO_2 (μmoles/l)	1	3.38	3.09	0.10	1.02	14.88	17.32	0.13	0.04
	2	3.22	3.39	0.05	2.50	17.69	9.88	0.15	0.06
	3	3.20	3.15	0.07	0.11	10.88	16.86	0.17	0.06
NH_4 (μmoles/l)	1	1.43	1.28	1.68	16.44	4.99	1.68	0.65	0.87
	2	1.91	1.41	0.61	3.99	5.72	1.43	0.83	0.77
	3	0.99	1.54	0.80	1.71	3.06	1.52	0.67	0.72
flow (Q) in m^3/s ($ft.^3/s$)		0.006 (0.20)	0.005 (0.16)	0.123 (4.33)	0 (0)	0.017 (0.61)	0.005 (0.18)	0.009 (0.33)	0.010 (0.37)

pH did not vary a great deal between study reaches, ranging from a low of 6.6 at CC-2 (measurement 1) to a high of 8.6 at CC-3 (measurements 1 and 2). The pH measurements taken at CC-1, CC-2, and CC-3 were similar to those taken at the other local creeks. Collectively, pH ranged from a low of 6.6 (at CC-2) to a high of 9.2 (at SMC-1) in local creeks.

Conductivity increased a great deal moving downstream through the Carpinteria Creek watershed, from 524-552 μS at CC-3, to 1,037-1,127 μS at CC-2, to 1,227-1,252 μS at CC-1. This indicates that dissolved ions and salts increase as one moves downstream through the watershed. This pattern of increasing conductivity from upstream to downstream has also been observed recently in several other southern Santa Barbara County creeks (Brinkman, 2000). Increased conductivity has been especially pronounced in watersheds with substantial areas of agricultural and/or urban development (Brinkman, 2000). Agricultural and urban areas can release large amounts of salts, metals, nutrients, and other dissolvable ions and solids into surface waters and groundwaters.

DO levels at CC-3 ranged from 7.3 to 8.2 milligrams per liter (mg/l). These are typical of the DO levels measured at other relatively undisturbed creeks in the local area (Brinkman, 2000). DO levels were higher at CC-2 (11.2-12.6 mg/l) and CC-1 (10.2-13.2 mg/l). This may be due in part to the comparatively shallow water depth that was present at CC-2 and CC-1 (generally between 2 to 18 inches deep), which increases the surface area to volume ratio of the creek and allows greater diffusion of oxygen from air to water. It also may be that differences in algae communities and/or microbial activity in the lowland creek reaches results in higher DO levels. The lower section of Carpinteria Creek did support extensive mats of green filamentous algae at the time of the creek surveys, while the upper reach (CC-3) did not. High DO levels were also present in the lowland creek reaches of Santa Monica and Franklin Creeks, which are also shallow and support extensive green filamentous algae. Based on this and other recent research, the trend of high DO levels in disturbed, shallow lowland creeks that support extensive mats of green filamentous algae is common in southern Santa Barbara County (Brinkman, 2000).

Suspended sediments increased moving downstream from CC-3 (5.0-6.4 mg/l) to CC-2 (9.4-11.8 mg/l), possibly due to increased erosion and sediment transport from orchards and other agricultural uses, which cover a substantial portion of the watershed area between CC-3 and CC-2. Suspended sediment concentrations at CC-1 were 4.7-4.9 mg/l, a significant drop from the concentrations present at CC-2. This may be because the watershed transitions from agricultural to urban areas shortly downstream of CC-2. Urban areas are typically dominated by hardscape (i.e., pavement) and landscaping, and do not have large expanses of bare soil, as is often the case with agricultural areas. Thus, urban areas typically generate less erosion and sediment transport to surface waters compared to agricultural uses, at least during low flow conditions. CC-1 and CC-2 were surveyed on the same day, so temporal fluctuations are not likely to be the reason for the difference in suspended sediment concentrations. Creek gradients and flows at CC-2 (0.16 cubic feet per second, or cfs) and CC-1 (0.20 cfs) were very similar, thus it does not appear that differences in sediment scouring at the two reaches were substantial.

Nutrient levels at CC-3 were quite low (PO_4: 0.16-0.21 μmoles/l, NO_3: 1.02-1.37 μmoles/l, NO_2: 0.05-0.10 μmoles/l, NH_4: 0.80-1.68 μmoles/l), and typical of nutrient levels that have been found at other relatively undisturbed creek reaches in southern Santa Barbara County during low flow conditions (Brinkman, 2000). Downstream at CC-2, nutrient levels were greatly elevated compared to those at CC-3. The watershed area between CC-3 and CC-2 is dominated by agricultural uses, where nitrogen and phosphorus containing fertilizers, pesticides, and herbicides are applied to crops and soils. These pollutants are swept into surface water runoff and leached into groundwaters, from where they enter local creeks. NO_3 levels were most dramatically elevated at CC-2, ranging from 1,126.91 to 1,146.61 μmoles/l. This is approximately 1,000 times greater than the NO_3 concentrations that were present at CC-3. NO_2 (3.09-3.39 μmoles/l) and PO_4 (0.33-0.38 μmoles/l) were also consistently higher at CC-2, although the increase in these nutrients was less dramatic than that of NO_3. NH_4 levels at CC-2 (1.28-1.51 μmoles/l) were similar to those at CC-3. These specific relationships between instream nutrient levels and agricultural development have also been observed in a number of similar watersheds in southern Santa Barbara County (Brinkman, 2000).

Nutrient levels dropped significantly moving downstream from CC-2 to CC-1. NO_3 concentrations as CC-1 (309.39 to 344.81 μmoles/l) were approximately one-third of those at CC-2, which is approximately 3,500 feet (less than a mile) upstream. PO_4 concentrations at CC-1 (0.17-0.20 μmoles/l) were approximately one-half of those at CC-2. NO_2 (3.20-3.38 μmoles/l) and NH_4 (0.99-1.91 μmoles/l) concentrations at CC-1 were similar to those at CC-2. The drop in nutrient levels from CC-2 to CC-1 may be due to the transition of watershed from agricultural to urban uses between the study reaches. Unlike agricultural uses, urban uses do not typically use large quantities of nitrogen and phosphorous containing fertilizers, pesticides, and herbicides. Thus, inputs of these pollutants would be expected to lessen significantly between CC-2 and CC-1, allowing nutrient levels in the water column to be reduced by natural processes (e.g., precipitation, sedimentation, uptake by plants and microbes, etc.).

High nutrient levels in the lower portion of Carpinteria Creek have also been reported in other recent water quality monitoring studies. NO_3 concentrations of 553 μmoles/l were present in a sample taken in May 1999 as part of a study completed by UCSB researchers (Page, 1999). A study being conducted by Project Clean Water found high nitrogen and phosphorus nutrient levels in samples taken from Carpinteria Creek just downstream of Carpinteria Avenue in late 1999 and early 2000 (Project Clean Water, 2000). Project Clean Water sampled numerous creeks in the Santa Barbara area, including Carpinteria Creek (just downstream of Carpinteria Avenue), Franklin Creek (at the 7th Street crossing) and Santa Monica Creek (at the Santa Ynez Road crossing).

Bacteria levels in creeks, ocean water, and groundwater can be elevated due to inputs from storm water runoff from urban and agricultural areas, and releases of human waste from faulty septic systems or sewer lines. Exposure to bacteria can pose an increased health risk to humans. In response to widespread public concern over bacterial contamination, the Santa Barbara County Environmental Health Services Division (EHS) began testing waters in the surf zone at several local beaches for bacteria contamination in 1995. EHS implemented a

permanent ocean water quality monitoring program in 1997. There are approximately twenty local beaches that are regularly sampled (weekly) as part of this program. Water samples are taken at these locations, and analyzed in the County's laboratory to determine the concentrations of total coliform bacteria, fecal coliform bacteria, and enterococcus organisms. Bacteria levels from each sample are compared to State health standards, and the results are made available to the public. State standards for ocean water are as follows: 10,000 total coliform organisms/100 ml, 400 fecal coliform organisms/100 ml, and 104 enterococcus organisms/100 ml.

EHS's sampling locations include Carpinteria State Beach at the mouth of Carpinteria Creek, and Carpinteria City Beach near the ocean inlet to Carpinteria Salt Marsh. The data indicate that bacteria levels at the mouth of Carpinteria Creek often exceed State health standards for total coliform, fecal coliform, and enterococcus during high creek flows (i.e., during and immediately after heavy rainfall). Bacteria levels at this location have been greater than 30,000 total coliform organisms/100 ml, 3,800 fecal coliform organisms/100 ml, and 2,000 enterococcus organisms/100 ml on several occasions during this time. During periods of low creek flows (e.g., in the summer months), bacteria levels at this location are typically below the State standards. However, this is not always the case, perhaps indicating that sources of bacterial contamination other than Carpinteria Creek can be problematic at this location. Such sources likely include the release of human and animal waste at the beach and in the ocean.

Project Clean Water staff collected water samples at each of their creek sampling locations once in October 1999 during low flow conditions, and on five occasions during peak flows in the winter of 1999-2000. Samples were tested for total coliform, fecal coliform, and enterococcus, as well as a wide range of other parameters (discussed below). The results of the bacterial sampling support the general statement that high bacteria levels occur in local creeks during peak creek flows and lower bacteria levels occur during low flows. Samples collected during high creek flows generally exceeded State ocean water standards at all locations during high creek flows. Total coliform levels were as high as 241,000 organisms/100 ml. Low flow samples collected in October at the Carpinteria Creek location were below State standards for total coliform, fecal coliform, and enterococcus (Project Clean Water, 2000).

Other water quality parameters that were analyzed in the recent Project Clean Water study included total dissolved solids (TDS), volatile organic compounds (VOCs), metals (copper, arsenic, chromium, zinc, lead, nickel), pesticides, oil and grease, methyl-blue activated substances (MBAS), biological oxygen demand (BOD), and nutrients. Established Federal and State standards for several of these pollutants were violated in Carpinteria Creek during peak flow sampling, including zinc, lead, copper, and chromium. Pesticides were also detected in Carpinteria Creek, including diazinon, which was recently banned by the U.S. Environmental Protection Agency (EPA). Carpinteria Creek has been included on the state impaired waters list (see Impaired Waters discussion in Section 2.3.4.6).

Santa Monica Creek

Water temperature measured during the Padre surveys at SMC-1 ranged between 24.7-25.0°C (76.5-77.0°F). Water temperature at SMC-2 was similar, ranging between 22.6-23.4°C (72.7-74.1°F). These water temperatures are higher than those measured in Carpinteria Creek, and probably result from the highly altered condition of the study reaches of Santa Monica Creek, which have a flat, concrete bed and banks, and receive little shade from vegetation.

pH was similar at SMC-1 (9.0-9.2) and SMC-2 (8.0-8.3), and did not differ greatly from the pH measurements at the other local creeks.

Conductivity measurements were very similar at SMC-1 (561-590 μS) and SMC-2 (571-580 μS). This is different from the situation in Carpinteria Creek, where conductivity increased from upstream to downstream. This may be explained by the fact that the Santa Monica Creek watershed is very narrow through the foothills and coastal plain (see Figure 1-2). Because of this, only a very small proportion of the watershed is developed with agricultural and urban uses, which are likely to be a prime contributor of dissolved ions and salts (and thus high conductivity) in many other local creeks.

DO levels at SMC-2 (upstream) ranged between 8.3-8.6 mg/l. At SMC-1 (downstream), DO levels were higher, ranging between 11.5-12.4 mg/l.

Suspended sediment concentrations were fairly low at SMC-1 (5.8-6.8 mg/l) and SMC-2 (5.7-7.6 mg/l). This is not surprising given the low proportion of agricultural uses in the watershed. A previous study indicates that only 3% of the watershed has been converted to agriculture (Rincon Consultants, 1999).

Nutrient levels at SMC-1 (PO_4: 0.67-0.87 μmoles/l, NO_3: 0.26-0.55 μmoles/l, NO_2: 0.13-0.17 μmoles/l, NH_4: 0.65-0.83 μmoles/l) and SMC-2 (PO_4: 0.16-0.18 μmoles/l, NO_3: 0.06-1.66 μmoles/l, NO_2: 0.04-0.06 μmoles/l, NH_4: 0.72-0.87 μmoles/l) were low. This is not surprising given that a small percentage of the watershed is developed with agricultural and urban uses. There was a modest increase in PO_4 and NO_2 from SMC-2 (upstream) to SMC-1 (downstream), possibly reflecting minor effects from the small agricultural and urban portion of the watershed.

Previous water quality monitoring studies have also reported low nutrient levels in the lowland portion of Santa Monica Creek relative to those reported in Carpinteria and Franklin Creeks (Page, 1999). However, the nutrient concentrations reported in the other studies for Santa Monica Creek have generally been higher than those found in the water sampling conducted by Padre.

Bacteria levels are determined weekly by EHS at Carpinteria City Beach near the ocean inlet to Carpinteria Salt Marsh, which receives freshwater inputs from Santa Monica and Franklin Creeks. The data indicates that bacteria levels at the marsh inlet rarely exceed State health standards for total coliform, fecal coliform, and enterococcus, even during high creek

flows. In fact, the State standards have only been exceeded in two occasions since EHS began collecting data. However, as indicated in the discussion of Carpinteria Creek, monitoring recently conducted by Project Clean Water indicates that bacteria levels generally exceeded State ocean water standards at all local creeks during high creek flows in the winter of 1999-2000, including Santa Monica Creek at Santa Ynez Road. In addition, samples collected by Project Clean Water during low flow conditions (October) at Santa Monica Creek exceeded State standards for enterococcus (Project Clean Water, 2000). Relatively low bacteria levels at the City beach may be the result of a buffering effect provided by the marsh.

Other water quality parameters that were found to exceed established standards in water samples collected from Santa Monica Creek by Project Clean Water include zinc, lead, copper, chromium, and arsenic. Pesticides were also detected in samples from Santa Monica Creek, including diazinon (Project Clean Water, 2000).

Since Santa Monica Creek provides freshwater input to Carpinteria Salt Marsh, which is a listed impaired water body (see discussion in Section 2.3.4.6), addressing the problems of water quality in the salt marsh will likely require actions involving Santa Monica Creek and surrounding upland areas.

Franklin Creek

Water temperature measured during the Padre creek surveys at FC-1 ranged between 20.0-20.4°C (68.0-68.7°F). Water temperature at FC-2 ranged between 21.9-23.8°C (71.4-74.8°F). The differences in water temperatures at FC-1 and FC-2 are likely due to differences in ambient air temperatures that existed during the surveys of these creek reaches. Like Santa Monica Creek, elevated water temperatures in the study reaches of Franklin Creek are likely due to the highly altered condition of the creek.

pH was similar at FC-1 (8.0-8.8) and FC-2 (7.5-8.5), and did not differ greatly from the pH measurements at the other local creeks.

Conductivity measurements were very high in the study reaches of Franklin Creek, and were greater at FC-1 (1,448-1,520 μS) than at FC-2 (1,152-1,260 μS). This is similar to the pattern observed in Carpinteria Creek, where conductivity increased from upstream to downstream, presumably due in part to contributions from extensive agricultural and urban areas in the lower watershed. Substantial proportions of the Franklin Creek watershed are agricultural (35%) and urban (20%) (Rincon Consultants, 1999).

DO levels at FC-2 ranged between 7.5-11.9 mg/l. At FC-1, DO levels were higher, ranging between 13.3-17.5 mg/l.

Suspended sediment concentrations were high at FC-1 (13.9-22.1 mg/l) and FC-2 (10.9-18.1 mg/l). This is not surprising given the high proportion of agricultural uses in the watershed.

Nutrient levels were exceptionally high at FC-1 (PO_4: 18.57 to 46.95 μmoles/l, NO_3: 1,779.12 to 2,592.31 μmoles/l, NO_2: 10.88 to 17.69 μmoles/l, NH_4: 3.06 to 5.72 μmoles/l) and FC-2 (PO_4: 0.35 to 0.79 μmoles/l, NO_3: 985.42 to 2,982.68 μmoles/l, NO_2: 9.88 to 17.32 μmoles/l, NH_4: 1.43 to 1.68 μmoles/l). These nutrient levels are even higher than those measured at the downstream reaches of Carpinteria Creek, and indicate that water quality in the lower section of Franklin Creek is heavily impacted by agricultural and urban uses.

It is noteworthy that PO_4 levels increased dramatically from FC-2 to FC-1. In fact, the PO_4 levels measured at FC-1 are much higher than those measured at any of more than 30 local creek reaches that were surveyed in a previous study (Brinkman, 2000). This appears to indicate that there are high levels of phosphate pollution coming from land uses within the City limits of the Franklin Creek watershed and/or from groundwater seeps entering the creek. Other water quality monitoring studies have also reported extremely high nutrient levels in the lowland portion of Franklin Creek (Page, 1999; Project Clean Water, 2000).

Bacteria levels at the ocean inlet to Carpinteria Salt Marsh rarely exceed State health standards for total coliform, fecal coliform, and enterococcus, even during high creek flows (see discussion for Santa Monica Creek). However, Project Clean Water monitoring indicates that bacteria levels generally exceeded State ocean water standards at all of the creeks they sampled during high creek flows, including Franklin Creek at 7th Street. In addition, Samples collected by Project Clean Water during low flow conditions at Franklin Creek exceeded State standards for enterococcus (Project Clean Water, 2000). A buffering effect from the Carpinteria Salt Marsh may reduce bacteria levels between the creeks and the ocean inlet of the salt marsh.

Other water quality parameters that were found to exceed established standards in water samples collected from Franklin Creek by Project Clean Water include zinc, lead, and copper. Pesticides were also detected in Franklin Creek, including diazinon (Project Clean Water, 2000).

Since Franklin Creek provides freshwater input to Carpinteria Salt Marsh, which is a listed impaired water body (see discussion in Section 2.3.4.6), addressing the problems of water quality in the salt marsh will likely require actions involving Franklin Creek and its surrounding upland areas.

Lagunitas Creek

Water quality data for Lagunitas Creek prior to the Padre surveys is not available. At the time that the Padre survey was conducted, the creek was mostly dry, but did contain a few isolated pools of water, and trickles of flowing surface water in some creek sections. Water quality measurements and samples were taken from three isolated pools. Overall, the concentrations of many water quality parameters were highly variable between the three samples, likely due to the isolated nature of the pools, the small volume of water within them, and differences in shading from riparian vegetation (i.e., sun exposure). Water quality is

typically far more constant in flowing creeks compared to what was observed in these isolated pools.

Creek temperature measurements were 17.1, 17.8 and 23.1°C (62.8, 64.0, and 73.6°F) at the three pools, respectively. The lower creek temperature readings were recorded at pools heavily shaded by dense willows. The higher temperature reading was recorded at a pool exposed to full sun on a warm, sunny day.

pH was 7.5 at all three pools, and did not differ greatly from the pH measurements at the other local creeks.

Conductivity was somewhat high, ranging from 855-1,025 μS. This may be due to the fact that, despite its small size, the watershed of Lagunitas Creek is mostly agricultural and urban.

DO levels were low, ranging from 2.9 to 5.5 mg/l between the three pools. The low DO levels are probably due primarily to the small size of the pools, and the absence of flowing water.

Suspended sediment concentrations were high, ranging from 20.4 to 26.8 mg/l. This is not surprising given the high proportion of agricultural uses in the watershed, and the highly eroded nature of the earthen creek banks.

Nutrient levels in samples taken from the three pools were elevated for the most part, but also quite variable (PO_4: 0.23-3.33 μmoles/l, NO_3: 0.20-17.83 μmoles/l, NO_2: 0.11-2.50 μmoles/l, NH_4: 1.71-16.44 μmoles/l). Elevated nutrient concentrations are probably a result of the high proportion of agricultural and urban uses in this small watershed.

2.3.3 Groundwater Quality

Available hydrologic data strongly suggests that the Rincon Creek fault is an impermeable barrier to groundwater between the northern portion (Storage Area 1) and southern portion (Storage Area 2) of the Carpinteria Basin. Groundwater within Storage Area 1 is generally suitable as a drinking water and agricultural irrigation source, and has low to moderate levels of total dissolved solids (TDS), which have been reported between 490-980 mg/l (Carpinteria Valley Water District, 1996). Groundwater within Storage Area 2 is typically of poor quality, and requires treatment for domestic uses and irrigation. TDS are typically greater than 1,000 mg/l. Combined iron and manganese ion concentrations are typically in excess of Federal standards, and hydrogen sulfide is present (Fugro West, 1994).

Groundwater quality in the Carpinteria Basin has been degraded to varying degrees by infiltration of irrigation water and septic system water, particularly in shallow, perched aquifers. One of the primary impacts has been rising nitrate levels (County of Santa Barbara, 1986).

2.3.4 Existing Water Quality Regulations

2.3.4.1 Federal Clean Water Act

Overview. The Federal Water Pollution Control Act Amendments of 1972 and 1987, collectively known as the Clean Water Act (33 United States Code [USC] §§1251 et seq.), establish the principal Federal statutes for water quality protection. CWA was established with the intent "to restore and maintain the chemical, physical, and biological integrity of the nation's water, to achieve a level of water quality which provides for recreation in and on the water, and for the propagation of fish and wildlife."

The many programs established by CWA collectively form a framework to assess water quality problems, establish water quality goals and priorities, and regulate and reduce pollution discharges into the nation's water bodies. CWA requires that ambient water quality standards (i.e., for chemical, physical, and biological properties) are established for receiving waters based on the sensitivity of the beneficial uses that the water body supports. CWA also requires the preparation of nonpoint source management programs, and establishes the National Pollutant Discharge Elimination System (NPDES) permit program. The NPDES program requires that permits are obtained for major water pollution sources. NPDES permits establish effluent limitations that must be adhered to by the pollution source operator. The responsibility of administrating the numerous requirements of CWA has been assigned primarily to the United States Environmental Protection Agency (EPA). As authorized by CWA, EPA has delegated a large proportion of the implementation responsibilities to the individual States, but maintains oversight and the authority to intervene if a particular State is not administering CWA requirements properly.

Before the CWA amendments of 1972, many of the nation's waters were grossly polluted. Lake Erie was dying, and the Cuyahoga River was so polluted it burst into flames. Since the passage the 1972 CWA amendments, the health of the nation's rivers, lakes, and coastal waters has greatly improved on the whole. The number of waterways that are safe for fishing and swimming has doubled since the enactment of the 1972 CWA amendments. Despite this improvement, a substantial proportion of the nation's waters are still impaired by pollution. According to the 1998 National Water Quality Inventory (Inventory), a biennial summary of State surveys of water quality mandated by CWA, approximately 40 percent of the nation's waters that were assessed did not meet water quality standards that have been established by the Federal and State governments. The Inventory lists 21,845 water bodies as "impaired", or not meeting water quality standards, including over 5 million acres of lakes and estuaries, and over 300,000 river and shoreline miles. Approximately 218 million Americans live within 10 miles of a water body designated as impaired.

The three most common kinds of water body impairment listed in the Inventory are sediments, nutrients, and pathogens. Other kinds of impairment listed include lower dissolved oxygen concentrations, habitat and flow alterations, changes in pH, and inputs of metals, mercury, and pesticides. The 1998 Inventory indicates that approximately 10 percent of

impaired waters are affected solely by point sources, approximately 47 percent by a combination of point and non-point sources, and 43 percent solely by non-point sources.

There are several key sections of CWA that guide the regulation of water pollution in the United States. The most important sections of CWA in the context of local creeks are discussed below.

Section 208, Water Quality Control Plans. This section requires the preparation of local water quality control plans throughout the nation. Each water quality control plan covers a defined drainage area. The primary goal of each water quality control plan is to attain water quality standards established by CWA and the State governments within the defined area of coverage. Minimum content requirements, preparation procedures, time constraints, and Federal grant funding criteria pertaining to the water quality control plans are established in Section 208. Preparation of the water quality control plans has been delegated to the individual States by the EPA.

Section 303(d), Impaired Waters Program. Section 303(d) requires States, territories, and tribes to develop lists of impaired waters within their jurisdictions every two years. Impaired waters are those that do not meet water quality standards. States, territories, and tribes are also required to establish priority rankings for waters on their respective lists. Water bodies in a given State or territory are prioritized by comparing their existing degrees of pollution, and the sensitivity and importance of beneficial uses that are being threatened. The water bodies that are deemed most important are designated as “high priority.”

Section 303(d) also requires States, territories, and tribes to develop Total Maximum Daily Loads (TMDLs) for all water bodies on their respective lists of impaired waters. In essence, TMDLs are plans by which impaired water bodies will be restored such that they consistently meet the established water quality standard(s) that are currently being violated. TMDLs specify the maximum amount of pollutants that a water body can receive and still meet water quality standards, and allocates pollutant loads among point and nonpoint sources in the subject watershed. The intent of CWA is for the TMDL program to work hand in hand with the impaired waters lists; impaired waters are identified, and then restored to meet water quality standards.

Section 401, Water Quality Certifications. This section of CWA requires that, prior to the issuance of a Federal license or permit for an activity or activities that may result in a discharge of pollutants into navigable waters, the permit applicant must first obtain a certification from the State in which the discharge will originate. A State certification indicates that the proposed activity or activities will not result in a violation of applicable water quality standards established by Federal or State law, or that there are no water quality standards that apply to the proposed activity. In cases either where the State has no authority to issue the certification, or the proposed activity would affect interstate waters, EPA can issue the certification. Where necessary, water quality certifications set forth effluent limitations, pollution control measures, and monitoring requirements that are deemed necessary to ensure that the permit applicant will comply with applicable water quality standards. Such limitations and measures are required as

conditions of the Federal license or permit to be issued. The Federal license or permit cannot be issued if request for certification is denied.

Section 402, NPDES. NPDES requires permits for pollution discharges into water bodies such that the permitted discharge does not cause a violation of Federal and State water quality standards. Section 402 establishes the EPA as the administrator of the NPDES program, and authorizes EPA to delegate NPDES program administration duties to the individual States as it deems appropriate. In California, the NPDES program responsibilities have been delegated to the State Water Resources Control Board and the nine Regional Water Quality Control Boards (see the discussion of State water quality regulations later in this section).

NPDES permits define quantitative and/or qualitative pollution limitations for the permitted source, and control measures, which must be implemented to achieve the pollution limitations. Pollution control measures are often referred to as Best Management Practices, or BMPs. Simply put, BMPs are practical ways of reducing water pollution. The term BMP can be used to describe a wide variety of pollution control measures. One example of a BMP is to install filtration equipment to remove pollutants from industrial wastewater. Other types of BMPs include periodically cleaning out urban storm drains to reduce pollutant loads (e.g., debris, sediments, etc.) in urban storm water runoff, and installing soil containment devices (e.g., silt fencing) around construction sites to reduce erosion of sediments into surface waters.

Section 402 identifies the types of dischargers that are required to obtain NPDES permits, and establishes a timetable for NPDES program implementation, which is being carried out in two major phases: Phases I and II. Since 1990, Phase I NPDES regulations have required permits for storm water discharges from the following types of sources:

- Major industrial point sources such as wastewater treatment plants, electricity generating stations, industrial factories, mining operations, etc.;
- Construction activities disturbing five or more acres or land, and;
- Municipal storm water systems serving populations of 100,000 persons or more.

In 1999, EPA established Phase II NPDES regulations, which will expand the existing NPDES program to include the following categories of pollution sources:

- All municipalities within designated urbanized areas, and small municipalities outside of designated urbanized areas with a population of at least 10,000 and/or a population density of at least 1,000 persons per square mile, and;
- Construction activities that disturb between one and five acres of land.

The City of Carpinteria is a small municipality with a population of greater than 10,000 people, and will be subject to the Phase II NPDES regulations. Per the Phase II regulations, small municipalities such as the City must apply for a municipal storm water permit by February 2003, and obtain the permit by March 10, 2003. The permit conditions require each municipality

to develop a Storm Water Management Program. The purpose of the Storm Water Management Program is to reduce the discharge of storm water pollutants to the maximum degree feasible, protect water quality, and meet applicable water quality standards. These goals are to be accomplished through the implementation of a framework of BMPs established in the Storm Water Management Program. The Phase II regulations stipulate requirements for BMPs in six areas, which are the following:

- Public Outreach and Education;
- Public Involvement and Participation;
- Illicit Discharge Detection and Elimination;
- Construction Site Storm Water Runoff Control;
- Post-construction Runoff Control; and
- Pollution Prevention and Good Housekeeping in Municipal Operations.

All facets of the storm water management programs must be fully implemented by the end of the first permit term, which is usually five years. Permitted municipalities must also conduct annual monitoring and reporting, and submit the report to the NPDES permitting agency. Annual reports must include detailed summaries of how BMPs established in the Plan are being implemented. The reports must also evaluate the effectiveness of each BMP, and determine whether measurable program goals are being met. A draft Storm Water Management Plan is included in Appendix B of this program report.

Section 404, Discharge of Dredge and Fill Material. Section 404 assigns the U.S. Army Corps of Engineers (the Corps) with permitting authority for proposed discharges of dredged and fill material into waters of the United States. Waters of the U.S. are defined as "…all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; including all interstate waters including interstate wetlands, all other waters such as intrastate lakes, rivers, creeks, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce."

The Corps typically considers all natural drainages with defined beds and banks to be waters of the U.S. The limit of Corps jurisdiction in non-tidal waters extends to the ordinary high water mark, including all adjacent wetlands. The Corps and EPA define wetlands as "…those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Federally jurisdictional wetlands are determined to be present if evidence of each of three criteria are observed: wetland hydrology, a dominance of hydrophytic vegetation, and hydric soils.

Section 404 permits specify the precise location at which dredge or fill material will be placed, and control measures that must be implemented during the proposed activity to ensure that impacts to topography, hydrology, water quality, and biological resources are minimized.

Section 404 establishes procedures by which the permitting agency is to review, condition, approve, and deny permit requests. Per the regulations, permitting agencies are responsible to conduct public noticing and the opportunity for public hearings during the review of each permit request. This includes informing the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) of each permit request. Consultation with USFWS and/or NMFS is required for proposed discharges that could impact species protected by the Federal Endangered Species Act (discussed in 2.4 Biological Resources). Measures that are required by USFWS and/or NMFS to minimize impacts to Federally protected species must be included as conditions of the permit.

2.3.4.2 California Environmental Quality Act

As indicated in the previous discussion of flood control regulations (Section 2.2.6), CEQA serves as the primary body of law guiding the environmental review process for proposed projects in California. CEQA requires California's public agencies to disclose the "significant" environmental effects of their actions, and to avoid or mitigate any "significant" environmental effects where feasible. Water quality impacts must be assessed and mitigated where feasible for proposed actions that are subject to CEQA.

2.3.4.3 California Coastal Act

As indicated in the previous discussion of flood control regulations (Section 2.2.6), CCA was enacted to provide long-term protection of California's Coastal Zone. Several policies in CCA apply directly to coastal creeks, estuaries, wetlands, riparian corridors, and associated habitats. Many are directly applicable to water quality issues.

2.3.4.4 California Porter-Cologne Act

The Porter-Cologne Act (California Water Code Section 13000) is the principal law governing water quality regulation in California. It establishes a comprehensive program to protect water quality and the beneficial uses of water. The Porter-Cologne Act applies to surface waters, wetlands, and groundwater, and to both point and nonpoint sources of pollution. Pursuant to the Porter-Cologne Act, it is the policy of the State:

- That the quality of all the waters of the State shall be protected;
- That all activities and factors affecting the quality of water shall be regulated to attain the highest water quality within reason, and;
- That the State must be prepared to exercise its full power and jurisdiction to protect the quality of water in the State from degradation.

Pursuant to the Porter-Cologne Act, the responsibility for protection of water quality in California rests with the State Water Resources Control Board (SWRCB). The SWRCB administers Federal and State water quality regulations for California's ocean waters, and also oversees and funds the State's nine Regional Water Quality Control Boards (RWQCBs). The

RWQCBs prepare water quality control plans, establish water quality objectives, and carry out Federal and State water quality regulations and permitting duties for inland water bodies, enclosed bays, and estuaries within their respective regions. The Porter-Cologne Act gives the SWRCB and RWQCBs broad powers to protect water quality by regulating waste dischargers to water and land, and requiring clean up of hazardous wastes.

The RWQCBs regulate discharges under the Porter-Cologne Act primarily through issuance of NPDES and waste discharge report (WDR) permits. Anyone discharging or proposing to discharge materials that could affect water quality (other than to a community sanitary sewer system regulated by an NPDES permit) must file a report of waste discharge. The Porter-Cologne Act provides RWQCBs with several options for enforcing regulations, including cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecutions.

2.3.4.5 California Ocean Plan

In response to requirements imposed on ocean-bordering States by CWA Section 208, SWRCB prepared the California Ocean Plan, and adopted the original document in 1972. The Ocean Plan has since been amended in 1978, 1983, 1988, 1990, and 1997. The Ocean Plan is intended to protect beneficial uses of California's ocean waters. Beneficial uses are defined in the Ocean Plan as being "…industrial water supply, water contact and non-contact recreation, aesthetic enjoyment, navigation, commercial and sport fishing, mariculture, preservation and enhancement of Areas of Special Biological Significance, rare and endangered species, marine habitat, fish migration, fish spawning and shellfish harvesting."

The Ocean Plan describes existing characteristics of the State's ocean waters, and establishes water quality objectives deemed necessary to protect beneficial uses. Water quality objectives have been established for physical, chemical, biological, and radioactive characteristics. Waste discharge requirements for point sources and non-point sources of pollution have also been established in the plan. In addition, the plan establishes waste discharge prohibitions with respect to hazardous substances, sludge, and discharges in areas of special biological significance.

Creeks that empty into the ocean (e.g., local creeks) affect the quality of nearshore coastal waters that are regulated by the Ocean Plan. In recognition of this, the Ocean Plan establishes water quality objectives for the physical, chemical, and biological characteristics of coastal creeks.

2.3.4.6 Central Coast Regional Water Quality Control Board

As indicated above, the California Porter-Cologne Act assigns the SWRCB and RWQCBs with the responsibility of protecting surface water and groundwater quality in California. Each RWQCB's jurisdiction covers one of the State's nine regional hydrologic units. The RWQCB's duties include the preparation and implementation of Water Quality Control Plans, regulation of waste discharges to water and land, and administration of a number of other

programs, including the impaired waters and TMDL programs mandated by CWA. The RWQCBs also consider requests for water quality certifications mandated by CWA Section 401.

Santa Barbara County is within the jurisdiction of the Central Coast Regional Water Quality Control Board (CCRWQCB), which oversees the area extending from the Santa Barbara County/Ventura County line to the northern boundary of Santa Cruz County (approximately 300 miles south to north), and from the coastline to approximately 40 miles inland (west to east).

Water Quality Control Plan, Central Coast Region. Per the requirements of the CWA and the California Porter-Cologne Act, CCRWQCB has prepared a Water Quality Control Plan for the watersheds under its jurisdiction. The Water Quality Control Plans from all nine of the RWQCBs and the California Ocean Plan (prepared and implemented by SWRCB) collectively constitute the State Water Quality Control Plan. Water Quality Control Plan, Central Coast Region has been designed to support the intentions of the CWA and the Porter-Cologne Act by: (1) characterizing watersheds within the Central Coast Region; (2) identifying beneficial uses that exist or have the potential to exist in each water body; (3) establishing water quality objectives for each water body to protect beneficial uses or allow their restoration, and; (4) providing an implementation program that achieves water quality objectives. Implementation program measures include monitoring, permitting, and enforcement activities. Per the requirements of CWA Section 303(c), the Water Quality Control Plan is reviewed every three years and revised as necessary to address problems with the plan, and meet new legislative requirements.

Beneficial uses that have been established by CCRWQCB in the Water Quality Control Plan for Carpinteria, Franklin, and Santa Monica Creeks and the Carpinteria Salt Marsh are provided below in Table 2-2. At this time, the CCRWQCB has not established beneficial uses for Lagunitas Creek.

Table 2-2. Beneficial Uses, Local Water Bodies

Beneficial Uses	Carpinteria Creek	Franklin Creek	Santa Monica Creek	Carpinteria Salt Marsh
MUN (municipal and domestic water supply)	Yes	Yes	Yes	No
AGR (agricultural water supply)	Yes	Yes	Yes	No
GWR (groundwater recharge)	Yes	Yes	Yes	No
REC-1 (water contact recreation)	Yes	Yes	Yes	Yes
REC-2 (non-contact water recreation)	Yes	Yes	Yes	Yes
WILD (supports terrestrial wildlife habitat)	Yes	Yes	Yes	Yes
COLD (cold fresh water habitat)	Yes	Yes	Yes	No
WARM (warm fresh water habitat)	Yes	Yes	Yes	Yes
MIGR (supports migrating aquatic organisms)	Yes	Yes	No	Yes
SPAWN (fish spawning and nursery habitat)	Yes	Yes	Yes	Yes

Table 2-2. (Continued)

Beneficial Uses	Carpinteria Creek	Franklin Creek	Santa Monica Creek	Carpinteria Salt Marsh
BIOL (biological habitats of special significance)	Yes	No	Yes	Yes
RARE (supports rare, threatened, or endangered species)	Yes	Yes	No	Yes
EST (estuarine habitat)	Yes	No	No	Yes
FRESH (provides freshwater replenishment to another water body)	Yes	Yes	Yes	No
COMM (supports commercial and/or recreational fishing or shellfish harvesting)	Yes	Yes	Yes	Yes

The Water Quality Control Plan establishes general qualitative and/or quantitative water objectives that apply to all inland surface waters, estuaries, and enclosed bays in the Central Coast Region. The general objectives pertain to the following water quality parameters: color, taste and odors, floating material, suspended material, settleable material, oil and grease, biostimulatory substances (e.g., nutrients), sediment, turbidity, pH, dissolved oxygen, temperature, toxicity pesticides, chemical constituents, other organics, and radioactivity. The general objectives can be found in Chapter 3 of the Water Quality Control Plan.

The Water Quality Control Plan also provides water quality objectives for specific beneficial uses such as municipal water supply, agriculture, cold freshwater aquatic life habitat, fish spawning habitat, recreation, etc. Water quality parameters of concern and numeric objectives vary considerably depending on the nature of the beneficial use. For example, objectives for municipal water supply and fish spawning habitat are much more stringent and apply to a greater number of parameters than those for agricultural or industrial water supply. Depending on the type of beneficial use, objectives can apply to parameters such as specific organic chemicals, heavy metals, inorganic ions, nutrients, pH, bacteria levels, temperature, dissolved oxygen, etc. In cases where multiple beneficial uses are designated for a given water body (as is the case for local water bodies), a combination of objectives apply, some of which are for the same parameters. In these cases, the most stringent objective for each water quality parameter applies to the water body. Specific objectives for the various beneficial uses can be found in Chapter 3 of the Water Quality Control Plan.

In addition to those described above, the Water Quality Control Plan establishes specific water quality objectives for a number of specific watersheds in the region. Objectives specific to local watersheds have not yet been established.

Waste Discharge Permitting. CCRWQCB is responsible for administering the State Waste Discharge Program for discharges to land and the Federally delegated NPDES program for discharges to surface waters. NPDES mandates that proponents of regulated activities that would result in a discharge of waste to a water body must obtain a permit from the permitting

agency (CCRWQCB locally), and adhere to any conditions imposed by the permitting agency to protect public health and water quality. See the discussion of CWA Section 402 for details on the NPDES program.

Impaired Waters, TMDLs. Consistent with the requirements of CWA Section 303(d), CCRWQCB identifies impaired waters and prepares TMDLs for impaired waters within its jurisdiction. Carpinteria Creek and the Carpinteria Salt Marsh are designated as impaired waters on CCRWQCB's most recent list, which was submitted to SWRCB in 1998 for inclusion on the Statewide impaired waters list. California's impaired waters list has since been approved by EPA in 1999. As defined by CWA, impaired waters are those that do not meet water quality objectives established by the Federal and State governments, including those in the local Water Quality Control Plan.

Carpinteria Creek and Carpinteria Salt Marsh have been designated as impaired based on monitoring studies conducted by the State Mussel Watch Program and the County of Santa Barbara, a number of other studies that have been completed, and general knowledge of local conditions. Table 2-3 lists the types and sources of impairment identified on the State list.

Per the requirements of CWA Section 303(d), TMDLs must be prepared and implemented for all impaired waters within 8-13 years of their initial listing. Many of the high priority water bodies identified by the Central Coast RWQCB have already been addressed. Listed high and medium priority water bodies with water quality problems due to be resolved in 2001 include: Salinas River and Lagoon, San Lorenzo River and estuary, Watsonville Slough, Aptos Creek, Carbonera Creek, Llagas Creek, Lompico Creek, Pajaro River, Rider Gulch Creek, San Benito River, San Luis Obispo Creek, and Shingle Mill Creek. Carpinteria Creek and Carpinteria Salt Marsh are among the priority water bodies on the State list, and resolution of their impairments (see Table 2-3) is scheduled to commence in 2006 and be completed by 2011. While neither Santa Monica Creek nor Franklin Creek are listed by name, these are the primary watersheds supplying freshwater into the Carpinteria Salt Marsh, and it is, therefore, highly likely that corrective actions will take place along these creeks as well.

Table 2-3. Types and Sources of Impairment, Local Water Bodies

Water Body	Type(s) of Impairment	Source(s) of Impairment
Carpinteria Creek	Pathogens	Agriculture, septage disposal, nonpoint sources
Carpinteria Marsh	Nutrients	Agriculture
	Organic enrichment, low dissolved oxygen levels	Agriculture
	Priority organics	Urban runoff/storm sewers
	Sedimentation/siltation	Agriculture, construction/land development, storm sewers

2.3.4.7 California Fish and Game Code, Creek and Lake Alteration Agreements

The State of California, pursuant to Sections 1601-1603 of the California Fish and Game Code, regulates projects that will divert, obstruct or change the natural flow or bed, channel or bank of any river, creek or lake that CDFG designates as being of benefit to an existing fish or wildlife resource. The Fish and Game Code establishes CDFG as the administrating agency. CDFG considers most natural perennial and intermittent drainages that have a defined bed and banks to be "creeks" subject to its jurisdiction. CDFG jurisdiction extends to the outer limit of riparian vegetation that exists along the creek or lake.

A Section 1601 Creek or Lake Alteration Agreement must be entered into with CDFG for any activities that would impact jurisdictional creeks and lakes in the manner described above. Similar to a CWA Section 404 permit issued by the Corps, Section 1601 Creek or Lake Alteration Agreements specify the precise location at which the proposed activity will occur, and control measures that must be implemented during the proposed activity to ensure that impacts to topography, hydrology, water quality, and biological resources are minimized. The Fish and Game Code also provides CDFG with the authority to enforce required conditions, suspend permits, and bring civil action against violators once an agreement has been issued.

2.3.4.8 Carpinteria Salt Marsh Reserve Management Plan

As indicated in the previous discussion of flood control regulations (Section 2.2.6), this document establishes a long-range management and preservation plan for the Carpinteria Salt Marsh Reserve. Numerous goals, policies, and actions in the Management Plan relate to water quality issues associated with the Franklin Creek and Santa Monica Creek watersheds.

2.3.4.9 City of Carpinteria Regulations

As indicated in the previous discussion of flood control regulations (Section 2.2.6), the City is responsible for regulating development, providing and maintaining public services and infrastructure, and reviewing and approving or denying proposed projects within the City limits. City regulations pertaining to water quality protection can be found primarily in the General Plan and Local Coastal Plan, and Grading Ordinance of the Carpinteria Municipal Code.

2.4 BIOLOGICAL RESOURCES

2.4.1 Introduction

This section describes aquatic, wetland, and riparian biological communities that exist along and adjacent to Carpinteria, Lagunitas, Franklin, and Santa Monica Creeks, focusing on creek reaches within the City limits. Biological communities that exist along and adjacent to local creeks are highly productive and sensitive. They have also been subject to degradation by a number of human activities, including habitat destruction, direct modification of creek beds and banks, and increased inputs of sediments and other pollution. Due to their high productivity, sensitivity, and history of degradation, these biological communities are protected by numerous existing laws and regulations. In addition, Federal and State laws protect a

number of species found in these communities that have been designated as rare, of concern, threatened, or endangered by the Federal and State governments.

This section is based on data collected during field surveys conducted along local creeks by Padre biologists in the spring and summer of 2000, and information provided in previous biological studies. Data sheets from the Padre field surveys are provided in Appendix A. Biological communities associated with each of the study creeks are described below.

2.4.2 Carpinteria Creek

The Carpinteria Creek watershed is relatively undisturbed in the Santa Ynez Mountains. Moving downstream through the foothills and the coastal terrace, the watershed and its two main tributaries (Carpinteria Creek and Gobernador Creek) have been subject to a wide range of human disturbances. These include encroachment by agricultural, suburban, and urban uses that generally extend near or up to the creek banks, road crossings, direct creek modifications (e.g., rip rap, pipe and wire revetment, sediment basins, etc.), inputs of polluted storm water and agricultural runoff, trash and debris, invasive non-native plant and animal species, and noise. These disturbances have degraded the biological communities in the lowland tributaries and main stem of Carpinteria Creek.

This section of the report describes the existing biological communities that are found in the disturbed lowland section of Carpinteria Creek within the City limits. In addition, the biological communities that are present at study reach (section of creek) CC-3 are described. CC-3 was surveyed by Padre biologists in May 2000. As shown in Figure 1-2, CC-3 is located along Gobernador Creek, upstream of a detention basin at an elevation of approximately 400 feet above sea level. Upstream of the detention basin, Gobernador Creek and its tributaries drain a relatively undisturbed watershed area.

CC-3 is intended to serve as a “reference site” for the Carpinteria Creek watershed. A reference site provides baseline creek conditions in a relatively undisturbed setting, and can serve as a model for efforts to restore sections of the creek that have been degraded, such as the lowland creeks in the watershed. It is important to realize that some of the differences in biological communities that exist between the reference site (CC-3) and lowland creeks in the watershed are influenced by natural variables such as topography, geology, creek morphology, and hydrology. Nevertheless, CC-3 provides valuable information as to what biological communities existed in lowland creek sections prior to human disturbance, and what could be restored.

The water quality of the study reaches in Carpinteria Creek was discussed in Section 2.3.2.1 (monitoring results were presented in Table 2-1). The physical and biological characteristics (with the exception of benthic macroinvertebrates) of stream reach CC-3 are described below in Section 2.4.2.1. Those of the downstream study reaches, CC-1 and CC-2, are described below in Section 2.4.2.2. Benthic macroinvertebrate communities are a valuable assessment tool, and the survey results and conclusions from all three study reaches of Carpinteria Creek are discussed in Section 2.3.2.3.

2.4.2.1 Upstream Reach CC-3

Physical Habitat. This section of Gobernador Creek is located in a narrow canyon with steep slopes. The creek channel is of a medium gradient, intermediate between low gradient and high gradient. The creek makes numerous bends through the canyon. The creek channel is composed of bedrock and large boulders, and also contains deposits of smaller boulders, cobble, gravel, and sand. Fine sediment deposits (i.e., fine sands, silts and clays) in the creek bed are sparse. The creek bed forms an alternating mix of shallow to medium depth riffles, and pools of varying size and depth. Overhanging creek banks, vegetation, boulder crevices, and woody debris provide excellent cover for fish, amphibians, and other aquatic organisms. The creek is mostly shaded by a dense riparian canopy and steep canyon walls. Creek flow was relatively high at CC-3 compared to CC-1 and CC-2 at the time of the Padre survey (May 25 2000), and was estimated to be approximately 4.3 cfs. There is some human disturbance at this creek reach, including a suspended water line along the east bank (see Figure 2-6), a private road along the western canyon slope (approximately 75-100 feet in elevation above the creek bed), the remains of a former rock dam, and non-native vegetation. However, this creek segment is relatively undisturbed compared to those in the lowland portion of the watershed.

A visually based, semi-quantitative creek habitat assessment was completed at CC-3 using an assessment protocol developed by EPA for use in wadeable rivers and creeks (Barbour et al., 1999). The assessment required the evaluation of several habitat characteristics, including bank stability, riparian canopy cover, habitat complexity, bottom substrate, creek flow, level of human disturbance, and others. Scores between 0 and 20 were assigned for each of 10 habitat characteristics based on criteria provided in the EPA protocol. Scores for each habitat characteristic were added to provide a total score for the study reach. A total score of 173/200 was assigned to CC-3 at the time of the survey (the detailed scoring for the habitat parameters of each study site are provided in Appendix A). This score indicates that the creek habitat at CC-3 is excellent overall, and has not been greatly impacted by human activities.

Aquatic vegetation at CC-3 included thin films of brown crusting algae on rocky substrate. Filamentous green algae was largely absent. There were some emergent riparian plants in still water near the creek edges, including scarlet monkeyflower (*Mimulus cardinalis*), small-headed bulrush (*Scirpus microcarpus*), and water speedwell (*Veronica anagallis-aquatica*).

Riparian vegetation along the study reach of Gobernador Creek consists of a fairly continuous overstory of riparian trees, and an understory of shrubs, herbs, and grasses that are generally dense (see Figures 2-5 and 2-6). Riparian vegetation bordering the creek is best classified as southern sycamore-alder riparian woodland, which transitions into chaparral vegetation up the canyon slopes. Dominant riparian trees include white alder (*Alnus rhombifolia*), California sycamore (*Plantanus racemosa*), black cottonwood (*Populus baslamifera*), coast live oak (*Quercus agrifolia*), and California bay (*Umbrellaria california*). There are also arroyo willow (*Salix lasiolepis*), southern black walnut (*Juglans californica*), and big leaf maple (*Acer macrophyllum*). Native understory plants include California blackberry

(*Rubus ursinus*), poison oak (*Toxicodendron diversilobum*), white nightshade (*Solanum douglasii*), mugwort (*Artemisia douglasiana*), toyon (*Heteromeles arbutifolia*), California honeysuckle (*Lonicera hispidula var. vacillans*), buck brush (*Ceanothus cuneatus*), mountain mahogany (*Cercocarpus betuloides*), canyon sunflower (*Venegasia carpesioides*), scarlet monkey flower, common horsetail (*Equisetum sp.*), creeping snowberry (*Symphoricarpus mollis*), fuchia-flowered gooseberry (*Ribes speciosum*), small-headed bulrush, and willow herb (*Epilobium ciliatum*). Non-native plants include giant reed (*Arundo donax*), German ivy (*Senecio mikanoides*), sweet fennel (*Foeniculum vulgare*), smilo grass (*Piptherum millaceum*), Durango root (*Datisca glomerata*), bent grass (*Agrostis viridis*), and annual beard grass (*Polypogon monspeliensis*).

Fish. Rainbow/steelhead trout (*Oncorhynchus mykiss*) were observed in several pools within, upstream and downstream of CC-3 during the creek survey conducted by Padre biologists. As many as 10 to 15 individuals were sighted in some of the larger pools. The individuals observed ranged from approximately 1 to 10 inches in length.

There is no taxonomic distinction made between rainbow trout and steelhead trout; they are considered to be the same species. All steelhead trout and rainbow trout are born in freshwater creeks, where they typically spend their first year or two, growing in size and maturity. The distinction between them is that steelhead trout are anadromous; they migrate to the ocean and reside there for several years, much like salmon. Rainbow trout do not assume an anadromous life history, but instead remain in creeks throughout their life cycle. Steelhead migrate back up creeks (typically the creek they were born in) to spawn in the same habitats used by resident rainbow trout. Most steelhead return to the ocean after spawning, and can spawn more than once in their lifetime. It is not entirely clear to what degree genetics versus mere opportunity (i.e., access to the ocean) determines whether a given trout will be an anadromous steelhead or a resident rainbow.

Adult steelhead trout can become much larger than resident rainbow trout. There are also differences in coloration. Adult steelhead typically have a silvery-blue color dorsally (top) and on their sides, with light, counter shaded undersides. Rainbows typically have brown speckles and bars against a lighter background dorsally and on their sides, and rainbow coloration along their light undersides.

Amphibians observed during the Padre creek survey include Pacific tree frog (*Pseudacris regilla*) (adults and tadpoles), California tree frog (*Pseudacris cadaverina*) (adults and tadpoles), and California newt (*Taricha torosa*). California newts were numerous, and were observed in several pools and slow riffles within, upstream, and downstream of CC-3. As many as 5 to 6 individuals were present in some of the pools. Several pairs were observed breeding. The newts tended to be most numerous in long, shallow pools, possibly avoiding competition with trout. Other amphibians having a high potential to occur include western toad (*Bufo boreas*) and black-bellied salamander (*Batrachoseps nigriventris*).

Reptiles observed by Padre biologists include western fence lizards (*Sceloporus occidentalis*). Other reptile species having a high potential to occur include western pond turtle (*Clemmys marmorata*), side-blotched lizard (*Uta stansburiana*), southern alligator lizard (*Elgaria multicarinata*), western skink (*Eumeces skiltonianus*) two-striped garter snake (*Thamnophis hammondii*), California silvery legless lizard (*Anniella pulchra*), common kingsnake (*Lampropeltis getulus*), ringneck snake (*Diadophis punctatus*), gopher snake (*Pituophis melanoleucus*), and western rattlesnake (*Crotalus viridis*).

Birds observed by Padre biologists within the study reach and downstream towards the detention basin include the following:

song sparrow (*Melospiza melodia*)
cliff swallow (*Hirundo pyrrhonota*),
black phoebe (*Saynoris nigricans*)
turkey vulture (*Cathartes aura*)
common yellowthroat (*Geothlypis trichas*)
American robin (*Turdus migratorius*)
lesser goldfinch (*Carduelis psaltria*)
spotted towhee (*Pipilo erythrophthalmus*)
canyon wren (*Catherpes mexicanus*)
violet-green swallow (*Tachycineta thalassina*)
red-tailed hawk (*Buteo jamaicensis*)
wrentit (*Chamaea fasciata*)
phainopepla (*Phainopepla nitens*)
house finch (*Carpodacus mexicanus*)
American goldfinch (*Carduelis tristis*)
California towhee (*Pipilo crissalis*).

Other bird species having a high potential to occur in the study reach and vicinity include the following:

red-shouldered hawk (*Buteo lineatus*)
American kestrel (*Falco sparverius*)
white-tailed kite (*Elanus leucurus*)
yellow warbler (*Dendroica petechia*)
band-tailed pigeon (*Columba fasciata*)
mourning dove (*Zenaida macroura*)
northern flicker (*Colaptes auratus*)
red-breasted sapsucker (*Sphyrapicus ruber*)
scrub jay (*Aphelocoma coerulescens*)
bushtit (*Psaltriparus minimus*)
Audubon's warbler (*Dendroica coronata*)
loggerhead shrike (*Lanius ludovicianus*)
Wilson's warbler (*Wilsonia pusilla*)
great-horned owl (*Bubo virginianus*)
Cooper's hawk (*Accipiter cooperii*)
orange-crowned warbler (*Vermivora celata*)
California quail (*Callipepla californica*)
American crow (*Corvus brachyrhynchos*)
acorn woodpecker (*Melanerpes formicivorus*)
Anna's hummingbird (*Calypte anna*)
western flycatcher (*Empidonax difficilis*)
plain titmouse (*Parus inornatus*)
dark-eyed junco (*Junco hyemalis*)
Bewick's wren (*Thryomanes bewickii*)
hermit thrush (*Catharus guttatus*)
ruby-crowned kinglet (*Regulus calendula*)

Mammals that have a high potential to occur at the study reach and vicinity include Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), long-tailed weasel (*Mustela frenata*), gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), California ground squirrel (*Spermophilus beecheyi*), western gray squirrel (*Sciurus griseus*), Merriam chipmunk (*Eutamias merriami*), black-tailed jackrabbit (*Lepus californicus*), brush rabbit (*Sylvilagus bachmani*), Botta's pocket gopher (*Thomomys bottae*), and several other rodents (e.g., mice, rats, woodrats, and voles).

2.4.2.2 Carpinteria Creek within the City limits, including CC-1 and CC-2

Physical Habitat. Lower Carpinteria Creek passes through extensive agricultural and urban areas, and has been subject to a moderate amount of human alteration. However, the creek has a natural bed and banks for the most part, and a narrow corridor of riparian vegetation along its length. This section of the creek has a low gradient, with alternating sections of shallow riffles and pools. The creek bottom contains small boulders, cobble, and gravel, with deposits of sand and finer sediments, which are extensive in some areas, especially at the downstream end. Large woody debris is largely absent from the creek bed. Portions of lower Carpinteria Creek have a fairly open canopy and are largely open to sunlight, while others are mostly shaded by dense overhanging vegetation. Overall, lower Carpinteria Creek has lower habitat quality and diversity for fish, amphibians, and other aquatic organisms compared to CC-3 and other upstream creek reaches.

During the creek surveys conducted by Padre biologists, creek flow in lower Carpinteria Creek was fairly low (0.20 cfs at CC-1, and 0.16 cfs at CC-2). During the late summer and early fall months, creek flow in lower Carpinteria Creek is typically very low and spotty, with portions of the creek bed going dry. However, water typically backs up several hundred yards upstream of the creek mouth in the summer. The creek mouth is typically blocked by a sand berm during this time. This results in the formation of a small estuary, which fills the width of the creek channel (approximately 30-40 feet wide) with water to depths of up to five feet or so. The estuary is surrounded by dense willows, cattails, and giant reed.

A visually based, semi-quantitative creek habitat assessment was completed at CC-1 and CC-2 using the EPA method described above in the discussion of CC-3. Total scores of 100/200 and 112/200 were assigned to CC-1 and CC-2, respectively at the time of the surveys. The scores for CC-1 and CC-2 are significantly lower than the score of 173/200 assigned to CC-3, and reflect the lower quality and diversity of habitat present in lower Carpinteria Creek.

Aquatic vegetation observed in the lower reach of Carpinteria Creek by Padre biologists included green, filamentous algae, and mats of yellow-green algae, particularly in areas open to direct sunlight. Partially submerged macrophytes observed include watercress (*Rorippa nasturtium-aquaticum*), water speedwell, cattails (*Typha spp.*), and common horsetails. Algae and macrophytes become especially prolific in the creek bottom during the summer and fall months when creek flow and velocity decrease, and water temperature and nutrient concentrations increase.

Riparian vegetation along the lower section of Carpinteria Creek includes a canopy of riparian trees, and an understory of shrubs, herbs, and grasses that are generally dense (see Figures 2-7 and 2-8). Riparian vegetation bordering the creek is best classified as southern cottonwood-willow riparian forest, which has been infiltrated by numerous non-native plant species. The riparian forest is immediately bordered by agricultural and urban uses. Dominant riparian trees are California sycamore, black cottonwood, and arroyo willow. Coast live oak, white alder, Mexican elderberry (*Sambucus mexicana*), and southern black walnut are also present, as are a few dogwoods (*Cornus sp.*) and box elders (*Acer negundo*). The most

common non-native tree in the riparian corridor is blue gum (*Eucalyptus globulus*), which forms dense stands in some areas. There are also various landscape trees that are within or directly adjacent to the riparian corridor.

Prominent native understory plants include California blackberry, poison oak, white nightshade, mugwort, cattails, and horsetails. Other native understory plants include toyon, lemonadeberry (*Rhus integrifolia*), stinging nettle (*Urtica dioica*), canyon sunflower, California figwort (*Scrophularia californica*), fiesta flower (*Pholistoma auritum var. auritum*), morning glory (*Calystegia sp.*), coyote brush (*Baccharis pilularis*), and scarlet monkeyflower. Non-native understory vegetation includes giant reed, which is highly invasive and forms dense, monotypic stands along the creek banks in several areas. Prominent non-native vines including German ivy, English ivy, and greater periwinkle (*Vinca major*) dominate the ground layer in areas. These highly invasive vines have extended into the canopy and killed several riparian trees. Other non-native plants in the riparian corridor include sweet fennel, castor bean (*Ricinus communis*), black mustard (*Brassica nigra*), iceplant (*Carpobrotus edulis*), ripgut brome (*Bromus diandrus*), wild radish (*Raphanus sativus*), common sow thistle (*Sonchus oleraceus*), smilo grass, annual beard grass, rescue grass (*Bromus catharticus*), Japanese honeysuckle (*Lonicera japonica*), garden nasturtium (*Tropaeolum majus*), myoporum (*Myoporum laetum*), and poison hemlock (*Conium maculatum*).

Terrestrial Invertebrates. Monarch butterflies (*Danaus plexippus*) are known to over-winter at Salzgeber Meadow by the thousands. Salzgeber Meadow consists of a dense forest of blue gums, native riparian trees, and understory, and is located along the eastern bank of Carpinteria Creek upstream of the railroad tracks (near the creek mouth).

Fish observed by Padre biologists include three-spined sticklebacks (*Gasterosteus aceleatus microcephalus*), which were common in shallow pools and gentle riffles. No steelhead trout were identified. However, adult steelhead are known to migrate through the lower portion of Carpinteria Creek, presumably towards suitable spawning habitat in the upper watershed. Steelhead migration typically occurs during periods of high creek flow. Tidewater goby (*Eucyclogobius newberryi*) is a potential resident at the creek mouth estuary.

Amphibians observed by Padre biologists include Pacific tree frog tadpoles and adults. Others having a high potential to occur include western toad and black-bellied salamander.

Reptiles observed by Padre biologists include western fence lizards. Other reptiles having a high potential to occur include side-blotched lizard, southern alligator lizard, western skink, California silvery legless lizard, common kingsnake, gopher snake, and western rattlesnake.

Birds identified by Padre biologists during field surveys in lower Carpinteria Creek include the following:

black phoebe
American crow
western wood pewee (*Contopus sordidulus*)
common yellowthroat
bushtit
California towhee
mourning dove
Anna's hummingbird
scrub jay
red-shouldered hawk
northern mockingbird (*Mimus polyglottos*)
yellow warbler
band-tailed pigeon
dark-eyed junco
song sparrow
mallard (*Anas platyrhynchos*)
house finch
acorn woodpecker
hooded oriole (*Icterus cucullatus*)
spotted towhee
western tanager (*Piranga ludoviciana*)
phainopepla
Cooper's hawk
European starling (*Sturnus vulgaris*)
house sparrow (*Passer domesticus*)
American robin
black-crowned night-heron (*N. nycticorax*)
Audubon's warbler

Other birds having a high potential to occur in lower Carpinteria Creek include the following:

red-tailed hawk
great-horned owl
white-tailed kite
American goldfinch
western flycatcher
bushtit
loggerhead shrike
Wilson's warbler
turkey vulture
American kestrel
cliff swallow
orange-crowned warbler
plain titmouse
Bewick's wren
hermit thrush
ruby-crowned kinglet

Mammals having a high potential to occur in lower Carpinteria Creek include Virginia opossum, raccoon, long-tailed weasel, coyote, gray fox, domestic dog, bobcat, domestic cat, California ground squirrel, western gray squirrel, Merriam chipmunk, black-tailed jackrabbit, brush rabbit, Botta's pocket gopher, and several other rodents (e.g., mice, rats, woodrats, and voles).

2.4.2.3 Benthic Macroinvertebrates in Stream Reaches CC-1, CC-2, and CC-3

Biomonitoring Using Benthic Macroinvertebrates. Benthic macroinvertebrates include aquatic insects, crustaceans, mollusks, annelids, and other invertebrate taxa that inhabit the water column and bottom substrate in creeks, lakes, estuaries, and marine waters. Many aquatic insects have aquatic larval life stages, and emerge from the water to complete aerial or terrestrial adult/reproductive stages. Some benthic macroinvertebrates are relatively intolerant of various forms of human disturbance (e.g., habitat alteration, water pollution, etc.) while others have higher disturbance tolerances. Thus, the presence, absence, and relative abundance of certain benthic macroinvertebrate taxa (i.e., species, genera, families, etc.) can be used as an indicator of water quality conditions and overall condition, or "health", of a given creek

ecosystem. In addition, creeks that have been subject to little or no human disturbance generally support diverse benthic macroinvertebrate communities, whereas creeks that have been subject to a great deal of human disturbance typically support a low diversity of benthic macroinvertebrates. Benthic macroinvertebrate communities, particularly insect taxa, have been used extensively as biological indicators of creek conditions since the early 1900's, most notably in the United States and Europe.

In addition to having varying human disturbance tolerances, benthic macroinvertebrates offer a number of other advantages as biological indicators for creek ecosystems. These include the following:

- Benthic macroinvertebrates are typically abundant and form diverse communities, especially in healthy creeks. This provides an advantage to using benthic macroinvertebrates in the assessment of creek health compared to other taxonomic groups such as fish and amphibians, which typically have comparatively lower diversity and abundance, and can be difficult to census. Thus, it is typically easier to detect temporal and spatial differences in creek conditions using benthic macroinvertebrates compared to vertebrates. This is especially true in the southern California region, where fish and other vertebrates residing in creeks are especially limited in their diversity.
- Benthic macroinvertebrates are an integral component of creek ecosystems. They typically represent a large proportion of the total ecosystem biomass, perform important functions in the cycling of nutrients and energy, and are food sources for vertebrate predators (i.e., fish, amphibians, birds, etc.). Thus, changes in benthic macroinvertebrate assemblages can have profound effects on the overall creek ecosystem.
- Benthic macroinvertebrates are exposed to environmental conditions (including water quality) continuously over a relatively long time period of time, as they typically have aquatic life stages lasting up to several months or even years. Thus, analysis of benthic macroinvertebrate communities provides a long-term, cumulative measure of creek health. This offers a considerable advantage compared to water quality monitoring, which offers only a "snapshot" of creek conditions at the time of sampling, and must be conducted often (and at great expense) to provide an indication of long-term creek conditions.
- Benthic macroinvertebrates have been well-studied in many cases, with detailed information available on taxonomy, life history, distribution, habitat requirements, pollution tolerances, and so on. The wealth of existing knowledge that is available facilitates understanding of the creek ecosystem based on the types of benthic macroinvertebrates that are present.
- Benthic macroinvertebrates are easy to collect, and can be identified fairly rapidly by trained professionals.

Benthic Invertebrate Communities Present in Carpinteria Creek. In order to facilitate comparison of creek conditions present at each study reach in the Carpinteria Creek watershed (CC-1, CC-2, and CC-3), a composite benthic macroinvertebrate sample was collected at each study reach using methods described in *Rapid Bioassessment Protocols for Use in Creeks and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition* (Barbour et al. 1999), published by the EPA in 1999. Consistent with the selected EPA rapid bioassessment protocol, the sample for each study reach was a composite of individual sub-samples collected from 20 different locations in the study reach. The sub-sampling locations were selected to account for the diversity and relative coverage area of creek habitats (e.g., riffles, pools, falls, etc.) found in the study reach. After collection, benthic macroinvertebrate samples were transported to the laboratory. 300 benthic macroinvertebrates were randomly picked from each sample using a dissecting microscope, and identified with the aid of taxonomic keys. In most cases, specimens were identified to the genus level. A detailed discussion of field and laboratory sampling methodology is provided in Appendix A.

Benthic macroinvertebrate assemblages have been shown to undergo seasonal succession in local creeks (Chaparral Watershed Group, 1986). In order to minimize seasonal differences, samples from CC-1, CC-2, and CC-3 were collected within a 10-day timeframe, between May 16 and May 25, 2000. Benthic macroinvertebrates collected from CC-1, CC-2, and CC-3 are listed and enumerated by taxonomic group in Table 2-4. Discussion of the benthic macroinvertebrate communities present at the time of the surveys and comparison among study reaches is provided in the following paragraphs.

CC-3. Of those collected, the sample from CC-3 contained the greatest diversity of aquatic insects, including at least 24 insect families and at least 30 insect genera (see Figure 2-12). The sample from CC-3 was dominated by non-Diptera insects, which comprised approximately 80 percent of the sample (241 of 300 specimens). Dominant insect orders included Ephemeroptera (mayflies), which made up approximately 39 percent of the sample (116 of 300 specimens), and Coleoptera (beetles), which made up approximately 32 percent of the sample (95 of 300 specimens). Other non-Diptera insect orders present included Tricoptera (caddisflies), which comprised approximately 7 percent of the sample (20 of 300 specimens), Hemiptera (true bugs), which comprised approximately 2 percent of the sample (5 of 300 specimens), and Odonata (dragonflies/damselflies), Plecoptera (stoneflies) and Orthoptera (grasshoppers/ crickets), each of which comprised less than 1 percent of the sample, respectively. Diptera (true flies) comprised approximately 20 percent of the sample (59/300 specimens). Non-insect taxa were not found in the sample.

CC-2. The sample collected at CC-2 contained at least 16 insect families, and at least 20 insect genera. Thus, diversity at CC-2 was lower than at CC-3, but higher than at CC-1 (see Figure 2-12). Although less diverse than the sample from CC-3, the sample from CC-2 was similarly dominated by non-Diptera insects, which comprised approximately 72 percent of the sample (216 of 300 specimens). Abundant insect orders included Ephemeroptera, which comprised approximately 56 percent of the sample (167 of 300 specimens), Diptera (75 of 300 specimens, 25 percent), and Coleoptera (47 of 300 specimens, approximately 16 percent). Other insect orders included Hemiptera and Collembola, which together accounted for less than

1 percent of the sample. Nine of the 300 organisms found in the sample were non-insects, and included Gastropoda (snails), Crustacea, and an Arachnid (water mite).

Table 2-4. Inventory of Benthic Macroinvertebrates from Carpinteria Creek

CLASS/order	Family	Genera	No. at CC-1	No. at CC-2	No. at CC-3
INSECTA					
Coleoptera	Dytiscidae	*Agabus*	1	4	1
		Hydroporous	1	17	2
		Oreodytes	3	18	27
		Rhantus	--	--	1
		Undetermined[1]	2	--	--
	Elmidae	*Optioservus*	--	1	58
		Zaitzevia	--	--	4
	Gyrinidae	*Gyrinus*	1	--	--
	Halipidae	*Peltodytes*	8	5	1
	Hydrophilidae	*Berosus*	--	1	--
	Hydropsychidae	Undetermined[1]	--	--	1
	Staphylinidae	*Thinobius*	--	1	--
	Undetermined[1]	Undetermined[1]	1	--	--
Collembola	Entomobryidae	Undetermined[1]	1	1	--
Diptera	Ceratopogonidae	*Palpomyia*	14	2	--
		Sphaeromias	4	4	1
		Undetermined[4]	3	--	--
	Chironomidae	Undetermined[2]	159	16	7
	Empididae	*Clinocera*	1	--	--
	Ephydridae	Undetermined[1]	3	1	--
	Muscidae	Undetermined[4]	1	--	--
	Psychodidae	*Pericoma*	--	--	2
	Simulidae	*Simulium*	36	52	--
	Stratiomyidae	*Caloparyphus*	--	--	16
		Euparyphus	--	--	21
		Undetermined[1]	--	--	12
Ephemeroptera	Baetidae	*Baetis*	4	88	3
		Callibaetis	--	24	--
	Caenidae	*Caenis*	1	19	18
	Emphemerellidae	*Ephemerella*	--	2	40
	Hepatgenidae	Undetermined[1]	--	--	2
	Leptophlebiidae	*Paraleptophlebia*	2	7	2

Table 2-4. (Continued)

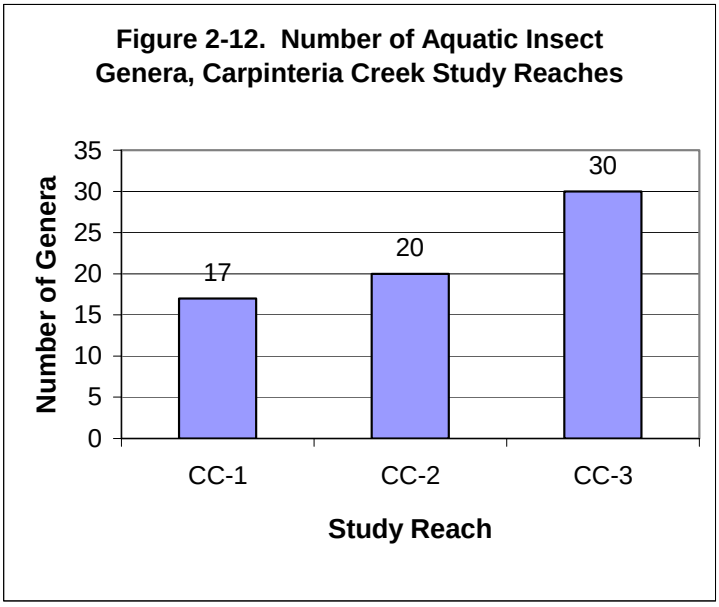
CLASS/order	Family	Genera	No. at CC-1	No. at CC-2	No. at CC-3
Ephemeroptera (Continued)	Tricoryithidae	*Tricorythodes*	--	27	48
	Undetermined[1]	Undetermined[1]	--	--	3
Hemiptera	Belostomatidae	*Abedus*	1	1	4
		Belostoma	--	--	1
Odonata (Anisoptera)	Undetermined[1]	Undetermined[1]	--	--	1
Odonata (Zygoptera)	Coenagrionidae	*Argia*	--	--	1
Orthoptera	Undetermined[1]	Undetermined[1]	--	--	1
Plecoptera	Chloroperlidae	Undetermined[1]	--	--	1
	Nemouridae	*Malenka*	--	--	1
Trichoptera	Helicopsychidae	*Helicopsyche*	--	--	5
	Hydropsychidae	Undetermined[1]	--	--	1
	Lepidostomatidae	*Lepidostoma*	--	--	6
	Rhyacophilidae	*Rhyacophila*	--	--	8
Subtotal (Insects)	**At least 32 families overall (at least 14 families at CC-1) (at least 16 families at CC-2) (at least 24 families at CC-3)**	**At least 39 genera overall (at least 17 genera at CC-1) (at least 20 genera at CC-2) (at least 30 genera at CC-3)**	**247**	**291**	**300**
ARACHNIDA	Undetermined[3]	Undetermined[3]	--	1	--
CRUSTACEA					
Subclass Copepoda	Undetermined[3]	Undetermined[3]	6	1	--
Subclass Ostracoda	Undetermined[3]	Undetermined[3]	39	3	--
GASTROPODA	Undetermined[3]	Undetermined[3]	7	4	--
OLIGOCHAETA	Undetermined[3]	Undetermined[3]	1	--	--
Subtotal (Non-insects)	**At least 5 families overall (at least 4 families at CC-1) (at least 4 families at CC-2)**	**At least 5 genera overall (at least 4 genera at CC-1) (at least 4 genera at CC-2)**	**53**	**9**	**--**

[1] These specimens that were not identified to the indicated level of taxonomy (e.g., family or genus), as they were damaged during the collection process, and missing body parts required for identification.

[2] Chironomids are very diverse, and identification beyond the family level (i.e., to genus) is very time intensive. In order to accomplish this, mouth parts must typically be dissected, mounted on slides, and viewed under a compound microscope. Therefore, chironomids were only identified to the family level.

[3] Insect taxa are the focus of this analysis, as is the case for most benthic macroinvertebrate studies in creek ecosystems. Non-insect taxa were not subject to rigorous identification efforts.

[4] Only identified to family level, as generic level key for this family or life stage (i.e., larvae, pupae, or adult) was not readily available.



CC-1. The sample collected at CC-1 contained at least 14 insect families, and at least 17 insect genera. Thus, this reach had the lowest diversity of the three reaches studied (see Figure 2-12). Unlike the samples collected at CC-3 and CC-2, the sample from CC-1 was dominated by insects from the order Diptera, which comprised approximately 74 percent of the sample (221 of 300 specimens). Non-insect taxa comprised approximately 18 percent of the sample (53 of 300 specimens), and included Crustacea (Ostracoda and Copepoda), Gastropoda, and Oligochaeta (segmented worms). Non-Diptera insects were scarce, comprising less than 9 percent of the sample (26 of 300 organisms). Orders of non-Diptera insects found in the sample include Coleoptera (17 of 300 specimens, approximately 6 percent), Ephemeroptera (7 of 300 specimens, approximately 2 percent), Hemiptera (1 of 300 specimens, less than 1 percent) and Collembola (1 of 300 specimens, less than 1 percent).

Indicator Taxa. Appendix B of Rapid Bioassessment Protocols for Use in Creeks and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition (Barbour et al. 1999) provides pollution tolerance values for a wide range of benthic macroinvertebrate taxa at the order, family, genus, and species levels. Pollution tolerance values are provided on a scale of 0 to 10. A tolerance value of 0 indicates that a given species or group of species (e.g., genus, family, or order) is extremely intolerant of pollution, and is found only in pristine creeks with excellent water quality. Higher values indicate progressively higher pollution tolerances, with a value of 10 indicating that the species or group has exceptional pollution tolerance, and can be found in the highly degraded, polluted creeks.

The pollution tolerance values provided in the Rapid Bioassessment Protocols document have been developed based on the literature, including a number of creek bioassessment studies completed by regional agencies (e.g., state governments). Tolerance values are listed in the Rapid Bioassessment Protocols document for the following regions: Northwest (Idaho), Upper Midwest (Wisconsin), Midwest (Ohio), Southeast (North Carolina) and the Mid-Atlantic. The tolerance values provided for a given species or group sometimes vary among regions, but they are usually similar. Tolerance values have not been determined for the Southwest region of the country, including California. However, tolerance values available for other regions of the country can be applied in a rough sense to benthic macroinvertebrate assemblages found in Carpinteria Creek and the southwest region in general.

There are a number of taxa that were abundant at CC-3 (relatively undisturbed site), but were rare or absent at CC-1 and CC-2 (relatively disturbed sites). This may indicate that these taxa are sensitive to human disturbance (i.e. pollution), which is much greater at the downstream reaches (CC-1 and CC-2) than at the upstream reach (CC-3). These potential indicator taxa are the following:

- *Optioservus* and *Zaitzevia* from the family Elmidae (riffle beetles) were numerous in the sample collected at CC-3 (62 of 300 specimens, approximately 21 percent). Only one specimen was found at CC-2 (*Optioservus*), and none were found at CC-1. This trend appears to be consistent with the literature, which indicates that these genera (tolerance values between 2.7 and 4) and Elmidae in general are moderately intolerant of pollution (Barbour et al. 1999).
- *Emphemerella* of the mayfly family Emphemerellidae were numerous at CC-3 (39 of 300 specimens, 13 percent), but rare at CC-2 (2 of 300 specimens, less than 1 percent) and absent from CC-1. This trend appears to be consistent with the literature, which indicates that *Emphemerella* (tolerance values between 1 and 2.7) and Emphemerellidae in general are highly intolerant of pollution (Barbour et al. 1999).
- Caddisflies (Tricoptera) were common in the sample from CC-3 (20 of 300 specimens, approximately 7 percent), and included the following genera: *Rhyacophila* (Rhyacophilidae), *Helicopsyche* (Helicopsychidae), *Lepidostoma* (Lepidostomatidae), and *Hydropsyche* (Hydropsychidae). Caddisflies were absent from samples collected at CC-1 and CC-2. This trend appears to be consistent with the literature, which indicates that the caddisflies collected at CC-3 (tolerance values between 0 and 4) and most caddisflies in general are moderately to highly intolerant of pollution (Barbour et al. 1999).
- Stoneflies (Plecoptera) were rare but present at CC-3, and absent from CC-2 and CC-1. The stoneflies present at CC-3 included *Malenka* from the family Nemouridae (tolerance value of 2) and an unidentified genus from the family Chloroperlidae (tolerance value of 1). The presence of these stoneflies at CC-3 and their absence at CC-2 and CC-1 appears to be consistent with the literature, which indicates that they are highly intolerant of pollution (Barbour et al. 1999).

- *Euparyphus* and *Calopharyphus* of the Diptera family Stratiomyidae (soldier flies) were common at CC-3 (49 of 300 specimens, approximately 16 percent), but absent from CC-2 and CC-1. This would not have been expected based upon trends reported in the literature, which indicate that *Calopharyphus* (tolerance value of 7) and Stratiomyidae in general are moderately tolerant of disturbed conditions (Barbour et al. 1999). Tolerance values for *Euparyphus* are not available.

A number of taxa were abundant at CC-1 and CC-2, but were absent or rare at CC-3. These taxa may be good indicators of the relatively disturbed creek conditions that occur in the lower reaches of Carpinteria Creek. These taxa are the following:

- Diptera were dominant at CC-1 (221 of 300 specimens, 74 percent), but much less so at CC-2 (75 of 300 specimens, 25 percent) and CC-3 (59 of 300 specimens, approximately 20 percent). This appears to be somewhat consistent with the literature, which indicates that a high proportion of Diptera taxa is indicative of high pollution levels, such as what occurs at CC-1 (Barbour et al. 1999). It is unclear why Diptera taxa were not dominant at CC-2, as this site is also polluted. It may be that the difference is due to the fact that CC-1 is subject to pollution from urban and agricultural areas, while CC-2 is only subject to agricultural pollution. This hypothesis has not been proven.
- Diptera of the family Chironomidae were dominant at CC-1 (159 of 300 specimens, approximately 53 percent), but were far less prevalent at CC-2 (16 of 300 specimens, approximately 5 percent) and CC-3 (7 of 300 specimens, approximately 2 percent). This appears to be somewhat consistent with the literature, which indicates that a high proportion of Chironomidae is indicative of high pollution levels (Barbour et al. 1999). It is unclear why Chironomids are not dominant at CC-2, as this site is also polluted. It may be that the difference is due to the fact that CC-1 is subject to pollution from urban and agricultural areas, while CC-2 is only subject to agricultural pollution. This hypothesis has not been proven.
- Ceratopogonids (*Palpomyia* and *Sphaeromias*) increased from 1 of 300 specimens sampled at CC-3 (less than 1 percent), to 6 of 300 specimens at CC-2 (2 percent), to 21 of 300 specimens sampled (7 percent) at CC-1. This trend appears to be somewhat consistent with the literature, which indicates that *Palpomyia* (tolerance value of 6) and Ceratopogonidae in general are moderately tolerant of pollution (Barbour et al. 1999). Tolerance values for *Sphaeromias* are not available.
- Simulidae (*Simulium*) were absent from CC-3, but numerous at CC-2 (52 of 300 specimens, approximately 17 percent) and CC-1 (36 of 300 specimens, 12 percent). This trend appears to be fairly consistent with the literature, which indicates that *Simulium* (tolerance values between 4.4 and 6) and Simulidae in general are somewhat tolerant of pollution (Barbour et al. 1999).
- Non-insect taxa were absent from the sample collected at CC-3, and increased moving downstream from CC-2 (9 of 300 specimens, 3 percent) to CC-1 (53 of 300 specimens, 18 percent). This trend appears to be fairly consistent with the literature,

which indicates that a high proportion of non-insects is indicative of high pollution levels (Barbour et al. 1999).

Genera that were found in similar numbers at all three study reaches are *Agabus* (Dytiscidae), *Peltodytes* (Halipidae), *Abedus* (Belostomatidae), and *Paraleptophlebia* (Leptophlebiidae). In addition, *Caenis* (Caenidae) and *Tricorythodes* (Tricorythidae) were common at CC-2 and CC-3. These taxa appear to be fairly adaptable to both unpolluted and polluted creek conditions. However, *Tricorythodes* was not found at CC-1, and only one *Caenis* (out of 300 specimens) was found at CC-1. The rarity of *Caenis* and the absence of *Tricorythodes* at CC-1 may indicate that the pollution tolerances of these genera were exceeded at this location. It may also be that their rarity or absence at CC-1 is a reflection of a patchy (i.e., non-uniform) distribution of these genera throughout the creek in response to small-scale differences in habitat (i.e., habitat heterogeneity). Neither of these hypotheses has been proven.

Conclusions. Based on the results of the sampling, there appears to be a progressive change in the benthic macroinvertebrate community moving downstream through Carpinteria Creek and its tributaries. It appears that the macroinvertebrate community is diverse and dominated by non-Diptera insect taxa at undisturbed, upstream reaches (i.e., CC-3) and transitions to a less diverse community dominated by Diptera and non-insect taxa (i.e., at CC-1). As is the case with all creeks, many factors influence benthic macroinvertebrate assemblages throughout Carpinteria Creek and its tributaries. A number of these factors are natural in origin, such as geology, topography, elevation, climate, weather, creek gradient, creek flow (rate and duration), creek bottom substrate, proximity to the ocean, light levels, vegetation, vertebrate predators, etc. However, human impacts have most likely been a primary cause of the significant differences in benthic macroinvertebrate communities that were observed between the three study reaches. This conclusion is supported by data collected for this study. As noted in Section 2.3.2.1, nutrient levels and conductivity increased at the downstream study reaches (Table 2-1). This finding was attributed to agricultural and urban runoff. Also, habitat assessment scores (which, in part, include the extent of alterations from human activities) decreased at the lower study reaches. Strong correlations exist between habitat assessment scores, water conductivity (i.e., a measure of total dissolved ion concentration), and diversity of aquatic insects at the three study reaches. The trends observed are that conductivity increased (i.e., total dissolved ion concentration increases) moving from upstream to downstream (Table 2-1), while habitat quality (Figure 2-13) and aquatic insect diversity (Figure 2-12) decreased. In addition, aquatic insect diversity in Carpinteria Creek appears to be negatively correlated with water conductivity (Figure 2-14).

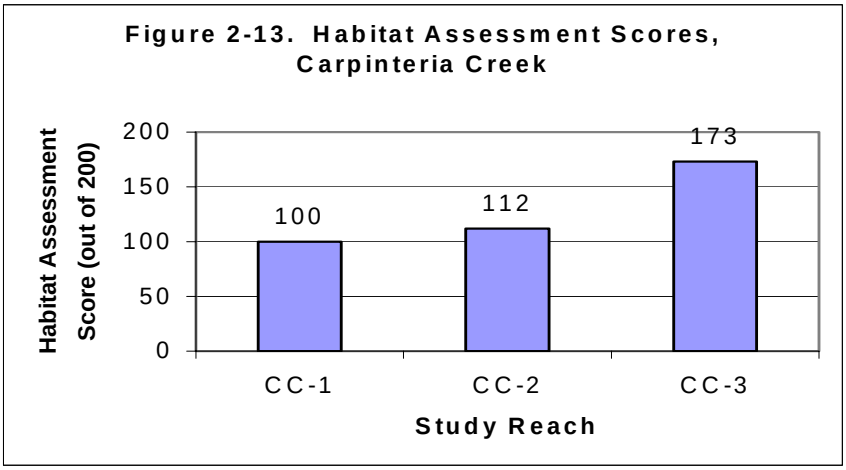


Figure 2-13. Habitat Assessment Scores, Carpinteria Creek

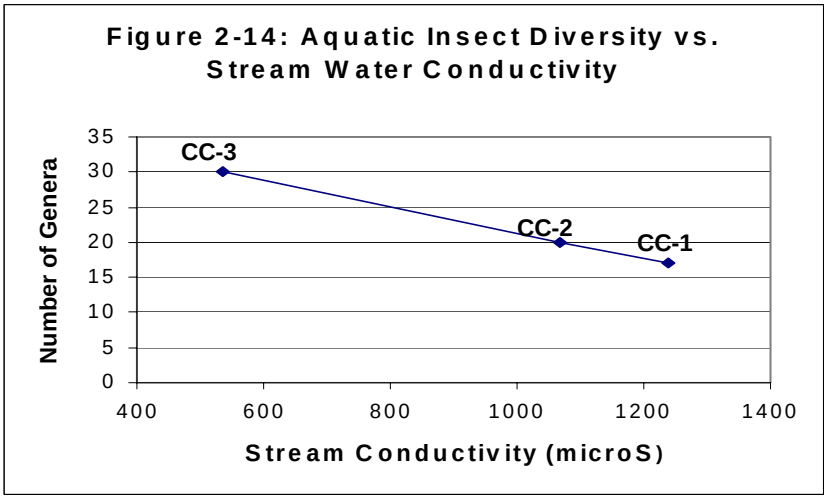


Figure 2-14: Aquatic Insect Diversity vs. Stream Water Conductivity

2.4.3 Santa Monica and Franklin Creeks, and Carpinteria Salt Marsh

The historic riparian corridors and aquatic habitats of lower Santa Monica and Franklin Creeks were largely destroyed during the construction of concrete flood channels. Despite their highly altered condition, these creeks are important in that they feed into El Estero, and eventually the ocean. The quality of water from these creeks influences the sensitive habitat of Carpinteria Salt Marsh and nearshore ocean waters (e.g., Carpinteria Reef). The 230-acre Carpinteria Salt Marsh is considered a sensitive habitat area due to its high biological productivity, and the rarity of salt marsh habitat along the southern California coast. In addition to freshwater inputs from Franklin Creek, Santa Monica Creek, and other small drainage courses, the marsh receives constant tidal flushing from the ocean. The marsh serves as a nursery for numerous fish species, and supports migratory waterfowl, as well as numerous resident birds, including white-tailed kite (State-listed species of concern), Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) (State and Federally-listed endangered), and

light-footed clapper rail (*Rallus longirostris*) (State and Federally-listed endangered). Salt marsh bird's beak (*Cordylanthus maritimus*), an endangered plant, is also found in the salt marsh.

2.4.3.1 Santa Monica Creek

The following describes the vegetation and wildlife present along lower Santa Monica Creek, which, as discussed above, has been converted to a concrete box channel.

Vegetation. Clumps of green filamentous algae occur in the channel of Santa Monica Creek during low flow periods. Algae is largely scoured out of the channel by high flows. No vegetation exists in dry portions of the concrete channel. There are occasional large, remnant coast live oaks and California sycamores beyond the concrete channel banks that were apparently spared during construction of the flood channel. There are also scattered ornamental trees and shrubs adjacent to the channel banks.

Fish. No fish were observed in lower Santa Monica Creek during the field surveys conducted by Padre biologists. No fish are expected to reside in this section of the creek due to the absence of habitat. Small fish such as three-spine sticklebacks and mosquito fish may enter the concrete channel for short periods of time from upper Santa Monica Creek and the salt marsh.

Amphibians and reptiles. No amphibians or reptiles were observed in the concrete sections of Santa Monica Creek during the field surveys conducted by Padre biologists. No amphibians or reptiles are expected to reside in the lower portion of the creek due to the absence of habitat.

Birds. Several birds were observed in vegetation along the concrete channels, and using the channel as a water source and/or foraging area. Many of these birds are often found in disturbed areas, and include mallard (male and female with several young), northern mockingbird, brewer's blackbird (*euphagus cyanocephalus*), American crow, rock dove (*Columba livia*), mourning dove, black phoebe, house finch, song sparrow, European starling, hooded oriole, cliff swallow, and house sparrow. Other birds having a high potential to occur in the vicinity of this highly disturbed creek include common yellowthroat, California towhee, Anna's hummingbird, scrub jay, American robin, band-tailed pigeon, dark-eyed junco, Audubon's warbler, and American kestrel.

Mammals. No mammals were observed in the lowland section of Santa Monica Creek by Padre biologists. Mammals are not expected to reside in the concrete channels due the absence of habitat and cover. Highly mobile mammals such as raccoon, opossum, and coyote may use the concrete channels as transportation corridors between natural habitats in the foothills and foraging areas on the coastal terrace (i.e., agricultural fields, Carpinteria Salt Marsh).

2.4.3.2 Franklin Creek

The following describes the vegetation and wildlife present along the lowland section of Franklin Creek, which, as discussed above, has been converted to a concrete box channel.

Vegetation. Clumps of green filamentous algae occur in the channel of Franklin Creek during low flow periods. Algae is largely scoured out of the channel by high flows. No vegetation exists in the dry portions of the concrete channel. There are scattered ornamental trees and shrubs adjacent to banks.

Fish. No fish were observed in the concrete sections of Franklin Creek during the field surveys conducted by Padre biologists. No fish are expected to occur in the concrete section of the creek due to the absence of habitat. Small fish such as three-spine sticklebacks and mosquito fish may enter the concrete channel for short periods of time from upstream tributaries and the salt marsh.

Amphibians and reptiles. No amphibians or reptiles were observed in the concrete sections of Franklin Creek during the field surveys conducted by Padre biologists. No amphibians or reptiles are expected to reside in the lower portion of the creek due to the absence of habitat.

Birds. Several birds were observed in vegetation along the concrete channels, and using the channel as a water source and/or foraging area. These include mallard (several males, females and young), northern mockingbird, brewer's blackbird, western gull, rock dove, mourning dove, black phoebe, house finch, song sparrow, European starling, cliff swallow, and house sparrow. Other birds having a high potential to occur in the vicinity of this highly disturbed creek include hooded oriole, common yellowthroat, California towhee, Anna's hummingbird, scrub jay, American robin, band-tailed pigeon, dark-eyed junco, Audubon's warbler, and American kestrel.

Mammals. No mammals were observed in the lowland section of Franklin Creek by Padre biologists. Mammals are not expected to reside in the concrete channels due the absence of habitat and cover. Highly mobile mammals such as raccoon, opossum, and coyote may use the concrete channels as transportation corridors between natural habitats in the foothills and foraging areas on the coastal terrace (i.e., agricultural fields, Carpinteria Salt Marsh).

2.4.4 Lagunitas Creek

Lagunitas Creek drains a small coastal terrace area in the southeast portion of the City. North of U.S. 101, the watershed is drained by earthen and concrete-lined ditches, which support little in the way of vegetation or wildlife. South of Carpinteria Avenue, the drainage is a natural creek channel composed of bedrock, alluvial deposits, and soil. This creek section supports dense riparian vegetation that can best be classified as southern arroyo willow riparian forest. Coastal scrub and annual grassland border the riparian areas, and extend up to the banks of the creek channel in some areas. Office developments are present adjacent to the

creek corridor. The vegetation communities in proximity to the creek have been degraded by human activities and invasive, non-native plants. However, the riparian forest and coastal scrub areas adjacent to the creek are designated as ESHA by the City. Vegetation and wildlife observed and potentially occurring in the creek and adjacent vegetation communities are discussed below.

Aquatic vegetation within the creek channel includes watercress, California bulrush (*Scirpus californicus*), and spreading rush (*Juncus patens*). Very little algae was observed during the field surveys, probably due in part to the highly intermittent nature of creek flow, and the dense riparian canopy that exists along much of the creek, which largely shades the creek from sunlight.

Southern arroyo willow riparian forest is dominated by arroyo willow, which forms a dense canopy along much of the creek. Other native riparian trees observed include a California sycamore sapling, a coast live oak sapling, and a large Mexican elderberry. A large non-native Monterey cypress (*Cupressus macrocarpa*) is present as well. Native understory vegetation includes California blackberry, lemonadeberry, spreading rush, white nightshade, and California figwort. Non-natives include German ivy and English ivy, which form dense groundcover in some areas. German ivy is particularly a problem, as it has grown over and killed numerous native shrubs and trees. Other non-natives found in the riparian forest include nasturgium, common sow thistle, filaree (*Erodium cicutarium*), sweet fennel, black mustard, hemlock, wild radish, scarlet pimpernel, prickly ox tongue (*Picris echioides*), Harding grass (*Phalaris aquatica*), and petty spurge (*Euphorbia peplus*).

Venturan coastal sage scrub bordering the riparian forest and creek is disturbed in terms of low species diversity and high density of non-native species. Dominant native plants are California sagebrush (*Artemisia californica*), coyote brush, and lemonadeberry. Subdominant species are invasive non-native plants including sweet fennel and Harding grass. Areas more removed from disturbance support additional native species including morning glory, green everlasting (*Gnaphalium californicum*), white nightshade, and California figwort. Many typical diagnostic plant species of this community are missing, including California buckwheat (*Eriogonum fasciculatum*), sage (*Salvia* spp.), California bush sunflower (*Encelia californica*) and our lord's candle (*Yucca whipplei*).

Coastal bluff scrub bordering the riparian forest is disturbed, with much of its cover contributed by introduced species, primarily hotten-tot fig (*Carpobrotus edulis*). However, native species are also dominant, including California bush sunflower and California sagebrush. Other native species in this community include seacliff buckwheat (*Eriogonum parvifolium*), coyote brush, lemonadeberry, and coastal golden bush (*Isocoma menziesii*).

Annual grassland occurs on previously cleared areas to the north and west of the creek. This community is dominated by annual grasses such as ripgut grass (*Bromus diandrus*), and herbs including western ragweed (*Ambrosia psilostachya*), short-beak filaree (*Erodium brachycarpum*), English plantain (*Plantago lanceolata*), Bermuda buttercup (*Oxalis pes-caprae*) and creeping wood sorrel (*Oxalis corniculata*).

Fish. No fish were observed in Lagunitas Creek during the surveys conducted by Padre biologists. None are expected due to the highly intermittent nature of the creek.

Amphibians. Adult pacific tree frogs were observed during the surveys conducted by Padre biologists. Numerous Pacific tree frog tadpoles were observed in one large pool just south of Carpinteria Avenue during the surveys conducted in May 2000. Western toad also has a high potential to occur at Lagunitas Creek.

Reptiles. Western fence lizard and side-blotched lizard were observed in the creek channel and adjacent riparian and coastal scrub areas. Other reptiles having a high potential to occur along the creek corridor include southern alligator lizard, California silvery legless lizard, common kingsnake, gopher snake, and western rattlesnake.

Birds. Bird species observed along the creek corridor during surveys conducted by Padre biologists include the following:

song sparrow
American crow
Cooper's hawk
wrentit
bushtit
mourning dove
California towhee
Audubon's warbler
white-crowned sparrow
spotted towhee
scrub jay
house finch
red-tailed hawk
red-shouldered hawk
black phoebe
American kestrel
cliff swallow
California thrasher
Anna's hummingbird
European starling
northern mockingbird

Most of these species were observed within southern arroyo willow riparian forest and coastal scrub areas. Other bird species having a high potential to occur in this area include the following:

common yellowthroat
house sparrow
yellow warbler
Audubon's warbler
white-tailed kite
American goldfinch
hooded oriole
American robin
dark-eyed junco
turkey vulture
cliff swallow
loggerhead shrike

Mammals. Mammals observed along the creek corridor include raccoon and brush rabbit. Other mammals having a high potential to occur in this area include Virginia opossum, coyote, California ground squirrel, Botta's pocket gopher, and several other rodents (e.g., mice, rats, woodrats, and voles).

2.4.5 Local Creeks as Wildlife Movement Corridors

Wildlife movement corridors are thin bands of natural habitat that provide critical linkages between larger habitat areas that are otherwise separated from each other by impassible obstacles such as urban and agricultural areas. Wildlife movement corridors allow animals to migrate between different habitats and geographic locations. This allows animals to forage through a variety of habitats, and allows physical and genetic exchange between animal populations. Movement corridors may be local or regional in nature. The loss of wildlife movement corridors can limit the ability of animals to find suitable habitat to meet their needs (e.g., foraging, breeding), and can limit the genetic diversity of populations confined to a specific habitat area.

Carpinteria Creek is a natural creek, and for the most part has dense riparian vegetation along its length. Within the city the creek is an important regional movement corridor for terrestrial animals, as it provides water, foraging habitat, cover, and a direct connection between habitats in the coastal terraces, foothills, and Santa Ynez Mountains that are otherwise separated by large expanses of urban and agricultural development. Carpinteria Creek is used by steelhead trout as a migration corridor between the ocean and spawning habitat in creeks of the upper watershed.

Substantial areas of riparian vegetation and wildlife habitat along Lagunitas Creek are limited to the reach downstream of Carpinteria Avenue. This section of the creek is used as a movement corridor by animals moving between riparian, coastal scrub and annual grassland habitats in the immediate area. In addition, the culvert crossing under U.S. 101 and Carpinteria Avenue may be used by mammals, reptiles, and amphibians to travel between upstream urban and agricultural areas and natural habitat along the downstream reach of the creek. Due to its small geographic extent, Lagunitas Creek is best described as a local wildlife movement corridor.

The lowland sections of Franklin Creek and Santa Monica Creek are concrete box channels that support virtually no wildlife foraging habitat and cover. Use of the concrete channels as wildlife migration corridors is thought to be very limited. Highly mobile mammals such as raccoon, opossum, and coyote may use the concrete channels as transportation corridors between natural habitats in the foothills and foraging areas on the coastal terrace.

2.4.6 Sensitive Biological Resources (Habitats and Species)

This subsection discusses biological communities, plant species, and animal species found in local creeks and riparian areas that are protected to varying degrees by the existing environmental laws and regulations. Applicable laws and regulations are discussed briefly below.

2.4.6.1 Sensitive Biological Communities

Protective Laws and Regulations. Local creeks and associated wetlands and riparian habitats are protected by a number of existing laws and regulations including the following:

- Clean Water Act Section 404 (Corps permits);
- California Environmental Quality Act;
- California Coastal Act;
- California Fish and Game Code Sections 1601-1603 (Creek Alteration Agreements);
- City of Carpinteria General Plan and Local Coastal Plan goals, policies, and implementation measures;
- Carpinteria Municipal Code, Zoning, Environmentally Sensitive Habitat Area (ESHA) Overlay District.

These laws and regulations overlap in scope, and provide protection to creeks, wetlands, and riparian areas. In cases where the impacts of a proposed action to creeks, wetlands, and riparian areas cannot be avoided, these laws and regulations collectively require that such impacts are minimized and mitigated.

Southern cottonwood-willow riparian forest existing along the lower section of Carpinteria Creek (including within the City limits) is considered a sensitive community by the California Department of Fish and Game (CDFG) Natural Diversity Data Base (NDDB). The NDDB includes an inventory of natural communities in California, and provides a sensitivity ranking to each type of habitat based on their rarity and threat of loss from human activities. The NDDB assigns southern cottonwood-willow riparian forest with a global ranking of G3, and a State ranking of S3.2. A global sensitivity level of G3 means that between 10,000 and 50,000 acres of this community remain worldwide. A State sensitivity level of S3.2 means that 10,000 to 50,000 acres of this community remain Statewide, and the community is considered threatened. This habitat area is considered to be ESHA by the City, and is designated as such on the ESHA Overlay Map.

Southern sycamore-alder riparian woodland that occurs along the upper portion of Gobernador Creek is assigned a global ranking of G4 and a State ranking of S4. These rankings indicate that this community is apparently secure, but that factors exist to cause concern (i.e., habitat area is somewhat limited, or there is some threat to the community).

Southern arroyo willow riparian forest existing along Lagunitas Creek is considered a sensitive natural community in the NDDB, with a global ranking of G2 and a State ranking of S2.1. A global sensitivity level of G2 means that 2,000 to 10,000 acres of this habitat exist worldwide. A State sensitivity of S2.1 means 2,000 to 10,000 acres of this habitat exist Statewide, and the habitat is considered very threatened. This habitat area is considered to be ESHA by the City, and is designated as such on the ESHA Overlay Map.

Venturan coastal sage scrub and **coastal bluff scrub** occur adjacent to the Lagunitas Creek corridor. The NDDB does not presently list these a sensitive biological communities. However, coastal scrub communities are becoming increasingly rare throughout their range and are considered endangered by much of the scientific community (Westman, 1981; Westman, 1986; Atwood, 1990). Davis et al. (1995) consider coastal scrub a natural community at risk because less than five percent of remaining coastal scrub habitat is protected in parks, reserves, and conservation easements. Also, the area coastal scrub has been substantially reduced compared to their historical extent. Further, these habitat areas are considered to be ESHA by the City, and are designated as such on the City's ESHA Overlay Map.

2.4.6.2 Sensitive Species Protection Laws

The Federal Endangered Species Act (ESA) provides for the designation and protection of invertebrates, wildlife, fish, and plant species that are in danger of becoming extinct and conservation of the ecosystems on which such species depend. To be protected under ESA, a species must be listed by the Secretary of the Interior as endangered or threatened. ESA defines an "endangered" species as any species that is in danger of becoming extinct throughout all or a significant portion of its range, excluding recognized insect pests. A "threatened" species is defined as one that is likely to become endangered in the foreseeable future. ESA makes it illegal for any individual to kill, collect, remove, harass, import, or export an endangered or threatened species without a permit from the Secretary of the Department of the Interior. ESA also provides the Secretaries of Interior, Treasury, and Transportation with the authority to enforce the law, and establishes civil and criminal penalties for violators of the law.

The California Endangered Species Act (CESA) (California Fish & Game Code §§ 2050, et seq.) generally parallels the main provisions of the Federal ESA, and is administered by CDFG. CESA is limited to species or subspecies native to California. Unlike its Federal counterpart, CESA prohibits the "take" of species petitioned for listing, or candidate species. The Fish and Game Code defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." The Fish and Game Code affords the same protection to species designated as "Fully Protected," "Special Animal," and "Species of Concern" by CDFG.

2.4.6.3 Sensitive Plant Species

Table 2-5 lists all sensitive plant species that are known to occur in or near local creeks. For the purposes of this discussion, sensitive plant species include those that are listed as Endangered, Threatened, Rare, or Species of Concern by the Federal government or State of California, are candidates for listing, or are proposed for listing. In addition, plants included on Lists 1, 2, 3, or 4 of the California Native Plant Society (CNPS) inventory, and those of local interest are considered to be sensitive plants. Current regulatory status and nearest known location of each species are included in Table 2-5.

Table 2-5. Sensitive Plant Species Occurring in or near Local Creeks

Common Name (*Scientific Name)*	Status	Nearest Known Location
Bitter gooseberry (*Ribes amarum* var. *hoffmannii*)	E, List 3	Carpinteria Creek (Wiskowski, 1988)
Three-ribbed arrow grass (*Triglochin striata*)	LC	Mouth of Carpinteria Creek (Wiskowski, 1988)
Glasswort (*Arthrocnemum subterminale*)	LC	Carpinteria Salt Marsh (Wiskowski, 1988)
Mat scale (*Atriplex watsonii*)	LC	Carpinteria Salt Marsh (Wiskowski, 1988)
Salt marsh bird's beak (*Cordylanthus maritimus* ssp. *Maritimus*)	SE, FE, List 1B	Carpinteria Salt Marsh (NDDB, 200)
Hutchinsia (*Hutchinsia procumbens*)	LC	Carpinteria Salt Marsh (Wiskowski, 1988)
Coulter's goldfields (*Lasthenia glabrata* ssp. *Coulteri*)	FSC, List 1B	Carpinteria Salt Marsh (NDDB, 2000)
Canyon gooseberry (*Ribes menziesii*)	LC	Carpinteria Salt Marsh (Wiskowski, 1988)
Arrow grass (*Triglochin concinna* var. *concinna*)	LC	Carpinteria Salt Marsh: (Wiskowski, 1988)
Late-flowered mariposa lily (*Calochortus weedii* var. *vestus*)	FSC, List 1B	Franklin Canyon Trail: (NDDB, 2000)

Status Codes:
FE Federal Endangered (USFWS)
SE State Endangered (CDFG)
FSC Federal Species of Concern (USFWS)
List 1B Plants rare, threatened or endangered in California and elsewhere (CNPS)
List 2 Plants rare, threatened or endangered in Ca., but more common elsewhere (CNPS) List 3 Plants about which we need more information-a review list (CNPS)
List 4 Plants of limited distribution-a watch list (CNPS)
E Endemic (Wiskowski, *Sensitive Plants of Santa Barbara County*, 1988)
LC Local concern (Wiskowski, *Sensitive Plants of Santa Barbara County*, 1988)

As indicated in Table 2-5, bitter gooseberry is endemic to the local area, and is on CNPS List 3. This plant has been documented in Carpinteria Creek (Wiskowski, 1988). Bitter gooseberry is normally found as an understory plant in riparian habitats. Three-ribbed arrow grass, designated as of "Local Concern," has been observed near the mouth of Carpinteria Creek. Several sensitive plant species occur in Carpinteria Salt Marsh, most notably Salt Marsh Bird's Beak, which is Federal and State-listed Endangered, and on the CNPS 1B list. Other sensitive plant species occurring at the marsh include glasswort, mat scale, hutchinsia, Coulter's goldfields, canyon gooseberry, and arrow grass. Late-flowered mariposa lily (Federal Species of Concern, CNPS list 1B) has been observed along the Franklin Canyon Trail, which passes near several tributaries of Franklin Creek in the foothills and mountains.

2.4.6.4 Sensitive Animal Species

Table 2-6 lists all sensitive animal species that are known to occur in or near local creeks. For the purposes of this discussion, sensitive animal species include those that are listed as Endangered, Threatened, Rare, or Species of Concern by the Federal government or State of California, or are proposed for listing. In addition, species that are Fully Protected pursuant to the California Fish and Game Code, or are designated as a "Special Animal" by CDFG are considered to be sensitive. Current regulatory status and nearest known location of each species are included in Table 2-6.

Table 2-6. Sensitive Animal Species Occurring in or Near Local Creeks

Common Name (*Scientific Name)*	**Status**	**Nearest Known Location(s)**
Steelhead trout (*Oncorhynchus mykiss*)	FE, SE	Carpinteria Creek
California newt *(Taricha torosa)*	CSC	Gobernador Creek
Tidewater goby (*Eucyclogobius newberryi*)	CSC, FE	Carpinteria Creek (NDDB, 2000)
Southwestern pond turtle (*Clemmys marmorata*)	CSC	Rincon Creek
Two-striped garter snake (*Thamniophis hammondii*)	CSC	Upper Mission Creek
Monarch butterfly (*Danaus plexippus*)	SA	Salzgeber Meadow (NDDB, 2000)
Cooper's hawk *(Accipiter cooperi)*	CSC	Carpinteria and Lagunitas Creeks
/White-tailed kite *(Elanus leucurus)*	SA, FP	Carpinteria bluffs and Carpinteria Salt Marsh
Loggerhead shrike *(Lanius ludovicianus)*	FSC, CSC	Carpinteria bluffs
Yellow warbler *(Dendroica petechia* ssp*. brewsteri)*	CSC	Carpinteria Creek, Carpinteria bluffs
Yellow-breasted chat *(Icteria virens)*	CSC	Carpinteria bluffs
Brown pelican (*Pelecanus occidentalis californicus*)	SE, FE	Carpinteria beaches
Light-footed clapper rail (*Rallus longirostris levipes*)	SE, FE	Carpinteria Salt marsh: (NDDB, 2000)

Table 2-6. (Continued)

Common Name (*Scientific Name)*	Status	Nearest Known Location(s)
Belding's savannah sparrow (*Passerculus sandwichensis beldingi*)	SE, FSC	Carpinteria Salt Marsh (NDDB, 2000)

Status Codes:
CSC California Species of Special Concern (CDFG)
FSC Federal Species of Concern (USFWS)
FP Fully protected by Fish and Game Code (CDFG)
MMPA Protected under the Marine Mammal Protection Act of 1972
SA Special Animal (CDFG)
FE Federal Endangered (USFWS)
SE State Endangered (CDFG)

Steelhead trout. Lower Carpinteria Creek probably does not provide suitable habitat for steelhead trout spawning or rearing due to the absence of clean gravels, deep pools, and the intermittent nature of creekflow. However, the presence of adult steelhead in lower Carpinteria Creek has been documented as recently as winter 2000. It is likely that steelhead migrate through the lower section of Carpinteria Creek to spawning areas in upstream tributaries of the watershed (i.e., Gobernador Creek, upper Carpinteria Creek, and their tributaries). Excellent spawning and rearing habitat is present in the upstream tributaries, as evidenced during the creek survey conducted along Gobernador Creek at CC-3, where numerous trout were observed. There are not any major impediments to upstream steelhead migration in lower Carpinteria Creek. There is a detention basin located along Gobernador Creek approximately one-quarter of a mile below CC-3 (see Figure 1-2). This detention basin conveys normal creek flows through an approximately 30-foot long, corrugated steel culvert approximately three feet in diameter. It has not been determined whether or not adult steelhead are able to pass upstream through this culvert. It was not determined whether there are any major obstructions to upstream steelhead migration along upper Carpinteria Creek.

Historically, steelhead trout occurred in Santa Monica Creek, spawning and rearing in its upstream reaches. However, steelhead are no longer expected to use Santa Monica Creek due to the conversion of the lowland section of the creek to a straightened concrete box channel. The uniformity of the concrete channel bottom, high creek velocities that occur during peak flows, and considerable length of the concrete channel (approximately 1.5 miles) probably prevent steelhead from migrating up the creek. In addition, a detention basin similar to the one along Gobernador Creek is located in the foothill section of Santa Monica Creek. It has not been determined whether or not this detention basin is an effective barrier to steelhead migration.

California newts were observed breeding in Gobernador Creek (CC-3) by Padre biologists in May 2000. Newts normally occur only in fairly undisturbed, perennial creeks that are well-shaded and have suitable pools and cover. Newts are sensitive to human disturbances. They were not observed downstream of the detention basin located

approximately one-quarter of a mile below CC-3, nor are they likely to occur downstream of this point in large numbers, as creek habitat is degraded by road crossings, agriculture, and low density residential development. Newts also have a high potential to occur in perennial, relatively undisturbed reaches of upper Carpinteria Creek, Santa Monica Creek, and Franklin Creek.

Southwestern pond turtles have been observed in several local creeks that are relatively undisturbed and provide suitable habitat. Upper Gobernador Creek has large, deep pools that are bordered by vegetation and sunlit rocks (i.e., basking areas). These pools provide suitable habitat for southwestern pond turtles. For this reason, pond turtles have a high potential to occur in upper Gobernador Creek.

Human activities (i.e., creek channelization, flood control maintenance, increased sedimentation) have largely filled in any large, deep pools that may have once existed in lower Carpinteria Creek. Also, the lower creek section is subject to moderate levels of human disturbance (i.e., noise, human presence, domestic animal presence). Pond turtles are easily startled, and may become stressed in this type of environment. Due to the general lack of suitable habitat and moderate level of human disturbance, pond turtles do not have a high potential to occur in lower Carpinteria Creek.

Two-striped garter snakes are highly aquatic snakes that normally inhabit perennial creeks with rocky beds bordered by riparian vegetation. During recent surveys, two-striped garter snakes have been found in several local creeks, primarily in bedrock creek sections that are fairly open to sunlight, have large, deep pools, and support abundant treefrog tadpoles (Brinkman, 2000). Two-striped garter snakes appear to specialize on tadpoles as a prey item. Adult snakes also eat frogs, toads, fish, and earthworms.

The section of Gobernador Creek surveyed by Padre biologists appears to provide suitable habitat for two-striped garter snakes. These snakes have a high potential to occur in the upstream reaches of this creek, as well as other undisturbed perennial creek reaches in the Carpinteria Creek, Santa Monica Creek, and Franklin Creek watersheds.

Lower Carpinteria Creek is somewhat intermittent, and does not contain deep pools. However, creekside vegetation is dense, and Pacific tree frogs and their tadpoles are abundant. Aquatic garter snakes have been sighted recently in a similar habitat in Tecolote Creek, a local creek located just west of Goleta (Brinkman, 2000). Based on the above, there is a potential for two-striped garter snakes to occur in lower Carpinteria Creek, at least during periods of surface water flow.

Tidewater goby. Isolated populations of tidewater goby are known to inhabit brackish coastal lagoons along several creeks in southern California, including the lagoon at the mouth of Carpinteria Creek. The tolerance for high salinity allows dispersal and colonization of new lagoons and estuaries following flushing during storm events. As a result of review of new information, the USFWS has determined that populations north of Orange and San Diego counties are not threatened with endangerment and has proposed removal of the northern

populations from the endangered species list (USFWS 1999). Until further action is taken, this fish remains Federally listed as Endangered, and State listed as a Species of Concern.

Monarch butterfly. As indicated previously, Salzgeber Meadow (near the downstream end of Carpinteria Creek) provides habitat for large numbers of over-wintering Monarch butterflies. Monarch butterflies are the only insect species in the world that is known to exhibit long-distance, seasonal migrations. These butterflies maintain a summer range across North America. Every fall, the Monarch butterflies fly west and south to over-wintering sites in coastal California and central Mexico. The winter roosts support the most sensitive phase of the Monarch's lifecycle, when mating occurs. Groves of eucalyptus and Monterey pine serve as the predominant Monarch butterfly over-wintering sites in California. Other trees including coast live oak, sycamore, and Monterey cypress also serve as over-wintering habitat. Densely clustered trees and understory vegetation (i.e., shrubs, grasses) are typically selected as over-wintering roost sites by Monarch butterflies. These sites typically provide a degree of protection from wind and storms, and exhibit more stable temperature, wind velocity, humidity, and sunlight intensity compared to adjacent areas. Monarch butterflies are known to move around selected groves of trees depending on variations in the microclimatic conditions.

The same over-wintering sites, and even the same trees, are often used year after year by Monarch butterflies. However, wide variations in the use of over-wintering sites do occur. Some sites may be used only periodically, while others are used every or almost every year. The number of Monarch butterflies using a given roost site can fluctuate dramatically on a day-to-day and year-to-year basis. Also, the duration for which a particular site is used can vary.

Cooper's hawks were sighted by Padre biologists at lower Carpinteria Creek (CC-2) and Lagunitas Creek. Cooper's hawks were observed soaring through the riparian canopy and roosting in riparian trees. Cooper's hawks forage and breed in riparian areas, and have a high potential to breed in the riparian forests of the Carpinteria Creek watershed. They seem to prefer lowland creek corridors to higher elevation areas. They may also use riparian habitat in the upper Santa Monica and Franklin Creek watersheds, as well as the riparian corridor along Lagunitas Creek.

White-tailed kites are regularly sighted foraging throughout the Carpinteria Valley. White-tailed kites were observed by Padre biologists on several occasions along the Carpinteria bluffs (near Lagunitas Creek), and also at Carpinteria Salt Marsh (near Santa Monica Creek). White-tailed kites nest at the tops of dense tree clusters 20-100 feet tall in riparian areas, and typically forage in open grassland, scrub and marsh habitats. Prey consists mainly of small mammals, but may also include small birds, reptiles, amphibians, and insects. The timing and persistence of sightings in the Carpinteria Valley indicates that the area serves as a reliable source of food and roosting habitat for white-tailed kites. Breeding likely occurs in local riparian areas such as those located along Carpinteria and upper Franklin and Santa Monica Creeks, as white-tailed kites typically forage within a half mile of their nests during breeding. Local breeding has been documented along Rincon Creek (Holmgren, 2000).

Loggerhead shrikes have been observed foraging in grasslands and coastal scrub communities of the Carpinteria bluffs. They nest in shrubs and trees in open areas, farmland, open oak woodlands and riparian areas, in which they forage for small animals and insects.

Yellow warblers were sighted by Padre biologists in lower Carpinteria Creek, and have also been sighted along the Carpinteria bluffs near Lagunitas Creek by others. This migrant species nests in deciduous trees and shrubs in riparian habitat in lowland valleys and up to high elevations. Breeding birds are known to be present in Santa Barbara County. This bird has declined primarily due to loss of habitat and brood parasitism by cowbirds.

Yellow-breasted chats have been sighted foraging on the Carpinteria bluffs near Lagunitas Creek. These migratory birds typically nest in low, dense riparian vegetation, particularly willow thickets and tangles of blackberry and wild grape in lowland valleys and foothill canyons. Once fairly common, this species is now uncommon and breeds primarily along the Santa Ynez River in Santa Barbara County.

California brown pelicans are commonly sighted immediately offshore of Carpinteria beaches. These birds can be seen gliding just above the water in search of food, and performing dramatic dives into the water (sometimes from 30 feet or more in the air) to capture fish. The nearest breeding habitat for these birds is on Anacapa Island, which is located approximately 23 miles southeast of Carpinteria.

Belding's savannah sparrows are year-round residents of the Carpinteria Salt Marsh, where they are observed regularly. These birds nest low to the ground in patches of pickleweed. This bird is extremely limited in its range, occurring in only a handful of salt marshes in coastal California.

Light-footed clapper rails are another year-round resident of the Carpinteria Salt Marsh. This species wades and forages in shallow waters near the edges of the salt marsh. This species has been severely diminished in range and numbers due to the destruction of salt marshes along the California coast. Predation upon clapper rails by introduced predators such as domestic cats and red foxes (*V. vulpes*) has also been a major problem.

2.5 WATERSHED LAND USES

2.5.1 Introduction

This section provides a brief discussion of land uses that exist in the watersheds of local creeks, focusing on areas within the City limits. Recreational uses within and adjacent to local creeks in the City limits are also discussed, as are aesthetic values.

2.5.2 Carpinteria Creek Watershed

Approximate land use coverage in the Carpinteria Creek watershed is as follows: 80 percent natural vegetation, 16 percent agriculture, and 4 percent urban (Rincon Consultants, 1999). The upper watershed within the Santa Ynez Mountains occupies the greatest area, and

consists almost exclusively of natural habitat (e.g., chaparral, riparian forests, etc.). Agricultural and urban uses are concentrated in the lower portion of the watershed, and have resulted in moderate degradation of lower Carpinteria Creek and its main tributaries (Gobernador Creek and upper Carpinteria Creek). Agricultural uses are prominent in the foothills, and extend downstream onto the coastal plain. There is also rural residential development in the foothills, and remnant natural habitat (primarily on steep hillsides).

Predominant land uses transition from agriculture to suburban/urban near the northern city limits. The portion of the watershed within the city limits is primarily zoned residential and commercial, and has been developed accordingly. There are two remaining agricultural areas in the City portion of the watershed, one being at the northern city limits along the eastern creek bank, and the other being just upstream of the railroad tracks along the eastern creek bank, between Salzgeber Meadow and the Concha Loma neighborhood. A narrow band of land extending along the Carpinteria Creek corridor is zoned as open space/recreation with an ESHA Overlay by the City. The most downstream section of the creek is within Carpinteria State Beach, which is zoned open space/recreation by the City. These are the only major expanses of open space in the City portion of the watershed.

Recreational resources within or adjacent to Carpinteria Creek in the city limits include informal trails along the creek and its riparian corridor, and a formal bike path that extends along the western creek bank from Carpinteria Avenue to U.S. 101. These trails are used by hikers and bikers for exercise, observing wildlife, and aesthetic enjoyment. Aesthetic values are provided by the natural elements of the creek and its riparian canopy. Views of these resources are also enjoyed from adjacent roadways, the Eighth Street footbridge, private residences, businesses, etc. In addition, Carpinteria State Beach is a major recreational resource adjacent to the creek mouth and estuary.

2.5.3 Santa Monica Creek Watershed

Approximate land use coverage in the Santa Monica Creek watershed is as follows: 86 percent natural vegetation, 10 percent agriculture, and 4 percent urban (Rincon Consultants, 1999). The upper watershed within the Santa Ynez Mountains occupies the greatest area, and consists almost exclusively of natural habitat. Agricultural uses are prominent in the foothills, and extend downstream onto the coastal plain. There is also rural residential development in the foothills, and remnant natural habitat (primarily on steep hillsides).

As shown in Figure 1-2, the coastal plain portion of the watershed is limited to a narrow band of land adjacent to the creek. Land uses on the coastal plain transition from agriculture to urban and suburban approximately at the northern city limits. The portion of the watershed within the city limits is primarily zoned residential and commercial, and has been developed accordingly. Unincorporated county areas west and north of the City limits are agricultural. As discussed in previous sections of this report, lower Santa Monica Creek has been converted to a concrete box channel for flood control purposes. This has largely destroyed the biological habitat once present along the creek.

Recreational resources within or adjacent to Santa Monica Creek in the City limits include a hiking/biking trail that extends along the eastern bank of the channel. The tidal channel of Santa Monica Creek extends into Carpinteria Salt Marsh, which is enjoyed by recreationalists and wildlife enthusiasts from informal trails and the new Salt Marsh Nature Park located along Ash Avenue.

2.5.4 Franklin Creek Watershed

Approximate land use coverage in the Franklin Creek watershed is as follows: 45 percent natural vegetation, 35 percent agriculture, and 20 percent urban (Rincon Consultants, 1999). Portions of the watershed within the Santa Ynez Mountains are primarily natural vegetation. Agricultural uses (including greenhouses) are concentrated in the foothills and upper coastal plain, generally to the north of the City limits. There are also rural residential developments in the foothills, and remnant natural habitat (primarily on steep hillsides). The portion of the watershed within the city limits is primarily zoned for residential, commercial, and public facility uses, and has been developed accordingly. There are some agricultural areas remaining in the City portion of the watershed near the northern City limits. The Main Channel of Franklin Creek and its tributaries have been converted to concrete box channels on the coastal plain for flood control purposes. Agricultural and urban development have largely destroyed the biological habitat once present in the lower portion of the Franklin Creek watershed. Water quality has also been significantly impacted.

Recreational resources within or adjacent to Franklin Creek in the City limits include Franklin Creek Park, located near the northern City limits along the western bank of the Main Channel. This park includes a grassy area with landscape trees that is used for passive recreation, and a youth playground. The park is also the southern terminus of the Franklin Creek hiking and biking trail, which extends upstream along the creek into unincorporated Santa Barbara County. The tidal channel of Franklin Creek extends into Carpinteria Salt Marsh, which is enjoyed by recreationalists and wildlife enthusiasts.

2.5.5 Lagunitas Creek Watershed

This small watershed drains approximately 300 acres of coastal terrace and foothills located in the eastern portion of the City and adjacent incorporated county lands. Predominant land uses in this area are agricultural, residential, and business park/office developments. A small proportion of the watershed is natural vegetation. Portions of the watershed in the City limits are designated for research/development industrial and residential uses.

Recreational opportunities are provided by informal trails that pass by Lagunitas Creek along the Carpinteria bluffs. Aesthetic values provided by the natural elements of the creek, riparian canopy, and adjacent coastal scrub habitats are enjoyed from the existing trails and adjacent commercial uses. The planned alignment of the Carpinteria bluffs trail identified in the City's General Plan/Local Coastal Plan crosses Lagunitas Creek to the south of Carpinteria Avenue. The bluffs trail currently extends across the majority of the bluffs, and, with planned

improvements, will eventually be continuous from Tarpits Park (west) to Rincon County Beach (east). Portions of the bluffs trail east of Lagunitas Creek were recently constructed.

2.5.6 Applicable City Regulations

The City is responsible for regulating development, providing and maintaining public services and infrastructure, and approving or denying proposed projects within the City limits. Portions of the Carpinteria Creek, Franklin Creek, Santa Monica Creek, and Lagunitas Creek watersheds within the City limits are directly under the City's jurisdiction. City regulations that are imposed on land uses near local creeks, as well as those that relate to the protection of recreational and aesthetic resources can be found in the General Plan/Local Coastal Plan, and the Carpinteria Municipal Code.

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3.0 CREEKS PRESERVATION PROGRAM REGULATIONS

3.1 PROGRAM GOALS

Local creeks are sensitive resources that provide many important benefits to local residents and ecosystems. Beneficial uses include biological habitat, surface water conveyance (i.e., flood control), sediment and nutrient transport, floodplain and beach nourishment, water filtration, water supply, recreational and aesthetic enjoyment, and scientific research. Local creeks and their beneficial uses have been damaged by human activities, which have altered natural hydrologic and geomorphologic processes, degraded water quality, and destroyed and degraded biological communities. Existing and future development threaten to cause continued and increased degradation of local creeks, and prevent natural recovery of creek ecosystems from the damage that has already been done. The Program has been developed to address these problems. The Goals of this Program are the following:

Goal 1 Preserve, restore and enhance local creek and riparian ecosystems, including geomorphology, hydrology, water quality and biological communities. This will ensure the preservation and enhancement of beneficial uses of local creeks, including biological habitat, surface water conveyance, sediment and nutrient transport, floodplain and beach nourishment, water filtration, water supply, recreational and aesthetic enjoyment, educational and interpretive opportunities and scientific research.

Goal 2 Establish regulations to guide the City towards compliance with federal, state, and local regulations that pertain to local creeks, including Phase II NPDES stormwater requirements.

Goal 3 To the greatest degree feasible, balance competing interests between beneficial uses of local creeks.

Goal 4 To provide background information and mitigation measures for use in the environmental clearance document required by the guidelines established under the California Environmental Quality Act (CEQA).

Already, there are numerous regulations in the City's General Plan/Local Coastal Plan and the Carpinteria Municipal Code that support the Goals of this Program. These regulations are discussed in the following section.

Relevant guiding policies applicable to this Creeks Preservation Program are set forth in the California Coastal Act. These are (by section number):

30231. The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through,

among other means, minimizing adverse effects of wastes water discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

30236. Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect exiting development, or (3) developments wheeler the primary function is the improvement of fish and wildlife habitat.

30240. (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts that would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

3.2 GENERAL PLAN/LOCAL COASTAL PLAN AND CARPINTERIA MUNICIPAL CODE REGULATIONS

This section discusses regulations from the City's General Plan/Local Coastal Plan and the Municipal Code that apply to local creeks and support the Program Goals.

3.2.1 General Plan/Local Coastal Plan

The City has recently completed a comprehensive update of the General Plan/Local Coastal Plan which was approved by the California Coastal Commission. The General Plan/Local Coastal Plan serves as the primary planning policy document for the City. It helps achieve the community's collective vision for preserving and improving the quality of life within Carpinteria by guiding development and managing resources. The General Plan/Local Coastal Plan is divided into a number of elements, including the following: Land Use, Community Design, Circulation, Housing, Open Space and Conservation, Safety, Noise, and Public Facilities. The various elements of the General Plan/Local Coastal Plan contain numerous goals, policies, and implementation measures that address local creeks, including issues related to biological resources, water quality, surface water drainage, ground water recharge, aesthetics, and recreation. In general, these policies establish allowed uses of local creeks, and measures to encourage their protection and restoration. Applicable goals, policies, and implementation measures of the General Plan/Local Coastal Plan are provided below (all numbering is retained to be identical to that in the GP/LCP).

3.2.1.1 Land Use Element

Objective LU-1: Establish the basis for orderly, well planned urban development while protecting coastal resources and providing for greater access and recreational opportunities for the public.

Policies:

LU-1a. The policies of the Coastal Act (Public Resources code Section 30210 through 30263) are hereby incorporated by reference (and shall be effective as if included in full herein) as the guiding policies of the land use plan.

LU-1d. Ensure that the type, location and intensity of land uses planned adjacent to any parcel designated open space/recreation or agriculture (as shown on Figure LU-1) are compatible with these public resources and will not be detrimental to the resource.

Objective LU-2: Protect the natural environment within and surrounding Carpinteria.

Policies:

LU-2a. Reduce the density or intensity of a particular parcel if warranted by conditions such as topography, geologic or flood hazards, habitat areas, or steep slopes. This can be achieved by establishing an environmentally sensitive area overlay district in the Zoning Ordinance. This overlay district will include maximum density and parcel size criteria for determining the appropriate intensity of these areas.

LU-2b. Regulate all development, including agriculture, to avoid adverse impacts on habitat resources. Standards for habitat protection are established in the Open Space, Recreation & Conservation Element policies.

3.2.1.2 Circulation Element

Objective C-1: To improve the community's ability to access U.S. 101 and areas north of the freeway through the improvement of interchanges.

Policy:

C-1b. The City shall strive to improve vehicular and pedestrian over crossings of the freeway and the various creeks while respecting their habitat value and sensitivity.

3.2.1.3 Open Space, Recreation & Conservation Element

Objective OSC-1: Protect, preserve, and enhance local natural resources and habitats.

Policies:

OSC-1a. Protect Environmentally Sensitive Habitat Areas from development and maintain them as natural open space or passive recreational areas.

OSC-1b. Prohibit activities, including development, that could damage or destroy biological resource areas.

OSC-1c. Establish and support preservation and restoration programs for natural areas such as Carpinteria Creek, Carpinteria Bluffs, Carpinteria Salt Marsh, seal rookery, Carpinteria reef, Pismo clam beds and the intertidal zones along the shoreline.

Implementation Policies:

1. In addition to the policies and implementation measures herein, utilize the California Environmental Quality Act (CEQA) to identify and avoid or reduce potential impacts to air and water quality, environmentally sensitive habitats, riparian habitats, marine plants and animals, and other environmental resources.

2. Form an Open Space and Conservation Advisory Committee to provide, at the pleasure of the City Council, recommendations concerning preservation and management of local natural resources and habitats. [5-year]

3. Prepare and implement habitat preservation programs with emphasis on preserving identified Environmentally Sensitive Habitat Areas through habitat management and restoration (1-7 years). The programs shall include at a minimum:

    - Special requirements for development plans which include Environmentally Sensitive Habitat Areas,
    - Management practices for protection and restoration of ESHA, and
    - Recognition of the right to maintain legal non-conforming development and the ongoing need to protect the public health and safety of those residing in such development.

4. The City shall maintain an Environmentally Sensitive Habitat Area (ESHA) Overlay District within its zoning ordinance with the purpose of protecting and preserving areas in which plant or animal life are either rare or especially valuable because of their role in the ecosystem and which could be easily disturbed or degraded by human activities and development. The intent of the zoning district shall be to ensure that all development on properties subject to the ESHA overlay is designed and carried out in a manner that will provide maximum protection to sensitive resources. The overlay area shall apply at a minimum to those parcels designated with the overlay designation on Figure OSC-1, any parcel identified as ESHA either on an official resource map adopted by the city or through the city's development review process, any parcel that meets the criteria for ESHA provided in this LUP, and any parcel located within 250 feet of a parcel so designated or determined to be ESHA.

5. Any area not designated on the ESHA Overlay map (Figure 3-1, GP/LCP Figure OSC-1) or identified in Table OSC-1, that meets the definition of ESHA provided in Section 30107.5, shall be considered ESHA and shall be afforded the same protections as formally designated areas.

6. Any activity proposed within an ESHA, including maintenance of property improvements such as weeding and brush clearing, tree trimming, and removal of dead or dying plant material ("maintenance"), shall not result in the significant disruption of habitat values and shall require approval from the City Biologist or a determination by the City that the proposed activity is consistent with the habitat management plan adopted by the City for the area. Further, the City shall annually provide notice to the owners of property that include ESHA concerning the limits on activities in ESHA, the prohibition on any disruption of habitat values and the procedure for requesting approval of activities potentially effecting an ESHA. Any activities proposed to be undertaken within the creek or below the top of bank must first be approved by the State Department of Fish and Game. For improvements existing prior to adoption of this plan, a maintenance program shall be submitted by the property owner(s) that describes the scope and nature of maintenance activities. The city shall review the program, make any appropriate changes to avoid further disruption of habitat values and shall approve the program. Unless maintenance work is proposed that is outside the scope of the approved program or a State Department of Fish and Game permit is required, no further review by the city shall be required; maintenance activities beyond those stated in the approved program are prohibited.

7. Determine appropriate methods for the preservation of sites that include sensitive biological resources. These methods may include land purchase, tax relief, purchase of development rights, or other methods. Where these methods are not feasible, the city should ensure through permit review that development does not result in any significant disruption of habitat identified on a site or on adjacent sites.

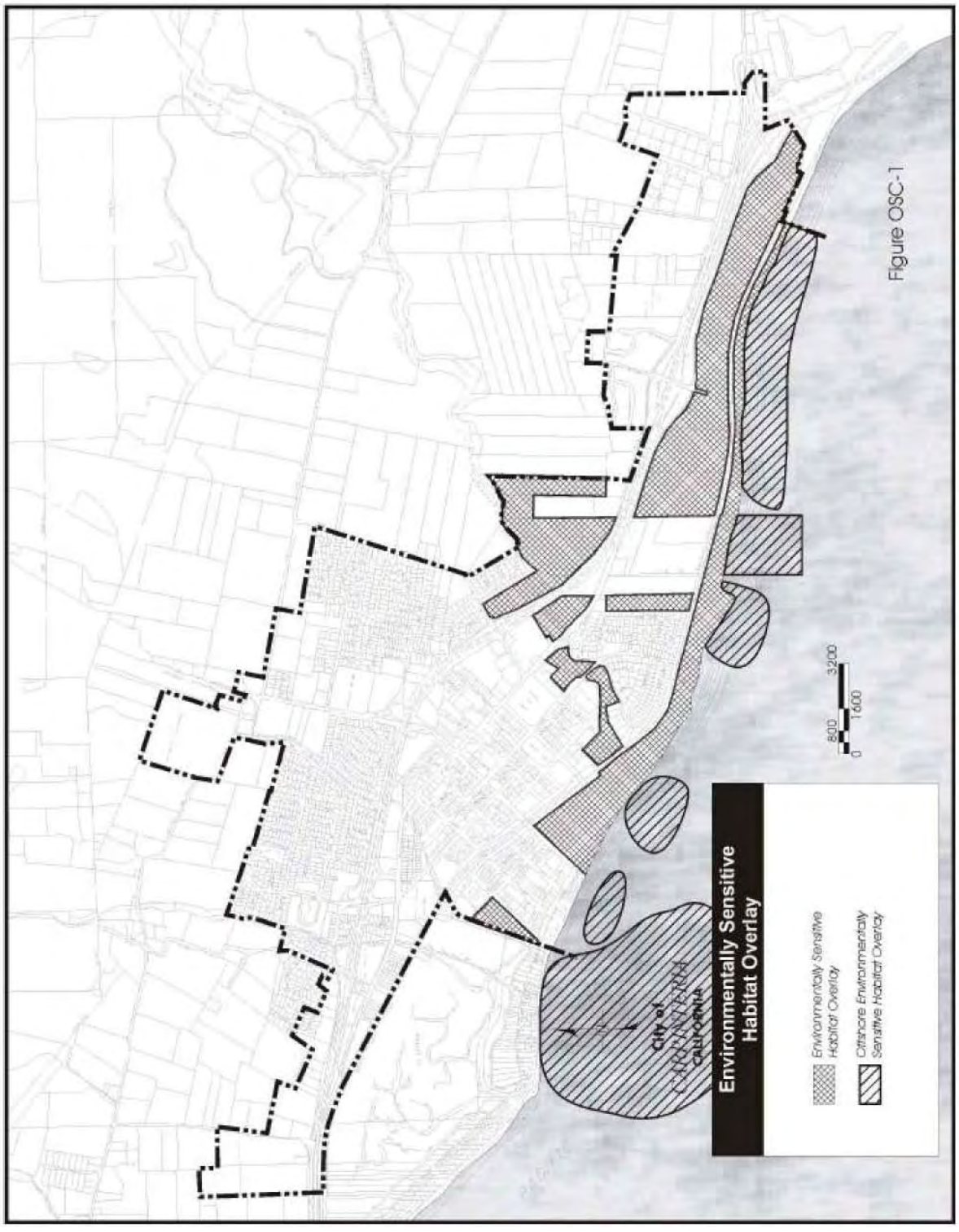

Figure 3-1 (OSC-1)
Environmentally Sensitive Habitat Area (ESHA) Overlay Map

8. Regulate all development, including agricultural development, adjacent to areas designated on the Land Use Plan as habitat areas, adjacent to ocean-fronting parks or recreation areas, or contiguous to coastal waters, to avoid adverse impacts on habitat resources. Regulatory measures include, but are not limited to setbacks, buffer zones, grading controls, noise restrictions and maintenance of natural vegetation.

9. Prior to issuance of a development permit, all projects shall be found to be in compliance with all applicable habitat protection policies of the General Plan/Local Coastal Plan and implementing policies and regulations of the Coastal Access and Recreation Program, Carpinteria Bluffs Access Recreation Master Open Space Program, and any other implementing plan for these policies.

10. Provide public education and information services on the community's significant natural resources including the creeks, the Carpinteria Salt Marsh, coastal bluff areas, Monarch butterfly habitat, etc., to increase community awareness of sensitive environmental habitats and their value to Carpinteria.

11. Require City Biologist review and recommendation for all development projects that the Community Development Department has determined have the potential for impacts on ESHA or water quality.

Objective OSC-2: Preserve and restore the natural resources of the Carpinteria Bluffs.

Policies:

OSC-2a. Maintain the Carpinteria Bluffs Coastal Access, Recreation, and Master Open Space Program.

OSC-2e. Designate the riparian habitat area as open space with an appropriate buffer.

Objective OSC-3: Preserve and restore wetlands such as the Carpinteria Salt Marsh.

Policies:

OSC-3a. Wetland delineations shall be based on the definitions contained in Section 13577 (b) of Title 14 of the California Code of Regulations.

OSC-3b. The upland limit of a wetland is defined as

a) the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic or xerophytic cover;

b) the boundary between soil that is predominantly hydric and soil that is predominantly non-hydric;

c) in the case of wetlands without vegetation or soils, the boundary between land that is flooded or saturated at some time during years of normal precipitation, and land that is not.

If questions exist, the limit shall be determined by a habitat survey made by a qualified biologist in consultation with the California Department of Fish and Game.

OSC-3c. Development adjacent to the required buffer around wetlands should not result in adverse impacts including but not limited to sediment, runoff, chemical and fertilizer contamination, noise, light pollution and other disturbances.

OSC-3d. Provide additional interpretive and trail opportunities to appropriate areas of the salt marsh if possible without creating significant impacts from such improvements.

Implementation Policies:

12. Maintain a minimum 100-foot setback/buffer strip in a natural condition along the upland limits of all wetlands. No structures other than those required to support light recreational, scientific and educational uses shall be permitted within the setback, where such structures are consistent with all other wetland development policies and where all feasible measures have been taken to prevent adverse impacts. The minimum setback may be adjusted upward to account for site-specific conditions affecting avoidance of adverse impacts.

13. Applications for new development within or adjacent to wetlands shall include evidence of consultation and preliminary approval from the California Department of Fish and Game, US Army Corps of Engineers, US Fish and Wildlife Service and other State and Federal resource management agencies, as applicable.

Objective OSC-6: Preserve the natural environmental qualities of creekways and protect riparian habitat.

Policies:

OSC-6a. Support the preservation of creeks and their corridors as open space, and maintain and restore riparian habitat to protect the community's water quality, wildlife diversity, aesthetic values, and recreation opportunities.

OSC-6b. Protect and restore degraded creeks on City-owned land where protection and restoration does not interfere with good flood control practices.

OSC-6c. When alterations to creeks are permitted by the Coastal Act and policies herein, the creek shall be protected by only allowing creek bank and creek bed alterations where no practical alternative solution is available, where the best mitigation measures feasible have been incorporated, and where any necessary State and federal permits

have been issued. Creek alterations should utilize natural creek alteration methods where possible (e.g. earthen channels, bio-technical stabilization). Nothing in this policy shall be construed to require the City to approve creek alterations not otherwise allowed herein and by the Coastal Act.

OSC-6d. Carry out and maintain all permitted construction and grading within stream corridors in such a manner so as to minimize impacts on biological resources and water quality such as increased runoff, creek bank erosion, sedimentation, biochemical degradation, or thermal pollution.

OSC-6e. Natural drainage patterns and runoff rates and volumes shall be preserved to the greatest degree feasible by minimizing changes to natural topography, and minimizing the areas of impervious surfaces created by new development.

OSC-6f. All development shall be evaluated for potential adverse impacts to water quality and shall consider Site Design, Source Control and Treatment Control BMPs in order to minimize polluted runoff and water quality impacts resulting from the development. In order to maximize the reduction of water quality impacts, BMPs should be incorporated into the project design in the following progression: (1) Site Design BMPs, (2) Source Control BMPs, and (3) Treatment Control BMPs.

Implementation Policies:

25. A setback of 50 feet from top of the upper bank of creeks or existing edge of riparian vegetation (dripline), whichever is further, shall be established and maintained for all development. This setback may be increased to account for site-specific conditions. The following factors shall be used to determine the extent of an increase in setback requirements**:**

    a. soil type and stability of the stream corridor

    b. how surface water filters into the ground

    c. types and amount of riparian vegetation and how such vegetation contributes to soil stability and habitat value

    d. slopes of the land on either side of the stream

    e. location of the 100 year floodplain boundary, and

    f. consistency with other applicable adopted plans, conditions, regulations and/or policies concerning protection of resources.

    Where existing buildings and improvements, conforming as to use but nonconforming as to the minimum creek setback established herein, are damaged or destroyed by fire, flood, earthquake or other natural disaster, such buildings and improvements may be

reconstructed to the same or lesser size and in the same general footprint location, provided that reconstruction shall be inaugurated by the submittal of a complete construction application within 24 months of the time of damage and be diligently carried to completion.

26. Prior to issuance of a development permit, all projects shall conform with the applicable habitat protection policies including but not limited to the General Plan/Local Coastal Plan, Open Space Bluffs Master Program, Creek Preservation Ordinance, and the Zoning Ordinance.

27. Prepare and implement a Watershed Management Plan in coordination with the County and Carpinteria Valley Water District with an emphasis on: erosion control, natural waterway restoration and preservation, wildlife habitat restoration, including steelhead runs, and water quality. [5-year]

28. Prohibit all development within stream corridors except for the improvement of fish and wildlife habitat, development necessary for flood control purposes (where no other method to protect existing structures in the floodplain is feasible and where protection is necessary for public safety), and bridges and trails (where no alternative route/location is feasible and when supports are located within stream corridor setbacks, such locations minimize impacts on critical habitat), except where this would preclude all reasonable use of the affected parcel. All development shall incorporate the best mitigation measures feasible to minimize impact to the greatest extent.

29. Limit all development within stream corridors, including dredging, filling and grading, to activities necessary for the construction specified in policy # 28 (see above) and to public hiking/biking and equestrian trails. When such activities require removal of riparian plant species, revegetation with local native plants shall be required. Minor clearing of vegetation may be permitted for hiking/biking and equestrian trails.

30. Prohibit further concrete channelization or other major alterations of streams in the City with the exception of natural habitat enhancement projects, or when the City finds that such action is necessary to protect existing structures and that there are no less environmentally damaging alternatives. Where alteration is permitted, best feasible mitigation shall be a condition of the project.

31. Develop a water pollution avoidance education program, to include distribution of literature on how to minimize point and non-point water pollution sources, and development of a curb drain inlet stenciling program to deter dumping of pollutants. [5-year]

32. In order to protect watersheds in the City, all construction related activities shall minimize water quality impacts, particularly due to sediments that are eroded from project sites and are conveyed to receiving waters, by implementing the following measures:

a. Proposed erosion and sediment prevention and control BMPs, both structural and non-structural, such as:

    - o Stabilize disturbed areas with vegetation, mulch, geotextiles, or similar method
    - o Trap sediment on site using fiber rolls, silt fencing, sediment basin, or similar method
    - o Ensure vehicles on site are parked on areas free from mud; monitor site entrance for mud tracked off-site
    - o Prevent blowing dust from exposed soils.

b. Proposed BMPs to provide adequate sanitary and waste disposal facilities and prevent contamination of runoff by construction chemicals and materials, such as:

    - o Control the storage, application and disposal of pesticides, petroleum and other construction and chemical materials
    - o Site washout areas more than fifty feet from a storm drain, open ditch or surface water and ensure that runoff flows from such activities do not enter receiving water bodies
    - o Provide sanitary facilities for construction workers
    - o Provide adequate disposal facilities for solid waste produced during construction and recycle where possible.

33. In order to protect watersheds in the City, all development shall minimize water quality impacts, particularly due to storm water discharges from existing, new and redeveloped sites by implementing the following measures:

a. Site design BMPs, including but not limited to reducing imperviousness, conserving natural areas, minimizing clearing and grading and maintaining predevelopment rainfall runoff characteristics, shall be considered at the outset of the project.

b. Source control Best Management Practices (BMPs) shall be preferred over treatment control BMPs when considering ways to reduce polluted runoff from development sites. Local site and soil conditions and pollutants of concern shall be considered when selecting appropriate BMPs.

c. Treatment control BMPs, such as bio-swales, vegetated retention/detention basins, constructed wetlands, stormwater filters, or other areas designated to control erosion and filter stormwater pollutants prior to reaching creeks and the ocean, shall be implemented where feasible.

d. Structural BMPs (or suites of BMPs) shall be designed to treat, infiltrate or filter the amount of stormwater runoff produced by all storms up to and including the 85th percentile, 24-hour runoff event for volume-based BMPs, and/or the 85th percentile, 1-hour runoff event, with an appropriate safety factor (i.e., 2 or greater), for flow-based BMPs.

e. Permits for new development shall be conditioned to require ongoing maintenance where maintenance is necessary for effective operation of required BMPs. Verification of maintenance shall include the permittee's signed statement accepting responsibility for all structural and treatment control BMP maintenance until such time as the property is transferred and another party takes responsibility. The City, property owners, or homeowners associations, as applicable, shall be required to maintain any drainage device to insure it functions as designed and intended. All structural BMPs shall be inspected, cleaned, and repaired when necessary prior to September 30th of each year. Owners of these devices will be responsible for insuring that they continue to function properly and additional inspections should occur after storms as needed throughout the rainy season. Repairs, modifications, or installation of additional BMPs, as needed, should be carried out prior to the next rainy season.

Objective OSC-7: Conserve native plant communities.

Policies:

OSC-7a. Oak trees and oak woodlands, because they are particularly sensitive to environmental conditions, as well as walnut, sycamore, and other native trees, shall be protected through appropriate development standards.

OSC-7b. When sites are graded or developed, areas with significant amounts of native vegetation shall be preserved. Structures shall be sited and designed to minimize the impact of grading, paving, construction of roads, runoff and erosion on native vegetation. Sensitive resources that exhibit any level of disturbance shall be maintained, and if feasible, restored. New development shall include measures to restore any disturbed or degraded habitat on the project site. Cut and fill slopes and all areas disturbed by construction activities shall be landscaped or revegetated at the completion of grading. Plantings shall be of native, drought-tolerant plant species consistent with the existing native vegetation on the site. Invasive plant species that tend to supplant native species shall be prohibited.

Implementation Policies:

34. Develop an ordinance for the protection of native oak, walnut, sycamore, and other native trees with provisions for the design and siting of structures to minimize the impact of grading, paving, construction of roads, runoff and erosion on native trees. In particular, require that grading and paving not adversely affect root zone aeration and stability of native trees. [5-year]

35. Develop an inventory of native plant communities. [10-year]

Objective OSC-8: Protect and conserve the Monarch butterfly tree habitat.

Policy:

OSC-8a. Protect trees supporting butterfly populations.

Implementation Policies:

37. Monarch Butterfly trees shall not be altered or removed, except where they pose a serious threat to public health and safety. The City shall determine where a serious threat to public health and safety exists and if necessary shall consult an arborist. Adjacent development shall be designed and set back far enough to protect the quality of the habitat. The minimum setback shall be 50 feet from the dripline of the butterfly trees. [5-year]

Objective OSC-10: Conserve all water resources, and protect the quality of water.

Policies:

OSC-10a. Minimize the erosion and contamination of beaches. Minimize the sedimentation, channelization and contamination of surface water bodies.

OSC-10b. Continue to support water conservation measures to provide an adequate supply of water to the community. Water conservation measures may include low-flow plumbing fixtures and drought tolerant landscape plans for new development.

Implementation Policies:

46. Work with the Carpinteria Valley Water District to implement the Carpinteria Groundwater Management Plan.

47. Work with the Carpinteria Valley Water District to implement CVWD's wellhead protection programs.

48. Provide water conservation public information and educational outreach program to encourage residential participation in water conservation measures in coordination with CVWD.

49. Monitor surface water runoff to identify waterborne pollutants entering the Pacific Ocean. In conjunction with County and CVWD, a Watershed Management Plan should be established to prevent such contamination from occurring.

50. Require that proposals for development include information necessary to determine that an adequate water source exists for the project and that water will be provided without jeopardizing the availability of water to other parts of the community, i.e., a can or will-serve letter from CVWD. Should adequate water to serve all development contemplated in the Land Use Element not be available, the City shall ensure that priority uses identified under the Coastal Act are protected.

51. Encourage CVWD to develop a reclaimed water system and, if available and where such reclaimed water sources can be used pursuant to law, require that new development participate in the extension of the system as necessary to serve the development proposed.

52. Ensure that soil erosion and the off-site deposition of soils is not exacerbated through development.

53. Provide storm drain stenciling and signage for new storm drain construction in order to discourage dumping into drains. Signs shall be provided at creek public access points to similarly discourage creek dumping.

54. The City shall adopt and implement a Storm Water Management Plan (SWMP) to minimize the water quality impacts of runoff from development in the City. The City's SWMP shall satisfy the requirements established by EPA's Final Phase II National Pollutant Discharge Elimination System (NPDES) regulations, which will be implemented by the Phase II general permit administered by the Central Coast Regional Water Quality Control Board. The City's SWMP shall, at a minimum, include Best Management Practices (BMPs) in the following categories:

    - Public Education and Outreach
    - Public Participation and Involvement
    - Illicit Discharge Detection and Elimination
    - Construction Site Runoff Control
    - Post-Construction Runoff Control
    - Pollution Prevention and Good Housekeeping in Municipal Operation.

Objective OSC-13: Preserve Carpinteria's visual resources.

Policies:

OSC-13a. Preserve broad, unobstructed views from the nearest public street to the ocean, including but not limited to Linden Avenue, Bailard Avenue, Carpinteria Avenue, and U.S. Highway 101. In addition, design and site new development on or adjacent to bluffs, beaches, streams, or the Salt Marsh to prevent adverse impacts on these visual resources. New development shall be subject to all of the following measures:

a. Height and siting restrictions to avoid obstruction of existing views of visual resources from the nearest public areas.

b. In addition to the bluff setback required for safety, additional bluff setbacks may be required for oceanfront structures to minimize or avoid impacts on public views from the beach. Blufftop structures shall be set back from the bluff edge sufficiently far to ensure that the structure does not infringe on views from the beach except in areas where existing structures already impact public views from the beach. In such cases, the new structure shall not be greater in height than adjacent structures and shall not encroach seaward beyond a plane created by extending a straight line ("stringline") between the nearest building corners of the existing buildings on either side of the proposed development. Patios, balconies, porches and similar appurtenances shall not encroach beyond a plane created by extending a straight line between the nearest corners closest to the beach from the existing balconies, porches or similar appurtenances on either side of the proposed development. If the stringline is grossly inconsistent with the established line of seaward encroachment, the Planning Commission or City Council may act to establish an encroachment limit that is consistent with the dominant encroachment line while still limiting seaward encroachment as much as possible.

c. Special landscaping requirements to mitigate visual impacts.

OSC-13c. Other than permitted development, discourage activities which could damage or destroy open space areas, including off-road vehicle use and unauthorized collecting of natural objects.

OSC-13d. Encourage the retention of those portions of creeks within the Planning Area that are unsuitable for active recreational use for use as open space that can provide passive recreational opportunities and protection of habitat.

OSC-13g. Require new development to protect scenic resources by utilizing natural landforms and vegetation for screening structures, access roads, building foundations, and cut and fill slopes in project design which otherwise complies with visual resources protection policies.

OSC-13h. Plans for development shall minimize cut and fill operations. Plans that do not minimize cut and fill shall be denied.

OSC-13i. Design all new development to fit the site topography, soils, geology, hydrology, and other existing conditions and be oriented so that grading and other site preparation is kept to an absolute minimum. Preserve all natural landforms, natural drainage systems, and native vegetation. Require [that] all areas on the site not suited to development as evidenced by competent soils, geology and hydrology investigation and reports remain as open space.

Implementation Policies:

59. Amend the Zoning Ordinance to include view preservation design standards including the listing of specific locations where maximum building height and mass standards will be applied, and areas where minimum open space buffers will be required. [5-year]

Objective OSC-14: Provide for adequate park and recreation facilities to meet the needs of the community and visitors.

Policies:

OSC-14a. Increase coastal and recreational access for all segments of the population, including the disabled and elderly, while protecting natural resources, particularly environmentally sensitive habitat areas.

OSC-14b. Provide for passive recreation uses of natural open space areas, such as along creeks and the Bluffs 1 areas, where such uses would not damage the resources being protected.

OSC-14f. No unrelated development shall be permitted in publicly owned recreational areas except pipelines to serve coastal dependent industrial uses when no alternative route is feasible.

OSC-14g. In implementing all proposals made in the General Plan/Local Coastal Plan for expanding opportunities for coastal access and recreation, utilize purchase in fee (simple) only after all other less costly alternatives have been studied and rejected as infeasible. Other alternatives may include: purchase of easements, recreation preserve contracts, and mandatory dedication in connection with development.

OSC-14h. Support habitat preservation by establishing habitat preserves and open space for passive and active recreation by developing programs including, but not limited to: transfer of development rights; conservation easements; land acquisition grants; partnership agreements between private developers, the City, school districts, State Park, and the National Forest; overlay performance zoning; development impact fees for recreational resources and services; and use fees and fines.

Implementation Policies:

60. Adopt a management plan for parks open space that integrates planning for trails, coastal access and recreation, and protection of significant biological resources.

Objective OSC-15: Maintain the existing trail system and provide additional recreation and access opportunities by expanding the trail system.

Policies:

OSC-15a. The City's trail system shall be maintained and expanded upon based upon Figure OSC-4 (p. 143 in GP), The Trails Map, and the Trails Master Plan or similar implementing document.

OSC-15b. Support enhancement of access trails along creekways designated as open space up to the foothills of the Santa Ynez mountain range. This should include exploring trail development for public use along the Edison easement behind Carpinteria High School, ending on the first ridge above the City. This should be linked to the old Franklin trail, leading to the ridge up to East Camino Cielo. Trail restoration and enhancement of easement areas should be pursued to restore the natural beauty along these trails by negotiating with property owners, the school district, and the National Forest, to redesign trails and adopt protective fencing methods.

OSC-15d. The creek trails shall be designed and located to prevent any significant direct or indirect adverse impacts on the riparian habitats of the creeks or the Carpinteria Salt Marsh.

Implementation Policies:

69. Prepare and adopt a Trails Master Plan that includes a ranking system to identify appropriate locations for new trails and for enhancing the existing trail system. The Plan should include identifying funding, budgeting, and capital improvement resources for trail land acquisition, development and maintenance. The Plan should also identify entities and programs where the City could participate in joint partnerships with other entities such as the school district, the National Forest, County, and private property owners. [5-year]

70. Continue the development of a coastline trail to extend from Carpinteria City Beach to Rincon Beach Park with vertical access points placed as frequently as possible to encourage public access.

71. Conduct a feasibility study on a trail running north/south from Eighth Street to the beach along Carpinteria Creek. The study should include analysis of alternative routes, protection of ESHA, and the need for a crossing of the railroad track.

72. Prepare a program (including funding, landscaping, maintenance, dedication of easements, etc.) for the development of Carpinteria, Santa Monica, and Franklin Creek trails. [10-year]

3.2.1.4 Safety Element

Objective S-4: Minimize the potential risks and reduce the loss of life, property and the economic and social dislocations resulting from flooding.

Policies:

S-4e. The City shall establish setback guidelines for land use planning purposes along natural creek, river, or stream floodplains, and identify and pursue opportunities to eliminate existing concrete channels and/or banking from creeks, rivers, or streams.

Implementation Policies:

15. Development applications submitted to the city shall include information adequate to determine compliance with applicable flood and stormwater management programs, policies and regulations. Further, the City shall require development to comply with the following standards unless superceded by a more restrictive standard applicable in the city:

    c. all development shall be designed and constructed as necessary to comply with Best Management Practices for nuisance and stormwater runoff and to comply with the requirements of any applicable NPDES permit. Further, all such nuisance and stormwater improvements shall be designed to ensure that the project will not result in a measurable reduction in terrestrial or aquatic habitat carrying capacities due to discharge of project site runoff to creeks, the salt marsh and the ocean.

3.2.2 Carpinteria Municipal Code

The Carpinteria Municipal Code establishes laws and regulations pertaining to all aspects of the local community. The Municipal Code is divided into a number of chapters that deal with particular issue areas. Those that pertain to actions affecting local creeks are Zoning, Environmentally Sensitive Habitat Area Overlay District (Title 14, Chapter 14.42), Excavation and Grading (Title 8, Chapter 8.36), and Flood Damage Protection (Title 15, Chapter 15.50).

With the recent completion of the comprehensive update of the City's General Plan/Local Coastal Plan, the Municipal Code will require additional review and update to bring it into consistency with GP/LCP policies. This review and update process will begin once the California Coastal Commission has completed its approval process of the GP/LCP. Due to the current inconsistency between the GP/LCP policies and the Municipal Code, the regulations relating to local creeks have not been included. This section will be updated once the Municipal Code update process is completed.

3.3 PROGRAM REGULATIONS

The following regulations are needed to ensure the attainment of Program Goals, specifically the protection and restoration of local creeks and compliance with Phase II NPDES stormwater requirements. The Program regulations provided below are intended to provide the additional scope and detail required to achieve Program Goals, building on the policies provided in the City's General Plan/Local Coastal Plan and Municipal Code regulations. In general, the Program regulations provide the following:

- Regulations to improve the quality of stormwater runoff, and guide the City towards compliance with Phase II NPDES storm water regulations.
- Environmental baseline information to be used for project environmental review.
- Specific standards for development within creek ESHA and creek setback areas to minimize and mitigate impacts to creek resources.
- Provides thresholds of significance for use by the city during the environmental review process (CEQA).
- Identification of specific protection and restoration opportunities in local creeks, and ways in which the city will facilitate creek protection and restoration projects.
- Guidance on the philosophy and approach that should be taken in creek protection and restoration projects.
- Guidance on how partnerships with other local agencies should be developed to achieve watershed-based management of local creeks and stormwater quality.

Program regulations are provided below in the following subsections: Geomorphology, Hydrology and Water Quality, and Biological Resources. The program regulations section of the proposed IP amendment contains three levels of text, titled "objectives," "policies" and "implementation measures." Only the implementation measures, as modified by the California Coastal Commission are to be considered enforceable regulations of the City's Local Coastal Program Implementation Program.

3.3.1 Geomorphology, Hydrology and Water Quality

The Program regulations in this subsection provide the additional scope and detail necessary to ensure the preservation and restoration of natural creek geomorphology, hydrology, and water quality. These regulations are intended to build on the regulations provided in the General Plan/Local Coastal Plan and the Municipal Code.

Objective 1 Preserve and restore natural geomorphology and hydrology in local creeks and their watersheds to the greatest degree possible, and improve water quality in local creeks such that applicable water quality standards and regulatory requirements are achieved.

Policy 1.1 The City will adopt and implement the Storm Water Management Plan (SWMP). A draft of this SWMP is provided in Appendix B. This draft is intended to serve as a guide to the development of a final SWMP, which will be completed as a separate action. The SWMP will be updated as necessary to minimize the water quality impacts of runoff from development in the City limits, and to ensure compliance with federal Phase II NPDES storm water requirements for small municipalities, which became effective in early 2003.

As will be required by the Phase II NPDES regulations, the SWMP establishes Best Management Practices (BMPs) that will be implemented to minimize water quality impacts. BMPs established in the SWMP are organized into the six minimum elements stipulated in the Phase II NPDES regulations, which are the following:

- Public Education and Outreach
- Public Participation and Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post-Construction Runoff Control
- Pollution Prevention and Good Housekeeping in Municipal Operations

In addition, the SWMP contains another optional element: Fostering Partnerships for Watershed Management. For potential inclusion in the City's final SWMP

Implementation Measure 1.1.1 The Program will utilize the measures outlined in the City of Carpinteria Water Quality Protection Regulations (see Appendix E).

3.3.2 Biological Resources

The Program regulations in this subsection provide the additional scope and detail necessary to ensure the preservation and restoration of natural biological habitats within and adjacent to local creeks, including aquatic, riparian and upland areas. These regulations are intended to build on the regulations provided in the General Plan/Local Coastal Plan and the Municipal Code.

Objective 2 Preserve and restore aquatic, riparian and upland habitats occurring within and adjacent to local creeks, including sensitive communities and species. Sensitive communities and species are defined as those designated as endemic, rare, threatened, endangered, or of concern by the federal, state, and/or local governments.

Policy 2.1 The City will not permit projects (whether public or private) that would result in the significant fragmentation of biological habitat within creek ESHA and/or creek setback areas established by the General Plan/Local Coastal Plan and Zoning Ordinance-ESHA Overlay District. Likewise, the City will not permit projects that

would create significant barriers to the movement or migration of fish and wildlife through creeks and adjacent habitats (i.e., wildlife corridors will be maintained). Significant fragmentation or barriers are considered to be manmade features, structure, or activity that would block or greatly reduce the movement of wildlife between recognized natural habitat areas or that would significant reduce the biological value or diversity of the habitat.

Implementation Measure 2.1.1 The City will work with the Santa Barbara County Flood Control District and others to facilitate and improve fish passage where feasible along the Carpinteria Creek. For example, the design of detention basins, bridges, bike crossings, etc. will be approved only if they do not, by their design, inhibit fish passage.

Implementation Measure 2.1.2 A setback of 50 feet from top of the upper bank of creeks or existing edge of riparian vegetation (dripline), whichever is farther, is required for all new development. This setback may be increased to account for site-specific conditions. The following factors shall be used to determine the extent of an increase in setback requirements:

a) soil type and stability of the stream corridor;
b) how surface water filters into the ground;
c) types and amount of riparian vegetation and how such vegetation contributes to soil stability and habitat value;
d) slopes of the land on either side of the stream;
e) location of the 100 year floodplain boundary; and
f) consistency with other applicable adopted plans, conditions, regulations and/or policies concerning protection of resources.

Where existing buildings and improvements, conforming as to use but non-conforming as to the minimum creek setback established herein, are damaged or destroyed by fires, flood, earthquake or other natural disaster, such buildings and improvements may be reconstructed to the same or lesser size and in the same general footprint location, provided that reconstruction shall be inaugurated by the submittal of a complete construction application within 24 months of the time of damage and be diligently carried to completion.

Implementation Measure 2.1.3 Development within stream corridors is prohibited with the exception of the following:

- Fish and wildlife habitat enhancement projects,
- Flood protection where no less environmentally damaging method for protecting existing structures exists and where protection is necessary for public safety. Flood control measures shall incorporate the best mitigation measures feasible, and shall utilize natural creek alteration methods where possible, including, but not limited to, earthen channels and biotechnical stabilization. Flood control projects shall not be permitted prior to the issuance of all necessary State and Federal permits.

- Bridges, public trails, and public park improvements including interpretive signs, kiosks, benches, raised viewing platforms, or similar sized structures immediately adjacent to public trails, where no alternative route or location is feasible and where located to minimize impacts on ESHA. New stream crossings shall be accomplished by bridging wherever possible. Trail and park improvements construction shall be allowed only in accordance with Implementation Measure 2.7.2 of this program.
- Repair and replacement of existing stream crossings where such repair and replacement is the least environmentally damaging alternative.
- Vegetation removal in accordance with the following standards:
    - Vegetation removal, including weeding and brush clearance, tree trimming for safety purposes, and removal of dead or dying plant materials shall be allowed only if it can be shown that such development shall not adversely impact the adjacent riparian species and meets all other provisions of this Program and the certified LCP. Such activity shall require approval from the City Biologist or a determination by the City that the proposed activity is consistent with the provisions of this Program and the certified LCP.
    - For improvements existing prior to adoption of this Program, a maintenance program shall be submitted by the property owner(s) that describes the scope and nature of maintenance activities. The City shall review the program, make any changes to avoid further disruption of habitat values and shall approve the program. Unless maintenance work is proposed that is outside the scope of the approved program or a State Department of Fish and Game permit is required, no further review by the City shall be required; maintenance activities beyond those stated in the approved maintenance program are prohibited.
- Reconstruction of existing lawfully constructed buildings and improvements within creek setback areas destroyed by fire, flood, earthquake or other natural disaster. Such buildings and improvements may be reconstructed to the same or lesser size and in the same general footprint location, provided that reconstruction shall be inaugurated by the submittal of a complete construction application within 24 months of the time of damage (within 12 months for non-residential structures) and be diligently carried to completion. Reconstruction projects must comply with Chapter 14.82 of the City zoning code.
- Reconstruction of existing lawfully constructed primary residences within creek setback areas, due to normal wear and tear such as structural pest damage or dry rot. Such residences may be reconstructed to the same or lesser size (square footage, height, and bulk) in the same footprint. If the reconstructed residence is proposed to be larger than the existing

structure, it may only be permitted in accordance with the standards for structural additions proved below:

- Structural additions or improvements to existing lawfully constructed primary residences within creek setback areas in conformance with Chapter 14.82 of the City zoning code and the following standards:
    - Second story additions shall be considered the preferred alternative to avoid ground disturbance;
    - Additions shall be located on those portions of the structure located outside or away from the ESHA;
    - In no case shall additions result in the extension of ground floor development into or toward ESHA;
    - Additions shall be allowed only if they: are located a minimum of six feet from any oak or sycamore canopy dripline; do not require removal of oak or sycamore trees; do not require any additional pruning or limbing of oak or sycamore trees beyond what is currently required for the primary residence for life and safety; minimize disturbance to the root zones of oak or sycamore trees to the maximum extent feasible (e.g., through measures such as raised foundations or root bridges); preserve habitat trees for sensitive species as defined by the certified LUP, in accordance with all provisions of the certified LCP and this Program;
    - Improvements, such as decomposed granite pathways or alternative patios, may be allowed in existing developed areas within the dripline of oak and sycamore trees if such improvements are permeable and do not require the compaction of soil in the root zone.
    - Additions and improvements shall be allowed only if it can be shown, pursuant to the required site-specific biological study, that such development shall not adversely impact the adjacent riparian species and meets all other provisions of this Program and the Certified LCP.

All permitted development shall incorporate the best mitigation measures feasible to minimize impacts to the greatest extent. When development results in the loss of habitat, mitigation shall be provided in accordance with Implementation Measure 2.4.4 of this Program.

Creek bank and creek bed alterations shall be allowed only where no practical alternative solution is available. Development, including any structure, feature, or activity, that would significantly fragment habitat or create barriers to the movement of fish and wildlife is prohibited in creek ESHA areas and/or creek setback areas. Development, including any structure, feature, or activity proposed to be undertaken within a creek or below the top of bank must be approved by the State Department of Fish and Game prior to City permitting.

Implementation Measure 2.1.4 New fencing on parcels adjacent to creeks and/or within a creek ESHA overlay area shall be wildlife permeable as defined by the following criteria:

- Fences shall have a wooden (not wire) rail at the top.
- Fences shall be less than 40 inches high.
- Fences shall have a space greater than 14 inches between the ground and the bottom rail.

Solid or chain-link fences are prohibited.

Implementation Measure 2.1.5 New development in or adjacent to habitat used by sensitive, rare, threatened, or endangered species, as defined by the certified City of Carpinteria Land Use Plan, shall be set back sufficiently far as to minimize impacts on the habitat area. For nesting and roosting trees used by sensitive, rare, threatened, or endangered raptors on parcels adjacent to Carpinteria Creek, this setback shall be a minimum of 300 feet. In addition, the maximum feasible area surrounding nesting and roosting sites shall be retained in grassland and to the extent feasible shall be sufficient to provide adequate forage for nesting success. Additions or alterations to existing development on parcels adjacent to Carpinteria Creek may be located within the applicable setback in accordance with the following requirements.

- In accordance with established multi-week protocols, a pre-construction survey for nesting and roosting activity shall be preformed by a qualified biologist for all improvements to existing development on parcels adjacent to Carpinteria Creek.
- Only those improvements that, in the opinion of a qualified biologist, do not adversely affect the future use of the nesting or roosting trees shall be approved.
- If nesting or roosting sensitive, rare, threatened, or endangered raptors are found within 300 feet of the proposed improvements, no construction activity shall occur within the nesting or roosting season, as applicable.
- Nesting or roosting trees are considered significant vegetation and shall only be altered or removed if it is determined by a qualified arborist that alterations or removal are necessary for the protection of public safety or the maintenance of the health of the affected tree, and there are no other feasible means of limiting the public hazard posed by the tree (e.g., fencing around the tree, supportive cabling of weak limbs). Removal of nesting or roosting trees shall be mitigated. In no case shall nesting or roosting trees be removed or altered during the nesting or winter roosting season.

Implementation Measure 2.1.6 If it is asserted that the application of the policies and standards contained in the LCP and this Program regarding use of property would constitute a taking of private property, the applicant shall apply for an economical viability determination in conjunction with their coastal development permit application and shall be subject to the following provisions:

1. The application for an economic viability determination shall include the entirety of all parcels that are geographically contiguous and held by the applicant in common ownership at the time of the application. Before any application for a coastal development permit and economic viability determination is accepted for processing, the applicant shall provide the following information unless the City determine that one or more of the particular categories of information is not relevant to its analysis:
    a. The date the applicant purchased or otherwise acquired the property, and from whom.
    b. The purchase price paid by the applicant for the property.
    c. The fair market value of the property at the time the applicant acquired it, describing the basis upon which the fair market value is derived, including any appraisals done at the time.
    d. The general plan, zoning or similar land use designations applicable to the property at the time the applicant acquired it, as well as any changes to the designations that occurred after acquisition.
    e. Any development restrictions or other restrictions on use, other than government regulatory restrictions described in subsection d above, that applied to the property at the time the applicant acquired it or which have been imposed after acquisition.
    f. Any change in the size of the property since the time the applicant acquired it, including a discussion of the nature of the change, the circumstances and the relevant dates.
    g. A discussion of whether the applicant has sold or leased a portion of, or interest in, the property since the time of purchase, including the relevant dates, sales prices, rents, and nature of the portion or interests in the property that were sold or leased.
    h. Any title reports, litigation guarantees or similar documents in connection with all or a portion of the property of which the applicant is aware.
    i. Any offers to buy all or a portion of the property that the applicant solicited or received, including the approximate date of the offer and offered price.
    j. The applicant's costs associated with the ownership of the property, annualized for each of the last five (5) calendar years, including property taxes, property assessments, debt service costs (such as mortgage and interest costs), and operation and management costs.
    k. Apart form any rents received from the leasing of all or a portion of the property, any income generated by the use of all or a portion of the property over the last five (5) calendar years. If there is any such income to report, it should be listed on an annualized basis along with a description of the uses that generated or has generated such income.
    l. Any additional information that the City requires to make the determination.

2. A coastal development permit that allows a deviation from a policy or standard of the LCP to provide a reasonable use may be approved or conditionally approved only if the appropriate governing body, either the Planning Commission or City Council, makes the following supplemental findings in addition to the findings required in Chapter 14.60 of the Zoning Code (Coastal Development Permits):
    a. Based on the economic information provided by the applicant, as well as any other relevant evidence, each use allowed in the LCP Policies and/or standards would not provide an economically viable use of the applicant's property.
    b. Application of the LCP policies and/or standards would interfere with the applicant's investment-backed expectations.
    c. The use proposed by the applicant is consistent with the applicable zoning.
    d. The use and project design, siting and size are the minimum necessary to provide the applicant with an economically viable use of the premises.
    e. The project is the least environmentally damaging alternative and is consistent wit all the provisions of the certified LCP other than the provisions for which the exception is requested.
    f. The development will not be a public nuisance. If it would be a public nuisance, the development shall be denied.

Policy 2.2 The City will consult and work with the appropriate resource agencies in the assessment of proposed projects that may impact creek, wetland, riparian, and adjacent upland habitats, and sensitive species including but not limited to steelhead trout, tidewater goby, Monarch butterfly, southwestern pond turtle, two-striped garter snake, and Cooper's hawk. Depending on the nature of resources that could be impacted by specific projects, resource agencies that may be consulted include the California Department of Fish and Game, Central Coast Regional Water Quality Control Board, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and National Marine Fisheries Service. All conditions recommended or required by the resource agencies to protect creeks, wetlands, riparian habitats, and sensitive species will be attached as conditions of the Development Permit for the project issued by the City. In addition, the City shall consider the recommendations of resource agencies when approving conditions of approval associated with a development permit.

Policy 2.3 The City will inform the public of the importance and sensitivity of creek resources, and the regulations that have been established to preserve and restore them. This will be accomplished through the public education program of the City's SWMP.

Implementation Measure 2.3.1 The City shall annually provide notice to the owners of property within creek ESHA overlay areas concerning the limits on activities in creek ESHA overlay areas, the prohibition of any disruption of habitat

values and the procedures for requesting approval of activities potentially affecting a creek ESHA.

Policy 2.4 The City will impose additional development standards to protect biological resources within creek ESHA and/or creek setback areas.

Implementation Measure 2.4.1 All Development Permit applications for projects within a creek ESHA overlay area must include a complete description of the proposed project, site plan, grading plan and other information required on the application form. The site plan and grading plan must be of a scale and contour interval to adequately depict the proposed work and delineate environmental features on the site. A biological study must be submitted with the application. The biological study must contain a topographic map at an appropriate scale and contour interval that adequately delineates the boundaries of creek beds and banks, wetlands, native riparian and upland vegetation, vegetation driplines, ESHA, and creek setback boundaries, as defined in the General Plan/Local Coastal Plan and Zoning Ordinance - ESHA Overlay District. In addition, the map must clearly show areas that would be directly impacted by project construction and development footprints. The biological study must also describe the flora and fauna known to occur or having the potential to occur on the site, including sensitive species as defined by the certified City of Carpinteria Land Use Plan. Where trees suitable for nesting or roosting, or significant foraging habitat is present, a formal raptor survey will be conducted as part of the biological study. The study shall include an analysis of the potential impacts of the proposed development on the identified habitat or species, an analysis of project alternatives designed to avoid and minimize those impacts and mitigation measures that would minimize or mitigate residual impacts that cannot be avoided through project alternatives. Research and survey methodology used to complete the study must also be provided. The biological study must be prepared by a professional biologist approved by or working directly for the City. The City will review the submitted application materials and require additional information as necessary to assess the potential impacts of the project to the affected creek(s).

Implementation Measure 2.4.2 Development Permit applications for project sites on parcels adjacent to creeks and/or within a creek ESHA overlay area will provide the City with a Construction Mitigation Plan. The Construction Mitigation Plan will describe protective measures that will be implemented to minimize the impacts of project construction activities on biological habitat. This includes impacts from direct ground disturbance, clearing, noise, dust generation, increased runoff, erosion, water pollution, application of herbicides, pesticides, and other harmful substances, and any other construction activities that may harm biological resources. Measures that will be required (where applicable) to minimize construction impacts include the following:

- The limits of the construction area will be clearly delineated (flagged, fenced etc), and construction activities will stay within these limits.
- Protective fencing shall be placed around the outermost limits of the protected zones of native trees within and adjacent to the construction area prior to the commencement of construction activities, and shall be maintained in place for the duration of all construction. The protected zone of a native tree shall extend five feet from the dripline or 15 feet from the trunk of the tree, whichever is greater. No construction, grading, staging, or materials storage shall be allowed within the fenced exclusion areas, or within the protected zones of any on-site native trees. Any development approved pursuant to Implementation Measure 2.1.6, including grading or excavation, that encroaches into the protected zone of a native tree shall be constructed using only hand-held tools.
- Important resources (e.g., native vegetation) located within the construction area that are to be preserved will be clearly marked to avoid the accidental removal of such resources.
- Appropriate buffer and/or setback areas, as defined by the provisions of this Program and the General Plan/Local Coastal Plan, or in the absence of applicable provisions, by a qualified biologist, will be clearly delineated and maintained between construction activities and the breeding, roosting and foraging habitat of sensitive species and communities, as defined by the certified LCP.
- Construction activities will be scheduled to avoid the breeding seasons of sensitive wildlife species. If nesting or roosting sensitive, rare, threatened, or endangered raptors are found within 300 feet of the proposed improvements, no construction activity shall occur within the nesting or roosting season, as applicable.
- Construction Phase Requirements from the City's Water Quality Protection Regulations will be implemented to minimize impacts related to runoff, erosion, and water quality (see Appendix E);
- The use of herbicides will be minimized by using manual removal methods to eliminate undesired vegetation whenever possible.

The Construction Mitigation Plan will be prepared by a professional biologist, arborist or landscape architect whom the City approves as qualified to complete the work. The Construction Mitigation Plan will be reviewed and approved by the City prior to issuance of the Development Permit.

Implementation Measure 2.4.3 A qualified biological monitor approved by or working directly for the City will be provided during construction activities for projects within on parcels within a creek ESHA overlay area to ensure that

protective measures provided in the Construction Mitigation Plan are fully implemented. The biological monitor will be responsible for conducting orientations for the work crew upon project commencement and subsequent orientations upon significant crew changes to educate work crews about the sensitivity of biological resources at the site, and to inform them of protective measures that must be complied with. The monitor will also be responsible for observing construction activities and directing construction crews as needed to ensure that protective measures are implemented. If any breach in protective fencing occurs, the monitor shall order all work suspended until the fence is repaired or replaced. The biological monitoring must be supervised by a professional biologist approved by or working directly for the City and who is qualified to complete the specific nature of the work.

Implementation Measure 2.4.4 If, after project review and consideration of all ESHA protection measures, a project is approved that will result in any destruction or degradation of natural habitat within a creek ESHA overlay area, a Habitat Restoration Plan will be required. The plan will be prepared by a professional biologist whom the City approves as qualified to complete the work. The plan will incorporate the following minimum conditions and elements:

- A clear statement of the restoration project goals will be provided. Some restoration goals may be broad, but the plan must also provide qualitative and quantitative standards by which the progress of the restoration effort can be measured. Examples of specific restoration standards may relate to the re-establishment of a diverse benthic macroinvertebrate community, use of the site by a particular wildlife species, or the establishment of native vegetation over a specified percentage of the site. The goals of the restoration project are to be based on the stream restoration principles identified in Implementation Measure 2.10.7.
- The Habitat Restoration Plan will delineate all habitat areas that will be destroyed or degraded by the project, and those that will be restored. A minimum habitat area replacement ratio of 3:1 will be required for habitat that is destroyed or degraded. Such restoration plans shall be approved by the City prior to implementation.
- On-site restoration (i.e., on the parcel or parcels the project is located on) will be conducted wherever possible. If on-site restoration is not feasible, restoration will occur at a suitable off-site location along the affected creek(s).
- To consolidated off-site restoration areas, the area to be restored will be permanently protected in a conservation easement and/or open space designation, by acquisition of the property by the applicant or by other means.
- Restored habitat will be in-kind with the habitat lost or degraded, will realize equal or greater biological value proportionate to the 3:1 replacement ratio provided above, and will be self-sustaining and viable in the long-term.

Restoration efforts will address physical features such as topography, soils, and creek bed and bank features (e.g., riffles, pools, large woody debris, boulders, etc.), vegetation and wildlife.

- A Grading and Site Preparation Plan will be provided that identifies finished topographic contours, and rock, soil and mulching materials that will be used. As part of site preparation, all debris and undesired non-native vegetation will be removed from restoration areas. The Grading and Site Preparation Plan will be prepared with the assistance and approval of a certified professional engineer.
- A Planting Plan shall be provided that lists the plant species that will be replanted, the source of plant material, planting methods, and locations. An appropriate palette of plant species native to the restored habitat will be used for revegetation. Plant material used in restoration projects will be collected and propagated from local, naturally occurring plant stocks, preferably from the same watershed and habitat type.
- A Maintenance, Monitoring, and Corrective Action Plan will be provided that identifies measures that will be implemented to ensure that restored habitat becomes properly established. Maintenance measures that may be employed include erosion control, watering vegetation until it becomes established, weeding, and replacing plants and trees that do not survive. Monitoring of the restoration area will be conducted at regular intervals. A performance bond must be filed with the City to ensure compliance with the performance standards established in the Habitat Restoration Plan. This bond shall remain in effect for five years or until the City biologist has determined the restoration has been successfully completed. Monitoring reports will be submitted to the City on an annual basis at a minimum, and more frequently if deemed necessary. Monitoring reports must assess the progress of the restoration effort in relation to the project goals. If restoration project goals are not met, corrective measures will be devised and implemented to achieve the goals. The City must consent that the subject property has been properly restored before the project proponent is released from maintenance, monitoring, and corrective action requirements. Monitoring must be conducted for a minimum of five years.

Implementation Measure 2.4.5 Development Permit applicants for parcels adjacent to creeks and/or within a creek ESHA overlay area shall provide the City with a Post-Construction Mitigation Plan. The Post-Construction Mitigation Plan shall describe protective measures that will be implemented to minimize impacts to biological resources due to effects including but not limited to noise, lighting, vehicular and pedestrian traffic, domestic pets, water pollution, erosion, and landscape plantings. At a minimum, measures that will be required (as applicable) to minimize post-construction impacts include the following:

- Mechanisms to provide for the permanent protection of areas identified and approved on the Development Permit (or other project approvals) as natural areas will be included in property exchange documents, deeds, lease agreements, CC&Rs, etc.
- Permanent landscaping will be provided to developed area (e.g., parking lots, buildings, backyards, etc.). Landscaping will be planted with appropriate native plant species selected by a qualified landscape architect and/or biologist.
- Project permitees and any and all successors will provide informational materials (e.g., in lease agreements, CC&Rs, deed restrictions) to future occupants that ensure protective standards/conditions of approval are recognized and complied with throughout the life of the project. Educational materials including interpretive signs will be installed near creeks and natural habitat areas. These educational materials and signs will discuss the importance and sensitivity of creek habitats, regulations that have been established to protect them, those standards/conditions of approval that affect the project, and penalties that may be imposed on violators of such regulations.
- The planting of any landscape plants that are on the California Exotic Pest Plan Council's Lists of Exotic Pest Plants of Greatest Ecological Concern in California is prohibited in any ESHA or creek setback area. These lists are provided in Appendix C.
- Loud, stationary equipment (e.g., air conditioners, etc.) shall be located away from or provided with enclosures to minimize potential impacts to wildlife.
- Post-Construction Requirements form the City's Water Quality Protection Regulations will be implemented to minimize impacts related to runoff, erosion, and water quality (see Appendix E).
- All fencing shall be wildlife permeable.
- Exterior lighting (except traffic lights, navigational lights, and other similar safety lighting) shall be minimized, restricted to low intensity features, shielded, and directed away from creek ESHA to minimize impacts to wildlife. Permitted lighting shall conform to the following standards:
    - The minimum necessary to light walkways used for entry and exit to the structure, including parking areas on the site. This lighting shall be limited to fixtures that do not exceed 60 watts, or the equivalent, unless a higher wattage is authorized by the Community Development Director.
    - Security lighting attached to the residence that is controlled by motion detectors and is limited to 60 watts, or the equivalent.

- The minimum lighting necessary for safe vehicular use of the driveway. The lighting shall be limited to 60 watts, or the equivalent.
- A light, not to exceed 60 watts or the equivalent, at the entrance to any non-residential accessory structures.
- No lighting around the perimeter of the site, no lighting for sports courts or other private recreational facilities and no lighting for aesthetic purposes is allowed.

The Post-Construction Mitigation Plan shall be prepared by a professional biologist whom the City agrees is qualified to complete the work. The Mitigation Plan shall be reviewed and approved by the City prior to issuance of the Development Permit.

Policy 2.5 Procedures for assessing penalties on violators of these regulations will also be provided. At a minimum, violators will be required to restore physical conditions and biological habitat that has been damaged as a direct result of their actions. This will entail the preparation and implementation of a Habitat Restoration Plan that meets the requirements described above in Implementation Measure 2.3.6. In addition, penalties in the form of fees may be assessed for violations. Fees that are collected from violators will be dedicated towards the acquisition, preservation, and restoration of local creeks.

Implementation Measure 2.5.1 In addition to all other available remedies, the City may seek to enforce the implementation measures contained herein pursuant to the provisions of Public Resources Code, Sections 30800 – 30822.

Any person who performs or undertakes development without a coastal development permit or inconsistent with any coastal development permit previously issued may, in addition to any other penalties, be civilly liable in accordance with the provisions of Public Resources Code Division 20, Section 30820. Pursuant to Public Resources Code Section 30811, the Community Development Director may, after a public hearing, order restoration of a site if he/she finds that the development has occurred without a coastal development permit form the appropriate authority, the development is inconsistent with the provisions of the Local Coastal Program, and the development is causing continuing resource damage. Pursuant to Public Resources Code Section 30821.6, any person who intentionally or negligently violates a restoration order may be civilly liable for a penalty for each day in which the violation persists.

At a minimum, violators shall be required to restore physical conditions and biological habitat that has been damaged as a direct result of their actions. This shall entail the preparation and implementation of a Habitat Restoration Plan that meets the requirements described above in Implementation Measure 2.4.4. In addition, penalties in the form of fees may be assessed for violations. Fines that

are collected from violations to the extent they exceed the City's costs of achieving compliance, shall be dedicated towards the acquisition, preservation and restoration of local creeks.

Policy 2.6 The City shall periodically review the ESHA Overlay Map to ensure its accuracy relative to specific studies conducted for proposed projects or other related biological studies. The City will also revise the ESHA Overlay Map periodically to account for changes in habitat boundaries resulting from approved habitat restoration projects.

Implementation Measure 2.6.1 The City shall periodically review the ESHA Overlay Map to ensure its accuracy relative to specific studies conducted for proposed projects or other related biological studies. The City shall also revise the ESHA Overlay Map periodically to account for changes in habitat boundaries resulting form approved habitat restoration projects. Each periodic revision to the ESHA Overlay Map should be submitted to the Coastal Commission as an amendment to the certified Local Coastal Program.

Policy 2.7 The City will ensure that sensitive creek habitats are not substantially impacted by recreational uses such as hiking, biking, and fishing, or due to habitation by transients.

Implementation Measure 2.7.1 The City will provide educational (interpretive) signs along creeks corridors at key viewpoints from streets, trails, and bike paths. The signs will briefly describe the importance and sensitivity of creek habitats, and the plant and wildlife species they support. Applicable Federal, State, and local regulations that prohibit the destruction of native vegetation, illegal dumping, and harassment or taking of wildlife (including protected species such as steelhead trout) will be discussed. Penalties for violations of such regulations will be summarized. In addition, a City phone number will be provided for public questions and concerns, including the reporting of unlawful activities.

Implementation Measure 2.7.2 Where new or expanded recreational trails are provided in stream corridors, they will be constructed of alternative surface materials (i.e., not paved), and shall be a maximum of five feet wide. New or expanded public trails and/or park improvements shall be designed and sited to minimize disturbance of sensitive creek resources including native vegetation, creek beds and banks. When such activities require removal of riparian plant species outside of trail limits, revegatation with local native riparian plants shall be required. Creek crossings will be minimized.

Implementation Measure 2.7.3 The City will work with law enforcement agencies to eliminate unlawful transient encampments in local creeks and adjacent open space areas. In order to facilitate this, the City will note and document public complaints, and evidence of transients encountered during

periodic creek surveys (see Implementation Measure 2.9.1). The City will contact the Santa Barbara County Sheriff and provide them with the information that is gathered, and request that the Sheriff enforce applicable laws.

Policy 2.8 The City will identify and monitor activities associated with any proposed projects outside of its jurisdiction that may impact local creek resources. Examples include proposed projects in upstream areas (e.g., in unincorporated Santa Barbara County and the Los Padres National Forest) that could impact stream flow, sediment transport, water quality, etc., and downstream projects (e.g., at Carpinteria State Beach) that could cause habitat fragmentation or introduce barriers to fish and wildlife movement. The City will review such projects, and provide comments regarding potential impacts and appropriate mitigation measures to the lead agency.

Policy 2.9 The City will develop a better understanding of the physical and biological conditions of local creeks, and fluctuations and trends in such conditions.

Implementation Measure 2.9.1 The City will coordinate with other agencies such as the County of Santa Barbara during any surveys of local creeks and riparian habitats. Creek surveys will involve walking the length creeks and noting observations including flora and fauna, condition of the creek bed, banks, and floodplains, creek discharge, and water clarity. In addition, when intensive surveys are proposed to be conducted in Carpinteria Creek, the City will cooperate and participate to extent feasible. Intensive surveys will include water quality testing, assessment of physical habitat, surveys of aquatic and terrestrial flora and fauna, and collection and identification of benthic macroinvertebrates. Creek survey methodology provided in Appendix A will be used as a guide for conducting surveys. In addition, detailed stream assessment guides such as the U.S. EPA's *Rapid Bioassessment Protocols for use in Wadeable Stream and Rivers* and CDFG's *California Stream Bioassessment Procedure* will be used as references for stream survey methodology.

Generally, creek surveys will be conducted in the spring (April or May) during periods of consistent creek flow. Survey dates may be adjusted from year to year depending on variations in rainfall and creek flow. However, in order to allow meaningful comparison of data collected from survey to survey, survey dates and methods will be kept as constant as possible. Whenever possible, creek monitoring surveys will be coordinated with water quality monitoring studies encouraged by the Water Quality Protection Regulations (see Appendix E).

Policy 2.10 The City will actively encourage and pursue projects proposed to preserve and restore local creek habitats. The City will take a holistic, watershed-based approach to creek preservation and restoration, employing the following basic principles:

- The underlying purpose of each restoration project will be to form self-sustaining habitats that are equivalent or similar to what once naturally occurred at the subject site(s). Restoration goals for particular habitat components (e.g., creek morphology, plant community composition, wildlife community composition, etc.) will be determined based on documented historical conditions at the restoration site, or documented conditions at a nearby reference site. Also, restoration goals will be realistic given the limitations imposed by existing development, flood control needs, water supply needs, etc.

- The full range of factors that shape the subject habitat will be considered in the design of creek restoration projects. This includes small-scale factors such as creek bed and bank materials, bank stability, stream gradient, riparian canopy cover, and local stream flow patterns, as well as large-scale factors such as watershed topography, geology, land use patterns, and sources of stream flow, sediments, nutrients, and pollutants.

- Restoration projects will eliminate sources of creek habitat degradation (i.e., creek flow alterations, increased erosion and sedimentation rates, water pollution, removal of vegetation, etc.), and allow the creek to restore itself through natural processes whenever possible. Physical alterations such as revegetation, bank stabilization (natural bank reconstruction), and the creation of instream habitat may also be pursued, but will be of a secondary priority. This approach will help create self-sustaining habitats with long-term viability, rather than short-term improvements that require continuous, long-term maintenance.

- Monitoring will be conducted for a minimum of five years to assess the progress of the project in relation to the restoration goals. Where restoration goals are not met, corrective measures will be devised and implemented to achieve the goals. Monitoring will allow project proponents to determine which restoration methods prove effective, and which do not. Thus, monitoring not only helps optimize the restoration efforts of a particular project, but also helps to guide future restoration projects.

- Restoration efforts will take a large-scale, watershed-based approach whenever possible. In order to facilitate this, the City will communicate with other interested agencies, groups, and citizens. This will allow greater cooperation and pooling of resources to implement large-scale restoration projects.

Implementation Measure 2.10.1 The City will evaluate the need and feasibility of private property acquisition along the creeks for the purpose of implementing habitat preservation and restoration projects. The City shall seek potential public and private funding sources include the State and Federal grants, City funds, environmental groups, and concerned local businesses and citizens.

Implementation Measure 2.10.2 The City will specifically promote, through both public and private efforts, the aquatic and riparian habitats of Carpinteria Creek for restoration. Restoration actions that will be pursued by the City include the following:

- Implementing the Water Quality Protection Regulations to address watershed-scale issues related to water quality, erosion, and sedimentation.
- Removing riprap, pipe and wire revetment, concrete bank revetments, and other artificial elements in the creek. This includes features such as road crossing culverts and detention basins that hinder the movement and migration of aquatic organisms such as steelhead trout.
- Removing trash and debris from the creek.
- Stabilizing eroded and cleared creek banks and floodplains. Natural materials such as native soils, rocks, and heavy timber will be used to reconstruct eroded areas. Native vegetation will be replanted to bind soil.
- Eradicating highly invasive, non-native vegetation such as giant reed, German ivy, periwinkle, and ice plant from the creek and adjacent riparian/upland areas, and replacing it with native vegetation.
- Improving habitat quality and complexity for aquatic invertebrates, fish, amphibians, and reptiles by re-introducing large woody debris and overhanging riparian vegetation to the creek bed and banks in a manner that does not create flooding hazards.
- Widening the band of riparian and upland habitat along the creek by purchasing adjacent land, restoring it with native biological communities, and preserving it. Notable opportunities for this include agricultural areas near the northern city limits and at Salzgeber Meadow.

Implementation Measure 2.10.3 The City will specifically target Lagunitas Creek and adjacent riparian and coastal scrub habitats for restoration. Restoration activities that will be pursued by the City include the following:

- Implementing the Water Quality Protection Regulations to address watershed-scale issues related to water quality erosion, and sedimentation.
- Removing trash and debris from the creek, including abandoned sewer lines and several large concrete roadway dividers.
- Stabilizing and revegetating areas that have been eroded or cleared.
- Eradicating highly invasive, non-native vegetation such as German ivy, English ivy, and ice plant from the creek and adjacent riparian/upland areas, and replacing it with native vegetation.

- Acquiring land along the tributary drainage ditches north of U.S. 101, and restoring natural swales, creek channels, and native vegetation.

Implementation Measure 2.10.4 The feasibility of habitat restoration along Franklin and Santa Monica Creeks is limited by their highly altered condition, flood control considerations, and tightly encroaching urban and agricultural developments. However, where feasible, proposed development shall restore natural elements to these creeks, including earthen banks, natural creek beds with riffles and pools, and a narrow corridor of riparian vegetation, while still maintaining the interests of the flood control function. Where feasible, proposed development shall include elements that provide wildlife habitat, and increase the value of the creeks as migration corridors for terrestrial and aquatic wildlife. Franklin Creek Park (City-owned) shall serve as a focal point for restoration efforts along Franklin Creek, unless other feasible and environmentally preferable locations are identified. Santa Monica Creek historically supported steelhead trout. Where feasible, proposed development in lower Santa Monica Creek shall restore the lower portion of the creek to a condition that would allow steelhead passage into the mountain tributaries. If funding is available, the City shall conduct a study to explore restoration options for Franklin and Santa Monica Creeks.

Implementation Measure 2.10.5 The City will encourage landowners, businesses, and special interest groups to set aside lands along or in proximity to local creeks for the purposes of habitat preservation and restoration. The City will hold public outreach meetings to present the ideas of habitat preservation and restoration to targeted organizations and individuals, and the public. The City will also explore incentives for private organizations and individuals to voluntarily form conservation easements and pursue restoration projects. The types of incentive programs that will be explored by the City include property tax breaks, official recognition and appreciation from the City in the form of publicly issued awards, and assistance with obtaining funding and resolving technical issues.

Implementation Measure 2.10.6 The City will offer technical assistance to private organizations and individuals in the planning and implementation of creek protection and restoration projects. Where it does not have the knowledge to assist with a particular issue, the City will suggest contacts with regulatory agencies and consulting professionals with expertise in habitat conservation and restoration.

Implementation Measure 2.10.7 The City will actively encourage and pursue, as funds are determined available by City Council, projects proposed to preserve and restore local creek habitats, using a holistic, watershed-based approach. Creek preservation and restoration projects shall conform to the following principles:

- The underlying purpose of each restoration project will be to form self-sustaining habitats that are equivalent or similar to what once naturally occurred at the subject site(s). Restoration goals for particular habitat components (e.g., creek morphology, plant community composition, wildlife community composition, etc.) will be determined based on documented historical conditions at the restoration site, or documented conditions at a nearby reference site. Also, restoration goals will be realistic given the limitation imposed by existing development, flood control needs, water supply needs, etc.

- The full range of factors that shape the subject habitat will be considered in the design of creek restoration projects. This includes small-scale factors such as creek bed and bank materials, bank stability, stream gradient, riparian canopy cover, and local stream flow patterns, as well as large-scale factors such as watershed topography, geology, land use patterns, and sources of stream flow, sediments, nutrients, and pollutants.

- Restoration projects will eliminate sources of creek habitat degradation (i.e., creek flow alterations, increased erosion and sedimentation rates, water pollution, removal of vegetation, etc.), and allow the creek to restore itself through natural processes whenever possible. Physical alterations such as revegetation, bank stabilization (natural bank reconstruction) and the creation of instream habitat may also be pursued, but will be of a secondary priority.

- Restoration projects shall help create self-sustaining habitats with long-term viability, rather than short-term improvements that require continuous, long-term maintenance.

- Monitoring will be conducted for a minimum of five years to assess the progress of the project in relation to the restoration goals. Where restoration goals are not met, corrective measures will be devised and implemented to achieve the goals.

- Restoration efforts will take a large-scale, watershed-based approach, whenever possible. In order to facilitate this, the City shall communicate with other interested agencies, groups, and citizens.

Policy 2.11 The City will pursue partnerships with other stakeholders to achieve a unified, watershed-based plan for the management, preservation, and restoration of local creeks.

Implementation Measure 2.11.1 The City will contact other agencies and groups that manage local creeks and their watersheds, and will hold meetings to

discuss cooperative strategies for protecting and restoring local creeks. Potential partners that the City will contact include the County of Santa Barbara Flood Control Department, Central Coast Regional Water Quality Control Board, National Forest Service, County of Santa Barbara, Project Clean Water, University of California Reserve System, Carpinteria Valley Water District, Carpinteria Unified School District, local environmental groups, Carpinteria Chamber of Commerce, and landowners. Cooperation in unified habitat management and restoration efforts will allow common goals to be set, and greater consistency, effectiveness, and efficiency in implementing management programs and restoration projects.

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4.0 PROGRAM IMPLEMENTATION

The following controls are hereby established to ensure that this Program is fully implemented, and is periodically reviewed and amended as needed to ensure the preservation of local creeks.

1. Implementation of the Program will be guided by the Program Director, who will be appointed by the City Manager.
2. Sufficient funds and resources will be made available to the Program Director to properly implement the Program on an annual basis pursuant to the City established program priorities.
3. The Program Director will review the Program every year, prepare a Program Progress Report, and brief the City Council of the report findings. Progress report meetings will be open to the public, and public input will be actively sought. The reporting process will be used by the City as an opportunity to evaluate the overall effectiveness of the Program as a whole, and to determine what changes (if any) are needed to most effectively preserve and restore local creeks. Program Progress Reports will contain the following information:

    - A discussion of the actions that have been taken to implement each Policy and Implementation Measure to date.
    - A discussion of the degree to which each Policy and Implementation Measure contributes to the achievement of Program Goals and Objectives.
    - A summary of the results of biological surveys and water quality monitoring studies that have been conducted in local creek habitats during the previous year.
    - Discussion of where problems with implementing the Program have occurred, and where shortcomings in the Program exist.
    - Recommendations of how existing Program regulations can be more effectively implemented, and what Program amendments (if any) could be made to more effectively and efficiently preserve and restore local creeks.
4. Any changes in Program implementation strategies or amendments to the Program itself will be made after the progress reporting process. Amendments to the Program itself will require the approval of City Council and the California Coastal Commission.
5. The following Program Implementation Schedule provides timing goals for implementing each Policy and Implementation Measure in the Program. The implementation schedule will begin at the time that the program is certified as an implementation program of the City's Local Coastal Plan.

Table 4-1. Program Implementation Schedule

Policy/Implementation Measure	Year			
	1	2	3	4
Policy 1.1 Adopt and implement SWMP	BW	IP	IP	FI
Implementation Measure 1.1.1 Utilize measures in Water Quality Protection Regulations	IP	IP	IP	IP
Policy 2.1 Prohibit fragmentation of habitat, barriers to wildlife movement.	FI	FI	FI	FI
Implementation Measure 2.1.1 Work with SBC Flood Control District on Fish Passage improvements	IP	IP	IP	IP
Implementation Measure 2.1.2 Implement 50-foot setback from top of bank	FI	FI	FI	FI
Implementation Measure 2.1.3 Prohibit development within stream corridor	FI	FI	FI	FI
Implementation Measure 2.1.4 Fencing shall be wildlife permeable	FI	FI	FI	FI
Implementation Measure 2.1.5 Implement 300-foot setbacks from sensitive riparian areas and nesting and roosting trees	FI	FI	FI	FI
Implementation Measure 2.1.6 Implementation of Economic Viability Determination Program	FI	FI	FI	FI
Policy 2.2 Consult with resource agencies	FI	FI	FI	FI
Policy 2.3 Public education program	BW	FI	FI	FI
Implementation Measure 2.3.1 Annual noticing for adjacent property owners	IP	FI	FI	FI
Policy 2.4 Development Permit requirements	FI	FI	FI	FI
Implementation Measure 2.4.1 Development Permit application requirements	FI	FI	FI	FI
Implementation Measure 2.4.2 Construction Mitigation Plan requirements	FI	FI	FI	FI
Implementation Measure 2.4.3 Construction monitoring requirements	FI	FI	FI	FI
Implementation Measure 2.4.4 Post-Construction Mitigation Plan requirements	FI	FI	FI	FI
Implementation Measure 2.4.5 Habitat Restoration Plan requirements	FI	FI	FI	FI
Policy 2.5 Revise Zoning Code to include Program Policy 2.4 and Implementation Measures 2.3.1 through 2.3.6	BW	IP	FI	FI
Implementation Measure 2.5.1 Additional enforcement measures.	FI	FI	FI	FI
Policy 2.6 Periodically revise ESHA Overlay map to include restored habitat areas	FI	FI	FI	FI
Implementation Measure 2.6.1 Periodic Review of ESHA Overlay Map	FI	FI	FI	FI
Policy 2.7 Minimize impacts on local creeks from recreational use and habitation by transients	BW	FI	FI	FI
Implementation Measure 2.7.1 Develop and provide educational signs	BW	IP	FI	FI
Implementation Measure 2.7.2 Minimize impacts from new trails	FI	FI	FI	FI
Implementation Measure 2.7.3 Eliminate illegal transient encampments	BW	FI	FI	FI
Policy 2.8 Review projects outside of City jurisdiction for potential impacts on local creeks	FI	FI	FI	FI
Policy 2.9 Achieve better understanding of local creeks	FI	FI	FI	FI
Implementation Measure 2.9.1 Conduct annual creek surveys	FI	FI	FI	FI
Policy 2.10 Pursue creek preservation and restoration projects	BW	IP	IP	IP

Policy/Implementation Measure		Year			
		1	2	3	4
Implementation Measure 2.10.1	Seek funding sources	BW	IP	IP	IP
Implementation Measure 2.10.2	Carpinteria Creek restoration	BW	IP	IP	IP
Implementation Measure 2.10.3	Lagunitas Creek restoration	BW	IP	IP	IP
Implementation Measure 2.10.4	Franklin and Santa Monica Creeks restoration feasibility study	--	--	BW	FI
Implementation Measure 2.10.5	Encourage private creek protection and restoration projects	BW	IP	IP	IP
Implementation Measure 2.10.6	Assist with private preservation and restoration projects	BW	IP	IP	IP
Implementation Measure 2.10.7	City shall pursue projects proposed to preserve or restore local creek habitat	BW	IP	IP	IP
Policy 2.11	Pursue unified watershed management with other entities	BW	IP	IP	IP
Implementation Measure 2.11.1	Form partnerships with other stakeholders	BW	IP	IP	IP

Abbreviations: BW = Begin Work IP = In Progress FI = Fully Implemented

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CITY OF CARPINTERIA

CREEKS PRESERVATION PROGRAM FINAL DOCUMENT Volume Two

Appendices

September 2005

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

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VOLUME TWO - APPENDICES

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APPENDIX A
STREAM SURVEY METHODOLOGY AND FIELD AND LABORATORY DATA FORMS

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APPENDIX A
STREAM SURVEY METHODOLOGY AND FIELD AND LABORATORY DATA FORMS

The following identifies the methods and equipment that were used to conduct surveys of local creeks at the selected study reaches. The surveys included fieldwork to assess creek habitats and collect data, and laboratory work to analyze water samples and benthic macroinvertebrate samples that were collected in the field.

FIELD SURVEYS

Field surveys were conducted to assess physical and biological conditions at selected study reaches along local creeks, and collect data and samples. Methods and equipment that were used at each study reach are described in Table A-1.

Table A-1. Field Survey Tasks and Equipment

Methods	Equipment
1. General observations were recorded, including creek study reach, date, time, current weather, stream flow status, physical habitat characteristics, plant and animal species observed, and level/sources of human disturbance.	1. Field notebook, data sheets, pencil.
2. A 100-meter long study reach was delineated. The widths of the creek (wetted perimeter, channel bottom, and bank full) and riparian corridor were measured at three points along the 100 meter reach.	2. Stakes, 100-m cloth measuring tape, compass, Field notebook, data sheets, and pencil.
3. The study reach was sketched and photographed. Survey points and important features (e.g., creek bed and bank boundaries, riparian vegetation, adjacent land uses, stream modifications, riffle/pool locations, boulders, falls, gravel bars, woody debris, etc.) were noted and photographed. A representative creek cross-section was also sketched.	3. Field notebook, pencil, and camera.
4. Three water samples were taken for laboratory analysis of suspended solids and nutrients (PO_4, NO_2, NO_3, and NH_4). Samples were placed on ice in a small cooler in the field. Sampling sites were noted on the study reach sketch.	4. 20-ml sample vials (nutrient samples), 500-ml sample bottles (suspended sediment samples), labels, sharpie pen, small ice chest, pencil, field notebook.
5. Three readings of temperature, pH, dissolved oxygen, and conductivity were taken directly from the creek and recorded. The sampling locations were noted on the study reach sketch.	5. HYDAC pH/conductivity meter, Yellow Springs Instruments dissolved oxygen/temperature meter, field notebook, and pencil.

Table A-1. (Continued)

Methods	Equipment
6. A composite benthic macroinvertebrate sample was collected at each study reach using methods described in *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition* (Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling, USEPA, 1999). Per this protocol, the composite samples consisted of individual samples collected from 20 different locations in the study reach. The sub-sampling locations were selected based on the diversity and relative coverage area of microhabitats (e.g., riffles, pools, falls, etc.) found in the study reach. Each sub-sample was collected by disrupting approximately 0.1 square meter of stream bottom by foot for approximately 20 seconds in front of a D-net. In areas with swift current (e.g., riffles), dislodged benthic organisms were simply swept downstream into the net. In areas without swift current (e.g., pools), the net was swept through the water three times while the stream bottom was being disturbed. Deep and hard to reach areas were sampled by jabbing the net (three times) along an approximately 0.1 square meter area of the stream bottom. Each composite sample was assumed to represent approximately two square meters of stream bottom (i.e., the sum of 20, 0.1 square meter sub-samples). After the composite sample was collected, it was sieved (250 μm mesh), scooped into a plastic container, and preserved in 70% ethanol solution. The microhabitats sampled, and the number of sub-samples within each microhabitat were noted.	6. D-net with 250-μm mesh, watch, 250 and 1,000-μm sieves, spoon, forceps, funnel, beakers, 500-ml bottles, labels, sharpie pen, ethanol, pencil, field notebook.
7. Stream discharge (Q) was estimated at a selected cross section of the study reach. This was accomplished by measuring wetted perimeter width, and depth and current (i.e., velocity) at three to five equally spaced points across the measured width. The product of these measurements was used to estimate Q.	7. Current meter, measuring tape, measuring stick, field notebook, and pencil.
8. A semi-quantitative stream habitat assessment was conducted using the protocol described in *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition* (Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling, USEPA, 1999). This required a visual-based assessment of the following habitat components: stream substrate/cover, sediment embeddedness, stream velocity/depth regime, sediment deposition, channel flow status, human alteration, channel sinuosity, habitat complexity/variability, bank stability, vegetative protection, and riparian vegetation composition and width. Scores were assigned (out of 200 possible points) to the habitat present at each study reach based on these components. Scoring criteria provided in the EPA protocol were used as a guide.	8. Habitat assessment sheets, field notebook, pencil.

LABORATORY WORK

Laboratory work was conducted to analyze water samples and benthic macroinvertebrate samples collected during the field surveys. Laboratory work is described in Table A-2.

Table A-2. Laboratory Tasks and Equipment

Task	Equipment
1. Each water sample collected for analysis of suspended solids was transferred to a graduated cylinder to determine volume, and then passed through pre-weighed 45 μm fiberglass filters using a hand-pumped filtering apparatus. Filters were place in a drying oven at 80° C (176° F) for 24 hours, and then re-weighed. Suspended solid concentrations were determined based on the volume of water in each sample, and the net increase in weight of each filter (due to trapped solids from the water sample). Water samples collected for analysis of nutrients were frozen upon returning from the field, and delivered to the UCSB Marine Sciences Laboratory. Concentrations of NO_2, NO_3, NH_4, and PO_4 were determined at the UCSB lab.	1. Pre-weighed 45-μm fiberglass filters, beaker, hand-pump filtering apparatus, drying oven, balance scale.
2. Benthic macroinvertebrate samples were sieved in the laboratory, and placed in a flat plastic tray. The tray was marked with a grid pattern of 25 equally sized squares (five by five). The entire sample was spread out evenly across the 25 squares. The sample was sorted through one square at a time under a dissecting microscope until a total of 300 macroinvertebrates were pulled out. The proportion of the sample evaluated (i.e., number of square sampled out of 25) was noted, and total macroinvertebrate densities for the approximately two square meter sample area were estimated. The 300 sorted macroinvertebrates were identified (most to the genus level) with the aid of taxonomic keys. Sorted macroinvertebrates and unsorted portions of the samples were bottled separately in 70% ethanol for storage.	2. 250-μm sieve, flat plastic tray (with grid), forceps, dissecting microscope, petri dish, invertebrate identification keys, 70% ethanol, plastic storage vials and bottles.

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APPENDIX B
DRAFT STORM WATER MANAGEMENT PLAN

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CITY OF CARPINTERIA
DRAFT STORM WATER MANAGEMENT PLAN

INTRODUCTION

This Storm Water Management Plan (SWMP) has been prepared by the City of Carpinteria to satisfy the requirements established by EPA's Final Phase II NPDES regulations, which were published in the Federal Register on December 8, 1999. Per the Phase II NPDES requirements, small municipalities such as the City of Carpinteria must obtain a NPDES municipal storm water permit by March 2003. The State of California Regional Water Quality Control Board, Central Coast Region (CCRWQCB) will be responsible for administering the NPDES permit program locally. The City will submit this SWMP as part of the permit requirements.

The objectives of this SWMP are to: (1) Reduce the discharge of storm water pollutants in the City to the maximum degree feasible; (2) Protect water quality, and; (3) Meet applicable water quality standards for local water bodies. Best Management Practices (BMPs) are the vehicles by which SWMP objectives will be achieved. BMPs are practical actions that can be taken to reduce water pollution. BMPs established in this SWMP are organized into the following six minimum control measures stipulated in the Phase II NPDES regulations:

- Public Education and Outreach
- Public Participation and Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post-Construction Runoff Control
- Pollution Prevention and Good Housekeeping in Municipal Operations

In addition, this SWMP contains another element: Fostering Partnerships for Watershed and Regionally Based Storm Water Management.

Per the Phase II regulations, BMPs established in the SWMP must be fully implemented by the City by the end of the first permit term, which usually covers a period of five years. Implementation of the SWMP will be administered by the City, under the direction of the Public Works Director. The following describes the SWMP elements and supporting BMPs.

ELEMENT 1: PUBLIC EDUCATION AND OUTREACH

The goal of the Public Education and Outreach Program is to facilitate greater public awareness of the sensitivity of local surface waters, their beneficial uses, the detrimental effects of polluted storm water and illicit discharges, and measures that can be taken to reduce storm water pollution. The City will accomplish this by preparing educational materials and making them available to the public through a variety of outreach efforts. Educational efforts will focus

on storm water issues of local concern, which include pollution from sediments, nutrients, bacteria, petroleum hydrocarbons, metals, pesticides, herbicides, trash and debris. Specific BMPs to be implemented as part of the Public Education and Outreach Program are provided below.

BMP 1-1 The City will develop brochures and fact sheets that discuss storm water issues, and make them available to the general public. The brochures and fact sheets will be made available at City offices, local libraries, local schools, and on the City's web-site, and will be distributed periodically with mass mailings such as water bills. Storm water education and outreach material developed by the City will be available in English and Spanish.

BMP 1-2 In order to facilitate awareness, signs will be placed in highly visible locations to mark local creeks and their tributaries. The City will also stencil messages such as "Do Not Dump: Drains Directly to Creek/Ocean" at strategically placed locations along City storm drains (e.g., at catch basins, along open channels).

BMP 1-3 The City will work with the Carpinteria Unified School District to promote awareness of storm water issues at local schools. Potential ways of accomplishing this include organizing guided field trips to local creeks, beaches, and the Carpinteria Salt Marsh, providing guest lecturers at school assemblies and classrooms, and the discussing storm water issues in science courses.

BMP 1-4 The City will provide educational displays on storm water issues at local events such as public meetings, youth sporting events, hazardous waste collection events, festivals, etc. Whenever possible, City staff will be present at such events to discuss storm water issues with interested members of the public.

BMP 1-5 The City will make further efforts to reach groups that are especially important in the context of water quality management, including owners/operators of agricultural fields and greenhouses, businesses and residences adjacent to local creeks and major storm drains, and industrial facilities. Outreach may consist of door-knocking, phone calls, mailings, and holding meetings to alert these groups of water quality issues specific to their activities, and methods that can be implemented to minimize storm water pollution impacts.

BMP 1-6 The City will compile a collection of references relating to storm water issues, and will make them available to the public through the local library.

ELEMENT 2: PUBLIC PARTICIPATION AND INVOLVEMENT

The goal of this element is to facilitate public participation and involvement in the development, implementation, and periodic review of the SWMP, as well as volunteer efforts. The benefits of this include improving public knowledge of local storm water issues, receiving public input on potential solutions, gaining public support for and compliance with the SWMP, and developing a volunteer workforce to help implement the SWMP and related efforts.

Facilitating public participation and involvement will be accomplished by implementing the BMPs provided below.

BMP 2-1 The City will advertise public meetings held before the initial adoption of the Creeks Preservation Program and SWMP, and during their periodic review in ensuing years. The City will seek public comments and input during such meetings and public review periods. All public noticing requirements established by State law will be met.

BMP 2-2 The City will organize and advertise at least one major public creek clean up event per year.

BMP 2-3 The City will promote the formation of volunteer groups in the community whose aim is to help deal with storm water issues. Examples include Adopt-a-Creek and Adopt-a-Storm Drain groups, which strive to keep storm drains and creeks free of trash and debris, and make general observations on their overall condition. The City will assist in the formation and maintenance of such groups as much as possible. Forms of City assistance may include arranging access to creeks and storm drains, provision of trash collection, transport, and disposal equipment and facilities, advertising of events, and recruitment of volunteers.

BMP 2-4 The City will encourage citizens, businesses, local schools, environmental organizations, etc. to participate in storm water programs, including storm drain stenciling, water quality monitoring, creek and storm drain clean ups, etc. Several forms of advertising may be used to foster public participation in storm water programs, including local newspapers, community newsletters, local radio and television, announcements at public events and meetings, mailings, telephone calls, and door-to-door visits. Effort will be made to reach a wide range of community groups, including non-English speaking groups.

BMP 2-5 The City will establish a Storm Water Phone Line that citizens can call to report a wide range of concerns related to storm water issues, including implementation of the SWMP, illegal dumping, illicit discharges, erosion from local construction sites, etc. The Storm Water Phone Line will be advertised at storm water events and meetings, and in educational materials distributed by the City.

ELEMENT 3: ILLICIT DISCHARGE DETECTION AND ELIMINATION

The goal of this element is to gain a thorough awareness of the City's storm water system, determine the types and sources of illicit discharges entering the system, and establish the legal, technical, and educational means needed to eliminate these discharges. Illicit discharges are unpermited waste discharges from non-storm water sources, including mistakenly or deliberately discharged sanitary sewer effluent, motor oil, grease, paint, chemicals, etc. Illicit discharges can release high levels of pollutants to water bodies, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria to receiving waters. Pollution from illicit discharges can significantly degrade receiving water quality and

threaten aquatic wildlife and human health. BMPs that will be implemented to detect and eliminate illicit discharges are provided below.

BMP 3-1 The City will continue to facilitate proper disposal of commonly dumped wastes such as motor oil, antifreeze, paint, chemicals, etc. through implementation of its Hazardous Waste Collection Program. This program includes an annual collection day, at which the City accepts limited quantities of hazardous wastes from individuals at no cost. The City insures that collected waste is properly disposed of. Hazardous waste collection efforts such as this will be advertised in public education and outreach efforts to be implemented as part of the SWMP.

BMP 3-2 An ordinance will be drafted and added to the Carpinteria Municipal Code that prohibits illicit discharges into the storm water system, with appropriate enforcement procedures, actions, and penalties to the extent allowable under applicable laws.

BMP 3-3 A map of the City's storm water system will be prepared. The map will show all major storm water conveyance infrastructure (e.g., channels, ditches, pipes), storm drain outlets, and water bodies that receive discharge from the City's storm water system (i.e., local creeks, Carpinteria Salt Marsh, and the ocean). This map will be used as a basis by which to investigate pollution inputs to the storm drain system, including illicit discharges.

BMP 3-4 An Illicit Discharge Detection and Elimination Plan will be implemented. The measures listed below will be implemented as part of this plan.

- The City will work with other stakeholders such as Project Clean Water to continue water-sampling programs to identify local creeks and storm drains with high pollution concentrations. Ideally, systematic sampling programs will be conducted throughout local watersheds and storm drain infrastructure to identify major sources of pollution. Ideally, water sampling will be conducted during both dry weather conditions and periods of peak storm flows, and samples will be evaluated for a wide variety of pollutants such as metals, oil and grease, nutrients, sediments, bacteria, pesticides, herbicides, etc.
- The results of the water sampling programs will be used to identify storm drains that convey highly polluted runoff, and are likely to convey illicit discharges. As funding permits, sources of illicit discharges (i.e., individual businesses, residences, etc.) will be determined by sampling storm drains from specific facilities.
- Once sources of illicit discharges are identified, offending parties will be notified that they are in violation of the City ordinance, and directed to correct the problem. The City will attempt to educate violators and work with them to eliminate illicit discharges. Legal action will be taken if necessary.
- All actions taken to identify and eliminate illicit discharges will be documented. This documentation will be used in further investigations, and to track progress.

ELEMENT 4: CONSTRUCTION SITE RUNOFF CONTROL

The goal of this element is to minimize water quality impacts from construction projects, particularly due to sediments that are eroded from construction sites and conveyed to receiving waters. Sediment runoff rates from construction sites are typically 10 to 20 times greater than those from agricultural lands, and 1,000 to 2,000 times greater that those from forested lands. In a short period of time, a construction site can contribute more sediment to streams and other receiving waters than what would naturally occur over several decades. Deposited sediments can fill in streams and bays, destroying biological habitat and causing flooding. Increased turbidity in the water column can harm aquatic organisms. Construction sites are also common sources of other types of pollution, including nutrients, pesticides, oil and grease, concrete washout, and debris. In order to minimize water quality impacts from construction sites, the City will enforce the BMPs listed below.

BMP 4-1 The City will continue to enforce the Excavation and Grading Ordinance (Carpinteria Municipal Code, Title 8, Chapter 8.36) for construction projects that involve grading. Under the terms of this ordinance, a grading permit must be obtained from the City engineer prior to commencement of grading activities. The City engineer reviews the site plans for the project, and requires the implementation of soil and slope stability measures (including erosion control) as necessary to protect life and property. The ordinance also requires that regular inspections are made during construction to ensure the integrity of engineered cuts and fills.

BMP 4-2 As part of the development review process, the City will continue to assess potential water quality impacts from construction projects. For construction projects that would disturb an area of one acre or greater, the City will require that a Storm Water Pollution Prevention Plan (SWPPP) is prepared. The Public Works Director may also require the preparation of a SWPPP for construction sites of less than one acre if they are situated in a sensitive area (i.e., adjacent to a creek).

SWPPPs describe the construction site and surrounding areas, identify potential water quality impacts, and list specific BMPs that will be implemented to minimize construction-related water quality impacts. BMPs provided in “Attachment A, Example BMPs for Construction Projects” are to be included in SWPPPs where applicable. Attachment A is not to be considered an exhaustive list of BMPs; if more effective measures are feasible, they are to be implemented.

The SWPPP is to be reviewed and approved by the Public Works Director prior to the issuance of development permits, grading permits, and building permits for the project. Prior to the commencement of construction activities, the Public Works Director will conduct a final inspection of the construction site to ensure that BMPs are in place. In addition, the Public Works Director will have the authority to inspect the site during construction. If the Public Works Director finds that BMPs are not being properly implemented, he or she will have the authority to suspend operations at the site until appropriate adjustments are made.

ELEMENT 5: POST-CONSTRUCTION RUNOFF CONTROL

The goal of this element is to minimize water quality impacts associated with post-construction storm water discharges from existing development, new development and redevelopment. Runoff from developed areas is known to carry a wide range of pollutants, including oil and grease, pesticides, solvents, heavy metals, and nutrients. Also, impervious surfaces associated with developed areas (i.e., pavement) reduce or eliminate percolation of rainwater through soil and vegetation, thus increasing the amount of surface runoff. These effects can degrade the quality of receiving waters, and result in scouring and erosion of drainage channels and banks, and downstream flooding. In order to minimize these types of water quality impacts, the City will implement the BMPs listed below. BMPs that apply to new development and redevelopment will be implemented for all projects affecting an area of one acre or greater.

BMP 5-1 The City will actively encourage (i.e., through the Public Education and Outreach) existing developments to minimize storm water pollution impacts by (1) reducing their use of harmful substances (i.e., fertilizers, pesticides, petroleum hydrocarbons, detergents, industrial chemicals, etc.), and (2) keeping storm water pollutants from entering sensitive receiving waters. The latter may be accomplished using a variety of techniques including erosion control, storm water detainment, and devices such as filters and skimmers at drainage inlets. Another effective method of facilitating pollutant trapping and filtering is the provision of vegetated drainage channels and buffers, including restoration of degraded creek banks and adjacent areas with native vegetation. The City will offer to assist proponents of such efforts in design, implementation, and funding whenever possible. This may include exploring a wide range of funding options, including Federal and State grants and contributions from environmental groups and concerned citizens.

BMP 5-2 As part of the development review process, the City will continue to assess potential water quality impacts from new development and redevelopment projects. This will include review of site plans by the Public Works Director. Prior to the issuance of development permits, grading permits, and building permits, the Public Works Director will verify that appropriate BMPs have been incorporated into the project design such that long-term water quality impacts will be minimized to the greatest degree feasible. At a minimum, the measures listed below will be included into the design of each new development project and redevelopment project affecting an area of one acre or greater.

- Creeks and adjacent wetlands and riparian vegetation will be preserved by adjacent developments per the requirements of policies and implementation measures established in the Carpinteria Creeks Preservation Program.
- Natural drainage patterns and runoff rates will be preserved to the greatest degree feasible by minimizing changes to natural topography, and minimizing the area of impervious surfaces created by the project.

- Erosion will be minimized by constructing cut and fill areas in accordance with the requirements of the Excavation and Grading Ordinance, stabilizing and landscaping areas of bare soil, and directing surface water runoff away from hillsides and other areas that could be easily eroded.
- Developments that will cause changes in surface water runoff rates (i.e., due to altered topography, creation of impervious surfaces) will provide detention basins or ponds that release storm water runoff from the site at pre-development flow rates. Controlled release of storm water will prevent increases in downstream stream scouring that would otherwise result. This will also allow capture of suspended sediments eroded from the site that would otherwise be transported downstream.
- Wherever feasible, alternative drainage features such as vegetated swales, retention ponds, and created wetlands will be provided as part of future developments. These types of drainage features trap sediments and provide biological filtration of storm water pollutants.
- Aggregate filters and surface oil skimmers will be provided at all catch basins and storm drain inlets. These features will be designed and maintained to achieve adequate storm water conveyance, and optimal removal of pollutants.
- In order to facilitate awareness of storm water quality issues, project proponents will provide stenciling and signage to mark catch basins, storm drains, and creeks within and adjacent to new development and redevelopment sites. These efforts will be consistent with those that will be carried out by the City in existing developed areas.
- Proponents of new development and redevelopment projects will distribute storm water educational materials developed by the City to tenants and buyers.
- Refuse containers will be provided in public areas such as parks, clubhouses, etc. to minimize littering and the transport of trash and debris to drainage features.

  This is not to be considered an exhaustive list of BMPs; additional measures are to be implemented where necessary to minimize water quality impacts. Long-term implementation of required BMPs (i.e., maintenance of detention basins, vegetation, etc.) will be required as a condition of project approval.

BMP 5-3 Immediately following the completion of construction and prior to the issuance of occupancy permits, the Public Works Director or his/her designee will conduct an inspection of the development site to ensure that required BMPs are in place. If the required BMPs are not in place, the Public Works Director will have the authority to delay the issuance of occupancy permits until appropriate adjustments are made.

BMP 5-4 The City will enforce the requirement for long-term implementation of BMPs for new development and redevelopment projects. This will be accomplished by requiring

property owners to conduct yearly inspection and maintenance of new storm drains, detention basins, filters, and other drainage facilities. Drainage facilities will be maintained and cleaned as needed to provide optimal storm water detention and removal of sediments and other pollutants. An annual report documenting inspection and maintenance will be required of each new development. The annual reports will be submitted to the Public Works Director for review and approval. If the inspection and maintenance outlined in the report is insufficient to provide optimal storm water detention and removal of sediments and other pollutants, the Public Works Director will require the property owners to take corrective action.

ELEMENT 6: POLLUTION PREVENTION AND GOOD HOUSEKEEPING IN MUNICIPAL OPERATIONS

The goal of this program element is to minimize storm water pollution from the operation of municipal facilities including offices, equipment yards vehicles, parks and open space areas, and storm drain infrastructure. Like other types of development, municipal facilities can increase storm water runoff rates, and introduce a wide range of pollutants to receiving waters. In addition, the local storm drain system acts as a sink for sediments, trash, and debris. The City has a responsibility to set a good example for businesses, residences, and other public agencies by in minimizing water quality impacts. In order to achieve this, the City will implement the BMPs listed below.

BMP 6-1 The City will implement storm water BMPs required in Element 4 for construction projects and Element 5 for new development/redevelopment projects as they apply to existing City operations, and future City projects.

BMP 6-2 The City will conduct yearly inspections of all City-owned storm drain facilities. The inspections will be made as soon as possible following the rainy season. The City will maintain its storm drain facilities as needed to provide optimal storm water detention and removal of sediments and other pollutants. This measure will be implemented in coordination with the Santa Barbara County Flood Control District, which is responsible for the maintenance of numerous storm water system components within the City limits.

BMP 6-3 The City will ensure that excess sediments, waste, and debris are removed regularly from its storm drains drain facilities. Wherever possible, removed sediments will be used for beach nourishment. The suitability of removed sediments for beach nourishment will be determined through communications with BEACON. This measure will be implemented in coordination with the Santa Barbara County Flood Control District, which is responsible for the maintenance of numerous storm water system components within the City limits.

BMP 6-4 The City will ensure the preservation of existing riparian vegetation and the revegetation of denuded areas along local creeks in accordance with policies and implementation measures established to support Objective 2 of the Carpinteria

Creeks Preservation Program. Riparian vegetation is effective in stabilizing creek banks, thereby reducing erosion and sediment transport into local creeks.

BMP 6-5 The City will develop and implement an inspection and monitoring program to ensure that municipal BMPs are being implemented.

BMP 6-6 The City will develop a training program to teach City staff how to implement and monitor BMPs to reduce water quality impacts from municipal operations such as park maintenance, equipment and vehicle maintenance and operation, new construction, and storm water system maintenance.

BMP 6-7 The City examine the costs and benefits of installing storm water skimming and filtration devices at existing catch basins and storm drain inlets throughout the City.

BMP 6-8 The City will continue its street sweeping program throughout the City.

ELEMENT 7: FOSTERING PARTNERSHIPS FOR WATERSHED AND REGIONALLY BASED STORM WATER MANAGEMENT

The goal of this program element is for the City to facilitate the formation of partnerships with other groups and individuals to deal with storm water issues on the watershed and regional levels. Because a given stream is affected by all of the physical and biological factors within its watershed, the watershed is the fundamental unit for management. This point is lost when multiple entities within a given watershed or region manage water quality issues without cooperating with each other. The situation can result in a wide disparity in goals, efforts, and success amongst jurisdictions, and inefficiency due to duplication of efforts (i.e., developing separate public education materials, implementing separate water quality monitoring programs, etc.). Cooperation amongst managing entities in unified watershed and regional management and restoration efforts allows common goals to be set, and greater consistency, effectiveness, and efficiency in implementing programs. In order to facilitate the formation of partnerships with other entities, the City will implement the BMP listed below.

BMP 7-1 The City will actively seek to forage partnerships with other groups and individuals to address storm water issues at the watershed and regional levels. This will be achieved by directly contacting other involved agencies and groups, and holding meetings at which cooperation can be discussed. Potential partners that the City will contact include the Central Coast Regional Water Quality Control Board (CCRWQCB), National Forest Service, County of Santa Barbara, Project Clean Water, City of Santa Barbara, University of California Reserve System, Carpinteria Unified School District, local environmental groups, and the Carpinteria Chamber of Commerce. Specific efforts that the City will seek to engage in with partners include public education and outreach, research (e.g., water quality monitoring), and pollution control BMPs.

SWMP IMPLEMENTATION AND REPORTING

As indicated previously, the SWMP will be implemented under the direction of the Public Works Director. The following table provides the timing goals for implementing each BMP in the SWMP. The implementation schedule will begin when the City obtains its initial NPDES Municipal Storm Water Permit from the CCRWQCB.

Implementation Schedule for Storm Water Management Plan BMPs

Program Element	BMP	Year			
		1	2	3	4
Element 1: Public Outreach and Education	1-1: Development and distribution of educational brochures and fact sheets	FI	FI	FI	FI
	1-2: Signs and stenciling	BW	FI	FI	FI
	1-3: School education program	BW	FI	FI	FI
	1-4: Educational displays at public events	BW	FI	FI	FI
	1-5: Additional outreach to especially important groups	BW	FI	FI	FI
	1-6: Compile and make available storm water reference collection	BW	FI	FI	FI
Element 2: Public Participation and Involvement	2-1: Public notification and participation during SWMP development.	FI	FI	FI	FI
	2-2: Annual creek clean up events	FI	FI	FI	FI
	2-3: Promote volunteer groups	FI	FI	FI	FI
	2-4: Encourage public participation in storm water programs	FI	FI	FI	FI
	2-5: Storm water phone line	FI	FI	FI	FI
Element 3: Illicit Discharge Detection and Elimination	3-1: Hazardous waste collection efforts	FI	FI	FI	FI
	3-2: Illicit discharges ordinance	BW	FI	FI	FI
	3-3: Storm water system map	BW	FI	FI	FI
	3-4: Illicit Discharge Detection and Elimination Plan	--	BW	FI	FI
Element 4: Construction Site Runoff Control	4-1: Continued enforcement of Excavation and Grading Ordinance	FI	FI	FI	FI
	4-2: Require SWPPPs for construction projects	FI	FI	FI	FI
Element 5: Post-Construction Runoff Control	5-1: Encourage storm water BMPs for existing development	BW	FI	FI	FI
	5-2: Require post-construction BMPs for new development and redevelopment	FI	FI	FI	FI
	5-3: Inspection of development sites for BMP installation.	FI	FI	FI	FI
	5-4: Long-term enforcement of BMPs.	BW	FI	FI	FI

Program Element	BMP	Year			
		1	2	3	4
Element 6: Pollution Prevention/Good Housekeeping in Municipal Operations	6-1: BMPs implemented in City operations and new projects.	FI	FI	FI	FI
	6-2 and 6-3: Storm water system maintenance	BW	FI	FI	FI
	6-4: Preservation of riparian vegetation	FI	FI	FI	FI
	6-5: BMP inspection and monitoring program	FI	FI	FI	FI
	6-6: City staff training program	FI	FI	FI	FI
	6-7: Cost-benefit study for storm drain filters and skimmers	--	BW	FI	--
	6-8: Cost-benefit study for street sweeping	--	BW	FI	--
Element 7: Fostering Partnerships for Storm Water Management	7-1: Forage partnerships to address storm water issues at the watershed and regional levels.	BW	FI	FI	FI

Abbreviations: BW = Begin Work IP = In Progress FI = Fully Implemented

Per the Phase II NPDES regulations, the City will be required to prepare SWMP monitoring reports annually, and submit them to CCRWQCB. The monitoring reports must include the following information:

- The status of compliance with permit conditions, including an assessment of the effectiveness of each BMP in the SWMP, and progress made towards the implementation of each BMP.
- The results of studies completed that relate to storm water management (e.g., biological surveys, water quality monitoring, illicit discharge detection, etc.).
- A summary of actions that will be implemented during the next reporting cycle.
- Any changes to BMPs in the SWMP, and a discussion of the reasons why changes will be made.

As indicated above, the annual reporting process will require the City to review the performance of each BMP in the SWMP on an annual basis. The reporting process will be used by the City as an opportunity to evaluate the overall effectiveness of the SWMP, and to determine what additions or revisions (if any) are needed to most effectively protect the quality of local surface waters.

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ATTACHMENT A:
BEST MANAGEMENT PRACTICES FOR CONSTRUCTION PROJECTS

The following Best Management Practices are to be incorporated where applicable into Storm Water Pollution Prevention Plans for construction activities that would disturb an area of one acre or more. These measures should also be incorporated into construction projects that would affect less than one acre of land if such sites are located in a sensitive area such as within or adjacent to a creek.

1. To the greatest degree feasible, construction activities will be conducted during the dry season (i.e., May to October).
2. Disturbance of soils and vegetation will be minimized to the greatest extent possible. Where construction activities would occur adjacent to natural vegetation, the work area will be clearly flagged to identify its limits. Disturbance of soil or vegetation will not occur beyond these limits.
3. Topsoil from excavations will be stored separately from deeper strata. When back-filling, the deeper strata will be replaced first, with the topsoil being used to fill the upper depths of the excavation. This will promote more rapid and complete recolonization of the disturbed area by vegetation.
4. Gravel pads will be installed at all access points to minimize the tracking of sediments on to roads.
5. Roadways in the vicinity of construction access points will be swept as necessary to prevent the accumulation of sediments.
6. Access roads, parking areas, and areas where bare soil is exposed by construction activities will be watered at least twice daily to minimize wind erosion. Whenever average wind speed exceeds 15 mph, watering of exposed soils will be conducted at an increased frequency.
7. Soil piles will be watered or covered as needed to prevent wind and water erosion of the soil.
8. Clearing and grading activities will cease during periods of high winds (greater than 20 miles per hour, averaged over one hour).
9. To minimize dust generation from construction vehicles, vehicle speeds at the construction site will be limited to 15 mph or less.
10. Trucks transporting fill material to and from the site will be covered from the point of origin.
11. Soil piles, debris, and construction materials (e.g., uncured concrete, fuels, paints, building supplies, etc.) will be stored in designated areas where they could not enter surface waters or storm drains due to spillage or erosion.

12. Earth berms, silt fencing, and/or hay bails will be provided and maintained around areas of exposed soils. These barriers will be placed such that on-site soils are not eroded and transported to downstream areas, and no net increase in storm water runoff from the work site occurs. Temporary de-silting/detention basins may also be required to accomplish these objectives.

13. In the event that surface water flow is encountered during construction activities, it will be diverted to prevent working in flowing water. This will include constructing a barrier and pumping water over land to a location downstream of the work area. Non-erosive materials such as sand bags will be used to construct the barrier.

14. If de-watering and/or surface water diversion are required, diverted flows will be directed through a filtration device (e.g., clarifier, sediment basin) prior to release into downstream areas. The filtration device will be maintained as needed to provide optimal sediment trapping performance. Rock, sandbags, or other suitable materials will be placed at the outlet of the filtration device to prevent soil scouring, and reduce flow from the outlet to non-erosive velocities.

15. If de-watering operations are required in areas that may be contaminated, ground water from the extraction site will be sampled at a certified laboratory. Should the ground water sample exceed water quality standards set by the Central Coast Regional Water Quality Control Board (CCRWQCB), all extracted ground water will be treated before being discharged to surface waters, ground waters, or the local sewer system. Clean up levels and treatment methodology will be approved by CCRWQCB.

16. All fueling of vessels, vehicles, and heavy equipment will occur in designated areas that are located away from surface water bodies and storm drains. Designated areas will include spill containment devices (e.g., drain pans, containment booms) and absorbent materials to clean up any spills that may occur.

17. Vehicles, vessels, and equipment will be maintained properly to prevent leakage of hydrocarbons and other fluids, and will be examined for leaks on a daily basis. All maintenance will occur in designated areas that are located away from surface water bodies and storm drains. Designated maintenance areas will include spill containment devices (e.g., drain pans, containment booms) and absorbent materials to clean up spills.

18. Any accidental spill of hydrocarbons or other fluids that may occur at the construction site will be cleaned immediately. Spill containment devices (e.g., drain pans, containment booms) and absorbent materials will be maintained on the work site for this purpose. CCRWQCB will be notified immediately in the event of an accidental spill to ensure proper clean up and disposal of waste.

19. Trucks, equipment, tools, and other objects in contact with wet concrete or concrete aggregate will be washed out in a designated area located away from surface waters and storm drains. Washings from these areas will be controlled such that concrete wastes are not conveyed to surface waters and storm drains.

20. When washing concrete to remove fine particles and expose aggregate, runoff water will be drained to a bermed or level area to avoid conveyance to surface waters and storm drains.
21. Excess concrete will be removed from the construction site. Sweepings of exposed aggregate concrete will be returned to the aggregate base stock pile or disposed of in the trash. Excess concrete will not be allowed to enter surface waters and storm drains.
22. Waste and debris generated by construction projects will be stored in designated waste collection areas and containers located away from surface waters and storm drains, and will be disposed of regularly.
23. Convenient, portable sanitary/septic facilities will be provided during construction projects. These facilities will be well-maintained and serviced, and wastes will be treated and disposed of in accordance with State and local requirements.
24. Mulching and revegetation of disturbed areas will be conducted as soon as possible following final grading. In the event that new plants do not become established before the beginning of the next rainy season (i.e., November), temporary runoff and erosion control barriers (i.e., earth berms, silt fences, hay bails, de-silting/detention basins) will be maintained through the rainy season (i.e., until May).
25. Fertilizers, herbicides, and pesticides will be used only if necessary in vegetation removal and/or revegetation efforts, especially where such activities would occur near storm drains and natural drainage courses. In cases where the use of these materials is necessary, they will be applied in a manner that minimizes the potential for transport into surface waters. For example, a herbicide such as Roundup will be applied directly to plant stalks and roots rather than by aerial spraying.
26. Prior to commencing construction projects, crew members will be trained how to implement and comply with the selected BMPs.
27. The contractor will inspect the site regularly to ensure that required BMPs are being implemented at all times, and that the BMPs are effectively minimizing water quality impacts. All inspections will be summarized in written monitoring records, which will be maintained by the contractor for a minimum of three years. If the contractor finds that the selected BMPs are not effective in minimizing water quality impacts, the he or she will immediately inform the Public Works Director, who will meet with the contractor at the site to devise alternative BMPs.

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APPENDIX C
LISTS OF EXOTIC PEST PLANTS

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Invasive Plant Inventory Revision **Completed PAFs**

Cape ivy in Berkeley hills (B. Case)

These Plant Assessment Forms (PAFs) include draft scores and documentation for plants reviewed for the updated California Invasive Plant Inventory (a.k.a. the Cal-IPC weed list). The meaning of each score can be found in the **Cal-IPC List Criteria** (pdf file). These rankings should be considered preliminary until final comments have been received. To view a summary of scores, documentation levels, and Jepson regions invaded for all reviewed species, see the following spreadsheets:

- Invasive Plant Inventory Spreadsheet (Excel)
- Invasive Plant Inventory Spreadsheet (pdf)

If you can provide additional information on any species or have other comments regarding the scores, contact Cal-IPC project manager Elizabeth Brusati (edbrusati@cal-ipc.org) by SEPTEMBER 1, 2005. To help us track comments, please include:

- The plant species name
- The number of the question your comment addresses (1.1, 1.2, etc.)
- Specific details for the information you are adding or the score that you think is incorrect

The final draft will be presented at the October 2005 Cal-IPC Symposium and published in late 2005.

Plants are categorized as High, Medium, or Low based on a combination of their documented impacts, potential for spread, and the range of habitats they tolerate. ***Please be aware that the rankings represent state-wide impacts*.** Lower-rated species are invasive but may occur in a limited number of regions or habitats within California. For information on plants of concern in your area, see information provided by local Weed Management Areas. Photographs for many species are available through The Nature Conservancy's Invasive Species Initiative webpage.

A glossary (pdf) of some of the terms used in the PAFs is available through *The Weed Workers' Handbook*.

High: These species have severe ecological impacts on ecosystems, plant and animal communities, and vegetational structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. These species are usually widely distributed ecologically, both among and within ecosystems.

Plants Rated High

- Aegilops triuncialis (Barbed goatgrass)
- Alternanthera philoxeroides (Alligatorweed)
- Ammophila arenaria (European beachgrass)
- Arundo donax (Giant reed)
- Bromus rubens (Red brome)
- Bromus tectorum (Cheat grass)
- Carpobrotus edulis (iceplant)
- Centaurea maculosa (Spotted knapweed)
- Centaurea solstitialis (Yellow starthistle)
- Cortaderia jubata (Jubata grass)
- Cortaderia selloana (Pampas grass)
- Cytisus scoparius (Scotch broom)
- Delairea odorata (Cape ivy)
- Egeria densa (Brazilian waterweed)
- Ehrharta calycina (Veldt grass)
- Eichhornia crassipes (Water hyacinth)
- Euphorbia esula (Leafy spurge)
- Genista monspessulana (French broom)
- Hedera helix (English ivy)
- Hydrilla verticillata (Hydrilla)
- Lepidium latifolium (Perennial pepperweed)
- Lolium multiflorum (Italian ryegrass)
- Ludwigia hexapetala (Creeping water primrose)
- Ludwigia peploides (Creeping water primrose)
- Lythrum salicaria (Purple loosestrife)
- Myriophyllum aquaticum (Parrotfeather)
- Myriophyllum spicatum (Spike watermilfoil)
- Onopordum acanthium (Scotch thistle)
- Rubus armeniacus/Rubus discolor (Himalayan blackberry)
- Salvinia molesta (Giant salvinia)
- Sesbania punicea (Red sesbania)
- Spartina alterniflora hybrids (smooth cordgrass)
- Spartium junceum (Spanish broom)
- Taeniatherum caput-medusae (Medusahead)
- Tamarix ramosissima (Saltcedar)
- Ulex europaeus (Gorse)

Medium: These species have substantial and apparent - but generally not severe - ecological impacts on ecosystems, plant and animal communities, and vegetational structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Plants Rated Medium

- Acroptilon repens (Russian knapweed)
- Ageratina adenophora (Eupatory)
- Ailanthus altissima (Tree-of-heaven)
- Alhagi maurorum (Camel thorn)
- Anthoxanthrum odoratum (Sweet vernal grass)
- Arctotheca calendula fertile (Fertile capeweed)
- Arctotheca calendula infertile (Capeweed)
- Asparagus asparagoides (Bridal creeper)
- Asphodelus fistulosus (Onion weed)
- Atriplex semibaccata (Australian saltbush)
- Avena barbata (Slender wild oat)
- Avena fatua (Wild oat)
- Brachypodium sylvaticum (False brome)
- Brassica tournefortii (Sahara mustard)
- Bromus diandrus (Ripgut grass)
- Cakile maritima (Sea rocket)
- Cardaria chalepensis (Lens-podded hoary cress)
- Cardaria draba (Heart-podded hoary cress)
- Carduus nutans (Musk thistle)
- Carduus pycnocephalus (Italian thistle)
- Carpobrotus chilensis (Iceplant)
- Carthamnus lanatus (Woolly distaff thistle)
- Centaurea calcitrapa (Purple starthistle)
- Centaurea melitensis (Tocalote)
- Centaurea virgata ssp. squarrosa (Squarrose knapweed)
- Centaurea x pratensis (Meadow knapweed)
- Chondrilla juncea (skeleton weed)
- Chrysanthemum coronarium (garland chrysanthemum)
- Cirsium arvense (Canada thistle)
- Cirsium vulgare (Bull thistle)
- Conium maculatum (Poison hemlock)
- Cotoneaster franchetii (Cotoneaster)
- Cotoneaster lacteus (Cotoneaster)
- Cotoneaster pannosa (Cotoneaster)
- Crupina vulgaris (Bearded creeper)
- Cupressus macrocarpa (Monterey cypress)
- Cynara cardunculus (Artichoke thistle)
- Cynodon dactylon (Bermuda grass)
- Cynoglossum officinale (Common houndstongue)
- Cynosurus echinatus (Annual dogtail)
- Cytisus striatus (Portugese broom)
- Descurainia sophia (Flixweed)
- Digitalis purpurea (Foxglove)
- Dipsacus fullonum (Wild teasel)
- Dipsacus sativus (Fuller's teasel)
- Dittrichia graveolens (stinkweed)
- Ehrharta erecta (Veldt grass)
- Ehrharta longiflora (Veldt grass)
- Elaeagnus angustifolia (Russian olive)
- Emex spinosa (Devil's thorn)
- Erechtites minima, E. glomerata (Australian fireweed)
- Eucalyptus globulus (Blue gum eucalyptus)
- Euphorbia terracina (carnation spurge)
- Festuca arundinacea (Tall fescue)
- Ficus carica (Edible fig)

- Foeniculum vulgare (Fennel)
- Geranium dissectum (Cutleaf geranium)
- Geranium molle (Dove geranium)
- Halogeton glomeratus (Halogeton)
- Hirschfeldia incana (Mediterranean mustard)
- Holcus lanatus (Common velvet grass)
- Hordeum marinum, H. murinum (Mediterranean barley, foxtail)
- Hypericum canariense (Canary Island St. John's wort)
- Hypericum perforatum (Klamathweed)
- Hypochaeris radicata (Rough cat's ear)
- Ilex aquifolium (English holly)
- Isatis tinctoria (Dyer's woad)
- Kochia scoparia (Kochia)
- Leucanthemum vulgare (Ox-eye daisy)
- Linaria genistifolia (Dalmatian toadflax)
- Lythrum hyssopifolium (Hyssop loosestrife)
- Mentha pulegium (Pennyroyal)
- Mesembryanthemum crystallinum (crystalline iceplant)
- Myoporum laetum (Myoporum)
- Nicotiana glauca (Tree tobacco)
- Oxalis pes-caprae (Bermuda buttercup)
- Pennisetum setaceum (Fountain grass)
- Phalaris aquatica (Harding grass)
- Polygonum cuspidatum (Japanese knotweed)
- Polygonum sachalinense (Giant knotweed)
- Potamogeton crispus (Curly-leaved pondweed)
- Rumex acetosella (Sheep sorrel)
- Sapium sebiferum (Chinese tallow tree)
- Sisymbrium irio (London rocket)
- Spartina anglica (English cordgrass)
- Spartina densiflora (Dense-flowered cordgrass)
- Stipa capensis (cape ricegrass)
- Tanacetum vulgare (Common tansy)
- Trifolium hirtum (Rose clover)
- Vinca major (Periwinkle)
- Vulpia myuros (Rat-tail fescue)
- Washingtonia robusta (Washington palm)

Low: These species are invasive but their ecological impacts are minor. Their reproductive biology and other attributes result in low to moderate rates of invasion. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Plants Rated Low

- Acacia melanoxylon (Blackwood acacia)
- Agrostis avenacea (Pacific bentgrass)
- Agrostis stolonifera (Carpet bent)
- Aira caryophyllea (Silver European hair grass)
- Bassia hyssopifolia (Bassia)
- Bellardia trixago (Bellardia)
- Bellis perennis (English daisy)
- Brassica rapa (Birdsrape mustard)
- Briza maxima (Rattlesnake grass)
- Bromus hordeaceus (Soft brome)

- Cardaria pubescens (Hairy whitetop)
- Carduus acanthoides (Plumeless thistle)
- Carduus tenuifolius (Slenderflower thistle)
- Cistus ladanifer (Gum cistus)
- Conicosia pugioniformis (Narrow-leaved iceplant)
- Convolvulus arvensis (field bindweed)
- Cotula coronopifolia (Common brassbuttons)
- Crataegus monogyna (Hawthorn)
- Dactylis glomerata (Orchard grass)
- Echium candicans (Pride-of-Madeira)
- Erigeron karvinskianus (Mexican daisy)
- Erodium botrys (Longbeak stork's bill)
- Erodium brachycarpum (Shortfruit stork's bill)
- Erodium cicutarium (Filaree)
- Eucalyptus camaldulensis (red gum)
- Euphorbia oblongata (Eggleaf spurge)
- Geranium retrorsum (New Zealand geranium)
- Geranium robertianum (Robert geranium)
- Gleditsia triacanthos (honey locust)
- Helichrysum petiolare (Licorice plant)
- Hypochaeris glabra (Smooth catsear)
- Iris pseudacorus (Yellow water iris)
- Ligustrum lucidum (Glossy privet)
- Lotus corniculatus (Bird's-foot-trefoil)
- Malephora crocea (Red-flowered iceplant)
- Marrubium vulgare (Horehound)
- Medicago polymorpha (Burr medic)
- Myosotis latifolia (Common forget-me-not)
- Nymphaea odorata (fragrant waterlily)
- Olea europaea (Olive)
- Ononis alopecuroides (Foxtail restharrow)
- Pennisetum clandestinum (Kikuyugrass)
- Phoenix canariensis (Canary Isl. date palm)
- Picris echoides (Bristly ox-tongue)
- Piptatherum miliaceum (Smilo grass)
- Pittosporum undulatum (Victorian box)
- Plantago lanceolata (Buckhorn plantain)
- Poa pratensis (Kentucky bluegrass)
- Polypogon monspeliensis (Rabbitfoot polypogon)
- Pyracantha spp. (Pyracantha)
- Ranunculus repens (Creeping buttercup)
- Raphanus sativus (Wild radish)
- Ricinus communis (castor bean)
- Robinia pseudoacacia (black locust)
- Rumex crispus (Curly dock)
- Salsola paulensii (Barbwire Russian thistle)
- Salvia aethiopis (Mediterranean sage)
- Saponaria officinalis (Bouncing bet)
- Schinus molle (Peruvian pepper tree)
- Schinus terebinthifolius (Brazilian pepper tree)
- Schismus spp. (Mediterranean grass)
- Senecio jacobaea (Tansy ragwort)
- Silybum marianum (Blessed milk thistle)
- Sinapis arvensis (Wild mustard)
- Sonchus asper (Spiny sowthistle)
- Spartina patens (Salt-meadow cord grass)
- Tamarix aphylla (athel)
- Ulmus pumila (Siberian elm)

- Undaria pinnatifida (Japanese kelp)
- Verbascum thapsus (Woolly mullein)
- Vicia villosa (vetch)
- Vulpia bromoides (squirrel tail fescue)
- Watsonia meriana (Bulbil watsonia)
- Zantadeschia aethiopica (Calla lily)

Red Alert: This is an additional designation for some species in either the high or medium category whose current ecological amplitude and distribution are limited. The designation alerts managers to species that are capable of rapidly invading unexploited ecosystems, based on initial, localized observations, and on observed ecological behavior in similar ecosystems elsewhere.

Red Alert Species

- Alternanthera philoxeroides (Alligatorweed)
- Arctotheca calendula fertile (Fertile capeweed)
- Asphodelus fistulosus (Onion weed)
- Asparagus asparagoides (Bridal creeper)
- Atriplex semibaccata (Australian saltbush)
- Brachypodium sylvaticum (False brome)
- Cardaria chalepensis (Lens-podded hoary cress)
- Carthamnus lanatus (Woolly distaff thistle)
- Centaurea x pratensis (Meadow knapweed)
- Dittrichia graveolens (stinkweed)
- Ehrharta longiflora (Veldt grass)
- Eichhornia crassipes (Water hyacinth)
- Emex spinosa (Devil's thorn)
- Euphorbia esula (Leafy spurge)
- Euphorbia terracina (carnation spurge)
- Hydrilla verticillata (Hydrilla)
- Hypericum canariense (Canary Island St. John's wort)
- Ilex aquifolium (English holly)
- Ludwigia hexapetala (Creeping water primrose)
- Mesembryanthemum crystallinum (crystalline iceplant)
- Myriophyllum aquaticum (Parrotfeather)
- Polygonum cuspidatum (Japanese knotweed)
- Polygonum sachalinense (Giant knotweed)
- Sapium sebiferum (Chinese tallow tree)
- Salvinia molesta (Giant salvinia)
- Spartina alterniflora hybrids (smooth cordgrass)
- Sesbania punicea (Red sesbania)
- Spartina anglica (English cordgrass)
- Spartina densiflora (Dense-flowered cordgrass)
- Stipa capensis (cape ricegrass)
- Washingtonia robusta (Washington palm)

Considered But Not Listed: In general, this designation is for species for which information is currently inadequate to respond with certainty to the minimum number of criteria questions (i.e., too many "U" responses), or for which the sum effects of ecological impacts, invasiveness, and ecological amplitude and distribution fall below the

threshold for ranking (i.e. the overall rank falls below Low). Many such species are widespread but are not known to have substantial ecological impacts (though such evidence may appear in the future). All species receiving a "D" score for ecological impact (Section1), regardless of what other section scores they receive, are by default placed into this category.

Considered But Not Listed

- Acacia paradoxa (kangaroothorn)
- Aeschynomene rudus (Rough jointvetch)
- Aira praecox (European hairgrass)
- Allium triquetrum (Three-cornered leek)
- Anthemis cotula (Mayweed)
- Berberis darwinii (Darwin barberry)
- Buddleja davidii (butterfly bush)
- Cestrum parqui (Willow jessamine)
- Chorispora tenella (Blue mustard)
- Crocosmia x crocomiiflora (Montbretia)
- Daucus carota (Queen Anne's Lace)
- Dimorphotheca sinuata (African daisy)
- Erodium moschatum (Filaree)
- Euphorbia lathyris (Caper spurge)
- Fumaria officinalis (Drug fumitory)
- Lactuca serriola (Prickly lettuce)
- Leptospermum laevigatum (Australian tea tree)
- Maytenus boaria (Mayten)
- Melilotus officinalis (Yellow sweetclover)
- Nerium oleander (Oleander)
- Nothoscordum gracile (False garlic)
- Oxalis corniculata (Gardener's oxalis)
- Parkinsonia aculeata (Mexican palo verde)
- Pistachia chinensis (Chinese pistache)
- Plantago coronopus (Cutleaf plantain)
- Solanum eleagnifolium (Silverleaf nightshade)
- Sonchus asper (Spiny sowthistle)
- Taraxacum officinale (Common dandelion)
- Tragopogon dubius (Yellow salsify)
- Tropaeolum majus (Garden nasturtium)
- Verbena litoralis (Tall vervain)

Inconclusive - *Phragmites australis* (Common reed) was not listed because global genetic issues make it unclear which strains are non-native in California. It is unclear whether this species was historically present in all regions of California.

Not Reviewed - The committee decided not to review these species because these plants escape into wildlands only in rare circumstances.

- Aeonium spp.
- Aptenia cordifolia (Red apple)
- Araujia sericofera (Bladderflower)
- Brassica oleraceus (Wild cabbage)
- Cercidium floridum (Blue palo verde)
- Chrysanthemum segetum (Corn chysanthemum)
- Colutea arborescens (Bladder-senna)

- Coprosma repens (Mirror plant)
- Cupaniopsis anacardioides (Carrot weed)
- Enchylaena tomentosa (Ruby salt-bush)
- Grindelia squarrosa (Gum plant)
- Kniphofia uvaria (Red hot poker)
- Passiflora caerulea (Blue passionflower)
- Sollya heterophylla (Australian bluebell creeper)
- Ulmas parvifolia (Chinese elm)
- Zoysia spp.

Information related to the Invasive Plant Inventory 2005 Revision:

- Submit comments on ratings to Elizabeth Brusati, edbrusati@cal-ipc.org
- **Cal-IPC List Criteria** - Detailed explanation of the meanings of scores
- **Holland Report** - Definitions of ecotypes used in Section 3 (Distribution)
- **Invasive Plant Inventory Spreadsheet (Excel)**
- **Invasive Plant Inventory Spreadsheet (pdf)**
- **Jepson Manual: Higher Plants of California** (Jepson Herbarium, University of California-Berkeley) - Follow the link to the Jepson Online Interchange and find taxonomic descriptions and geographic ranges for California plants, as well as links to herbaria collections.
- **Pest Plant Form** - Use this form to submit plants that you think should be reviewed during the next list revision. The Invasive Plant Inventory committee will meet occasionally to consider additions and revisions to the list.

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California Invasive Plant Council

Invasive Plant Inventory

Summary 7/12/05

Scores should be considered preliminary until final comments have been received.

See individual Plant Assessment Forms and the Evaluation Criteria for explanation of scores. Total score represents statewide impact in California wildlands.

Not = Considered but not listed, NR = not reviewed

Scientific Name	Common Name	Plant Score		Sections			Doc	Cal-IPC	Jepson Regions (based on The Jepson Manual: Higher Pl							
		Score	Alert	S1	S2	S3	Avg	1999 List	CA	CA-FP	CaR	CW	GV	NW	SN	SW
Acacia melanoxylon	blackwood acacia	Low	No	C	C	B	2.7	need info				1		1		1
Acacia paradoxa	kangaroo thorn	Not	No	D	C	C	2.5					1				1
Acroptilon repens	Russian knapweed	Med	No	B	B	B	3.2			1	1	1	1	1	1	1
Aegilops triuncialis	barbed goatgrass	High	No	A	A	B	3.6	annual grasses			1	1	1		1	
Aeonium spp.		NR														1
Aeschynomene rudis	rough jointvetch	Not		D	C	D	3.2	need info					1			
Ageratina adenophora	eupatory	Med	No	B	B	B	2.8	B				1				1
Agrostis avenacea	Pacific bentgrass	Low	No	C	C	C	2.4	need info				1	1	1	1	1
Agrostis stolonifera	creeping bent	Low	No	C	B	C	1.9					1	1	1	1	1
Ailanthus altissima	tree of heaven	Med	No	B	B	B	3.0	A-2								
Aira caryophyllea	silver European hairgrass	Low	No	C	C	A	2.6			1	1	1	1	1	1	1
Aira praecox	European hairgrass	Not	No	D	C	C	2.8							1		
Albizia lophantha	plume acacia							considered				1			1	1
Alhagi maurorum	camelthorn	Med	No	B	B	B	3.2						1			
Alhagi pseudalhagi	camelthorn							Red Alert					1			
Allium triquetrum	three-cornered leek	Not	No	D	C	C	1.6					1		1		
Alternanthera philoxeroides	alligator weed	High	Yes	A	B	C	2.9						1			1
Ammophila arenaria	European beach grass	High	No	A	B	B	3.2	A-1				1		1		1
Anthemis cotula	dog fennel	NOT	No	D	B	B	2.4					1	1	1	1	1
Anthoxanthum odoratum	sweet vernal grass	Med	No	B	B	B	2.7	considered				1		1	1	
Aptenia cordifolia	red apple	NR						need info				1				1
Arctotheca calendula (fertile)	fertile capeweed	Med	Yes	B	B	C	3.6	Red Alert				1		1		
Arctotheca calendula (infertile)	infertile capeweed	Med	No	B	B	B	2.8	Red Alert				1		1		
Arundo donax	giant reed	High	No	A	B	A	2.8	A-1				1	1		1	1
Asparagus asparagoides	smilax asparagus	Med	Yes	B	B	D	2.6					1				1
Asphodelus fistulosus	onionweed	Med	Yes	B	A	C	2.9	need info					1			1
Atriplex semibaccata	Australian saltbush	Med	No	B	B	B	2.9	A-2	1		0				0	
Avena barbata	slender wild oat	Med	No	B	B	A	3.5	Annual Grasses								
Avena fatua	wild oat	Med	No	B	B	A	3.2	Annual Grasses								
Bassia hyssopifolia	bassia	Low	No	C	C	B	2.7	B	1					0		
Bellardia trixago	bellardia	Low	No	C	C	C	1.9	B				1		1		
Bellis perennis	English lawn daisy	Low	No	C	C	C	2.8					1		1		1
Berberis darwinii	Darwin barberry	Not	No	U	B	D	2.1					1				
Brachypodium sylvaticum	false brome	Med	Yes	B	A	D	2.5					1				
Brassica oleraceus	wild cabbage	NR										1				1
Brassica rapa	birdsrape mustard	Low	No	C	B	B	1.8			1	1	1	1	1	1	1
Brassica tournefortii	African mustard	Med	No	B	A	B	2.3	A-2								1
Briza maxima	rattlesnake grass	Low	No	C	C	B	2.3					1		1	1	1

nts in California. Hickman 1993)							Scientific Name 2	
D	Dmoj	Dson	GB	MP	SNE	Habitats of Concern		
						coniferous forest, chaparral, woodland, riparian	Acacia melanoxylon	
							Acacia paradoxa	
			1	1	1	scrub, grassland, riparian, pinyon-juniper woodland, forest	Acroptilon repens	
						grassland, oak woodland	Aegilops triuncialis	
						NOT REVIEWED	Aeonium spp.	
						edges of ponds and rice fields, NOT LISTED	Aeschynomene rudis	
						coastal canyons, coastal scrub, slopes	Ageratina adenophora	
						vernal pools, coastal prairie, meadows, grasslands	Agrostis avenacea	
						wetlands, riparian	Agrostis stolonifera	
						riparian areas, grassland, oak woodland	Ailanthus altissima	
						grassland, oak woodland, vernal pools	Aira caryophyllea	
						coastal dunes	Aira praecox	
1	1	1					Albizia lophantha	
1					1	grassland, meadows, riparian and desert scrub, Sonoran thorn woodland	Alhagi maurorum	
						arid areas	Alhagi pseudalhagi	
						coastal scrub, riparian woodland	Allium triquetrum	
						freshwater aquatic systems, including marshes	Alternanthera philoxeroides	
						coastal dunes	Ammophila arenaria	
						coastal dunes, chaparral, woodlands	Anthemis cotula	
						coastal prairie, coniferous forest	Anthoxanthum odoratum	
						NOT LISTED	Aptenia cordifolia	
						coastal prairie	Arctotheca calendula (fertile)	
						coastal prairie	Arctotheca calendula (infertile)	
1						riparian areas	Arundo donax	
						riparian woodland	Asparagus asparagoides	
						coastal dunes and prairie, grassland	Asphodelus fistulosus	
						coastal grassland, scrub, "high marsh" of coastal salt marsh	Atriplex semibaccata	
1	1			1		coastal scrub, grassland, oak woodland, forest	Avena barbata	
1	1			1		coastal scrub, chaparral, grassland, woodland, forest	Avena fatua	
						alkaline habitats	Bassia hyssopifolia	
						grassland, esp. serpentine, where a threat to natives	Bellardia trixago	
						damp grasslands	Bellis perennis	
						forest (what kind?)	Berberis darwinii	
						redwoods and mixed evergreen forest in Santa Cruz mtns.	Brachypodium sylvaticum	
						DO NOT REVIEW	Brassica oleraceus	
					1	coastal scrub, grassland, meadows, riparian	Brassica rapa	
1						desert dunes, desert and coastal scrub	Brassica tournefortii	
						grasslands	Briza maxima	

Bromus diandrus	ripgut brome	Med	No	B	B	A	3.3	annual grass	1							
Bromus hordeaceus	soft brome	Low	No	B	C	A	2.8		1	1	1	1	1	1	1	1
Bromus madritensis ssp. Rubens	red brome	High	No	A	B	A	3.0	A-2	1							
Bromus tectorum	cheat grass	High	No	A	B	A	3.1	A-1								
Buddleja davidii	butterfly bush	Not	No	D	B	D	2.5					1		1		
Cakile maritima	sea rocket	Med	No	B	B	B	3.6					1		1		1
Cardaria chalepensis	lens-podded white-top	Med	Yes	B	B	C	3.2	B								
Cardaria draba	hoary cress	Med	No	B	B	B	2.6	A-2				1				
Cardaria pubescens	hairy white top	Low	No	C	B	C	2.5		1				1			1
Carduus acanthoides	giant plumeless thistle	Low	No	B	C	C	3.0	need info				1		1	1	
Carduus nutans	musk thistle	Med	No	B	B	B	3.1				1			1	1	
Carduus pycnocephalus	Italian thistle	Med	No	B	B	A	2.9	B				1		1	1	1
Carduus tenuifolius	slender flower thistle	Low	No	C	C	B	2.8					1		1	1	1
Carpobrotus chilensis	iceplant	Med	No	B	B	A	1.8	considered				1		1		1
Carpobrotus edulis	highway iceplant	High	No	A	B	A	3.3	A-1				1		1		1
Carthamus lanatus	woolly distaff thistle	Med	Yes	A	B	C	2.8					1		1	1	
Centaurea calcitrapa	purple starthistle	Med	No	B	B	B	2.7	B				1	1	1	1	1
Centaurea debeauxii (=C. x pratens	meadow knapweed	Med	Yes	B	B	C	2.7					1		1		
Centaurea maculosa	spotted knapweed	High	No	A	B	B	3.4	Red Alert		1	1	1	1	1	1	1
Centaurea melitensis	tocalote	Med	No	B	B	B	2.6	B								
Centaurea solstitialis	yellow starthistle	High	No	A	B	A	3.0	A-1								
Centaurea squarrosa	squarrose knapweed	Med	No	B	B	B	2.8				1			1		
Cercidium floridum	blue palo verde	NR														
Cestrum parqui	willow jessamine	Not	No	D	B	C	2.0					1				
Chondrilla juncea	rush skeletonweed	Med	No	B	B	B	3.1				1	1	1	1	1	
Chorispora tenella	blue mustard	Not	No	U	C	C	1.5				1		1			1
Chrysanthemum coronarium	garland chrysanthemum	Med	No	B	B	B	2.0					1				1
Chrysanthemum segetum	corn chrysanthemum	NR										1		1		
Cirsium arvense	Canada thistle	Med	No	B	B	B	2.8	B								
Cirsium vulgare	bull thistle	Med	No	B	B	B	3.3	B		1	1	1	1	1	1	1
Cistus ladanifer	gum cistus	Low	No	C	C	C	3.3	need info				1				1
Colutea arborescens	bladder-senna	NR										1			1	
Conicosia pugioniformis	narrow-leaved iceplant	Low	No	C	B	C	2.1	A-2				1				
Conium maculatum	poison hemlock	Med	No	B	B	B	2.8	B								
Convolvulus arvensis	field bindweed	Low	No	C	B	B	3.5	considered	1	1	1	1	1	1	1	1
Coprosma repens	mirror plant	NR						considered								
Cortaderia jubata	jubatagrass	High	No	A	A	A	3.1	A-1				1		1		1
Cortaderia selloana	pampas grass	High	No	A	A	B	3.2	A-1				1				1
Cotoneaster franchetti	cotoneaster	Med	No	B	A	B	2.6	need info				1		1		
Cotoneaster lacteus	cotoneaster	Med	No	B	B	B	2.1	A-2				1		1		
Cotoneaster pannosus	cotoneaster	Med	No	B	A	B	2.5	A-2				1		1		
Cotula coronopifolia	brassbuttons	Low	No	C	B	B	2.2					1		1		1
Crataegus monogyna	hawthorn	Low	No	C	B	C	3.4	B				1		1		
Crocosmia x crocosmiiflora	montbretia	Not		D	B	B	2.6	considered				1		1		1
Crupina vulgaris	bearded creeper	Med	No	B	C	B	3.2	Red Alert						1		
Cupaniopsis anacardioides	carrot weed	NR														
Cupressus macrocarpa	Monterey cypress	Med	No	B	B	B	2.3	need info				1				
Cynara cardunculus	artichoke thistle	Med	No	B	B	B	4.0	A-1				1				1

						dunes, scrub, grassland, woodland, forest	Bromus diandrus	
1	1	1	1	1	1	grasslands, sagebrush, serpentine soils	Bromus hordeaceus	
						scrub, grassland, desert washes, woodlands	Bromus madritensis ssp. Rubens	
1						sagebrush, pinyon-juniper, grassland	Bromus tectorum	
						north coast coniferous forest	Buddleja davidii	
						coastal dunes	Cakile maritima	
						wetlands	Cardaria chalepensis	
						riparian areas, marshes of central coast, ag. Lands, disturbed areas	Cardaria draba	
			1			grassland	Cardaria pubescens	
				1		valley and foothill grassland	Carduus acanthoides	
				1		grassland	Carduus nutans	
						forest, scrub, grassland, woodland	Carduus pycnocephalus	
						valley and foothill grassland	Carduus tenuifolius	
						coastal dunes, scrub, prairie	Carpobrotus chilensis	
						many coastal communities, esp. dunes	Carpobrotus edulis	
						grassland	Carthamus lanatus	
						grassland	Centaurea calcitrapa	
						grassland	Centaurea debeauxii (=C. x pratensis)	
			1	1	1	riparian, grassland, wet meadows, forests	Centaurea maculosa	
1						grassland, oak woodland	Centaurea melitensis	
						grassland	Centaurea solstitialis	
				1		scrub, grassland, pinyon-juniper woodland	Centaurea squarrosa	
1		1				DO NOT REVIEW	Cercidium floridum	
						coastal scrub, riparian areas	Cestrum parqui	
						grasslands	Chondrilla juncea	
			1	1	1	coastal scrub, grassland	Chorispora tenella	
							Chrysanthemum coronarium	
						DO NOT REVIEW	Chrysanthemum segetum	
						grassland, riparian areas, forests	Cirsium arvense	
			1	1	1	riparian areas, marshes, meadows	Cirsium vulgare	
						coastal scrub, chaparral, woodland	Cistus ladanifer	
						DO NOT REVIEW	Colutea arborescens	
						coastal dunes, scrub, grassland	Conicosia pugioniformis	
						riparian woodland, grassland	Conium maculatum	
1	1	1	1	1	1		Convolvulus arvensis	
						DO NOT REVIEW	Coprosma repens	
						coastal habitats	Cortaderia jubata	
						coastal dunes, coastal scrub, Monterey pine, riparian, grasslands, wetlands, serpe	Cortaderia selloana	
						coniferous forest	Cotoneaster franchetti	
						many coastal communities, esp. north coast, Big Sur	Cotoneaster lacteus	
						many coastal communities, esp. north coast, Big Sur	Cotoneaster pannosus	
						salt and freshwater marshes	Cotula coronopifolia	
						riparian habitats, woodland	Crataegus monogyna	
						forest, coastal scrub and prairie	Crocosmia x crocosmiiflora	
				1		forest, woodland, grassland	Crupina vulgaris	
						DO NOT REVIEW	Cupaniopsis anacardioides	
						coastal prairie, desert scrub, riparian areas	Cupressus macrocarpa	
						coastal grasslands	Cynara cardunculus	

Cynodon dactylon	Bermuda grass	**Med**	**No**	**B**	**B**	**B**	**3.3**			1	1	1	1	1	1	1
Cynoglossum officinale	houndstongue	**Med**	**No**	**B**	**B**	**B**	**2.5**				1				1	
Cynosurus echinatus	hedgehog dogtailgrass	**Med**	**No**	**B**	**B**	**A**	**2.5**					1	1	1	1	1
Cytisus scoparius	Scotch broom	**High**	**No**	**A**	**B**	**A**	**3.2**	A-1		1	1	1	1	1	1	1
Cytisus striatus	striated broom	**Med**	**No**	**B**	**B**	**B**	**2.7**	A-2				1		1		1
Dactylis glomerata	orchard grass	**Low**	**No**	**C**	**B**	**B**	**2.9**			1	1	1	1	1	1	1
Daucus carota	Queen Anne's lace	**Not**	**No**	**D**	**C**	**B**	**2.7**		1	1	1	1	1	1	1	1
Delairea odorata	Cape ivy	**High**	**No**	**A**	**A**	**B**	**3.1**	A-1				1				
Descurainea sophia	flixweed, tansy mustard	**Med**	**No**	**B**	**B**	**B**	**1.9**	need info	1							
Digitalis purpurea	foxglove	**Med**	**No**	**C**	**B**	**B**	**2.4**	considered				1		1	1	
Dimorphotheca sinuata	African daisy	**Not**	**No**	**D**	**C**	**B**	**1.8**	need info				1	1			1
Dipsacus fullonum	wild teasel	**Med**	**No**	**B**	**B**	**B**	**3.8**	considered				1		1	1	
Dipsacus sativus	fuller's teasel	**Med**	**No**	**B**	**B**	**B**	**3.8**	considered				1		1		1
Dittrichia graveolens	stinkweed	**Med**	**Yes**	**B**	**A**	**C**	**3.0**					1	1	1	1	1
Echium candicans	pride-of-Madeira	**Low**	**No**	**C**	**B**	**B**	**1.7**	need info				1		1		1
Egeria densa	Brazillian waterweed	**High**	**No**	**A**	**A**	**B**	**3.1**	A-2					1		1	1
Ehrharta calycina	purple veldt grass	**High**	**No**	**A**	**A**	**B**	**3.4**	A-2				1				
Ehrharta erecta	panic veldt grass	**Med**	**No**	**B**	**B**	**B**	**2.2**	B				1				1
Ehrharta longiflora	long-flowered veldt grass	**Med**	**Yes**	**B**	**B**	**C**	**2.8**	need info								1
Eichhornia crassipes	water hyacinth	**High**	**Yes**	**A**	**A**	**C**	**3.2**	A-2				1	1			1
Elaeagnus angustifolia	Russian olive	**Med**	**No**	**B**	**A**	**B**	**3.3**	A-2				1	1			
Emex spinosa	devil's thorn	**Med**	**Yes**	**B**	**B**	**D**	**1.6**									1
Enchylaena tomentosa	ruby saltbush	**NR**														
Erechtites glomerata, E. minima	Australian fireweed	**Med**	**No**	**C**	**B**	**A**	**3.2**	B				1		1		
Erica lusitanica	heath							need info						1		
Erigeron karvinskianus	Mexican daisy	**Low**	**No**	**C**	**B**	**C**	**1.9**					1			1	
Eriogonum fasciculatum	California buckwheat									1	1	1	1	1	1	1
Erodium botrys	stork's-filaree	**Low**	**No**	**C**	**C**	**A**	**2.8**			1	1	1	1	1	1	1
Erodium brachycarpum	filaree	**Low**	**No**	**C**	**C**	**B**	**2.6**			1	1	1	1	1	1	1
Erodium cicutarium	filaree	**Low**	**No**	**C**	**C**	**A**	**3.1**		1	1	1	1	1	1	1	1
Erodium moschatum	filaree	**Not**	**No**	**D**	**C**	**A**	**2.7**			1	1	1	1	1	1	1
Eucalyptus camaldulensis	red gum	**Low**	**No**	**C**	**C**	**C**	**2.2**					1	1	1		1
Eucalyptus globulus	blue gum	**Med**	**No**	**B**	**B**	**B**	**2.8**	A-1				1	1	1		1
Euphorbia esula	leafy spurge	**High**		**A**	**A**	**C**	**3.5**	A-2			1			1		
Euphorbia lathyris	caper spurge	**Not**	**No**	**D**	**C**	**B**	**2.2**	need info				1	1	1		1
Euphorbia oblongata	oblong spurge	**Low**	**No**	**C**	**C**	**B**	**2.0**					1	1			
Euphorbia terracina	Geraldton carnation weed	**Med**	**Yes**	**B**	**B**	**C**	**1.7**									
Festuca arundinacea	tall fescue	**Med**	**No**	**B**	**B**	**A**	**2.9**	B								
Ficus carica	edible fig	**Med**	**No**	**B**	**A**	**B**	**2.6**	A-2				1	1			1
Foeniculum vulgare	wild fennel	**Med**	**No**	**B**	**B**	**A**	**2.8**	A-1		1	1	1	1	1	1	1
Fumaria officinalis	drug fumitory	**Not**	**No**	**D**	**C**	**D**	**2.3**	considered								1
Genista monspessulana	French broom	**High**	**No**	**A**	**A**		**3.2**	A-1				1		1		1
Geranium dissectum	cutleaf geranium	**Med**	**No**	**C**	**B**	**A**	**1.7**			1	1	1	1	1	1	1
Geranium molle	dovefoot geranium	**Med**	**No**	**C**	**B**	**A**	**1.7**			1	1	1	1	1	1	1
Geranium retrorsum	New Zealand geranium	**Low**	**No**	**C**	**B**	**B**	**1.9**					1		1	1	1
Geranium robertianum	Robert geranium	**Low**	**No**	**C**	**B**	**C**	**2.8**					1				
Gleditsia triacanthos	honey locust tree	**Low**	**No**	**C**	**B**	**C**	**3.3**						1			
Glyceria declinata	mannagrass	**Not**	**No**	**U**	**D**	**C**	**0.9**	need info								

1	1	1				scrub, grassland	Cynodon dactylon	
						woodland, forest, interior dunes	Cynoglossum officinale	
						oak woodland, grassland	Cynosurus echinatus	
						coastal scrub, oak woodland	Cytisus scoparius	
						often confused with C. scoparius; coastal scrub, grasslands	Cytisus striatus	
			1	1	1	grassland, broadleaved forest	Dactylis glomerata	
1	1	1	1	1	1		Daucus carota	
						coastal riparian areas, also south side San Gabriel mtns.	Delairea odorata	
						scrub, gassland, woodland	Descurainea sophia	
						forest, woodland	Digitalis purpurea	
						chaparral, riparian, grassland, forest	Dimorphotheca sinuata	
						grassland, seep, riparian scrub	Dipsacus fullonum	
						grassland, seep, bogs	Dipsacus sativus	
						grassland, riparian scrub	Dittrichia graveolens	
						scrub, coastal prairie	Echium candicans	
					1	streams, ponds, sloughs, lakes, Sacramento-San Joaquin Delta	Egeria densa	
						sandy soils, esp. dunes; rapidly spreading on central coast	Ehrharta calycina	
						scrub, coastal dunes, grassland, woodland, forest	Ehrharta erecta	
						coastal scrub	Ehrharta longiflora	
						waterways; esp. troublesome Sacramento-San Joaquin Delta	Eichhornia crassipes	
1	1				1	interior riparian areas	Elaeagnus angustifolia	
						edges of beaches, other coastal habitats	Emex spinosa	
						DO NOT REVIEW	Enchylaena tomentosa	
						coastal woodland, scrub, NW forests, esp. redwoods	Erechtites glomerata, E. minima	
							Erica lusitanica	
						riparian and North Coast coniferous forests	Erigeron karvinskianus	
1	1	1			1	NATIVE TO PART OF STATE	Eriogonum fasciculatum	
							Erodium botrys	
							Erodium brachycarpum	
1	1	1	1	1	1	grassland, shrubland	Erodium cicutarium	
							Erodium moschatum	
							Eucalyptus camaldulensis	
						riparian areas, grassland, moist slopes	Eucalyptus globulus	
				1		forests, woodlands, juniper forest	Euphorbia esula	
							Euphorbia lathyris	
						meadows, woodlands	Euphorbia oblongata	
							Euphorbia terracina	
						coastal scrub, grassland	Festuca arundinacea	
						riparian woodland	Ficus carica	
						grassland (cultivated garden herb not invasive)	Foeniculum vulgare	
							Fumaria officinalis	
						coastal scrub, oak woodland, grassland	Genista monspessulana	
							Geranium dissectum	
							Geranium molle	
						coastal scrub and prairie, North Coast forest	Geranium retrorsum	
						coniferous forest	Geranium robertianum	
						riparian woodland and forest	Gleditsia triacanthos	
						vernal pools	Glyceria declinata	

Grindelia squarrosa	gum plant	NR											1		1	1
Halogeton glomeratus	halogeton	Med	No	B	A	B	3.0	Red Alert			1					
Hedera canariensis	Algerian ivy	still being reviewed						need info								
Hedera helix	English ivy	High	No	A	A	A	2.7	B								
Helichrysum petiolare	licorice plant	Low	No	C	B	C	2.0	Red Alert				1		1		
Hirschfeldia incana	Mediterranean mustard	Med	No	B	B	A	1.9	need info				1	1	1	1	1
Holcus lanatus	velvet grass	Med	No	B	B	A	2.9	B		1	1	1	1	1	1	1
Hordeum marinum, H. murinum	Mediterranean barley, foxtail	Med	No	B	B	A	2.8		1	1	1	1	1	1	1	1
Hydrilla verticillata	hydrilla	High	Yes	A	B	C	3.2	Red Alert					1	1	1	1
Hypericum canariense	Canary Island St. Johnswort	Med	Yes	B	B	C	1.2	need info								1
Hypericum perforatum	St. John's wort	Med	No	B	B	B	3.7	B				1	1	1		1
Hypochaeris glabra	smooth cat's ear	Low	No	C	B	B	3.1			1	1	1	1	1	1	1
Hypochaeris radicata	rough cat's ear	Med	No	C	B	A	2.2	need info		1	1	1	1	1	1	1
Ilex aquifolium	English holly	Med	Yes	B	B	C	2.7	B				1		1		
Iris pseudacorus	yellow water iris	Low	No	C	B	C	2.3	B				1	1			1
Isatis tinctoria	dyer's woad	Med	No	B	B	A	3.0	need info			1			1	1	
Kniphofia uvaria	red hot poker	NR														
Kochia scoparia	kochia	Med	No	B	C	B	3.2					1	1			
Lactuca serriola	prickly lettuce	Not	No	D	C	B	3.1		1	1	1	1	1	1	1	1
Lepidium latifolium	perennial pepperweed	High	No	A	A	A	3.1	A-1	1							
Leptospermum laevigatum	Australian tea tree	Not	No	D	C	D	2.2					1				
Leucanthemum vulgare	ox-eye daisy	Med	No	B	B	B	2.5	B				1		1	1	1
Ligustrum lucidum	glossy privet	Low	No	C	B	C	3.1	need info						1		
Linaria genistifolia ssp. dalmatica	dalmation toadflax	Med	No	B	B	B	2.8			1	1	1	1	1	1	1
Liquidambar styraciflua	American sweet gum	NR														
Lolium multiflorum	Italian rye	High	No	A	B	A	2.6	annual grasses								
Lotus corniculatus	bird's foot trefoil	Low	No	C	B	B	2.8			1	1	1	1	1	1	1
Ludwigia peploides var.	ludwigia	High	No	A	B	B	2.5					1	1	1	1	1
Ludwigia uruguayensis (= L. hexap	water primrose	High	Yes	A	B	C	2.6	need info				1		1		1
Lupinus arboreus	bush lupine	still being reviewed						A-2				1		1		
Lythrum hyssopifolium	Hyssop loosestrife	Med	No	C	B	A	3.0			1	1	1	1	1	1	1
Lythrum salicaria	purple loosestrife	High	No	A	A	B	3.8	Red Alert					1	1		
Malephora crocea	coppery mesemb	Low	No	B	C	C	2.0	need info				1				1
Marrubium vulgare	white horehound	Low	No	C	C	B	2.8			1	1	1	1	1	1	1
Maytenus boaria	mayten	Not	No	D	C	D	2.4	need info				1				
Medicago polymorpha	California bur clover	Low	No	C	C	A	2.8	considered		1	1	1	1	1	1	1
Melilotus officinalis	yellow sweetclover	Low	No	B	C	C	3.3	considered		1	1	1	1	1	1	1
Mentha pulegium	pennyroyal	Med	No	C	A	A	2.7	A-2				1	1	1		1
Mesembryanthemum crystallinum	crystalline iceplant	Med	Yes	B	B	C	3.7	B				1		1		1
Myoporum laetum	myoporum	Med	No	B	B	B	2.6	A-2				1				1
Myosotis latifolia	common forget-me-not	Low	No	C	B	B	2.2			1	1	1	1	1	1	1
Myosotis sylvestris	broad-leaf forget-me-not	NR														
Myriophyllum aquaticum	parrot's feather	High	Yes	A	B	C	2.8	B			1	1		1		1
Myriophyllum spicatum	Eurasian watermilfoil	High	No	A	A	B	2.8	A-1				1	1		1	
Nerium oleander	oleander	Not	No	D	B	D	2.6	considered			1		1			
Nicotiana glauca	tree tobacco	Med	No	B	B	B	2.5	need info					1	1	1	1
Nothoscordum inodorum	false garlic	Not		D	B	D	2.1					1	1			1
Nymphaea odorata	fragrant waterlily	Low	No	C	B	C	2.3						1		1	1

1	1		1		1	DO NOT REVIEW	Grindelia squarrosa	
1	1		1			scrub, grassland, pinyon-juniper woodland	Halogeton glomeratus	
						coastal forests, riparian areas	Hedera canariensis	
						coastal forests, riparian areas	Hedera helix	
						north coastal scrub	Helichrysum petiolare	
	1					scrub, grassland, riparian areas	Hirschfeldia incana	
	1	0	1	1	1	coastal grassland, wetlands	Holcus lanatus	
1	1	1	1	1	1	grasslands?	Hordeum marinum, H. murinum	
1	1	1				freshwater aquatic systems	Hydrilla verticillata	
						coastal scrub and prairie	Hypericum canariense	
						redwood forest, meadows, woodland; invasion may occur due to lag in control by e	Hypericum perforatum	
							Hypochaeris glabra	
						coastal dunes, scrub, and prairie; woodland, forest	Hypochaeris radicata	
						riparian areas	Ilex aquifolium	
						riparian, wetland areas, esp. San Diego and Los Angeles Cos.	Iris pseudacorus	
			1	1		Great Basin scrub and grassland, coniferous forest	Isatis tinctoria	
						DO NOT REVIEW	Kniphofia uvaria	
1	1	1	1	1	1		Kochia scoparia	
1	1	1	1	1	1	grasslands, seasonal wetlands	Lactuca serriola	
0						coastal, inland marshes, riparian areas, wetlands, grassland, potential to invade m	Lepidium latifolium	
							Leptospermum laevigatum	
						grassland, coastal scrub	Leucanthemum vulgare	
						riparian areas	Ligustrum lucidum	
						grasslands, forest clearings	Linaria genistifolia ssp. dalmatica	
						WE HAVE NO LIT FOLDER FOR THIS	Liquidambar styraciflua	
						grassland, oak woodland, pinyon-juniper woodland	Lolium multiflorum	
			1	1	1	grassland, riparian areas, wetlands	Lotus corniculatus	
	1					freshwater aquatic systems	Ludwigia peploides var.	
						freshwater aquatic systems	Ludwigia uruguayensis (= L. hexapetala)	
						native to south and central coast; invasive in north coast dunes	Lupinus arboreus	
						grassland, wetlands, vernal pools	Lythrum hyssopifolium	
				1		wetlands, marshes, riparian areas	Lythrum salicaria	
						coastal bluff, coastal scrub	Malephora crocea	
	1					grassland, scrub, riparian areas	Marrubium vulgare	
						coastal scrub	Maytenus boaria	
						grassland	Medicago polymorpha	
			1	1	1	grasslands	Melilotus officinalis	
						vernal pools, wetlands	Mentha pulegium	
						coastal bluffs, dunes, scrubs, grasslands	Mesembryanthemum crystallinum	
						coastal habitats, riparian areas	Myoporum laetum	
						coniferous forest, riparian areas	Myosotis latifolia	
						NO INFORMATION	Myosotis sylvestris	
						freshwater aquatic systems	Myriophyllum aquaticum	
						freshwater aquatic systems	Myriophyllum spicatum	
						riparian areas, others?	Nerium oleander	
1	1	1				coastal scrub, grassland, riparian woodland	Nicotiana glauca	
						riparian woodland	Nothoscordum inodorum	
						freshwater aquatic systems	Nymphaea odorata	

Olea europaea	European olive	Low	No	C	B	B	2.5	B				1	1	1		1
Ononis alopecuroides	foxtail restharrow	Low	No	C	B	C	2.2	Red Alert				1				
Onopordum acanthium	Scotch thistle	High	No	B	B	B	2.9			1	1	1	1	1	1	1
Oxalis corniculata	gardener's oxalis	Not	No	D	C	C	2.2		1		1	1	1	1	1	1
Oxalis pes-caprae	Bermuda buttercup	Med	No	B	B	B	2.9	need info				1		1		1
Parentucellia viscosa	yellow parentucellia	still being reviewed						need info			1	1		1		1
Parkinsonia aculeata	Mexican Palo Verde	Not	No	D	B	D	2.2						1			1
Passiflora caerulea	blue passion flower	NR						need info								
Pennisetum clandestinum	Kikuyu grass	Low	No	C	C	B	2.3	need info				1		1		1
Pennisetum setaceum	fountain grass	Med	No	B	B	B	2.9	A-1				1	1			1
Phalaris aquatica	Harding grass	Med	No	B	B	B	2.6	B				1		1	1	1
Phoenix canariensis	Canary Island date palm	Low	No	C	B	D	2.3					1				1
Phragmites australis	common reed	Med	No	B	B	B	2.5		1		1	1	1	1	1	1
Picris echioides	bristly ox-tongue	Low	No	C	B	B	2.4	considered			1	1	1	1	1	1
Pinus radiata cultivars	Monterey pine	still being reviewed						need info		1		1				
Piptatherum miliaceum	smilo grass	Low	No	C	B	B	2.4	need info				1	1			1
Plantago coronopus	plantain	NOt	No	U	C	B	1.7					1	1	1	1	1
Plantago lanceolata	English plantain	Low	No	C	C	B	2.1			1	1	1	1	1	1	1
Poa pratensis	Kentucky bluegrass	Low	No	C	B	B	2.7		1	1	1	1	1	1	1	1
Polygonum cuspidatum	Japanese knotweed	Med	Yes	B	B	D	2.7				1	1	1	1	1	
Polygonum sachalinense	giant knotweed	Med	Yes	B	A	D	2.5				1	1	1	1	1	
Polypogon monspeliensis	annual beardgrass	Low	No	C	C	B	2.3		1	1	1	1	1	1	1	1
Potamogeton crispus	curlyleaf pondweed	Med	No	B	B	B	3.2	B				1	1	1		1
Pyracantha angustifolia, crenulata,	pyracantha	Low	No	C	B	B	2.8	need info				1		1		1
Ranunculus repens	creeping buttercup	Low	No	C	C	B	2.9				1	1		1	1	1
Raphanus sativus	wild radish	Low	No	C	C	B	2.5			1	1	1	1	1	1	1
Retama monosperma	bridal broom	still being reviewed						Red Alert								
Ricinus communis	castor bean	Low	No	C	B	B	2.5	B				1	1			1
Robinia pseudoacacia	black locust	Low	No	C	B	B	2.8	B		1	1	1	1	1	1	1
Rubus armeniacus (R. discolor)	Armenian (Himalayan) blackberry	High	No	A	A	A	3.0	A-1		1	1	1	1	1	1	1
Rumex acetosella	sheep sorrel	Med	No	B	B	A	2.3			1	1	1	1	1	1	1
Rumex crispus	curly dock	Low	No	C	C	A	2.7		1	1	1	1	1	1	1	1
Salsola paulsenii	barbwire Russian thistle	Low	No	C	C	C	2.9									1
Salsola tragus	Russian thistle	Med	No	B	B	B	2.8	need info	1	1	1	1	1	1	1	1
Salvia aethiopis	Mediterranean sage	Low	No	C	B	B	2.5	need info								
Salvinia molesta	giant waterfern	High	Yes	A	A	C	2.9	Red Alert				1				
Sapium sebiferum	Chinese tallow tree	Med	Yes	B	A	D	3.2	Red Alert					1			
Saponaria officinalis	bouncing bet	Low	No	C	B	C	2.5	A-2				1	1	1		1
Schinus molle	Peruvian pepper tree	Low	No	C	B	B	2.5	B				1	1		1	1
Schinus terebinthifolius	Brazilian pepper tree	Low	No	C	B	C	2.6	B								1
Schismus arabicus, S. barbatus	Mediterranean grass	Low	No	B	C	A	2.3	annual grasses				1	1			1
Senecio jacobaea	tansy ragwort	Low	No	C	B	B	2.8	B			1	1	1	1	1	1
Sesbania punicea	scarlet wisteria tree	High	Yes	A	B	C	3.2	Red Alert					1			
Silybum marianum	blessed milk thistle	Low	No	C	C	A	3.5	considered				1	1	1		1
Sinapis arvensis	wild mustard	Low	No	C	C	C	2.9				1	1	1	1	1	1
Sisymbrium irio	London rocket	Med	No	B	B	A	1.9						1			1
Solanum elaeagnifolium	silverleaf nightshade	Med	No	B	B	B	2.8				1	1	1	1	1	1
Sollya heterophylla	Australian bluebell creeper	NR														

						grassland, riparian areas, woodlands near old plantings	Olea europaea	
						grassland, oak woodland	Ononis alopecuroides	
			1	1		wet meadows, sage brush, riparian areas	Onopordum acanthium	
1	1	1	1	1	1	riparian areas (based on other places)?	Oxalis corniculata	
						coastal dunes and scrub, oak woodland	Oxalis pes-caprae	
						coastal dunes, moist grasslands	Parentucellia viscosa	
						riparian scrub?	Parkinsonia aculeata	
						DO NOT REVIEW	Passiflora caerulea	
							Pennisetum clandestinum	
						coastal dunes and scrub, chaparral, grassland	Pennisetum setaceum	
						coastal sites, esp. moist soils	Phalaris aquatica	
						desert washes	Phoenix canariensis	
1	1	1	1	1	1	wetlands	Phragmites australis	
							Picris echioides	
						NOT RATED - UNSURE HOW TO HANDLE	Pinus radiata cultivars	
						coastal dunes, scrub, riparian, grassland	Piptatherum miliaceum	
						salt marshes, coastal bluffs, chaparral	Plantago coronopus	
							Plantago lanceolata	
1	1	1	1	1	1	grassland, scrub, riparian areas	Poa pratensis	
						riparian areas, wetlands, forest edges	Polygonum cuspidatum	
						riparian areas	Polygonum sachalinense	
1	1	1	1	1	1	margins of ponds and streams, seasonally wet places, edge of coastal dunes	Polypogon monspeliensis	
1	1					freshwater aquatic systems	Potamogeton crispus	
						coastal scrub and prairie, riparian areas	Pyracantha angustifolia, crenulata, seratus, etc.	
						riparian areas, coniferous forest	Ranunculus repens	
							Raphanus sativus	
						one population at Fallbrook Naval Weapons Station, San Diego Co.	Retama monosperma	
						coastal scrub and prairie, riparian areas	Ricinus communis	
			1	1	1	riparian areas, canyons	Robinia pseudoacacia	
						riparian areas, marshes, oak woodlands	Rubus armeniacus (R. discolor)	
						coastal habitats, riparian areas, forest, wetlands	Rumex acetosella	
1	1	1	1	1	1	grassland, vernal pool, meadows, riparian	Rumex crispus	
	1				1		Salsola paulsenii	
1	1	1	1	1	1	scrub, grasslands, desert dunes	Salsola tragus	
				1		sagebrush, juniper, bunchgrass	Salvia aethiopis	
		1				freshwater aquatic systems	Salvinia molesta	
						riparian areas	Sapium sebiferum	
			1	1	1	riparian scrub and woodland	Saponaria officinalis	
						riparian areas	Schinus molle	
						riparian areas	Schinus terebinthifolius	
1						scrub, thorn woodland	Schismus arabicus, S. barbatus	
						grassland, riparian; biocontrol agents established	Senecio jacobaea	
						riparian areas	Sesbania punicea	
						grassland, riparian	Silybum marianum	
							Sinapis arvensis	
						scrub, grassland	Sisymbrium irio	
1	1	1	0	0	0		Solanum elaeagnifolium	
						DO NOT REVIEW	Sollya heterophylla	

Sonchus asper	spiny sowthistle	**Not**	**No**	**D**	**B**	**B**	**3.1**		1		1	1	1	1	1	1
Spartina alterniflora hybrids	smooth cordgrass	**High**	**Yes**	**A**	**A**	**C**	**3.5**	A-2				1				
Spartina anglica	English cordgrass	**Med**	**Yes**	**B**	**B**	**D**	**3.4**	Red Alert				1				
Spartina densiflora	dense-flowered cordgrass	**Med**	**Yes**	**B**	**B**	**D**	**3.2**	Red Alert				1				
Spartina patens	salt-meadow cord grass	**Low**	**No**	**C**	**C**	**D**	**2.9**	Red Alert				1		1		1
Spartium junceum	Spanish broom	**High**	**No**	**A**	**B**	**B**	**3.2**	B				1		1		1
Stipa capensis	Cape feathergrass	**Med**	**Yes**	**B**	**B**	**D**	**1.9**	need info								
Taeniatherum caput-medusae	medusahead	**High**	**No**	**A**	**A**	**A**	**3.4**	A-1			1		1	1	1	1
Tamarix aphylla	athel	**Low**	**No**	**C**	**B**	**B**	**3.5**	need info					1			1
Tamarix ramosissima	saltcedar	**High**	**No**	**A**	**A**	**A**	**3.3**	A-1				1	1		1	1
Tanacetum vulgare	common tansy	**Med**	**No**	**B**	**B**	**B**	**2.3**	need info						1		
Taraxacum officinale	common dandelion	**Not**	**No**	**D**	**B**	**B**	**2.8**				1	1	1	1	1	1
Tragopogon dubius	yellow salsify	**Not**	**No**	**D**	**C**	**B**	**3.2**					1	1		1	1
Tropaeolum majus	garden nasturtium	**Not**	**No**	**D**	**C**	**C**	**1.4**									
Trifolium hirtum	rose clover	**Med**	**No**	**C**	**B**	**A**	**2.8**				1	1	1	1	1	1
Ulex europaeus	gorse	**High**	**No**	**A**	**B**	**B**	**2.9**	A-1			1	1		1	1	
Ulmus pumila	Siberian elm	**Low**	**No**	**C**	**B**	**B**	**2.5**						1		1	
Undaria pinnatifida	wakame	**Low**	**No**	**C**	**B**	**C**	**3.3**									
Verbascum thapsus	woolly or common mullein	**Low**	**No**	**C**	**B**	**B**	**3.8**	B			1					
Verbena bonariensis, V. litoralis	tall vervain	**Not**		**D**	**B**	**C**	**2.1**	need info			1		1	1		
Vicia villosa	hairy vetch	**Low**	**No**	**C**	**C**	**C**	**2.8**			1	1	1	1	1	1	1
Vinca major	periwinkle	**Med**	**No**	**B**	**B**	**B**	**2.8**	B			1		1		1	
Vulpia bromoides	brome fescue	**Low**	**No**	**C**	**C**	**B**	**2.9**			1	1	1	1	1	1	1
Vulpia myuros	rattail fescue	**Med**	**No**	**B**	**B**	**A**	**3.0**			1	1	1	1	1	1	1
Washingtonia robusta	Washington palm	**Med**	**Yes**	**B**	**B**	**C**	**2.7**									1
Watsonia meriana	bulbil watsonia	**Low**	**No**	**C**	**B**	**C**	**2.3**							1		
Zantesdeschia aethiopica	calla lily	**Low**	**No**	**C**	**B**	**C**	**2.1**	considered				1		1		1

1	1	1	1	1	1		Sonchus asper	
						San Francisco Bay salt marshes and mudflats	Spartina alterniflora hybrids	
						San Francisco Bay salt marshes	Spartina anglica	
						San Francisco and Humboldt Bay salt marshes	Spartina densiflora	
						San Francisco Bay salt marshes	Spartina patens	
						coastal scrub, grasslands, wetlands, oak woodland, forests	Spartium junceum	
							Stipa capensis	
						grasslands, scrub, woodland	Taeniatherum caput-medusae	
1						desert washes, riparian areas, seeps and springs	Tamarix aphylla	
1			1		1	desert washes, riparian areas, seeps and springs	Tamarix ramosissima	
						riparian areas, forest	Tanacetum vulgare	
			1	1	1		Taraxacum officinale	
						grasslands, coniferous forest	Tragopogon dubius	
							Tropaeolum majus	
						grassland, oak woodland	Trifolium hirtum	
						scrub, woodland, forest	Ulex europaeus	
1	1					scrub, grassland, woodland	Ulmus pumila	
						estuaries	Undaria pinnatifida	
						meadows, sagebrush, pinyon-juniper woodlands	Verbascum thapsus	
						riparian areas	Verbena bonariensis, V. litoralis	
							Vicia villosa	
1						riparian, oak woodlands, coastal scrub	Vinca major	
						coastal sage scrub, chaparral	Vulpia bromoides	
1	1	1					Vulpia myuros	
						desert washes	Washingtonia robusta	
						coastal prairie, coniferous forest	Watsonia meriana	
						coastal prairie, wetlands	Zantesdeschia aethiopica	

Invasive Plants of California's Wildlands

September 2000 Addendum

Species Name Index

Common, Scientific, and Synonymous Names

A

B

C

APPENDIX D
ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

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APPENDIX D
ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

BMP	Best Management Practices
CCA	California Coastal Act
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CVWD	Carpinteria Valley Water District
CWA	Clean Water Act
DO	Dissolved oxygen
EIR	Environmental Impact Report
EHS	Santa Barbara County Environmental Health Services Division
EPA	United States Environmental Protection Agency
ESHA	Environmentally Sensitive Habitat Area
FEMA	Federal Emergency Management Agency
GP/LCP	General Plan/Local Coastal Plan
LCP	Local Coastal Program/Plan
NDDB	Natural Diversity Data Base
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
RWQCB	Regional Water Quality Control Boards
SBCFCD	Santa Barbara County Flood Control District
SWRCB	State Water Resources Control Board
TMD	Total Maximum Daily Load
USGS	United States Geologic Survey

DEFINITIONS

Alluvial - Soils deposited by stream action.

Aquifer - An underground, water-bearing layer of earth, porous rock, sand, or gravel, through which water can seep or be held in natural storage. Aquifers generally hold sufficient water to be used as a water supply.

Buffer zone - An area of land separating two distinct land uses that acts to soften or mitigate the effects of one land use on the other.

California Environmental Quality Act (CEQA) - A State law requiring State and local agencies to regulate activities with consideration for environmental protection. If a proposed activity has the potential for a significant adverse environmental impact, an Environmental Impact Report (EIR) must be prepared and certified as to its adequacy before taking action on the proposed project. General Plans require the preparation of a "program EIR."

Channelization - The straightening and/or deepening of a watercourse for purposes of storm-runoff control or ease of navigation. Channelization often includes lining of stream banks with a retaining material such as concrete.

Detention basin - A basin formed by damming a waterway to retard flood runoff and minimize the effect of sudden floods.

Endangered species - An animal or plant species whose prospects for survival and reproduction are in immediate jeopardy for one or more causes.

Endemic - Plants or animals that are native to a particular region.

Environmental Impact Report (EIR) - A report required of general plans by the California Environmental Quality Act and which assesses all the environmental characteristics of an area and determines what effects or impacts will result if the area is altered or disturbed by a proposed action. (See "California Environmental Quality Act".)

Environmentally Sensitive Habitat Area (ESHA) - Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and development (as defined in the California Coastal Act).

Estuary - An area of mixed freshwater and sea water, typically at the mouth of a river or stream. Organisms living in an estuary are adapted to a wide range of salinities.

Fault - A fracture in the earth's crust forming a boundary between rock masses that have shifted.

General Plan (GP) - A compendium of a city's or a county's policies regarding its long-term development, in the form of maps and accompanying text. The General Plan is a legal document required of each local agency by the State of California Government Code Section 65301 and adopted by the City Council or Board of Supervisors. In California, the General Plan has seven mandatory elements (Circulation, Conservation, Housing, Land Use, Noise, Open Space, Safety and Seismic Safety) and may include any number of optional elements (such as Air Quality, Economic Development, Hazardous Waste, and Parks and Recreation). The General Plan may also be called a "City Plan," "Comprehensive Plan," or Master Plan."

Groundwater - Water under the earth's surface, often confined to aquifers capable of supplying wells and springs.

Groundwater recharge - The natural process of infiltration and percolation of rainwater from land areas or streams though permeable soils into water-holding rocks that provide underground storage ("aquifers").

Impaired waters - (As defined by CWA) Those waters that do not meet water quality objectives established by the Federal and State governments.

Loam - A soil composed of clay, sand, and some organic matter.

National Pollutant Discharge Elimination System (NPDES) - A system of regulations under the Clean Water Act whose goal is to reduce the level of pollutants in the waters of the United States.

Reach - A continuous, uninterrupted extent or stretch of stream, creek, or river.

Riparian - The biological community adjacent to perennial and intermittent steams. Riparian areas are delineated by the existence of plant species normally found near freshwater.

Setback - The horizontal distance between a property line and a structure or other feature.

Stormwater - Surplus surface water generated by rainfall that does not seep into the earth but flows overland to flowing or stagnant bodies of water.

Total Maximum Daily Loads (TMDLs) - The maximum amount of pollutants that a water body can receive and still meet water quality standards.

Watershed - The total area above a given point on a watercourse that contributes water to its flow; the entire region drained by a waterway or watercourse that drains into a lake, reservoir, or other waterbody.

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APPENDIX E
CITY OF CARPINTERIA WATER QUALITY PROTECTION REGULATIONS

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CITY OF CARPINTERIA
WATER QUALITY PROTECTION REGULATIONS

0 PURPOSE AND INTENT

The purpose of this Water Quality Protection Regulations is to protect and enhance coastal waters within the City of Carpinteria in accordance with the policies of the City's Local Coastal Plan (OSC-1 IM 10, OSC-6e, OSC-6f , OSC-6 IM 31, OSC-6 IM 32, OSC-6 IM 33, OSC-10c, OSC-10 IM53, OSC-10 IM54*)* Sections 30230, 30231, 30232 and 30240 of the California Coastal Act, and the City's Phase II NPDES permit requirements. To implement the certified Land Use Plan (LUP), application submittal requirements, development standards, and other measures are provided to ensure that permitted development shall be sited and designed to conserve natural drainage features and vegetation, minimize the introduction of pollutants into coastal waters to the maximum extent practicable, limit the discharge of stormwater runoff, and protect the overall quality of coastal waters and resources.

The intent of this Water Quality Protection Regulations is to address the following principles:

All development shall be evaluated by the Planning Director or his/her designee during the Coastal Development Permit (CDP) review process for potential adverse impacts to water quality and shall be designed to minimize the introduction of pollutants that may result in water quality impacts. Applicants shall incorporate Site Design, Source Control and, where required, Treatment Control Best Management Practices (BMPs) in order to minimize polluted runoff and water quality impacts resulting from the development. Site Design BMPs reduce the need for Source and/or Treatment Control BMPs, and Source Control BMPs may reduce the amount of Treatment Control BMPs needed for a development. Therefore, BMPs should be incorporated into the project design in the following progression:

- Site Design BMPs
- Source Control BMPs
- Treatment Control BMPs

Projects should be designed to control post-development peak storm water runoff discharge rates so that they do not exceed the estimated pre-development rate, unless there is no potential for the increased peak storm water discharge rate to result in increased downstream erosion. This objective can be accomplished through the creation of a hydrologically functional project design that strives to mimic the existing natural hydrologic regime and by achieving the following goals:

- Maintain and use existing natural drainage courses and vegetation

- Conserve natural resources and areas by clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition
- Minimize the amount of directly connected impervious surface and total area of impervious surface
- Incorporate or connect to existing on-site retention and infiltration measures
- Direct rooftop runoff to permeable areas rather than driveways or impervious surfaces to reduce the amount of storm water leaving the site
- Minimize clearing and grading
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants
- Promote natural vegetation by using parking lot islands and other landscaped areas
- Preserve riparian areas and wetlands

Incorporating these goals and principles into the project design will help to minimize the introduction of pollutants to the site and decrease the amount of polluted runoff leaving the site, resulting in the overall objective of water quality protection. Sections 3 and 4 of this Water Quality Protection Regulations, an element of the Carpinteria Implementation Plan (IP), describe the requirements and process for implementing BMPs into development and provide examples of types of BMPs to incorporate.

0 APPLICABILITY

All properties within the City of Carpinteria are located within the coastal zone as defined in the California Coastal Act and are subject to the policies, standards and provisions contained in the certified LCP that may apply. Where any standard provided in this Water Quality Protection Regulations conflicts with any other policy or standard contained in the City's General Plan, Zoning Code or other City-adopted plan, resolution or ordinance not included in the certified Carpinteria LCP, and it is not possible for the development to comply with both the Carpinteria LCP and other plans, resolutions or ordinances, the policies, standards or provisions of the LCP shall take precedence.

0 APPLICATION SUBMITTAL REQUIREMENTS

The following information shall be submitted with an application for a Coastal Development Permit for all projects requiring the development and implementation of an Erosion and Sediment Control Plan (Section 3.1), Site Design and Source Control Measures (Section 3.2), or a Water Quality Management Plan (Section 3.3), according to the requirements listed below.

0.0 Construction Phase Requirements: (eg. Erosion and Sediment Control Plan)

An Erosion and Sediment Control Plan shall be required for all development that requires a grading or building permit.

The Erosion and Sediment Control plan shall include a site specific erosion control plan that includes controls on grading (i.e. timing and amounts), best management practices for staging, storage, and disposal of construction and excavated materials, design specifications for sedimentation basins, and landscaping/re-vegetation of graded or disturbed areas. The plans shall also include a site- specific polluted runoff control plan that demonstrates how runoff will be conveyed from impermeable surfaces into permeable areas of the property in a non-erosive manner, and demonstrate how development will treat or infiltrate stormwater prior to conveyance off site during construction.

0.0 Post Construction Phase Requirements: Site Design and Source Control Measures

Site Design and Source Control Measures shall be required for all development and shall detail how stormwater and polluted runoff will be managed or mitigated. These measures shall require the implementation of appropriate Site Design and Source Control BMPs from Section 5 and Appendix A to minimize post-construction polluted runoff and impacts to water quality. The applicant shall also specify any Treatment Control or Structural BMPs that they elect to include in the development to minimize post-construction polluted runoff, and include the operation and maintenance plans for these BMPs.

The following information shall be included in the description of Site Design and Source Control Measures:

- Site design and source control BMPs that will be implemented to minimize post-construction polluted runoff (see Section 4.1)
- Drainage improvements (e.g., locations of infiltration basins)
- Potential flow paths where erosion may occur after construction
- Methods to accommodate onsite percolation, revegetation of disturbed portions of the site, address onsite and/or offsite impacts and construction of any necessary improvements
- Stormwater pollution prevention measures including all construction elements and Best Management Practices (BMPs) to address the following goals in connection with both construction and long-term operation of the site:
    - Maximize on-site retention and infiltration measures including directing rooftop runoff to permeable areas rather than driveways
    - Maximize, to the extent practicable, the percentage of permeable surfaces and limit directly connected impervious areas in order to allow more percolation of runoff into the ground

0.0 Post Construction Phase Requirements: Water Quality Management Plan

A Water Quality Management Plan (WQMP) shall be required for all development that either fails to adequately address water quality impacts using Site Design and Source Control Measures or is in a category of development identified below. In addition to the Site Design and Source Control Measures required for all development, the WQMP shall include Treatment Control (or Structural) BMPs identified in Appendix A to minimize post-construction polluted runoff and impacts to water quality. The WQMP shall also include the operation and maintenance plans for these BMPs.

0.0.0. Special Categories of Development

A WQMP shall be required for projects that fall into one or more of the following categories of development:

- Hillside residential development
- Housing developments of ten units or more
- Industrial/commercial development
- Restaurants
- Retail gasoline outlets /Automotive service facilities
- Parking lots (5,000 square feet or more of impervious surface area or with 25 or more parking spaces)/ Outdoor storage areas
- Projects that discharge to an ESA or coastal water[1]
- Redevelopment projects that result in the creation or addition or replacement of 5,000 square feet or more of impervious surface on an already developed site

0.0.0. Contents of a Water Quality Management Plan

The WQMP shall be certified by a California Registered Civil Engineer and approved by the City's Department of Public Works, City Engineer. The following information shall be included in a WQMP:

- Site design, source control and treatment control BMPs that will be implemented to minimize post-construction polluted runoff (see Section 4.1)
- Pre-development peak runoff rate and average volume
- Expected post-development peak runoff rate and average volume from the site with all proposed non-structural and structural BMPs
- Drainage improvements (e.g., locations of diversions/conveyances for upstream runoff)
- Potential flow paths where erosion may occur after construction

[1] Environmentally Sensitive Areas: All development and redevelopment located within or directly adjacent to or discharging directly to an environmentally sensitive area (where discharges from the development or redevelopment will enter receiving waters within the environmentally sensitive area). "Directly adjacent" means situated within 200 feet of the environmentally sensitive area. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands

- Methods to accommodate onsite percolation, revegetation of disturbed portions of the site, address onsite and/or offsite impacts and construction of any necessary improvements
- Measures to treat, infiltrate, and/or filter runoff from impervious surfaces (e.g., roads, driveways, parking structures, building pads, roofs, patios, etc.) on the subject parcel(s) and to discharge the runoff in a manner that avoids erosion, gullying on or downslope of the subject parcel, the need for upgrades to municipal stormdrain systems, discharge of pollutants (e.g., oil, heavy metals, toxics) to coastal waters, or other potentially adverse impacts. Such measures may include, but are not limited to, the use of structures (alone or in combination) such as biofilters and grasses waterways, on-site desilting basins, detention ponds, dry wells, etc.
- Information describing how the BMPs (or suites of BMPs) have been designed to infiltrate and/or treat the amount of storm water runoff produced by all storms up to and including the 85th percentile, 24-hour storm event for volume-based BMPs, and/or the 85^{th} percentile, 1-hour storm event, with an appropriate safety factor (i.e., 2 or greater), for flow-based BMPs. The term "treatment" includes physical, biological and chemical processes such as filtration, the use of bio-swales, detention and retention ponds and adsorption media. The actual type of treatment should be linked to the pollutants generated by the development as indicated in Appendix B.
- A long-term plan and schedule for the monitoring and maintenance of all drainage-control devices. All structural BMPs shall be inspected, cleaned, and repaired when necessary prior to September 30th of each year. Owners of these devices shall be responsible for insuring that they continue to function properly and additional inspections should occur after storms as needed throughout the rainy season. Repairs, modifications, or installation of additional BMPs, as needed, shall be carried out prior to the next rainy season.

The Public Works Director, the City Engineer, or his/her designee, who reviews drainage plans shall determine if the post-development BMPs require efficacy monitoring and, if so, the applicant shall submit a monitoring program for review and approval by the Public Works Director, the City Engineer, or his/her designee.

0.0 CEQA

Provisions of this section shall be complementary to, and shall not replace, any applicable requirements for storm water mitigation required under the California Environmental Quality Act.

0.0 Water Quality Checklist

A water quality checklist or other type of review tool will be developed by the City and used to supplement the CEQA checklist in the permit review process to assess potential water quality impacts and appropriate mitigation measures.

0 DEVELOPMENT STANDARDS

0.0 BMP Requirements and Implementation

All development shall be evaluated for potential adverse impacts to water quality and the applicant shall incorporate Site Design, Source Control and, where required, Treatment Control BMPs, in order to minimize polluted runoff and water quality impacts resulting from the development. Site Design and Source Control Measures are required for all development, as specified in Section 3.2, and a WQMP requires the implementation of Site Design, Source Control and Treatment Control BMPs, as specified in Section 3.3. In order to maximize the reduction of water quality impacts, BMPs should be incorporated into the project design in the following progression: (1) Site Design BMPs, (2) Source Control BMPs, and (3) Treatment Control BMPs. Examples of these BMPs may be found in Section 5 and Appendix A.

0.0.0. Types of BMPs

Non-structural BMPs are preventative actions that involve management and source controls such as protecting and restoring sensitive areas such as wetlands and riparian corridors, maintaining and/or increasing open space, providing buffers along sensitive water bodies, minimizing impervious surfaces and directly connected impervious areas, and minimizing disturbance of soils and vegetation. Structural BMPs include: storage practices such as wet ponds and extended-detention outlet structures; filtration practices such as grassed swales, sand filters and filter strips; and infiltration practices such as infiltration basins and infiltration trenches. In many cases combinations of non-structural and structural measures will be required to reduce water quality impacts.

Additional guidance on best management practices is available from the State, the EPA and from other sources such as Bay Area Stormwater Management Agencies Association (BASMAA) “Starting at the Source”. Stormwater technologies are constantly being improved, and staff and developers should be responsive to any changes, developments or improvements in control technologies.

0.0.0. BMP Selection Process

In selecting BMPs to incorporate into the project design, the applicant should first identify the pollutants of concern that are anticipated to be generated as a result of the development. Table 1 in Appendix B should be used as a guide in identifying these pollutants of concern. In addition, pollutants generated by the development that exhibit one or more of the following characteristics shall be considered primary pollutants of concern:

- The pollutant is anticipated to be generated by the project and is also listed as a pollutant causing impairment of a receiving water of the project
- Current loadings or historical deposits of the pollutant are impairing the beneficial uses of a receiving water

- Elevated levels of the pollutant are found in water or sediments of a receiving water and/or have the potential to be toxic to or bioaccumulate in organisms therein
- Inputs of the pollutant are at a level high enough to be considered potentially toxic

The City of Carpinteria has two waterbodies designated as impaired according to the 303(d) list adopted by USEPA in July 2003. Carpinteria Creek is listed as impaired for pathogens, and Carpinteria Marsh is listed as impaired for nutrients, organic enrichment/low dissolved oxygen, priority organics and sedimentation/siltation. Applicants shall use these above designations of impairment and any future designations of impairment, as updated through the 303(d) listing process, to assess primary pollutants of concern for their project, as described above.

Site Design and Source Control BMPs are required based on pollutants commonly associated with the project type, as identified in Table 1. Table 2 in Appendix B should be used as guidance to determine the specific area for each project where Site Design and Source Control BMPs are required to be implemented. BMPs that minimize the identified pollutants of concern may be selected from the examples in Section 5 and Appendix A, targeting primary pollutants of concern first. In the event that the implementation of a BMP listed in Section 5 or Appendix A is determined to be infeasible at any site, the implementation of other BMPs that will achieve the equivalent reduction of pollutants shall be required.

Treatment Control BMPs should be selected using the matrix in Table 3 in Appendix B as guidance to determine the removal efficiency of the BMP for the pollutants of concern for that project. Treatment Control BMPs that maximize pollutant removal for the identified primary pollutants of concern should receive priority for BMP selection, followed by BMPs that maximize pollutant removal for all other pollutants of concern identified for the project. The most effective combination of BMPs for polluted runoff control that results in the most efficient reduction of pollutants shall be implemented. The applicant may select from the list of BMPs in Appendix A. In the event that the implementation of a BMP listed in Appendix A is determined to be infeasible at any site, the implementation of other BMPs that will achieve the equivalent reduction of pollutants shall be required.

0.0.0. Sizing of Treatment Control BMPs

Where post-construction treatment controls are required, the BMPs (or suites of BMPs) shall be designed to infiltrate and/or treat the amount of storm water runoff produced by all storms up to and including the 85th percentile, 24-hour storm event[2] for volume-based BMPs, and/or the 85th percentile, 1-hour storm event, with an appropriate safety factor (i.e., 2 or greater), for flow-based BMPs.

[2] Considering the long-run records of local storm events in a 24-hour period, the 85th percentile event would be larger than or equal to 85% of the storms. The 85th percentile storm can be determined by reviewing local precipitation data or relying on estimates by other regulatory agencies. For example, the Los Angeles Regional Water Quality Control Board has determined that 0.75 inch is an adequate estimate of the 85th percentile, 24-hour storm event for typical municipal land uses within its jurisdiction.

The term "treatment" includes physical, biological and chemical processes such as filtration, the use of bio-swales, detention and retention ponds and adsorption media. The actual type of treatment should be suited to the pollutants generated by the development as indicated in Appendix B.

0.0.0. BMP Maintenance and Conditions of Transfer

All applicants shall provide binding maintenance requirements for Structural and Treatment Control BMPs, including but not limited to legal agreements, covenants, CEQA mitigation requirements, and conditional use permits. Verification at a minimum shall include:

- The developer's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and either
    - A signed statement from the public entity assuming responsibility for Structural and Treatment Control BMP maintenance and that it meets all local agency design standards; or
    - Written conditions in the sales or lease agreement, which require the recipient to assume responsibility for maintenance and conduct a maintenance inspection at least once a year; or
    - Written text in project conditions, covenants, and restrictions (CCRs) for residential properties assigning maintenance responsibilities to the Home Owners Association for maintenance of the Structural and Treatment Control BMPs; or
    - Any other legally enforceable agreement that assigns responsibility for the maintenance of post-construction Structural and Treatment Control BMPs

0.0 Development on Hillsides

Soils shall be stabilized and infiltration practices incorporated during the development of roads, bridges, culverts and outfalls to prevent stream bank or hillside erosion. For all development on or adjacent to hillsides, project plans shall include the following BMPs to decrease the potential of slopes and/or channels from eroding and impacting storm water runoff:

- Convey runoff safely from the tops of slopes and stabilize disturbed slopes
- Utilize existing natural drainage systems to the maximum extent feasible
- Control and minimize excess flow to natural drainage systems to the maximum extent feasible
- Stabilize permanent channel crossings using "soft engineering" practices when possible
- Vegetate slopes with native or drought tolerant vegetation
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion

Additional measures to prevent downstream erosion, such as cisterns, infiltration pits and/or contour drainage outlets that disperse water back to sheet flow, shall be implemented for projects discharging onto slopes greater than 10 percent.

New development on hillsides, on sites with low permeability soil conditions, or areas where saturated soils can lead to geologic instability should incorporate BMPs that do not rely on or increase infiltration.

0.0 Cumulative Impacts

Because of the city's designation under the Phase II NPDES regulations, all discretionary projects (except those that do not result in a physical change to the environment) within the urbanized area whose contributions are cumulatively considerable shall implement one or more best management practices to reduce their contribution to the cumulative impact.

0 DEVELOPMENT-SPECIFIC DESIGN STANDARDS

0.0 Commercial Development

Commercial development shall be designed to control the runoff of pollutants from structures, parking and loading areas. The following measures shall be implemented to minimize the impacts of commercial development on water quality.

<u>Properly Design Loading/Unloading Dock Areas</u>
Loading/unloading dock areas have the potential for material spills to be quickly transported to the storm water conveyance system. To minimize this potential, the following design criteria are required:

- Cover loading dock areas or design drainage to minimize run-on and runoff of storm water.
- Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.

<u>Properly Design Repair/Maintenance Bays</u>
Oil and grease, solvents, car battery acid, coolant, and gasoline from repair and maintenance bays can negatively impact storm water if allowed to come into contact with storm water runoff. Therefore, design plans for repair bays shall include the following:

- Repair/ maintenance bays shall be indoors or designed in such a way that doesn't allow storm water runoff or contact with storm water runoff.
- Design a repair/maintenance bay drainage system to capture all washwater, leaks, and spills. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. Obtain an Industrial Waste Discharge Permit if required.

Properly Design Vehicle/Equipment Wash Areas

The activity of vehicle/equipment washing/steam cleaning has the potential to contribute metals, oil and grease, solvents, phosphates, and suspended solids to the storm water conveyance system. Include in the project plans an area for washing/steam cleaning of vehicles and equipment. This area shall be:

- Self-contained and/or covered, equipped with a clarifier, or other pretreatment facility, and
- Properly connected to a sanitary sewer or other appropriately permitted disposal facility.

Properly Design Parking Areas

Parking lots contain pollutants such as heavy metals, oil and grease, and polycyclic aromatic hydrocarbons that are deposited on parking lot surfaces by motor vehicles. These pollutants are directly transported to surface waters. To minimize the offsite transport of pollutants, the following design criteria are required:

- Reduce impervious surface land coverage of parking areas.
- Infiltrate runoff before it reaches storm drain system.
- Treat runoff before it reaches storm drain system.

Parking lots may also accumulate oil, grease, and water insoluble hydrocarbons from vehicle drippings and engine system leaks. To minimize impacts to water quality, the following measures are required:

- Treat to remove oil and petroleum hydrocarbons at parking lots that are heavily used (e.g. lots with 25 or more parking spaces, performing arts parking lots, shopping malls, or grocery stores).
- Ensure adequate operation and maintenance of treatment systems particularly sludge and oil removal, and system fouling and plugging prevention control.

0.0 Restaurants

Restaurants shall be designed to minimize runoff of oil and grease, solvents, phosphates, and suspended solids to the storm drain system. The following measures shall be implemented to minimize the impacts of restaurants on water quality.

Properly Design Equipment/Accessory Wash Areas

The activity of outdoor equipment/accessory washing/steam cleaning has the potential to contribute metals, oil and grease, solvents, phosphates, and suspended solids to the storm water conveyance system. Include in the project plans an area for the washing/steam cleaning of equipment and accessories. This area shall be:

- Self-contained, equipped with a grease trap, and properly connected to a sanitary sewer.
- If the wash area is to be located outdoors, it shall be covered, paved, have secondary containment and be connected to the sanitary sewer or other appropriately permitted disposal facility.
- Any outdoor storage of solid or liquid waste (i.e., oil and grease) shall comply with the requirements of Sections 5.4 and 5.5.

0.0 Gasoline Stations, Car Washes and Automotive Repair Facilities

Gasoline stations and automotive repair facilities shall be designed to minimize runoff of oil and grease, solvents, car battery acid, coolant and gasoline to stormwater system. The following measures shall be implemented to minimize the impacts of gasoline stations, and automotive repair facilities on water quality.

Properly Design Fueling Areas

Fueling areas have the potential to contribute oil and grease, solvents, car battery acid, coolant, and gasoline to the storm water conveyance system. Therefore, design plans for fueling areas shall include the following:

- The fuel dispensing area shall be covered with an overhanging roof structure or canopy. The canopy's minimum dimensions shall be equal to or greater than the area within the grade break. The canopy shall not drain onto the fuel dispensing area, and the canopy downspouts shall be routed to prevent drainage across the fueling area. As an alternative, the site shall be served by an oil/water separator or other source or treatment control BMP's that will achieve equivalent mitigation.
- The fuel dispensing area shall be paved with Portland cement concrete (or equivalent smooth impervious surface), and the use of asphalt concrete shall be prohibited.
- The fuel dispensing area shall have a 2% to 4% slope to prevent ponding, and shall be separated from the rest of the site by a grade break that prevents run-on of storm water to the extent practicable.
- At a minimum, the concrete fuel dispensing area shall extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.

Properly Design Repair/Maintenance Bays

Oils and grease, solvents, car battery acid, coolant, and gasoline from the repair/maintenance bays can negatively impact storm water if allowed to come into contact with storm water runoff. Therefore, design plans for repair bays shall include the following:

- Repair/maintenance bays shall be indoors or designed in such a way that doesn't allow storm water run-on or contact with storm water runoff.
- Design a repair/maintenance bay drainage system to capture all wash-water, leaks, and spills. Connect drains to a sump for collection and disposal. Direct connection

of the repair/maintenance bays to the storm drain system is prohibited. Obtain an Industrial Waste Discharge Permit if required.

Properly Design Vehicle/Equipment Wash Areas

The activity of vehicle/equipment washing/steam cleaning has the potential to contribute metals, oil and grease, solvents, phosphates, and suspended solids to the storm water conveyance system. Include in the project plans an area for washing/steam cleaning of vehicles and equipment. This area shall be:

- Self-contained and/or covered, equipped with a clarifier, or other pretreatment facility, and properly connected to a sanitary sewer or other appropriately permitted disposal facility.

Properly Design Loading/Unloading Dock Areas

Loading/unloading dock areas have the potential for material spills to be quickly transported to the storm water conveyance system. To minimize this potential, the following design criteria are required:

- Cover loading dock areas or design drainage to minimize run-on and runoff of storm water.
- Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.

0.0 Outdoor Material Storage Areas

Outdoor material storage areas refer to storage areas or storage facilities used solely for the storage of materials. Improper storage of materials outdoors may provide an opportunity for toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to enter the storm water conveyance system. Outdoor material storage areas shall be designed to prevent stormwater contamination from stored materials. Where proposed project plans include outdoor areas for storage of materials that may contribute pollutants to the storm water conveyance system, the following measures are required:

- Materials with the potential to contaminate storm water shall be: (1) placed in an enclosure such as a cabinet, shed or similar structure that prevents contact with runoff or spillage to the storm water conveyance system; or (2) protected by secondary containment structures such as berms, dikes or curbs.
- The storage areas shall be paved and sufficiently impervious to contain leaks and spills.
- The storage area shall have a roof or awning to minimize collection of storm water within the secondary containment area.

0.0 Trash Storage Areas

A trash storage area refers to an area where a trash receptacle or receptacles are located for use as a repository for solid wastes. Loose trash and debris can be easily transported

by the forces of water or wind into nearby storm drain inlets, channels, and/or creeks. Trash storage areas shall be designed to prevent stormwater contamination by loose trash and debris. All trash container areas shall meet the following requirements (individual family residences are exempt from these requirements):

- Trash container areas shall have drainage from adjoining roofs and pavement diverted around the area(s).
- Trash container areas shall be screened or walled to prevent off-site transport of trash.

0.0 Single Family Residential

To mitigate the increased runoff rates from Single Family Residences due to new impervious surfaces, new residential projects and additions, as well as remodel projects that need an Erosion and Sediment Control Plan, shall include design elements that accommodate onsite percolation, retention or collection of storm water runoff such that the peak runoff rate after development either meets the 85^{th} percentile storm event criterion or does not exceed predevelopment runoff levels to the maximum extent practicable. BMPs (including those outlined in the California Storm Water Best Management Practice Handbooks) that may achieve this objective fit into these categories:

- Minimizing Impervious Areas
- Increase Rainfall Infiltration
- Minimize Directly Connected Impervious Areas (DCIAs)

Appendix A

STORM WATER BEST MANAGEMENT PRACTICES

The following are a list of BMPs that may be used to minimize or prevent the introduction of pollutants of concern that may result in significant impacts to receiving waters. Other BMPs approved by the City as being equally or more effective in pollutant reduction than comparable BMPs identified below are acceptable. All BMPs shall comply with local zoning and building codes and other applicable regulations.

Site Design BMPs

Minimizing Impervious Areas

- Reduce sidewalk widths where it is practicable
- Incorporate landscaped buffer areas between sidewalks and streets.
- Design residential streets for the minimum required pavement widths
- Minimize the number of residential street cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.
- Use open space development that incorporates smaller lot sizes
- Increase building density while decreasing the building footprint
- Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together
- Reduce overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas

Increase Rainfall Infiltration

- Use permeable materials for private sidewalks, driveways, parking lots, and interior roadway surfaces (examples: hybrid lots, parking groves, permeable overflow parking, etc.)

- Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas, and avoid routing rooftop runoff to the roadway or the urban runoff conveyance system

Maximize Rainfall Interception

- Maximizing canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs

Minimize Directly Connected Impervious Areas (DCIAs)

- Draining rooftops into adjacent landscaping prior to discharging to the storm drain
- Draining parking lots into landscape areas co-designed as biofiltration areas
- Draining roads, sidewalks, and impervious trails into adjacent landscaping

Slope and Channel Protection

- Use of existing natural drainage systems to the maximum extent feasible
- Stabilized permanent channel crossings
- Planting native or drought tolerant vegetation on slopes
- Energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels

Maximize Rainfall Interception

- Cisterns
- Foundation planting

Increase Rainfall Infiltration

- Dry wells

Source Control BMPs

- Storm drain system stenciling and signage
- Regular street and parking lot sweeping
- Outdoor material and trash storage area designed to reduce or control rainfall runoff
- Efficient irrigation system

Treatment Control BMPs

Biofilters

- Grass swale
- Grass strip
- Wetland vegetation swale
- Bioretention

Detention Basins

- Extended/dry detention basin with grass lining
- Extended/dry detention basin with impervious lining

Infiltration Basins

- Infiltration basin
- Infiltration trench
- Porous asphalt
- Porous concrete
- Porous modular concrete block

Wet Ponds and Wetlands

- Wet pond (permanent pool)
- Constructed wetland

Drainage Inserts

- Oil/Water separator
- Catch basin insert
- Storm drain inserts
- Catch basin screens

Filtration Systems

- Media filtration
- Sand filtration

Hydrodynamic Separation Systems

- Swirl Concentrator
- Cyclone Separator

Appendix B

BMP IMPLEMENTATION TABLES

Table 1. Anticipated and Potential Pollutants Generated by Land Use Type

	General Pollutant Categories								
Priority Project Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development >100,000 ft^2	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Automotive service facilities			X	X(4)(5)	X		X		
Retail Gasoline Outlets			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	
Hillside development	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site
(2) A potential pollutant if the project includes uncovered parking areas
(3) A potential pollutant if land use involves food or animal waste products
(4) Including petroleum hydrocarbons
(5) Including solvents

Table 2. Site Design and Source Control BMP Selection Matrix

	Specific Areas for Implementation of Site Design and Source Control BMPs													
Priority Project Categories	Private Roads	Residential Driveways & Guest Parking	Loading/Unloading Dock Areas	Repair/Maintenance Bays	Vehicle Wash Areas	Outdoor Processing Areas	Equipment Wash Areas	Parking Areas	Roadways	Fueling Areas	Hillside Landscaping	Outdoor Material Storage Areas	Trash Storage Areas	Pools and Spas
Detached Residential Development	R	R									R			R
Attached Residential Development	R												R	R
Commercial Development >100,000 ft^2			R	R	R	R						R	R	
Automotive service facilities			R	R	R		R			R		R	R	
Retail Gasoline Outlets			R	R	R		R			R		R	R	
Restaurants			R				R					R	R	
Hillside development	R										R			
Parking Lots								R					R	
Streets, Highways & Freeways									R					
R = Required – minimize pollutants of concern by selecting appropriate Site Design and Source Control BMPs														

Table 3. Treatment Control BMP Selection Matrix[1]

Pollutant of Concern	***Treatment Control BMP Categories***						
	Biofilters	Detention Basins	Infiltration Basins[2]	Wet Ponds or Wetlands	Drainage Inserts	Filtration	Hydrodynamic Separator Systems[3]
Sediment	M	H	H	H	L	H	M
Nutrients	L	M	M	M	L	M	L
Heavy Metals	M	M	M	H	L	H	L
Organic Compounds	U	U	U	U	L	M	L
Trash & Debris	L	H	U	U	M	H	M
Oxygen Demanding Substances	L	M	M	M	L	M	L
Bacteria	U	U	H	U	L	M	L
Oil & Grease	M	M	U	U	L	H	L
Pesticides	U	U	U	U	L	U	L

(0) The City is encouraged to periodically assess the performance characteristics of many of these BMPs to update this table.
(0) Including trenches and porous pavement
(0) Also known as hydrodynamic devices and baffle boxes

L: Low removal efficiency
M: Medium removal efficiency
H: High removal efficiency
U: Unknown removal efficiency

Sources: *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (1993), *National Stormwater Best Management Practices Database* (2001), *and Guide for BMP Selection in Urban Developed Areas* (2001).

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