4.1.2 RIPARIAN AND WETLAND HABITATS

4.1.2.1 Regulatory Background

Impacts to riparian and wetland habitats require authorizations from regulatory agencies at the federal and state level. On the federal level, the USACE is authorized to issue permits for specific activities that affect jurisdictional wetland and non-wetland waters. On the state level, CDFG and the SWRCB, through the RWQCBs, are authorized to issue authorizations for specific activities that affect Waters of the State.

U.S. Army Corps of Engineers

The U.S. Congress authorized the USACE to issue permits for specific activities that affect jurisdictional water bodies, including certain non-wetland waters and wetlands. The two main statutory authorities providing this responsibility are Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) within navigable Waters of the U.S. and Section 404 of the Clean Water Act (33 USC 1344) within Waters of the U.S. For this SAMP Study Area, the extent of navigable waters is limited to a small area along the Pacific Ocean. Most of the activities involving the USACE involve activities within Waters of the U.S.

Section 10 of the Rivers and Harbors Act prohibits unauthorized obstruction or alteration of any navigable water of the United States. Within navigable Waters of the U.S., construction of any structure, excavation of materials, or any other work that affects the course, location, condition, or capacity of such waters is unlawful unless authorized by the USACE. Navigable Waters of the U.S. include tidally influenced water bodies such as oceans, large lakes, and navigable rivers. As stated before, the extent of navigable waters is limited to a small area along the Pacific Ocean. For the purposes of this SAMP, the Rivers and Harbors Act is a very minor issue.

Section 404 of the Clean Water Act authorizes the USACE to issue permits for the discharge of dredged and/or fill materials into Waters of the U.S. at specified sites. Within Waters of the U.S., activities that discharge dredged and/or fill materials associated with developments, linear transportation crossings, bank stabilization, maintenance, and other activities require a permit from the USACE. Activities that do not discharge dredged and/or fill materials such as vegetation clearing where the soil is not disturbed, groundwater extraction, and grazing do not require a permit from the USACE. Under Section 404 of the Clean Water Act, the USACE regulates discharges of dredged or fill material into “Waters of the U.S.,” including wetlands. Waters of the U.S. is defined 33 CFR 328.3 as:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce...;
- All interstate waters including interstate wetlands;
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams)...the use, degradation or destruction of which could affect interstate or foreign commerce...;
- All impoundment of waters otherwise defined as Waters of the United States under the definition;
- Tributaries of waters defined in paragraphs (a) (1)-(4) of this section; and

- Territorial seas; and

- Wetlands adjacent to waters identified above.

The USACE authorizes the discharge of dredged and fill materials through two mechanisms. Small and routine activities involving temporary discharge of dredged and/or fill materials or permanent discharges less than 0.5 acre are processed as general permits. General permits are generally issued within 45 days of a receipt of a complete application and do not involve coordination with the public or other resource agencies. General permits are issued for similar classes of activities that are similar and have minimal impacts individually and cumulatively. As identified in Table 4.1.2-1. Nationwide general permits are issued for various activities. Regional general permits have been issued for certain classes of activities within a smaller geographic area such as maintenance dredge in Newport Bay in Orange County, California and exotics removal in southern California and Arizona. Activities seeking to be authorized under an existing general permit often need verification by the USACE that the activity does comply with a given general permit.

Larger activities that do not qualify for a general permit are processed as an individual permit. Individual permits are issued after dissemination of a public notice with a 15- to 30-day comment period and writing of an environmental assessment. The environmental assessment includes documentation showing compliance of the activity with the Section 404(b)(1) Guidelines, which requires that the activity satisfy requirements of an analysis of alternatives; not degrade water quality, not jeopardize endangered species, not violate toxic effluent standards; and not contribute to the significant degradation of waters; and minimize all impacts. The environmental assessment must also address public interest factors of the proposed action on the physical, biological, and human environments. Individual permits are generally issued approximately 120 days after receipt of a complete application.

Before a permit authorization is issued, the activity must demonstrate compliance with other relevant statutes. Applicable statutes include, but are not limited to, Section 7 of the Endangered Species Act, National Historic Preservation Act, Section 401 of the Clean Water Act, National Environmental Policy Act, and Section 307 of the Coastal Zone Management Act. Compliance with applicable statutes are required only when applicable issues present themselves, because not all proposed projects have issues related to listed endangered species, cultural resources, effects on the coastal zone, etc.

California Department of Fish and Game

Pursuant to Section 1602 of the California Fish and Game Code, “an entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake, unless…(t)he department receives written notification regarding the activity in the manner prescribed by the department…”

TABLE 4.1.2-1
SUMMARY OF 2002 NATIONWIDE PERMITS

Nationwide Permit	Statutory Authority	Limits	Pre-Construction Notification (PCN) Threshold	Delineation Required?	Applicable Water
NWP 1–Aids to Navigation	10	None	PCN not required	No	Navigable waters of the U.S.
NWP 2–Aids to Navigation	10	None	PCN not required	No	Navigable waters of the U.S.
NWP 3–Maintenance	10/404				
(i) repair, rehabilitation, and replacement of previously authorized, currently serviceable structures or fills		Authorizes only minor deviations for maintenance	PCN not required	No	All waters of the U.S.
(ii) discharges associated with removal of accumulated sediments and debris in the vicinity of existing structures		200 feet from structure	All activities	No	All waters of the U.S.
(iii) discharges associated with restoration of upland areas damaged by a storm, flood, or other discrete event		Restore to original ordinary high water mark; dredge up to 50 cubic years	All activities	No	All waters of the U.S.
NWP 4–Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities	10/404	None	PCN not required	No	All waters of the U.S.
NWP 5–Scientific Measurement Devices	10/404	25 cubic yards for weirs and flumes	10 to 25 cubic yards for weirs and flumes	No	All waters of the U.S.
NWP 6–Survey Activities	10/404	None	PCN not required	No	All waters of the U.S.
NWP 7–Outfall Structures and Maintenance	10/404				
(i) construction of outfall structures and associated intake structures		None	All activities	No	All waters of the U.S.
(ii) maintenance excavation and dredging to remove accumulated sediments		None	PCN not required	Yes	All waters of the U.S.
NWP 8–Oil and Gas Structures	10	None	PCN not required	No	Navigable waters of the U.S.
NWP 9–Structures in Fleeting and Anchorage Areas	10	None	PCN not required	No	Navigable waters of the U.S.
NWP 10–Mooring Buoys	10	None	PCN not required	No	Navigable waters of the U.S.
NWP 11–Temporary Recreational Structures	10	None	PCN not required	No	Navigable waters of the U.S.

TABLE 4.1.2-1 (Continued)
SUMMARY OF 2002 NATIONWIDE PERMITS

Nationwide Permit	Statutory Authority	Limits	Pre-Construction Notification (PCN) Threshold	Delineation Required?	Applicable Water
NWP 12–Utility Line Activities	10/404	1/2 acre	See text of NWP	Yes	
(i) utility lines			See text of NWP	Yes	
(ii) utility line substations		1/2 acre	>1/10 acre	Yes	Non-tidal waters of the U.S., except non-tidal wetlands adjacent to tidal waters
(iii) foundations for overhead utility line towers, poles, and anchors		Minimum necessary	See text of NWP	Yes	All waters of the U.S.
(iv) access roads		1/2 acre	>500 feet in waters of U.S.; construction with impervious materials	Yes	Non-tidal waters of the U.S., except non-tidal wetlands adjacent to tidal waters
NWP 13–Bank Stabilization	10/404	Minimum necessary	>500 linear feet, or >1 cubic yard per running foot	No	All waters of the U.S., except special aquatic sites
NWP 14–Linear Transportation Projects	10/404	1/2 acre in non-tidal waters, or 1/3 acre in tidal waters	>1/10 acre; discharges into special aquatic sites	Yes	All waters of the U.S.
NWP 15–U.S. Coast Guard Approved Bridges	404	None	PCN not required	No	Navigable waters of the U.S.
NWP 16–Return Water from Upland Contained Disposal Areas	404	None	PCN not required	No	All waters of the U.S.
NWP 17–Hydropower Projects	404	None	All activities	No	All waters of the U.S., except navigable waters
NWP 18–Minor Discharges	10/404	25 cubic yards; 1/10 acre of special aquatic sites	>10 cubic yards or discharges into special aquatic sites	Yes	All waters of the U.S.
NWP 19–Minor Dredging	10/404	25 cubic yards	PCN not required	No	Navigable waters of the U.S.
NWP 20–Oil Spill Cleanup	404	None	PCN not required	No	Navigable waters of the U.S.
NWP 21–Surface Coal Mining Activities	10/404	None	All activities	Yes	All waters of the U.S.
NWP 22–Removal of Vessels	10/404	None	Removal of vessels listed or eligible for National Register of Historic Places	No	All waters of the U.S.
NWP 23–Approved Categorical Exclusions	10/404	None	PCN not required	No	All waters of the U.S.

TABLE 4.1.2-1 (Continued)
SUMMARY OF 2002 NATIONWIDE PERMITS

Nationwide Permit	Statutory Authority	Limits	Pre-Construction Notification (PCN) Threshold	Delineation Required?	Applicable Water
NWP 24–State Administered Section 404 Program	10	None	PCN not required	No	Navigable waters of the U.S.
NWP 25–Structural Discharges	404	None	PCN not required	No	All waters of the U.S.
NWP 27–Stream and Wetland Restoration Activities	10/404	None	Certain activities on public and private land (see text of NWP)	No	All waters of the U.S.
NWP 28–Modifications of Existing Marinas	10	Activities limited to authorized marina area	PCN not required	No	Navigable waters of the U.S.
NWP 29–Single Family Housing	10/404	1/4 acre	All activities	Yes	Non-tidal waters of the U.S., including non-tidal wetlands
NWP 30–Moist Soil Management for Wildlife	404	None	PCN not required	No	All waters of the U.S., except navigable waters
NWP 31–Maintenance of Existing Flood Control Facilities	10/404	Maintenance baseline approved by district engineer	All activities Yes	Yes	All waters of the U.S.
NWP 32–Completed Enforcement Actions	10/404	5 acres of non-tidal wetlands or 1 acre of tidal wetlands (see text of NWP)	All activities	No	All waters of the U.S.
NWP 33–Temporary Construction, Access, and Dewatering	10/404	None	All activities	No	All waters of the U.S.
NWP 34–Cranberry Production Activities	404	10 acres, but activity cannot result in net loss of wetland acreage	All activities	Yes	All waters of the U.S., except navigable waters
NWP 35–Maintenance Dredging of Existing Basins	10	Dredging to previously authorized depths or controlling depths, whichever is less	PCN not required	No	navigable waters of the U.S.
NWP 36–Boat Ramps	10/404	50 cubic yards of fill; 20 foot width for boat ramp	PCN not required	No	All waters of the U.S., except special aquatic sites
NWP 37–Emergency Watershed Protection and Rehabilitation	10/404	None	All activities	No	All waters of the U.S.

TABLE 4.1.2-1 (Continued)
SUMMARY OF 2002 NATIONWIDE PERMITS

Nationwide Permit	Statutory Authority	Limits	Pre-Construction Notification (PCN) Threshold	Delineation Required?	Applicable Water
NWP 38–Cleanup of Hazardous and Toxic Waste	10/404	None	all activities	Yes	All waters of the U.S.
NWP 39–Residential, Commercial, and Institutional Developments	10/404	1/2 acre; 300 linear feet of perennial or intermittent stream bed	>1/10 acre; discharges into open waters	Yes	Non-tidal waters of the U.S., except non-tidal wetlands adjacent to tidal waters
NWP 40–Agricultural Activities	404	1/2 acre; 300 linear feet of perennial or intermittent stream bed	>1/10 acre; >300 linear feet of intermittent stream bed; construction of farm buildings in farmed wetlands	Yes	Non-tidal waters of the U.S., except non-tidal wetlands adjacent to tidal waters and navigable waters of the U.S.
NWP 41–Reshaping Existing Drainage Ditches	404	None	reshape >500 linear feet of drainage ditch	Yes	Non-tidal waters of the U.S., except non-tidal wetlands adjacent to tidal waters and navigable waters of the U.S.
NWP 42–Stormwater Management Facilities	404	1/2 acre; 300 linear feet of perennial or intermittent stream bed	>1/10 acre; >300 linear feet of intermittent stream bed	Yes	Non-tidal waters of the U.S., except non-tidal wetlands adjacent to tidal waters and navigable waters of the U.S.
NWP 43–Stormwater Management Facilities	404	1/2 acre for construction of new facilities; 300 linear feet of perennial or intermittent stream bed	>1/10 acre; >300 linear feet of intermittent stream bed	Yes	Non-tidal waters of the U.S., except non-tidal wetlands adjacent to tidal waters and navigable waters of the U.S.
NWP 44–Mining Activities	10/404	1/2 acre	All activities	No	Isolated waters and non-tidal wetlands adjacent to headwater streams; aggregate mining in lower perennial streams

Pursuant to Section 1603, after the notification is deemed complete, CDFG determines whether the activity may substantially adversely affect an existing fish and wildlife resource. If CDFG determines that the activity may have that effect, CDFG shall provide a draft agreement to the entity within 60 days after the notification is complete. The draft agreement describes the fish and wildlife resources that CDFG has determined the activity may substantially adversely affect and includes measures to protect those resources. CDFG's description of the affected resources must be specific and detailed, and CDFG must make available, upon request, the information upon which its determination of substantial adverse effect is based.

In *A Field Guide to Lake and Streambed Alteration Agreements: Section 1600-1607 California Fish and Game Code*, CDFG personnel are provided the following guidance relative to implementation of the Section 1600 Program.

> *While there is no definition for the term lake in the Fish and Game Code or associated regulations, there has been little problem with applying the agreement process to lake bed alterations. The term stream, which includes creeks and rivers, is defined in Title 14, California Code of Regulations (CCR), Section 1.72 as follows:*
>
> > *"A stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation."*
>
> *However, this definition is not complete with respect to Sections 1601 or 1603 because it does not define the terms bed, channel, or bank and does not define other stream-related features such as aquatic life, riparian vegetation, etc. It is therefore incumbent on Department personnel to develop a sense of what constitutes a stream for purposes of implementing and enforcing sections 1600–1607 and Lake/Streambed Alteration Agreements.*
>
> *The following concepts have therefore been developed to assist Department employees in this endeavor.*
>
> 1. *The term stream can include intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams (United States Geological Survey Maps, USGS), and watercourses with subsurface flow. Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent wildlife.*
>
> 2. *Biologic components of a stream may include aquatic and riparian vegetation, all aquatic animals including fish, amphibians, reptiles, invertebrates, and terrestrial species, which derive benefits from the stream system.*
>
> 3. *As a physical stream, a stream not only includes water (at least on an intermittent or ephemeral basis), but also a bed, bank, and/or levee, instream features such as logs or snags, and various floodplains depending on the return frequency of the flood event being considered (i.e., 10, 50, or 100 years, etc.)*
>
> 4. *The lateral extent of a stream can be measured in ways depending on a particular situation and the type of fish or wildlife resources at risk. The following criteria are presented in order from the most inclusive to the least inclusive.*

A. The floodplain of a stream can be the broadest measurement of a stream's lateral extent depending on the return frequency of the flood event used. For most flood control purposes, the 100-year flood event is the standard measurement and maps of the 100-year floodplain exist for many streams. However, the 100-year floodplain may include significant amounts of upland or urban habitat and therefore may not be appropriate in many cases.

B. The outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats and is therefore a reasonable and identifiable boundary for the lateral extent of a stream. In most cases, the use of this criterion should result in protecting the fish and wildlife resources at risk.

C. Most streams have a natural bank which confines flows to the bed or channel except during flooding. In some instances, particularly on smaller streams or dry washes with little or no riparian habitat, the bank should be used to mark the lateral extent of a stream.

D. A levee or other artificial stream bank could be used to mark the lateral extent of a stream. However, in many instances, there can be extensive areas of valuable riparian habitat located behind a levee.

Any of the above criteria could be applicable in determining what constitutes a stream depending on the potential for the proposed activity to adversely affect fish and other stream-dependent wildlife resources.

Therefore, with respect to the areas evaluated for the SAMP, the outer limits of CDFG jurisdiction would be defined as the outer limits of habitat functionally considered to be riparian as contrasted with "uplands" habitat.

Regional Water Quality Control Board

Pursuant to 33 CFR 330.4(c), the USACE cannot issue a Section 404 Permit until an Individual 401 Water Quality Certification has been obtained. In California on non-tribal lands, Section 401 Certifications are issued by the RWQCBs.

Subsequent to the SWANCC decision, the Chief Counsel for the SWRCB issued a memorandum that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program.[1] The memorandum states:

California's right and duty to evaluate certification requests under section 401 is pendant to (or dependent upon) a valid application for a section 404 permit from the Corps, or another application for a federal license or permit. Thus if the Corps determines that the water body in question is not subject to regulation under the COE's 404 program, for instance, no application for 401 certification will be required…

The SWANCC decision does not affect the Porter Cologne authorities to regulate discharges to isolated, non-navigable waters of the states….

[1] Wilson, Craig M. January 25, 2001. Memorandum addressed to State Board Members and Regional Board Executive Officers.

> *Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." (Water Code § 13260(a)(1) (emphasis added).) The term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." (Water Code § 13050(e).) The U.S. Supreme Court's ruling in SWANCC has no bearing on the Porter-Cologne definition. While all waters of the United States that are within the borders of California are also waters of the state, the converse is not true – waters of the United States is a subset of waters of the state. Thus, since Porter-Cologne was enacted California always had and retains authority to regulate discharges of waste into any waters of the state, regardless of whether the COE has concurrent jurisdiction under section 404. The fact that often Regional Boards opted to regulate discharges to, e.g., vernal pools, through the 401 program in lieu of or in addition to issuing waste discharge requirements (or waivers thereof) does not preclude the regions from issuing WDRs (or waivers of WDRs) in the absence of a request for 401 certification….*

In this memorandum, the SWRCB's Chief Counsel has made the clear assumption that fill material to be discharged into isolated Waters of the U.S. is to be considered equivalent to "waste" and therefore subject to the authority of the Porter-Cologne Water Quality Act. However, while providing a recounting of the Porter-Cologne Water Quality Act's definition of Waters of the U.S., this memorandum does not also reference the Porter-Cologne Water Quality Act's own definition of waste:

> *"Waste" includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.*

The lack of inclusion of a reference to "fill material," "dirt," "earth" or other similar terms in the Porter-Cologne Water Quality Act's definition of "waste," or elsewhere in the Porter-Cologne Water Quality Act, suggests that no such association was intended. Thus, the Chief Counsel's memorandum signals that the SWRCB is attempting to retain jurisdiction over discharge of fill material into isolated Waters of the U.S. by administratively expanding the definition of "waste" to include "fill material" without actually seeking amendment of the Porter-Cologne Water Quality Act's definition of waste (an amendment would require action by the state legislature). Consequently, discharge of fill material into Waters of the State not subject to the jurisdiction of the USACE pursuant to Section 404 of the Clean Water Act may require authorization pursuant to the Porter-Cologne Water Quality Act through application for waste discharge requirements (WDRs) or through waiver of WDRs, despite the lack of a clear regulatory imperative.

4.1.2.2 Existing Riparian Resources in the Watersheds

Terminology

Use of the terms "riparian" and "wetland" may lead to confusion unless explicitly defined. Within this EIS, the following definitions apply:

Aquatic General reference to various water-oriented habitats such as rivers, streams, creeks, ponds, lakes, etc. These resources may be perennial, intermittent, or ephemeral in nature.

Waters of the U.S. Refers to Federally regulated streams classified as non-wetlands, as well as wetlands, bordered by an Ordinary High Water Mark (OHWM). Waters of the U.S. are regulated by the USACE.

Wetland Refers to the Federal definition, and requires three parameters to be present: hydrologic indicators, hydric soil, and hydrophytic vegetation. Wetlands are a subset of Waters of the U.S. Wetlands in a riparian context are regulated by the USACE.

Riparian Term used for areas within and adjacent to rivers, streams, and creeks. These areas typically support plant species adapted to (or can tolerate) occasional or permanent flooding and/or saturated soils.

Riparian Habitat Refers to habitat found in a riparian setting, and includes areas within the jurisdiction of the USACE. Riparian habitat would contain the applicable river, stream, or creek (within an OHWM). Riparian habitat may contain three-parameter wetlands (Federal definition), but usually does not.

Riparian Ecosystem An ecosystem defined by linear corridors of variable width occurring along rivers, streams, and creeks. Hydrologic interaction (with a river, stream, or creek) and distinct geomorphic features are two unique components of this ecosystem.

Several efforts to map aquatic resources within the SAMP Study Area have been undertaken to support SAMP planning. These include (1) a planning-level delineation performed by the USACE to identify potentially regulated wetlands and Waters of the U.S. over a large area (watershed-scale), (2) a functional assessment performed by the USACE to characterize and rank the "integrity" of the SAMP Study Area riparian ecosystems in order to provide the basis for evaluating the impacts of various open space/development alternatives on riparian ecosystems, (3) an on-site (or project-level) jurisdictional delineation performed by Glenn Lukos Associates (GLA) and approved by the USACE to identify actual (versus potentially) regulated wetlands and Waters of the U.S. within the RMV Planning Area, and (4) mapping of invasive species within the RMV Planning Area and Caspers Regional Park riparian ecosystems performed by PCR and GLA (for the RMV Planning Area) and County of Orange staff (Caspers Regional Park). These efforts are discussed in further detail below.

4.1.2.3 Planning-Level Delineation of Riparian Ecosystems

The USACE (Lichvar et al. 2000) conducted a delineation of aquatic resources within the San Juan Watershed and the western portion of the San Mateo Watershed within the SAMP Study Area, including riparian habitats, wetlands, and non-vegetated streams within the jurisdictions of the USACE. Aquatic resources were identified using a high precision planning-level delineation approach that adjusts the sampling methods outlined in the *Corps Wetlands Delineation Manual* ("Wetlands Manual") (Environmental Laboratory, 1987)[2] and 33 CFR 328, and applies them at a watershed scale. This planning-level delineation approach allowed for the identification of different types of potentially regulated wetlands and Waters of the U.S. over a large area (watershed scale). Details of the planning-level delineation methodology are included in Appendix E1. While the approach provides a high quality map of probable jurisdictional

[2] Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

wetlands and Waters of the U.S., suitable for use in large scale project planning, it does not serve as a substitute for the on-site jurisdictional delineation that is normally conducted as part of Section 404 Permit review process. In this SAMP, a planning-level delineation was used in the formulation of different open space/development alternatives. An on-site jurisdictional delineation has been completed for the RMV Planning Area. This detailed on-site jurisdictional delineation is used to determine impacts to jurisdictional Waters of the U.S.

Lichvar et al. (2000) evaluated the existing vegetation spatial databases (maps) supplied by the County of Orange. However, Lichvar et al. (2000) did not uses these maps because of the following limitations: (1) numerous rectification problems, (2) lacked of sufficient detail to produce acceptable wetland maps, and (3) a spatial extent of the map units was too large to be used for the SAMP Study Area. In order to develop the wetland delineation map units, Lichvar et al. (2000) developed a new spatial database for use in this project (Appendix E1).

The narrow streams were digitized by stereoscoping the locations on aerial photographs and then digitizing the coverage by using the rectified orthophoto quadrangle as a background. The first-order streams, identified on the coverages as lines (referred to as 'WoUS1'), were 15 feet or less wide.

Planning-Level Delineation Results

Based on the planning-level delineation, aquatic resources including riparian and Waters of the U.S. within San Juan Creek Watershed and the western portion of the San Mateo Creek Watershed, are depicted in Figure 4.1.2-1. There were 984 miles (1,585 km) of ephemeral and intermittent stream channels identified as potentially Waters of the U.S. These areas were mostly first and second order streams and located higher in the watersheds.

Thirty-one vegetation (riparian and some upland) and aquatic resource categories were identified by Lichvar et al. (2000). Thirteen distinct associations of riparian vegetation are present in the SAMP Study Area. Additional information about species typically found in these community designations may be found in Lichvar et al. (2000), USACE (2001), and Jones and Stokes Associates (1993). Descriptions of the riparian vegetation types are provided below.

Riparian Communities in the SAMP Study Area

As identified on Table 4.1.2-2 and as previously depicted on Figure 4.1.2-1, there are 9,287.6 acres of aquatic habitats in the SAMP Study Area. Of these, about 3,222.2 acres would qualify as Waters of the U.S. based on geomorphology (bankfull channel or active floodplain) and hydrophytic vegetation within the terraces (jurisdictional rating of 1-4) and non-floodplain areas (jurisdictional rating of 1-3). Thirteen of the Lichvar categories represent distinct associations of riparian or wetland vegetation that occur in the SAMP Study Area with an additional nine associations that are typically associated with uplands. Three of the aquatic categories represent aquatic features (e.g., open water, fluctuating shoreline, or spreading grounds and detention basins) and one category (Mitigation Site) is not identified relative to the cover type. In order of prevalence, the vegetation associations represented are: southern coast live oak riparian forest, coast live oak woodland, mule fat scrub, willow riparian scrub (southern willow scrub), southern sycamore riparian woodland, bigcone spruce-canyon live oak forest, white alder riparian forest, open water, southern arroyo willow riparian forest, floodplain sage scrub, canyon live oak ravine forest, coast live oak forest, canyon live oak forest, coastal freshwater marsh, herbaceous riparian, lemonadeberry riparian, *Arundo donax*, annual grassland, coast live oak savanna, ruderal wetland, eucalyptus, narrow-leaved willow riparian forest, chamise-scrub, and southern coastal salt marsh. The lemonadeberry riparian, narrow-

leaved riparian, eucalyptus, ruderal wetland, and *Arundo donax* associations are not included in the Gray and Bramlet (1992) habitat classification system, but were mapped in the Lichvar et al. (2000) and PCR/BALANCE/PWA studies based on the dominance of particular species. The descriptions of these riparian communities primarily are based on Gray and Bramlet (1992) and Michael Brandman Associates (1996).

TABLE 4.1.2-2
RIPARIAN AND WETLAND HABITATS IN THE SAMP STUDY AREA

Vegetation Community	Total Acres	Waters of the U.S. Acres
Riparian/Wetland Habitats		
Annual Grassland	9.7	0
Arundo donax	15.3	15.3
Bigcone Spruce-Canyon Live Oak Forest	477.7	0
Canyon Live Oak Forest	195.0	0
Canyon Live Oak Ravine Forest	243.9	30.9
Chamise-Sage Scrub	0.5	0
Coast Live Oak Forest	239.5	0
Coast Live Oak Savanna	5.6	0
Coast Live Oak Woodland	851.1	0.1
Coastal Freshwater Marsh	141.3	141.3
Eucalyptus	2.8	0.3
Floodplain Sage Scrub	280.2	69.0
Fluctuating Shorelines	4.7	4.7
Mitigation site	21.8	21.8
Mulefat Scrub	778.7	584.3
Open Water	345.0	345.0
Rhus integrifolia	16.2	4.6
Riparian Herb	22.1	3.7
Ruderal	4.3	0
Salix exigua	1.9	1.9
Southern Arroyo Willow Forest	307.7	307.7
Southern Coast Live Oak Riparian Forest	3,018.6	30.0
Southern Coastal Salt Marsh	0.2	0.2
Southern Sycamore Riparian Woodland	619.9	293.4
Southern Willow Scrub	727.8	727.8
Spreading Grounds and Detention Basins	21.7	21.7
White Alder Riparian Forest	342.1	26.2
Riparian/Wetland Habitats Subtotal	8,695.3	2629.9
Watercourses		
Intermittent Rivers and Streams	304.5	304.5
Perennial Rivers and Streams	112.3	112.3
Flood Control Channels	28.4	28.4
Ephemeral Rivers and Streams[a.]	147.1	147.1
Watercourses Subtotal	592.3	592.3
Total Aquatic Habitats	9,287.6	3,222.2

a. Assuming specific widths of 1 foot for 1st order Strahler streams, 3 feet width for 2nd order Strahler streams, and 5 feet width for 3rd order Strahler streams, there were about 146.48 acres of ephemeral streams. The estimate for acreage of ephemeral streams is 147.07 acres, after including 0.59 acre of the larger order ephemeral streams.

Source: Lichvar et al. database (2000)

***Annual Grassland*.** Areas of annual grassland occur on terraces adjacent to the bankfull channel and form a mosaic with wetland and riparian habitats, accounting for 9.7 acres in the SAMP Study Area. Areas of annual grassland are dominated by grasses of Mediterranean origin including wild oats (*Avena fatua*, Obligate Upland [UPL]), slender wild oats (*Avena barbata*, UPL), red brome (*Bromus madritensis* ssp. *rubens*, Neutral Indicator [NI]), ripgut brome (*Bromus diandrus*, UPL), softchess (*Bromus hordeaceus*, Facultative Upland [FACU]), and hare barley (*Hordeum murinum* ssp. *leporinum*, NI).

Arundo Donax. Giant reed or *Arundo donax* riparian refers to areas dominated by the non-native giant reed (*Arundo donax*, Facultative Wetlands [FACW]). It is a classification used in Lichvar et al. (2000) and is not included in the Gray and Bramlet (1992) habitat classification system. Giant reed riparian comprises approximately 15.3 acres in the SAMP Study Area, occurring in scattered patches in Arroyo Trabuco below Oso Parkway and in various locations in San Juan Creek.

Bigcone Spruce-Canyon Live Oak Forest. Bigcone spruce-canyon live oak forest is a montane riparian community of steep headwaters of mainstreams dominated by bigcone Douglas fir (*Pseudotsuga macrocarpa*, UPL) and canyon live oak (*Quercus chrysolepis*, UPL). Big-leaf maple (*Acer macrophyllum,* Facultative [FAC]), California laurel (*Umbellularia californica*, FAC), coast live oak (*Quercus agrifolia*, UPL), and interior live oak (*Quercus wislizeni*, UPL) are also associated with this habitat. Bigcone spruce-canyon live oak forest covers approximately 477.7 acres in the SAMP Study Area and occurs in scattered locations in the Cleveland National Forest generally north of Arroyo Trabuco.

Canyon Live Oak Forest and Live Oak Ravine Forest. Both communities are montane habitats with Canyon live oak ravine forest generally associated with the steep headwaters of mainstem drainages. Both communities are dominated by canyon live oak, big-leaf maple, California laurel, coast live oak, bigcone Douglas fir, and interior live oak. Canyon live oak forest accounts for approximately 195 acres in the SAMP Study Area and canyon live oak ravine forest covers about 243.9 acres in the SAMP Study Area. Both occur in scattered locations in the Cleveland National Forest generally north of Arroyo Trabuco.

Chamise Sage Scrub. Chamise sage scrub is generally an upland community throughout the SAMP Study Area and is limited to approximately 0.5 acre where it occurs on terraces or within the flood prone area of drainages in the SAMP Study Area.

***Coast Live Oak Forest, Coast Live Oak Savanna, and Coast Live Oak Woodlands*.** Oak-dominated habitats occur within canyons and slopes throughout the SAMP Study Area and are dominated by coast live oak which can form areas of dense canopy in the coast live oak forest and open canopies in the savanna and woodland communities. These communities account for approximately 239.5, 5.6, and 851.12 acres, respectively, within the SAMP Study Area.

***Coastal Freshwater Marsh*.** Coastal and valley freshwater marshes are seasonally or permanently flooded sites typically dominated by perennial hydrophytic monocots up to 6.5 feet in height (Gray and Bramlet 1992; Kramer 1988). Freshwater marsh supports cattails (*Typha domingensis,* Obligate Wetland [OBL]; *T. angustifolia*, OBL), bulrush (*Scirpus americanus,* OBL; *S. maritimus,* OBL; *S. californicus,* OBL; *S. acutus,* OBL, *S. microcarpus*, OBL), sedges (*Cyperus eragrostis,* FACW; *C. niger,* OBL; *C. odoratus,* FACW; *C. esculentus*, FACW), spikerushes (*Eleocharis acicularis,* OBL; *E. macrostachya*, OBL), and yerba mansa (*Anemopsis californica*, OBL) (Barbour and Major 1977; Holland and Keil 1995; Michael Brandman Associates 1996; Sawyer and Keeler-Wolf 1995). Forbs in freshwater marsh include marsh fleabane (*Pluchea odorata*, OBL), common monkeyflower (*Mimulus guttatus*, OBL), scarlet

monkeyflower (*Mimulus cardinalis*, OBL), willow weed (*Polygonum lapathifolium*, OBL), whorled dock (*Rumex conglomerates*, FACW), willow dock (*Rumex salicifolius*, OBL), willow-herb (*Epilobium ciliatum*, FACW), yellow waterweed (*Ludwigia peploides*, OBL), cut-leaf water parsnip (*Berula erecta*, OBL), slender aster (*Aster subulatus* var. *ligulatus*, FACW), rosilla (*Helenium puberulum*, FACW), western goldenrod (*Euthamia occidentalis* OBL), white water-cress (*Rorippa nasturtium-aquaticum*, OBL), and stinging nettle (*Urtica dioica* ssp. *holosericea*, FACW) (Michael Brandman Associates 1996). Grasses associated with freshwater marsh include rabbits-foot grass (*Polypogon monspeliensis*, FACW+), knotgrass (*Paspalum distichum*, OBL), water bent (*Agrostis viridis*, FACW), Mexican sprangletop (*Leptochloa uninervia*, FACW), and western witchgrass (*Panicum capillare*, FAC).

Freshwater marsh occurs throughout the SAMP Study Area, accounting for approximately 141.3 acres, generally in association with creeks and drainages, including Arroyo Trabuco, Chiquita Canyon, Cañada Gobernadora, San Juan Creek, Cristianitos Creek, upper Gabino Canyon, and Dove Canyon.

***Eucalyptus*.** The non-native blue gum eucalyptus (*Eucalyptus globules*, UPL) occurs adjacent to drainage courses within the SAMP Study Area, accounting for approximately 2.8 acres.

***Floodplain Sage Scrub*.** Floodplain sage scrub is associated with high-energy drainages such as San Juan Creek, Verdugo Creek and Cristianitos Creek, occurring on the drier terraces that are subject to scouring flows during large storm events (i.e., ten-year return interval or greater). Dominant species include scalebroom (*Lepidospartum squamatum*, UPL), California bricklebush (*Brickellia californica*, FACU), California buckwheat (*Eriogonum fasciculatum*, UPL), California sagebrush (*Artemisia* californica, UPL), Sonora everlasting (*Gnaphalium leucocephalum*, UPL), and mule fat (*Baccharis salicifolia*, FACW). This community accounts for approximately 280.2 acres within the SAMP Study Area.

Fluctuating Shorelines. Fluctuating shorelines consist of fringe habitat along natural or man-made lacustrine waterbodies. Natural lacustrine fluctuating shoreline hydrology respond to water levels driven by seasonal precipitation events, with inundation occurring in winter and early spring and exposure occurring in summer and fall. Along man-made waterbodies, fluctuating shoreline hydrology responds to inputs and outputs of water for the purpose of water supply and treatment. Due to the regular inundation, fluctuating shorelines are generally unvegetated with occasional opportunistic growth of more ruderal wetland species. They are located in the Upper Oso Reservoir and Dove Canyon Reservoir.

Mitigation Sites. Mitigation sites are aquatic resource habitats created by humans. Oftentimes, the mitigation sites are created to compensate the loss of aquatic resource habitat elsewhere. The habitat types within mitigation sites vary from herbaceous marsh to southern willow scrub to sycamore woodland, depending on the goals and purposes of the mitigation. The mitigation sites are located in Chiquita Creek and Gobernadora Creek.

***Mule Fat Scrub*.** Mule fat scrub is dominated by mule fat, but also may include willows (*Salix* spp.), sedges (*Carex* spp.), stinging nettle, Bermuda grass (*Cynodon dactylon*, FAC), western ragweed (*Ambrosia psilostachya*, FAC), California mugwort (*Artemisia douglasiana*, FACW), Douglas nightshade (*Solanum douglasii*, FAC), castorbean (*Ricinus communis*, FACU), cocklebur (*Xanthium* spp.), rabbit's-foot grass, knotgrass, and barnyard grass (*Echinochloa crus-galli*, FACW). (Gray and Bramlet 1992; Holland 1986; Sawyer and Keeler-Wolf 1995). Mule fat scrub usually occurs in intermittent streambeds, seeps, and the toe of landslides where local seeps develop.

Mule fat scrub comprises approximately 778.7 acres in the SAMP Study Area and occurs in drainages throughout the SAMP Study Area. Areas with large concentrations of mule fat scrub include Arroyo Trabuco, San Juan Creek, Cañada Gobernadora, Bell Canyon, lower Gabino Canyon, La Paz Canyon, Verdugo Canyon, and upper Cristianitos Creek.

Open Water. Open water refers to permanent or semi-permanent bodies that hold water year-round or for the majority of the year (as opposed to vernal pools which are more ephemeral). They may support vegetation that is tolerant of, or requires, permanently flooded conditions (Gray and Bramlet 1992). Open water often contains several phytoplankton species and filamentous blue-green and green algae (Gray and Bramlet 1992). Other vegetation in lakes and reservoirs includes aquatic species such as horned-pondweed (*Zannichellia palutris*), mosquito fern (*Azolla filiculoides*), duckweed (*Lemna* spp.), milfoil (*Myriophyllum* spp.), waterwort (*Elatine* sp.), fennel-leaved pondweed (*Potamogeton pectinatus*), common water nymph (*Najas guadalupensis*), and hornwort (*Ceratophyllum demersum*) (Gray and Bramlet 1992; Michael Brandman Associates 1996). Emergent hydrophytes include cattail, bulrush, nutsedge, spikerush, and knotgrass (Michael Brandman Associates 1996). Terrestrial species along the fluctuating shoreline of lakes and reservoirs include willow, mule fat, dock, sharp-leaved Timothy (*Crypsis vaginiflora*, OBL), toad rush (*Juncus bufonius*, FACW=), hyssop loosestrife (*Lythrum hyssopifolium*, FACW), and cocklebur. Invasive forbs and grasses along shorelines include Bermuda grass, barnyard grass, *Setaria* spp., *Chenopodium* spp., and pigweed (*Amaranthus* spp.).

A variety of migratory and resident wildlife use open water and the associated emergent and shoreline vegetation for breeding, foraging, and resting. Wildlife species indicative of open water and the potential presence of other species using these habitats include great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), snowy egret (*Egretta thula*), pied-billed grebe (*Podilymbus podiceps*), tricolored blackbird (*Agelaius tricolor*), red-winged blackbird (*Agelaius phoeniceus*), sora, common yellowthroat, southwestern pond turtle (*Emys* [*Clemmys*] *marmorata pallida*), Pacific chorus frog (*Pseudacris* [*Hyla*] *regilla*), western toad (*Bufo boreas*), and various bats (Science Advisors 1997).

The SAMP Study Area includes 345 acres of open waters ranging in size from small lakes and ponds to large reservoirs such as Lake Mission Viejo and Upper Oso Reservoir. Smaller bodies of open water are scattered throughout the SAMP Study Area, including Cristianitos Canyon, upper Gabino Canyon (Jerome's Lake), San Juan Creek (CalMat Lake), Lower Arroyo Trabuco, and Coto de Caza (Portola Reservoir).

***Lemonadeberry (Rhus Integrifolia) Riparian*.** Lemonadeberry riparian is a classification used in the USACE Engineer Research and Development Center/CRREL and PCR/BALANCE/PWA study and is not included in the Gray and Bramlet (1992) habitat classification system. It comprises approximately 16 acres in the planning area and only occurs in patchy locations in upper Gabino Canyon, Verdugo Canyon, Lucas Canyon, and an unnamed drainage adjacent to Cristianitos Road northwest of Cristianitos Creek. It was not mapped in the Cleveland National Forest. Lemonadeberry is a xeric-adapted chaparral species that is not dependent upon stream or river courses. Lemonadeberry is listed by Reed (1988)[3] as an upland species (UPL) and by Sawyer and Keeler-Wolfe (1996)[4] (under sumac series) as "uplands" vegetation type and is thus not a riparian species when considered in the context of aquatic functions.

[3] Reed, P.B., Jr. 1988. *National List of Plant Species that Occur in Wetlands*. U.S. Fish and Wildlife Service Biological Report 88(26.10).

[4] Saywer, John, O. and Todd Keerler-Wolfe. 1995. *A Manual of California Vegetation*. California Native Plant Society, Sacramento.

In all cases, the vegetation identified by USACE Engineer Research and Development Center/CRREL as lemonadeberry were classified as southern willow scrub or upland non-riparian habitat in the Southern Subregion NCCP/HCP vegetation mapping. In addition, the three polygons that occur within the GLA project-level delineation SAMP Study Area were identified in the field as upland habitat with which CDFG concurred.

***Ruderal Wetland*.** Ruderal wetland is characterized by a predominance of non-native herbaceous species, consistent with disturbance. Approximately 4.3 acres of this association occurs within the SAMP Study Area. Characteristic species include bristly ox-tongue (*Picris echioides*, FAC*), Spanish sunflower (*Pulicaria paludosa*, FACW), prickly sow-thistle (*Sonchus asper*, FAC), hyssop loosestrife, lambsquarters (*Chenopodium album*, FAC), tumbling pigweed (*Amaranthus albus*, FAC), sharp-leaved timothy, and five-hook bassia (*Bassia hyssopifolia*, FAC).

***Riparian Herb*.** Riparian herb typically comprises an early successional stage of riparian scrub or forest typically resulting from occasional to frequent flooding or scouring of woody vegetation. Disturbed sites are colonized by both native and non-native, mostly annual opportunistic wetland species such as knotgrass, willow herb, barnyard grass, cattails, Mexican sprangletop, smooth cocklebur, Johnson grass (*Sorghum halapense*, FACW), rabbits-foot grass, white watercress, water speedwell, willow knotweed, tall nutsedge, toad rush, Mexican tea (*Chenopodium ambrosioides*, FAC), and yellow nutsedge.

Riparian herb comprises approximately 22 acres in the SAMP Study Area. Herbaceous riparian occurs in scattered locations, including Chiquita Canyon, Cañada Gobernadora, Trampas Canyon, upper Arroyo Trabuco, and lower Hot Spring Canyon. This vegetation type is typically associated with areas that exhibit an abundance of water and there is generally a distinct boundary between the herbaceous understory and the adjacent upland scrub or grassland habitat.

***Narrow-leaved Willow (Salix exigua) Riparian*.** Narrow-leaved willow riparian forest is a classification created by the USACE Engineer Research and Development Center/CRREL and PCR/BALANCE/PWA study. It refers to areas dominated by narrow-leaved willow (*Salix exigua*, OBL). Narrow-leaved willow riparian forest comprises only two acres in two patches in San Juan Creek and upper La Paz Canyon. This vegetation type is typically associated with areas that exhibit intermittent flows and/or high groundwater levels (e.g., within 10 to 15 feet of the surface during the dry season). There is generally a distinct boundary between the willow canopy and the adjacent upland scrub or grassland habitat.

***Southern Arroyo Willow Riparian Forest*.** Southern arroyo willow riparian forest has a closed canopy of arroyo willow in arborescent form. Arroyo willow (*Salix lasiolepis*, FACW) is the dominant species; however, the canopy can also include red willow (*S. laevigeta*, FACW), black willow (*S. gooddingii*, OBL) and occasionally yellow willow (*S. lucida* ssp. *lasiandra*, OBL) and black cottonwood (*Populus balsamifera* ssp. *trichocarpa*, FACW). Understory components include mugwort, mule fat, Olney's bulrush, and marsh fleabane. It comprises nearly 308 acres in the SAMP Study Area. This vegetation community occurs in Chiquita Canyon south of Oso Parkway, portions of lower Arroyo Trabuco, San Juan Creek south of its confluence with Bell Canyon, Cañada Gobernadora throughout Coto de Caza, above and associated with Oso Reservoir, and lower Cristianitos Creek. This vegetation type is typically associated with areas that exhibit an abundance of surface water or areas of high groundwater and there is generally a distinct boundary between the willow canopy and the adjacent upland scrub or grassland habitat.

***Southern Coast Live Oak Riparian Forest*.** Southern coast live oak riparian forest is dominated by coast live oak, with western sycamore (*Platanus racemosa*, FACW) and Mexican elderberry (*Sambucus mexicana*, FAC) as subdominants. Arroyo willow, red willow, and Gooding's black willow sometimes occur in the most mesic areas as small clumps or patches. Understory vegetation includes holly-leaf redberry (*Rhamnus ilicifolia*, UPL), California coffeeberry (*Rhamnus californica*, UPL), mule fat, coastal goldenbush (*Isocoma menziesii* ssp. *veneta*, UPL), poison oak (*Toxicodendron diversilobum*, UPL), toyon (*Heteromeles arbutifolia*, UPL), laurel sumac (*Malosma laurina*, UPL), California mugwort, and Douglas nightshade.

Southern coast live oak riparian forest is by far the most common riparian vegetation community in the SAMP Study Area. USACE Engineer Research and Development Center/CRREL mapped approximately 3,018 acres. This habitat type occurs throughout the SAMP Study Area, including Arroyo Trabuco, San Juan Creek, Cañada Gobernadora, Chiquita Canyon, Cristianitos Creek and its tributaries, Gabino Canyon, Airplane Canyon, Verdugo Canyon, Bell Canyon, Crow Canyon, Trampas Canyon, Live Oak Canyon, Lion Canyon, Hot Spring Canyon, Hickey Canyon, and Rose Canyon.

***Southern Coastal Salt Marsh*.** Southern coastal salt marsh is limited in the SAMP Study Area to approximately 0.20 acre near the mouth of San Juan Creek. Characteristic species include common pickleweed (*Salicornia virginica*, OBL), alkali heath (*Frankenia salina*, FACW), fleshy jaumea (*Jaumea carnosa*, OBL), and saltgrass (*Distichlis spicata*). This association is typically associated with intermittent tidal flooding and freshwater flooding during the winter and spring rainy season.

***Southern Sycamore Riparian Woodland*.** Southern sycamore riparian woodland is an open to dense woodland dominated by western sycamore and coast live oak. Understory vegetation includes scalebroom, mule fat, willow riparian scrub (see description below), holly-leaf redberry, California coffeeberry, laurel sumac, Mexican elderberry, fuchsia-flowered gooseberry (*Ribes speciosum*, UPL), poison-oak, giant ryegrass (*Leymus condensatus*, UPL), beardless wild rye (*Leymus tritocoides*, FAC), lemonadeberry (*Rhus integrifolia*, UPL), Douglas nightshade, and California mugwort. Large patches of grassland dominated by upland brome and Italian ryegrass (*Lolium multiflorum*, UPL) also may be present.

Sycamore riparian woodland comprises approximately 619 acres in the SAMP Study Area. It generally is associated with floodplains and terraces of larger streams such Arroyo Trabuco, upper San Juan Creek, upper Bell Canyon, Fox Canyon, Lion Canyon, Gabino Canyon, and La Paz Canyon. This vegetation type does not exhibit an abrupt boundary with adjacent uplands. Western sycamore is a phreatophyte, meaning that it is deep rooted (sometimes at 60 feet or more), in contact with deep groundwater that is often beyond the rooting depth of upland species. This results in a community/vegetation type that supports FACW, FAC, and UPL species with western sycamore exhibiting an indicator status of FACW.

***Southern Willow Scrub*.** Southern willow scrub is dominated by willows (*Salix* spp.) but typically lack the arborescent form of the southern arroyo willow forest. Associated species typically include gooseberry (*Ribes* spp.), Mexican elderberry, mule fat, and an understory of herbaceous hydrophytes. Arroyo willow is the dominant species within perennial and intermittent stream channels at elevations up to about 2,450 feet.

Southern willow scrub comprises approximately 727.8 acres in the SAMP Study Area and is found in lower Arroyo Trabuco and patchy distributions in upper Chiquita Canyon, throughout Cañada Gobernadora, lower San Juan Creek, Cristianitos Canyon, Trampas Canyon, tributaries to Verdugo Canyon, and in various smaller drainages and tributaries throughout the SAMP

Study Area in the Cleveland National Forest. As noted above, this vegetation type is typically associated with areas that exhibit intermittent surface water and perched groundwater at depths where it available to the plants during the dry season. Typically there is a distinct boundary between the willow canopy and the adjacent upland scrub or grassland habitat.

Spreading Grounds and Detention Basins. Spreading grounds and detention basins consist of impoundments of streambeds for the control of flooding and sediments. Spreading grounds and detention basins are generally soft-bottom and are routinely maintained by flood control agencies or private landowners. Sometimes there are opportunistic growth of herbaceous riparian, willow riparian scrub, and mule fat scrub vegetation in between maintenance cycles. Within the SAMP Study Area, spreading grounds and detention basins are limited to less than 22 acres.

***White Alder Riparian Forest*.** White alder riparian forest typically is a riparian association associated with perennial streams and is dominated by white alder (*Alnus rhombifolia*, FACW). In lower elevations, this association often forms a mosaic with willow-dominated associations. In upper elevation areas within the Cleveland National Forest, associated species include California laurel and big-leaf maple. California mugwort, California rose (*Rosa californica,* FACW), and California blackberry (*Rubus ursinus*, FACW) occur as understory species. White alder riparian forest comprises approximately 342 acres and occurs in upper Arroyo Trabuco and its tributaries Holy Jim Canyon and Falls Canyon, as well as upper Bell Canyon, Hot Spring Canyon, and Cold Spring Canyon. It also occurs in small patches at lower elevations in Cristianitos Creek and Bell Canyon. This vegetation type is typically associated with areas that exhibit an abundance of surface water and there is generally a distinct boundary between the alder canopy and the adjacent upland scrub or grassland habitat.

Description of Watercourses

***Intermittent Rivers and Streams*.** Intermittent streams and creeks include watercourses such as streams and rivers that temporarily contain water during rain events and shortly thereafter. Portions of intermittent streams and creeks can be vegetated with plants found in the herbaceous riparian vegetation type and/or the willow riparian scrub, woodland, or forest vegetation types. These drainage features may provide functions such as nutrient cycling, groundwater recharge, and habitat support. Lichvar et al. (2000) mapped intermittent rivers and streams, perennial rivers and streams, flood control channels, and ephemeral rivers and streams (Figure 4.1.2-1). Intermittent rivers and streams were mapped for upper Arroyo Trabuco, Bell Canyon, and San Juan Creek and comprise the majority (303 acres) of the mapped watercourses in the SAMP Study Area.

***Perennial Rivers and Streams*.** Perennial rivers and streams include watercourses such as flood control channels, streams, and rivers that contain water year-round. Portions of perennial rivers and streams can be vegetated with plants found in the herbaceous riparian vegetation type and/or the willow riparian scrub, woodland, or forest vegetation types. Within the San Juan Creek Watershed, most perennial streams result from dry-season runoff from residential areas with the notable exception of Chiquita Creek. Perennial streams and rivers comprise approximately 110 acres and are limited to smaller areas in Arroyo Trabuco between Oso Parkway and Crown Valley Parkway and a small portion of San Juan Creek.

***Flood Control Channels*.** Flood control channels consist of engineered concrete-lined and soft-bottomed watercourses designed to convey large volumes of water during rain events. Flood control channels are generally unvegetated but vary greatly and may support herbaceous riparian, willow riparian scrub, and mule fat scrub vegetation types. Many of these channels are

routinely maintained by the County of Orange (or private landowners), and usually do not contain substantial vegetation growth. Flood control channels are limited to about 28 acres in the SAMP Study Area, a small segment of San Juan Creek, a small drainage located north of La Paz Road and east of Marguerite Parkway, and a small drainage north of Olympia Road and west of Melinda Road.

***Ephemeral Rivers and Streams*.** These drainages flow during and for up to one day after precipitation events. They are delineated solely by hydrologic indicators such as the presence of an Ordinary High Water Mark (OHWM). These drainage features typically provide limited biogeochemical functions such as energy dissipation and transport of organic carbon. 'WoUS1,' described above, would fall under this descriptor. Since the Lichvar aquatic resource habitat mapping identified only those stream features greater than 10 feet in width, only 0.59 acre of ephemeral streams and washes were mapped as aquatic resource polygons. However, there is a large amount of ephemeral drainages less than 15 feet that were mapped separately as linear features. Assuming specific widths of 1 feet width for 1st order Strahler streams, 3 feet width for 2nd order Strahler streams, and 5 feet width for 3rd order Strahler streams, there were about 146.48 acres of ephemeral streams. The estimate for acreage of ephemeral streams is 147.07 acres (0.59 + 146.48) (rounded to 141.7 in Table 4.1.2-2).

Wildlife

The multiple strata (e.g., canopy, shrubs, herbaceous species) of riparian communities provide diverse and valuable habitat for terrestrial wildlife, including breeding areas, shade, cover, water, and food (Warner and Hendrix 1984). Fish and other aquatic species benefit from important shading and other attributes. Riparian areas are of particular importance because the moisture of the stream channels is important as a water source in the dry California landscape and the areas are productive during the summer months when upland plant communities tend to be dormant (Warner and Hendrix 1984; Grenfell 1988; Holland and Keil 1995). Riparian areas also function as important movement, migration, and dispersal corridors for a variety of wildlife. Wildlife species that are indicative of healthy riparian systems and the potential presence of other riparian species include red-shouldered hawk (*Buteo lineatus*), Cooper's hawk (*Accipiter cooperii*), sora (*Porzana carolina*), common yellowthroat (*Geothlypis trichas*), two-striped garter snake (*Thamnophis hammondii*), red racer (coachwhip) (*Masticophis flagellum piceus*), arroyo toad (*Bufo californicus*), California chorus frog (*Pseudacris* [*Hyla*] *cadaverina*), southwestern pond turtle, arroyo chub, threespine stickleback (*Gasterosteus aculeatus*), and several bats (Science Advisors 1997). It should be noted, however, that these species do not all occur in all types of riparian habitat. For example, the pond turtle requires perennial water and would not be expected to occur in sycamore alluvial woodland unless it is associated with a pond or perennial river or stream.

The type of wildlife species associated with watercourses depends on the location and type of watercourse (e.g., a natural stream course versus an artificial flood control channel), intermixing with riparian and wetland habitats, and availability of perennial and ephemeral water sources. Natural stream courses in San Juan Creek, lower Gabino Canyon, and Talega Canyon support the arroyo toad. Watercourses with perennial water provide habitat for two-striped garter snake, southwestern pond turtle, arroyo chub (*Gila orcutti*), threespine stickleback, and various bats (foraging habitat). Watercourses with at least ephemeral water provide habitat for other amphibian species, such as western toad and Pacific chorus frog, and reptiles, such as silvery legless lizard (*Anniella pulchra pulchra*) and red racer. Watercourses also provide movement and dispersal habitat for mammals, such as coyote (*Canis latrans*) and bobcat (*Lynx rufus*).

Human-Related Disturbances and Threats

Riparian habitats are directly threatened by conversion to other uses (e.g., agriculture, mineral extraction, and sand and gravel mining), flood control projects, and cattle grazing. Riparian areas also are directly and indirectly threatened by adjacent activities such as agriculture and urban development. These activities have many adverse effects, including reduction of the floodplain, alterations to normal fluvial processes, degradation of water quality, and colonization by exotic plant species.

4.1.2.4 Landscape-Level Functional Assessment

The USACE (Smith 2000) conducted an assessment of the riparian ecosystems of the San Juan Creek and Western San Mateo Creek Watersheds. The overall objective of the assessment was to characterize and rank the "integrity" of the riparian ecosystems in order to provide the basis for evaluating the impacts of the SAMP alternatives on riparian ecosystems. The assessment was accomplished by dividing the riparian ecosystem along the SAMP Study Area drainages into assessment units or "riparian reaches" and assessing each riparian reach using a suite of indicators of ecosystem integrity. The landscape-level Functional Assessment is included as Appendix E2.

Riparian ecosystems consist of the biological, physical, and hydrologic features that occur along perennial, intermittent, and ephemeral drainages of the SAMP Study Area. The center of the ecosystem consists of the stream channel. The hydrologic interaction between the stream channel and the adjacent areas typically results in two distinct zones. The first zone is called the active floodplain. It includes areas that are inundated by overbank flooding, which typically occurs at least once every five years. This zone exhibits the fluvial features associated with recurring flooding such as point bars, areas of scour, sediment accumulation, and debris. The second zone consists of abandoned floodplains and historical terraces formed by infrequent fluvial processes. Vegetation in the stream channel consists of aquatic species and short-lived herbaceous plants that are adapted to continual disturbances by scouring. Vegetation in the two floodplain zones are composed of woody perennials that rely on the high water tables present in the riparian zone and capable of re-establishment after floods. A profile of a typical riparian ecosystem is provided in Figure 4.1.2-2.

"Waters of the United States" consist of drainages and wetlands subject to regulation under Section 404 of the Clean Water Act, and are often a subset of the aquatic resources regulated by the CDFG. Within riparian ecosystems, "waters" include (1) perennial, intermittent, ephemeral stream channels exhibiting a distinctive bed and bank, and (2) wetland vegetation in the floodplain zones that meet the hydrologic, hydrophytic vegetation, and hydric soils criteria outlined in the Wetlands Manual. Not all vegetation in the floodplain zones meets these criteria and represents jurisdictional "waters."

Smith (2000) defined riparian ecosystems with high ecosystem "integrity" as riparian areas that (1) exhibit the full range of physical, chemical, and biological attributes and processes that characterized riparian ecosystems in the southern California region over short- and long-term cycles prior to cultural alteration; and (2) support a balanced, integrated, and adaptive biological community resulting from natural evolutionary and biogeographic processes. The concept of ecosystem integrity involves many characteristics and processes and, consequently, there is no single, direct measure of ecosystem integrity. In order to focus on the most important characteristics and processes contributing to ecosystem integrity, the USACE (2001) identified three ecosystem attributes to represent ecosystem integrity: hydrologic, water quality, and habitat integrity. The selection of these attributes follows directly from the mandate in

Section 101(a) of the Clean Water Act to "…*restore and maintain the chemical, physical, and biological integrity of the Nation's waters*."

Ecosystem Integrity Assessment Methods

In order to assess riparian ecosystem integrity, the USACE defined a standard of comparison or "reference condition." It represents a conceptual condition under which riparian ecosystems achieve and sustain a high level of integrity. For the assessment, Smith (2000) defined the reference condition as the "culturally unaltered condition," which consists of the conditions in riparian ecosystems at the SAMP Study Area that existed prior to grazing, agriculture, fire suppression, water resource management, transportation corridors, urbanization, and other cultural alterations.

"Culturally unaltered" was selected as the reference condition for the assessment because it represents the physical, chemical, and biological conditions under which riparian ecosystems have naturally evolved and, therefore, represents the physical, chemical, and biological conditions that the Clean Water Act mandates should be maintained. Culturally unaltered reference conditions are expected to be uncommon in the watershed because of the various urban and agricultural disturbances in the watershed since Spanish colonization. However, Smith (2000) states that it is possible to make reasonable speculations as to what culturally unaltered conditions were like based on examples of apparently unaltered riparian ecosystems in other portions of southern California.

In order to assess the three ecosystem integrity attributes (hydrologic, water quality, and habitat), Smith (2000) developed "indicators," which represent indirect measures of the attributes that can be readily measured through field, map, and aerial photograph investigations. A summary of the three ecosystem attributes and the indicators used by the USACE to rate the attributes of ecosystem integrity at the SAMP Study Area are provided below.

Hydrologic Integrity

Hydrologic integrity is defined as the range of frequency, magnitude, and temporal distribution of stream discharge along with a concomitant surface and subsurface interaction with the floodplain that historically characterized riparian ecosystems in the region. In southern California, this translates into seasonal intermittent, ephemeral, or low flow periods with annual bank-full discharges superimposed on a background of episodic, and often catastrophic, larger magnitude floods that inundate historical terraces.

Indicators used to assess hydrologic integrity included factors that influence the frequency, magnitude, and temporal distribution of stream discharge, and factors that influence the hydrologic linkage between the stream channel and the active floodplain and adjacent terraces, as listed below:

- **Altered Hydraulic Conveyance** – a measure of the extent of man-made modifications to drainage channels such as concrete channels.

- **Surface Water Retention** – a measure of the degree to which the hydrologic regime has been altered due to storage in sediment and retention basins.

- **Perennialized Stream Flow** – a measure of the amount of supplemental stream flows, primarily in the summer, due to man-made return flows from irrigation and/or urban runoff.

- **Import, Export, or Diversion of Surface Water** − a measure of the amount of water imported, exported, or diverted from the natural drainage.

- **Floodplain Interaction** – a measure of the degree to which the stream channel has been disconnected from the adjacent floodplain due to culturally accelerated channel incision, bank protection, and levees.

Water Quality Integrity

Water quality integrity is defined as the range of pollutant loading (i.e., nutrients, pesticides, hydrocarbons, and sediments) similar to that which historically characterized riparian ecosystems in the region. In addition to all the indicators used for hydrologic integrity, additional indicators of water quality integrity used in the USACE (2001) study included:

- **Land Use/Land Cover** – a measure of the extent to which the loading of nutrients, pesticides, hydrocarbons, and sediments exceeds natural levels.

- **Sediment Regime** – a measure of the degree to which sediment dynamics in the stream channel are in equilibrium with the upstream sediment supply, and the erosion and deposition processes in the channel.

- **Area of Native Riparian Vegetation** – a measure of the degree to which native riparian vegetation occurs in the floodplain

Habitat Integrity

Riparian ecosystems with habitat integrity exhibit the quality and quantity of habitat necessary to support and maintain a balanced, integrated, adaptive biological system having the full range of characteristics, processes, and organisms that historically characterized riparian ecosystems in the region. Several factors were considered in selecting indicators of habitat integrity including the spatial extent and quality of riparian habitat, the "connectedness" of riparian habitats at the riparian reach and drainage basin scales, and the spatial extent and quality of upland habitat in the landscape adjacent to riparian ecosystems. The key indicators of habitat integrity included:

- **Area of Native Riparian Vegetation** – a measure of the degree to which native riparian vegetation occurs in the floodplain.

- **Riparian Corridor Continuity** – a measure of the extent of continuous, uninterrupted riparian vegetation along the drainage.

- **Land Use/Land Cover: Riparian Ecosystem Boundary** – a measure of the presence of man-made features at the boundary of riparian ecosystems and uplands that would inhibit normal movement of wildlife between riparian and upland habitats.

- **Land Use/Land Cover: Upland Buffer** – a measure of the degree to which the land uses in the upland areas adjacent to riparian ecosystems have been converted to man-made uses (e.g., urban, agricultural).

Functional Assessment Tasks

The assessment of riparian ecosystem integrity was conducted by completing the following sequential tasks (Smith 2000):

Task 1: Identification of riparian reach assessment units

Task 2: Characterization of riparian reaches

Task 3: Assessment of indicators

Task 4: Assigning indicator scores and calculation of indices

Task 5: Archiving of information

The drainages in the watershed were divided into assessment units called "riparian reaches." A riparian reach was defined as a segment of the stream channel and the adjacent riparian ecosystem exhibiting relatively homogenous characteristics with respect to geology, geomorphology, channel morphology, substrate type, vegetation communities, and cultural alteration. In association with each riparian reach and as illustrated on Figure 4.1.2-3, two other areas were defined including a "local drainage area" and a "drainage basin." The local drainage area of a riparian reach included the area from which surface water drained directly to the mainstem channel or tributaries that entered the mainstem channel in the riparian reach. The local drainage area did not include areas that drained to the mainstem channel of upstream riparian reaches.

Most riparian reaches were characterized based on field surveys. Inaccessible reaches were characterized by aerial photographs and topographic maps. Ecosystem integrity indicators were measured using a combination of fieldwork and spatial analysis in GIS. Indicator values were assigned as a percent deviation from the reference condition (i.e., 0 to 100 percent). The range of indicator values was then divided into five categories and assigned an indicator score of 1 to 5 to simplify the calculation of endpoint indices, and facilitate presentation of results in tables, charts, and GIS. A score of 5 represents close concurrence with the reference condition, and consequently a high level of integrity. A score of 1 represents a deviation of 50 percent or more the reference condition, and consequently a low level of integrity.

Overall hydrologic, water quality, and habitat integrity indices were calculated in the spreadsheet by summing the scores of the indicators associated with hydrologic, water quality, and habitat integrity as discussed above. Individual indicator scores and summary indices were presented in tabular form in the spreadsheet and spatially in GIS. Scores and indices were presented for individual riparian reaches, as well as for entire drainages.

Functional Assessment Results

Smith (2000) identified 388 riparian reaches in the San Juan Creek/San Mateo Creek Watersheds with drainage basins averaging 325 acres. In general, the index values exhibited a relatively wide and even spread across the possible range of index values suggesting that indicators were scaled appropriately and were sensitive enough to distinguish varying degrees of hydrologic, water quality, and habitat integrity. A summary of the ecosystem integrity scores for the three key ecosystem attributes for all drainages in the watershed is presented in Table 4.1.2-3.

TABLE 4.1.2-3
SUMMARY OF ECOSYSTEM INTEGRITY SCORES:
ALL DRAINAGES COMBINED

Ecosystem Integrity Attribute	Mean Score	Range	Maximum Possible Score
Hydrologic	23.8	6-30	30
Water Quality	32.6	13-41	45
Habitat	18.2	5-25	25

The spatial distribution of ecosystem integrity scores is shown on Figures 4.1.2-4, -5 and -6 for the following ecosystem attributes: hydrologic, water quality, and habitat, respectively. The maps show the rankings for each riparian reach. Dark areas represent high scores where the attribute integrity score is high. Lighter areas represent reaches where the ecosystem attribute has been reduced due to man-made disturbances and factors. The lowest hydrologic, water quality, and habitat integrity scores were observed along creeks where land development has altered the channels and local drainage basins.

General types of impairments that reduced the integrity of various riparian reaches were as follows:

- Discontinuity in riparian corridor due to habitat disturbances.
- Increased low-flows due to irrigation return flows and runoff from developed areas.
- Presence of non-native vegetation along certain reaches.
- Presence of adjacent land uses that reduce habitat quality and increase nutrient, pesticide, and sediment loading.
- Disturbances along channel margins that impede wildife movement to and from uplands.
- Land use and channel modifications that have disrupted natural sediment dynamics in the watershed and channel, respectively.

The results of the functional assessment provided a means for determining which of several proposed alternative development scenarios would result in the least impact to riparian ecosystem integrity in the watershed. By simulating changes that could be expected to occur as a result of a proposed alternative scenario in terms of indicators, the existing information and tools were used to generate new indicator scores and indices for riparian reaches. These scores and indices were then compared with baseline indicator scores and integrity indices to show how the proposed alternative scenarios would impact riparian ecosystem integrity in the watershed. A discussion of indicator scores for each alternative is discussed in Chapter 6.0, Alternatives Analysis, of this EIS.

4.1.2.5 RMV Planning Area On-site Jurisdictional Delineation

While a planning-level delineation provides for high quality mapping of jurisdictional wetlands and Waters of the U.S. suitable for project planning, it does not substitute for the on-site jurisdictional delineation as part of the Section 404 permit review process. In order to facilitate advanced project-level review, regulatory specialists from GLA conducted an on-site (or project-level) jurisdictional delineation between October 29, 2002 and November 5, 2003 to identify and

quantify the extent of areas subject to the jurisdiction of the USACE pursuant to Section 404 of the Clean Water Act within the RMV Planning Area for purposes of evaluating the SAMP alternatives. The delineation is depicted on Figures 4.1.2-7a through 4.1.2-7i. Appendix E3 contains the project-level delineation report. The following is a summary of the delineation methodology and results. The USACE approved the delineation on May 20, 2004.

In addition, areas subject to the jurisdiction of the CDFG pursuant to Section 1600 et seq. of the Fish and Game Code were also identified to support preparation of the MSAA portion of the NCCP/MSAA/HCP. As caveated by Lichvar et al. (2000), the planning-level delineation serves as a planning-level tool, and subsequent refinements are expected from ground-level delineations for both USACE and CDFG jurisdiction. Because of the availability of more detailed delineations, riparian habitat in the RMV Planning Areas is defined by the GLA delineation for the purposes of this EIS.

Nine development areas (areas of potential development shown on the alternatives) within the RMV Planning Area were evaluated, with the maximum potential limits (i.e., the largest development footprint of any alternative) of each planning area subject to the project-level Section 404 delineation. All major roadway alignments not included within the nine planning areas were also examined.

Methodology

Prior to conducting the field delineation, a 200-scale color aerial photograph, a 200-scale topographic base map of the property, and the USGS topographic maps (Cañada Gobernadora [dated 1968, photo revised in 1988], San Clemente [dated 1968 and photo revised in 1975], and San Juan Capistrano [dated 1968 and photo revised in 1981]) were examined to determine the locations of potential areas of USACE and CDFG jurisdiction. Prior to completing the jurisdictional delineation, GLA reviewed the planning-level delineation prepared by the USACE (September 2000). All areas identified as potentially jurisdictional in the planning-level delineation were evaluated for USACE and CDFG jurisdiction. All suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils, and hydrology. Suspected wetland habitats were evaluated using the methodology previously described. While in the field, the jurisdictional area was recorded onto a 200-scale color aerial photograph using visible landmarks. Other data were recorded onto wetland data sheets.

Beginning on March 11, 2003, Regulatory Specialists from GLA; a representative of Rancho Mission Viejo; representatives of the USACE, including Russell Kaiser, Corice Farrar, and Rob Lawrence; and representatives of CDFG including Don Chadwick, Bradley Henderson, and Donna Cobb conducted a field verification of the project-level delineation. Prior to beginning the field-level verification, the USACE representative, Mr. Kaiser, noted that the USACE would generally assert jurisdiction over drainages that conduct flows during 10-year storm events or less, and that drainages that do not conduct flows during 10-year events are not considered as Waters of the U.S. Following the initial site visits in early March 2003, the area experienced a rainfall event on March 15, 2003 that averaged over five inches over most of the SAMP Study Area, corresponding very closely with a 10-year event. The 10-year storm event resulted in clear discharge in many of the drainages evaluated, including the presence of litter/debris (e.g., oak leaves or other plant materials), sediment deposits, and destruction of terrestrial vegetation (through scouring or buried by sediments). Many of the features failed to exhibit any signs of discharge. The 10-year storm event recorded on March 15, 2003 allowed for determination of the (1) presence of an OHWM, and where present, (2) the lateral extent of the OHWM.

Field verification was completed on October 27, 2003 with the exception of specific areas addressed during a field review on November 20, 2003 with senior staff from the USACE (Appendix E3 lists specific field dates). During the field verification, all areas identified in the Lichvar (2000) planning-level delineation as well as by GLA in the project-level delineation were examined. The results of the field verification are incorporated into the delineation.

Summary of Results

Nine potential development areas within the RMV Planning Area were evaluated plus areas subject to potential impacts associated with major arterials that connect the potential development areas.[5] Total USACE jurisdiction identified within the potential development areas and the potential arterial right-of-ways is 267.12 acres, of which 158.92 acres consist of jurisdictional wetlands. Table 4.1.2-4 summarizes the jurisdictional totals for the development areas of the RMV Planning Area.

TABLE 4.1.2-4
JURISDICTIONAL TOTALS FOR RESOLVED FEATURES

Development Areas in RMV Planning Area	Wetland[a.]	Non-Wetland Waters[b.]	Total USACE[c.]
Ortega Gateway	0.04	2.19	2.23
Chiquita	11.44	2.64	14.08
Gobernadora	11.93	8.81	20.74
East Ortega	23.41	13.64	37.05
Trampas	0.82	9.48	10.30
Cristianitos Meadows	5.30	0.88	6.18
Cristianitos Canyon	4.74	7.80	12.54
TRW	1.05	7.71	8.76
O'Neill Ranch	58.73	10.18	68.91
Road Gaps	41.46	44.87	86.33
Totals[d.]	**158.92**	**108.2**	**267.12**

a. Total area (acres) of three-parameter wetland features subject to USACE jurisdiction pursuant to Section 404 of the Clean Water Act.
b. Total area (acres) of non-wetland tributaries subject to USACE jurisdiction pursuant to Section 404 of the Clean Water Act.
c. Total area (acres) of features subject to USACE jurisdiction (consists of both wetlands and non-wetland waters).
d. These totals may change depending upon USACE determinations regarding proposed non-jurisdictional and isolated features.

As stated before, the on-site delineation by GLA focused on the nine planning areas identified for potential development by the various alternatives. The GLA delineation did not cover the entire 22,815-acre RMV Planning Area due to its immense size. In lieu of the GLA delineation, the USACE Planning-Level Delineation approximated the extent of Waters of the U.S. in the entire 22,815-acre RMV Planning Area. Based on (bankfull channel or active floodplain) and hydrophytic vegetation within the terraces (jurisdictional rating of 1-4) and non-floodplain areas (jurisdictional rating of 1-3), there are about 857.1 acres of Waters of U.S. within the entire RMV Planning Area.

[5] Glenn Lukos Associates. 2003. *Jurisdictional Delineation of Areas Subject to the Jurisdiction of the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act*. November 2003.

Determination of Riparian Error! Bookmark not defined. **Habitat per CDFG Jurisdiction**

As is the case for Waters of the U.S., the planning level delineation does not substitute for an on-site jurisdictional determination for jurisdictional riparian habitat under CDFG. In order to facilitate advanced project level review, regulatory specialists from GLA conducted a project-level jurisdictional determination in 2002 and 2003 for the areas proposed for development under the SAMP including Alternatives B-4, B-5, B-6, B-8, and B-9 to identify the limits of jurisdiction pursuant to Section 1600 et seq. of the Fish and Game Code, including areas of riparian habitat. The delineation determined that the potential development areas contain 398.14 acres within the jurisdiction of the CDFG, of which 368.40 acres consist of vegetated riparian habitat.[6] For many streams and lakes, CDFG jurisdiction extends beyond USACE jurisdiction. Where it was determined that riparian resources extended beyond the limits of USACE jurisdiction, the following approach was used.

The methodology described here, incorporated the wetland indicator status for each species as provided by Reed (1988), with the hydrologic requirements as noted above. The methodology also follows Smith (2000) and is also consistent with the guidance provided by CDFG. The convention for application of these tools in the field for the project-level delineation was developed with direct input from CDFG biologists during the verification process. The methodology for defining the dimensions of riparian habitat in the field is summarized as follows:

- Designation of an area as "riparian habitat" was generally limited to stands of vegetation that included a predominance of species that exhibited an indicator status of Facultative, Facultative Wetland, or Obligate. (Coast live oaks were included as riparian habitat in specific instances as further described/discussed below.)

- Where all riparian habitat was included within the bank-full stream channel (e.g., riparian herb), the outermost limits of either the bank or riparian habitat was mapped as the limits of CDFG riparian jurisdiction/habitat.

- Where riparian habitat extended beyond the bank-full channel to the active floodplain, and did not extend outside the active floodplain, the outermost limits of either the active floodplain or riparian habitat was mapped as the limits of CDFG riparian jurisdiction/ habitat. By inclusion of the active flood plain and associated riparian habitat, the hydrologic, biogeochemical, and habitat functions not specifically associated with riparian vegetation, such as areas with localized ponding that support aquatic organisms (e.g., invertebrates, amphibians), but providing such hydrologic, biogeochemical and habitat functions, were captured and included within the jurisdictional area(s).

- Where riparian habitat extended beyond the active floodplain to active terraces, the outermost limits of the riparian habitat on the terrace (i.e., canopy edge or "drip line") was mapped as the limits of CDFG riparian jurisdiction/habitat. Similar to inclusion of the floodplain described above, inclusion of the active terraces ensured that functions such as hydrologic exchange with the adjacent uplands, nutrient cycling, shading by overhanging vegetation, bank and channel stabilization by roots, as well as habitat functions were included in the jurisdictional area(s).

[6] An additional 91.70 acres have been evaluated in the field, including 55.88 acres of cattail marsh and 35.82 acres of open water, for which Rancho Mission Viejo and CDFG have not reached concurrence relative to their jurisdictional status (i.e., unresolved features). These unresolved features are located within Trampas Canyon (Planning Area 5) of the RMV Planning Area and consist of the ONIS artificial tailings facility and other mining related facilities. GLA noted that these features do not meet the definition of a streambed or lake under the Fish and Game Code at the time of project implementation (GLA 2004).

This latter case (i.e., channel stabilization by roots) was most typically applied to southern coast live oak riparian forest. In some cases, particularly in U-shaped canyons, the limits of the active terrace were not always discernible. In such cases, coast live oaks (and in a few instances California sycamores) were included as riparian where they either (1) exhibited roots that reached the banks of the drainage, thereby, benefiting from the drainage or by providing stabilization for the banks (i.e., a benefit for the stream) or (2) where meaningful portions of the canopy overhung the stream, thereby providing for shading or litter (nutrient cycling) which would benefit the stream. In some instances, facultative wetland species such as Mexican rush (*Juncus mexicanus*) or clustered field sedge (*Carex praegracilis*) were indicators of shallow subsurface water that was at least seasonally available to the stream environment. Coast live oaks (and California sycamores) located above active terraces or (where terraces were not distinct) beyond where either roots or shading provided direct benefits to the stream, or that supported a predominance of UPL vegetation, were not included as CDFG-regulated riparian vegetation.

4.1.2.6 Invasive Plant Species within Riparian Habitats of the SAMP Study Area

An important detrimental impact to riparian habitat is the presence and expansion of invasive plant species. These plant species are non-native to California and have the potential to displace native species and alter riparian ecosystem functioning. The California Exotic Pest Plant Council (CalEPPC 1999) rated invasive species according to their "invasiveness" in California:

- **List A**− Most Invasive Wildland Pest Plants; documented as aggressive invaders that displace natives and disrupt natural habitats. Includes two sub-lists: List A-1and List A-2.

- **List B**− Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be widespread or regional.

Various invasive plant species occur within the riparian habitat of the watershed, including (with CalEPPC list rating) saltcedar (*Tamarix* spp.; A1), pampas grass (*Cortaderia* sp.; A1), giant reed (*Arundo donax*; A1), black mustard (*Brassica nigra*; A1), Eucalyptus (*E.* spp.; A1), tree-of-heaven (*Ailanthus altissima*; A2), castor bean (*Ricinus communis*; B), poison hemlock (*Conium maculatum*; B), and Brazilian pepper (*Schinus terebinthifolius*; B).

Various efforts to control the extent of invasive species have occurred within the SAMP Study Area as follows:

County of Orange

The County of Orange has performed eradication of *Arundo donax* from selected reaches of San Juan Creek and Trabuco Creek during the last decade, and in some areas the eradication programs are ongoing. In general, the County has attempted to implement a "top-down" approach, beginning in upper portions of the watersheds, and working downstream so as to eliminate sources of reintroduction from upper watershed areas. The County's efforts in San Juan Creek have generally been required as mitigation for projects that have impacted jurisdictional waters (e.g., Antonio Parkway) and the programs have been completed. In some areas, such as areas in San Juan Creek near the confluence with Hot Springs Canyon, the *Arundo donax* has become re-established.

County of Orange eradication efforts in Trabuco Creek have also primarily been tied to project mitigation (e.g., Forster Ranch contributed funds to the County for ongoing eradication of *Arundo donax* from 5.8 acres of Trabuco Creek[7]). The County has also conducted a program to eliminate 3.5 acres of *Arundo donax* (combined cover of numerous small patches) from an approximately 8,000-foot reach of Trabuco Creek for impacts associated with construction of the Crown Valley Parkway Bridge.

Rancho Mission Viejo

As part of its cattle ranching operations, Rancho Mission Viejo has performed eradication of artichoke thistle across most of its property since the 1970s and efforts continue annually. A comprehensive artichoke thistle removal program has also been implemented for the approximately 1,600-acre Ladera open space area that has been ongoing since 2001. Rancho Mission Viejo has also begun a program to control Spanish sunflower (*Pulicaria paludosa*) in Gobernadora Creek and Chiquita Creek; however, this program is currently in the beginning phases with a pilot program that is comparing control methods (i.e., hand removal versus spraying). Finally, in coordination with the County of Orange, Rancho Mission Viejo has implemented an *Arundo donax* eradication program in Trabuco Creek to remove two acres (combined cover of *Arundo donax* clumps) from the reach immediately downstream of the County's Crown Valley Parkway and Forster Ranch eradication areas.

Northrop Grumman Space Technology TRW Capistrano Test Site

Pursuant to Biological Opinion 1-6-00-F-6 and Department of the Army Permit 199915591 RLK, Northrop Grumman Space Technology TRW Capistrano Test Site has conducted invasive species eradication in lower Cristianitos Creek. This program is to be continued through the life of the lease which extends through 2018. The program has achieved performance standards reflective of no invasive species, a condition consistent with monitoring reports submitted to Northrop Grumman.

Invasive Species Mapping with the RMV Planning Area

To support the SAMP effort, invasive species mapping within RMV Planning Area riparian systems and adjacent or contiguous upland areas was conducted by PCR. This effort began with a review of previous riparian mapping and classification of the RMV Planning Area drainages, and included photographic interpretation of historic and current aerial imagery, field mapping and data collection, and report preparation (details on the methodology of the mapping are discussed in Appendix F4). Artichoke thistle was mapped in the Ladera Land Conservancy open space areas by PCR. Artichoke thistle mapping throughout the rest of the RMV Planning Area was performed by GLA.

San Juan Creek Watershed

***Arroyo Trabuco*.** Results from Neill and Giessow identified a Priority 1 species, *Arundo donax* giant reed, as "common" within the side slopes of reach TB-06b, and "common" within the floodplain of reaches TB-06c and TB-06d. A Priority 2 species, castor bean, was also identified as "common" along the terraces of reach TB-06c, and "present" within the floodplain of reach TB-06d. Another Priority 2 species, pampas grass, was identified as "common" within the floodplain of TB-06c, and "present" within the floodplain of TB-06d. It should be noted that immediately upstream of the RMV Planning Area's northwestern boundary, *Arundo donax* and

[7] The County's Forster Ranch program is a five-year program that was initiated in 2001 and will be completed in 2005.

pampas grass are "common" within the floodplain and tamarisk is "present" within the Arroyo Trabuco Channel. Results from the Neill and Giessow Investigation's January 2002 survey identified the entire RMV Planning Area portion of Arroyo Trabuco as containing an "abundance" of *Arundo donax*. This mapping effort recorded the highest occurrence of *Arundo donax* north of the RMV Planning Area near cabins in Holy Jim Canyon, approximately two miles upstream from the Cleveland National Forest boundary. Additionally, it was noted that during winter 2000/2001, the upper two miles of Trabuco Creek within O'Neill Regional Park was cleared by County of Orange staff and prison crews. The current investigation identified Priority 1 species, *Arundo donax*, and Priority 2 species, pampas grass and castor bean, but did not observe tamarisk. *Arundo donax* is abundant within Arroyo Trabuco. Pampas grass and castor bean individuals were located throughout the RMV Planning Area portions of this drainage with pampas grass spreading rapidly in some areas.

Cañada Chiquita. Invasive species occurrences were not previously documented within this drainage. The current investigation identified only one Priority 2 species, pampas grass, and one Priority 3 species, tree tobacco. Two isolated pampas grass individuals were located within reaches CH-02 and CH-06a. Isolated tree tobacco individuals were located within downstream reaches CH-01, CH-02, and CH-06b; scattered within reach CH-06a; and abundant within reach CH-04a (central). Spanish sunflower occurs at scattered locations, typically in wetter areas associated with Chiquita Creek.

Cañada Gobernadora. Invasive species occurrences were not previously documented within this drainage. The PCR investigation identified one Priority 1 species, *Arundo donax*, and one Priority 3 species, tree tobacco. Isolated individuals of *Arundo donax* were located within reaches GO-02 and GO-07. Isolated individuals of tree tobacco were located within downstream reaches GO-02 and GO-03 and abundant within GO-07 upstream. In addition, Spanish sunflower (which was not mapped by PCR) has been identified by GLA as an invasive exotic within localized portions of the riparian areas associated with Gobernadora Creek.

San Juan Creek. Results from the Neill and Giessow Investigation (2002) characterized the upstream and downstream RMV Planning Area portions of San Juan Creek as containing an "abundance" of *Arundo donax*; the central portion of the drainage contained "scattered" populations of the same species. This mapping effort documented the spread of *Arundo donax* downstream from early plantings at San Juan Hot Springs and nearby cabins outside the Cleveland National Forest boundary. According to the Neill and Giessow Investigation, *Arundo donax* was cleared within Caspers Wilderness Park from 1997 to 1998. Other efforts to clear infestations of *Arundo donax* occurred downstream and south of the RMV Planning Area portion of the Habitat Reserve in the City of San Juan Capistrano between La Novia Avenue and I-5 in 1995, but the species has subsequently reinvaded. The current investigation identified all of the Priority 1, 2, and 3 species. *Arundo donax* is abundant throughout San Juan Creek. Isolated castor bean and tamarisk individuals were located throughout the RMV Planning Area portions of this drainage. Scattered tree tobacco occurrences were located within the mainstem as well as tributary reaches along the southern bank of the mainstem, as was Spanish sunflower.

Verdugo Creek. Invasive species occurrences were not previously documented within this drainage or its tributaries. The current investigation identified one Priority 1 species, *Arundo donax*, and one Priority 3 species, tree tobacco. One isolated *Arundo donax* individual was located within reach VD-01. Isolated tree tobacco occurrences were located within downstream reach VD-01 and increased in abundance upstream with a dominance of this species located within reach VD-05b.

San Mateo Creek Watershed

***Gabino Creek*.** The Neill and Giessow results identified tamarisk, a Priority 1 species in the San Mateo Creek Watershed, as being "present" within the LP-13, LP-14, which are tributary to Gabino Creek as well as associated with Gabino Creek (LP-15) near the confluence with Blind Canyon Creek. These occurrences were confirmed during field reconnaissance by GLA. The PCR investigation also identified one Priority 2 species, pampas grass, and one Priority 3 species, tree tobacco, associated with Gabino Creek and its tributaries. These included abundant occurrences of pampas grass within reach LP-14 and scattered occurrences in LP-12. Tree tobacco was identified within the mainstem of Gabino Creek (GA-18, LP-10, LP-12, and LP-15).

La Paz Canyon Creek. Previous investigations did not identify invasive species as associated with La Paz Canyon Creek. Two occurrences of tree tobacco were identified in LP-10 immediately upstream of the confluence of La Paz Canyon Creek and Gabino Creeks

Cristianitos Creek. Invasive species occurrences were not previously documented within this drainage or its tributaries. The current investigation identified all of the Priority 1, 2, and 3 species as present in Cristianitos Creek. *Arundo donax* is scattered in the downstream portion of this drainage (CR-18). Isolated castor bean and tamarisk individuals were located throughout the RMV Planning Area portion of this drainage. Abundant occurrences of pampas grass were located within the central (CR-14) and southern (CR-18) portion of the drainage. Scattered tree tobacco and Spanish sunflower occurrences were located along the entire mainstem.

Talega Creek. Invasive species occurrences were not previously documented within this drainage. The current investigation did not detect any occurrences.

To supplement mapping of invasive species within the RMV Planning Area, particularly San Juan Creek, the County of Orange followed up on its early mapping efforts and mapped invasive species in Caspers Regional Park according to the same methodology described above. The results are shown on Figure 4.1.2-8.