David Magney Environmental Consulting

WETLAND FUNCTIONAL ASSESSMENTS OF THE CAMARILLO REGIONAL PARK WETLAND AND GOLF COURSE PROJECTS, VENTURA COUNTY, CALIFORNIA

Prepared for:

Coastal Conservancy

CALIFORNIA STATE COASTAL CONSERVANCY

August 2004

Mission Statement

To provide quality environmental consulting services with integrity that protect and enhance the human and natural environment

DMEC

Wetland Functional Assessments of the Camarillo Regional Park Wetlands and Golf Course Projects, Ventura County, California

Prepared for:

California State Coastal Conservancy
1330 Broadway, Suite 1100
Oakland, California 94612
Contact: Peter Brand
510/286-4162

Prepared by:

David Magney Environmental Consulting
P.O. Box 1346
Ojai, California 93024-1346
Contact: David L. Magney
805/646-6045

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BACKGROUND

The California State Coastal Conservancy (Coastal Conservancy) contracted Michael Brandman Associates (MBA) and EIP Associates in early 1997 to develop a conceptual riparian enhancement and constraints evaluation of Camarillo Regional Park (MBA 1998). The Coastal Conservancy contracted David Magney Environmental Consulting (DMEC) through a competitive bidding process to prepare a wetlands restoration plan for the Calleguas Creek Watershed, which DMEC completed in October 2000 (DMEC 2000a). The results of that plan identified several potential wetland restoration sites within the Calleguas Creek watershed, one of which is at Camarillo Regional Park. The Coastal Conservancy then contracted DMEC to prepare detailed conceptual wetland expansion and restoration plans for two wetland sites within the watershed, Camarillo Regional Park and the confluence of Conejo Creek and Arroyo Santa Rosa, both of which were identified in the watershed restoration plan (DMEC 2000a), and adopted by the Calleguas Creek Watershed Management Plan Committee in 2001. This assessment of wetland functions at Camarillo Regional Park is part of the process of developing a feasible wetland restoration plan.

PROJECT PURPOSE

The Coastal Conservancy wishes to restore and enhance wetland habitat and functions within the Calleguas Creek watershed and elsewhere in Ventura County. The purpose of the wetland assessment is to (1) determine how, and how much, the proposed project will change wetland functions of Calleguas Creek and onsite wetlands at the project site; and (2) to assess how proposed habitat enhancement and expansion would improve existing wetland functions. In early May 2004, Ventura County General Services Agency, Parks Department, requested permission from the Ventura County Board of Supervisors to seek bids to develop a golf course at Camarillo Regional Park. The Board of Supervisors also has encouraged alternative projects at the park.

The Coastal Conservancy is interested in knowing how the various proposed projects at Camarillo Regional Park will affect existing wetlands, and if either the enhancement or expansion of wetlands onsite is feasible and beneficial. The Coastal Conservancy is interested in obtaining a scientifically based, objective comparison of the different projects so that it can make informed decisions before proceeding with any specific proposals.

PROJECT BACKGROUND

The Coastal Conservancy hired DMEC in 2002 to develop conceptual wetlands restoration plans for the Camarillo Regional Park site to begin implementation of elements of the watershed wetlands plan. Preliminary discussions with Ventura County General Services Agency staff failed to reach mutually agreeable results on the availability of the parklands for wetland floodplain restoration, and the project was temporarily suspended.

In 1997, the General Services Agency (GSA) proposed to build an 18-hole golf course and 16,000-seat amphitheatre at Camarillo Regional Park, and contracted with Impact Sciences to prepare an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) (Impact Sciences 1997). The stated primary purpose of the project was to raise money to fund the Parks Department. The Ventura County Board of Supervisors voted to certify the EIR as complete and approved the project.

In deciding a lawsuit against that project, filed by the California Native Plant Society (CNPS) and the Environmental Defense Center (EDC), the Ventura County Superior Court found that the project was inconsistent with the Ventura County General Plan. The Court also found that the project EIR did not fully satisfy CEQA requirements, in part for the County's failure to adequately assess or mitigate for direct and indirect impacts to biological and wetland resources. The Court ordered the Board of Supervisors to rescind their approval of the project.

Another golf course project was considered by GSA at Camarillo Regional Park in 2001, and a wetland function and values assessment was conducted on behalf of GSA and Ventura County Planning Division by Bowland & Associates (2001); however, no further action was taken by GSA on that proposal. The Bowland & Associates assessment was based primarily on best professional judgment, it did not include any field measurements, and it relied heavily on the 1997 project EIR (Bowland & Associates 2001), which the Ventura County Superior Court found to be inadequate in regards to biological and wetland impact assessments.

To meet both Coastal Conservancy project decisionmaking procedures and Ventura County General Plan policies regarding wetlands, DMEC here presents a wetland functional assessment using the Hydrogeomorphic Rapid Assessment Method (HGM) to objectively demonstrate how various proposed projects are expected to change wetland functions onsite.

This evaluation assesses four project scenarios: two involving building an 18-hole golf course; and two specifically designed to restore ecosystem functions through the restoration of geomorphic and biological attributes and processes of Calleguas Creek at Camarillo Regional Park.

ASSESSMENT OBJECTIVES

The objectives of this assessment are to objectively and quantitatively determine what (and how much) wetland functions will be affected under four project scenarios, and those project scenarios include the following:

A. Building a 18-hole golf course;
B. Building a 18-hole golf course and enhancing remaining/existing wetlands onsite;
C. Enhancing existing wetlands onsite; and
D. Maximizing/expanding wetlands onsite.

The following is a list of restoration goals and objectives to address all elements of wetland enhancement and expansion plans proposed by the Coastal Conservancy. These plans will (partially or wholly):

- Not jeopardize the continued existence of any special-status species or critical habitats to comply with the state and federal Endangered Species Act;
- Result in a minimum impact to existing high quality upland biological values;
- Cause no significant short-term or long-term loss of existing biological function for wetland-dependent species or habitats;
- Specifically improve habitat for wetland/riparian species, especially for special-status species;
- Ensure a mix of habitat types that maximizes ecosystem complexity;
- Result in an increase in wildlife movement corridor opportunities;
- Comply with requirements of applicable regulatory and resources agencies;
- Reduce flooding and its impacts to adjacent farmlands;
- Result in an overall reduction in downstream sedimentation patterns at the Mugu Lagoon;
- Eliminate the need for additional local channelization of Calleguas Creek and its tributaries;
- Encourage recreational uses within the Conejo/Santa Monica Mountains;
- Incorporate reclaimed wastewater treatment ponds and/or increased groundwater recharge opportunities into the overall restoration design;
- Keep the hydrologic regime as simple as possible, requiring minimal manipulation/maintenance;
- Not result in significant adverse impacts to water quality or hydrologic conditions in the watershed;
- Include quantifiable restoration objectives and a long-term monitoring and maintenance program to ensure the anticipated level of success;
- Be cost-effective to implement; and
- Minimize short-term construction-level impacts.

All the project scenarios are to be compared to existing (baseline) conditions, as of May 2004. Riverine/Riparian wetland ecosystems are known to provide a wide range of physical, biochemical, and biological functions. This assessment has four components; it will provide a comparative analysis of how four

project scenarios differ as related to changes in wetland functions onsite, all being compared to existing conditions. First, the assessment will determine the level at which each wetland function is operating compared to reference standard sites. Then the assessment will measure what changes to wetland functions can be expected after implementing each of the four projects listed above. This assessment will provide a numerical scoring of the project site under the four scenarios, compared to existing conditions.

PROJECT LOCATION

Camarillo Regional Park (project site) is located immediately adjacent (south and east) to Calleguas Creek, at the western base of the Conejo/Santa Monica Mountains, south of City of Camarillo, in southern Ventura County, California (Figure 1, Project Site Location Map). The park is located on the east bank of Calleguas Creek a short distance downstream from its confluence with Conejo Creek (Arroyo Conejo). Calleguas Creek is confined by flood control levees to protect adjacent agricultural lands from irregular flooding events. Wetland habitats have developed on the upslope side of the left bank levee at Camarillo Regional Park, where approximately 73.4 acres of riparian and seasonal wetland habitats have developed, including 22.5 acres of wetland habitat within the levees of Calleguas Creek.

Camarillo Regional Park contains two small valleys separated by a low hill and saddle that bisects the property east and west. The southern portion of the park contains the ruins of an old dairy, and fill material for a previously proposed federal prison. This fill area now contains a paved model airplane runway and unpaved parking lot and related facilities.

The northern portion of the park contains a permanent pond formerly used for model boats. Three settling ponds owned and operated by Camrosa Water District are also located at the mouth of the northern valley. Immediately upslope from the Camrosa ponds is an approximate 11.7-acre Alkaline Meadow wetland surrounded by approximately 10 acres of riparian scrub and forest habitat. An archery range was developed a number of years ago in the upper portions of this small valley.

The proposed golf course facilities would be located on most of the flatter portions of the lands of the park, east and south of, and adjacent to, Calleguas Creek (Ventura County) (APN 234005014, 234005015). The site was previously occupied by a dairy (over 20 years ago) under federal ownership. The project site is located approximately 2,400 feet (0.44 mile) southeast of Lewis Road at the intersection of University Road. Downtown Camarillo is located approximately 14,000 feet (2.65 miles) to the north. Geographic coordinates for the center of the site is 34°10’45”N latitude and 119°1’47”W longitude. The project site ranges in elevation from 60 feet above mean sea level (msl) to 400 feet msl. Figure 2, Aerial Photograph of Camarillo Regional Park, illustrates the relative location of the project site existing wetlands[1] (light blue boundary line) and proposed golf course[2] (magenta boundary line), and adjacent land cover. Calleguas Creek flows generally southwest along the western/northern side of the property.

[1] The wetlands boundary approximates where DMEC expects wetlands occur onsite based on the County of Ventura’s General Plan wetlands definition and policy, and where Corps of Engineers and CDFG jurisdictions are likely to lay. A formal wetland delineation verified by the Corps is required to determine Corps jurisdiction.

[2] The bounds of the proposed golf course was delineated by DMEC based on a map provided by Ventura County General Services Agency (GSA) and compared to supporting documents and maps in the 1997 EIR prepared by Impact Sciences on behalf of GSA.

Figure 1. Project Site Location Map

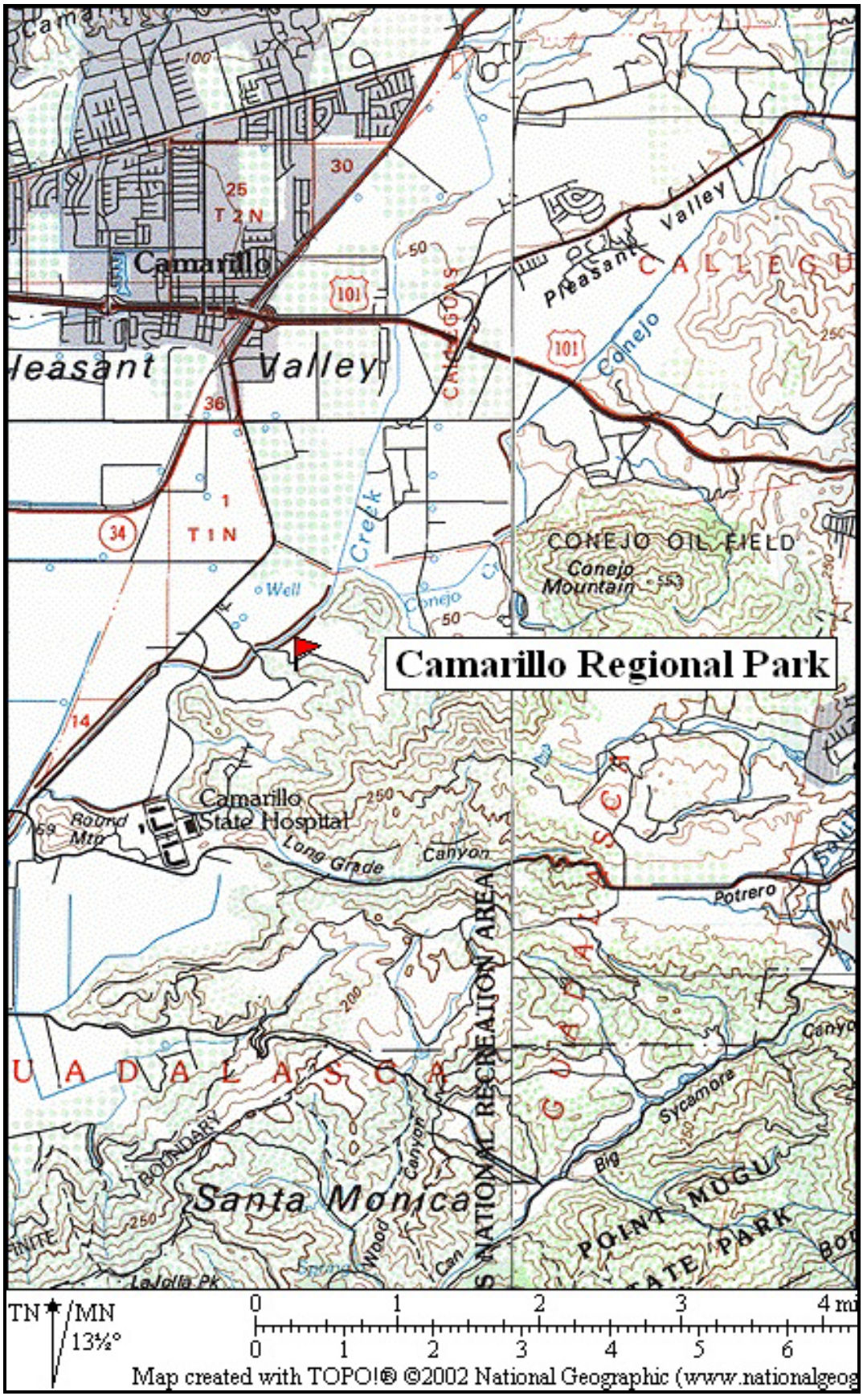
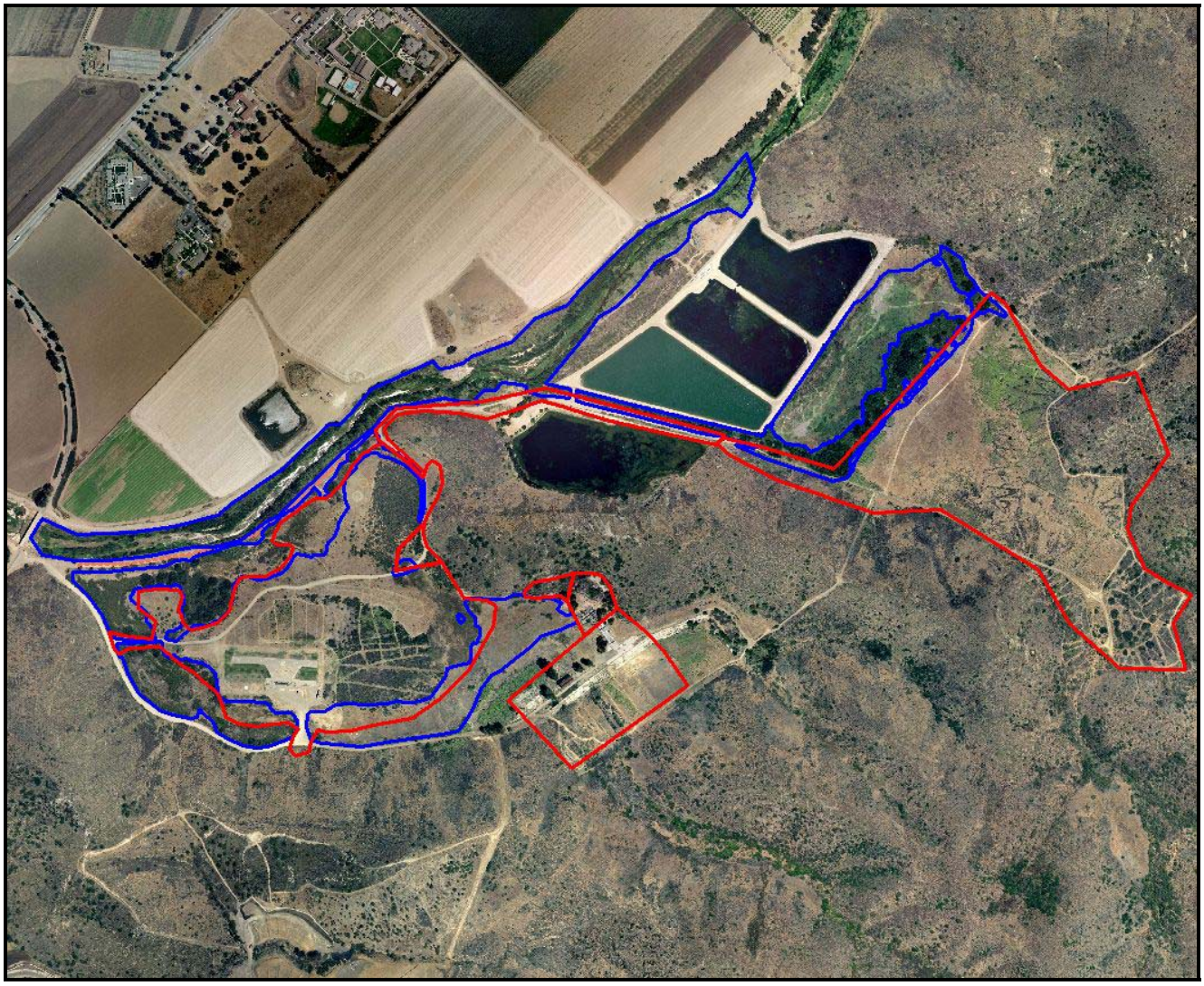


Figure 2. Aerial Photograph of Camarillo Regional Park Delineating Golf Course and Wetlands



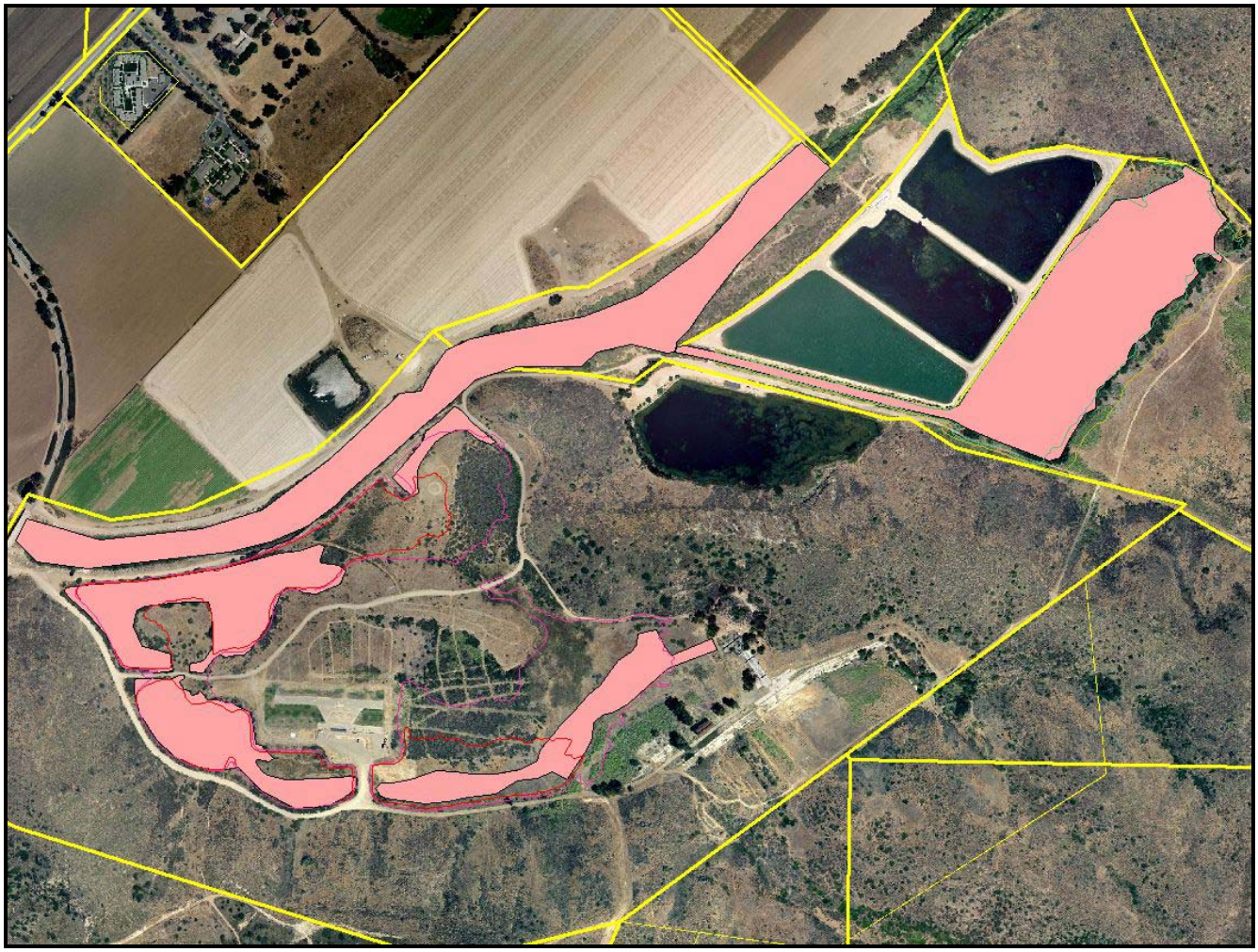
The blue lines represent approximate boundaries of existing wetland habitats onsite (~73.2 acres) (they extend upstream and downstream in Calleguas Creek beyond the site). The red lines represent approximate boundaries of proposed golf course facilities, and occupy approximately 117 acres. Source: Aerial photograph base is from AirPhotoUSA, dated July 2003, State Plane Calif. Zone 5, NAD83, golf course layout adapted from GSA graphic.

JURISDICTIONAL WATERS DETERMINATION

A delineation of waters of the U.S., including wetlands, has not been conducted by DMEC for this project or for this HGM assessment. However, since these areas are confined within Calleguas Creek and adjacent areas dominated by hydrophytes, DMEC assumes that the jurisdictional area, from the Corps' perspective, lies within the bed and banks of the creek and a portion of the adjacent lands. DMEC performed a cursory delineation of wetlands and riparian habitats based on direct observations, preliminary delineation maps from other sources (Impact Sciences 1998, MBA 1998, detailed topographic map of project site [CAD file obtained from GSA], and July 2003 color aerial photography [from AirPhotoUSA]). Figure 3, Camarillo Regional Park Wetlands as Delineated by Impact Sciences, shows wetlands (Corps and CDFG) that Impact Sciences mapped as part of their work on behalf of GSA for the former amphitheater and golf course project proposed by GSA in 1997

(Impact Sciences 1998). Impact Sciences' delineation was never formally verified by Corps (Wakeley pers com 1998).

Figure 3. Camarillo Regional Park Wetlands as Delineated by Impact Sciences



The rose-colored areas indicate the approximate boundaries of Impact Sciences 1997-98 wetland delineation, with both Corps and CDFG wetlands included, totaling 53.7 acres of mapped wetlands, which includes Calleguas Creek. DMEC digitized the boundaries onto the July 2003 aerial photograph from Impact Sciences' Figure 6, and minor errors during the transposition from one map source (Impact Sciences 1998 map at 1"=6,600') are likely to have occurred during the digitization process. The red and magenta lines represent the 68- and 70-foot contours, respectively, while the greenish and tan lines represent the 82- and 84-foot contours, respectively. The yellow lines are parcel boundaries.

Waters of the State extend laterally to include riparian habitat, such as dominated by Arroyo Willow (*Salix lasiolepis*) and Mulefat (*Baccharis salicifolia*); therefore, most of the project site lowlands can be considered as a riparian wetland from the State's perspective.

Waters of the U.S.

For the purposes of this project, areas of waters of the U.S., under Corps jurisdiction, include the bed and banks of Calleguas Creek and lowland portions of the park parcels. This area is considered jurisdictional waters of the U.S, including wetlands. This also meets the CDFG wetland jurisdictional criteria as well as adjacent riparian vegetation, and the County of Ventura's definition in its General Plan. The proposed golf course is

located partially within jurisdictional waters of the U.S., including wetlands. The proposed wetlands enhancement and expansion project alternatives are located within and adjacent to waters of the U.S.

WETLANDS

Jurisdictional wetlands, pursuant to Section 404 of the Clean Water Act, at the project site are located within Calleguas Creek and low-laying areas of the site generally below the 70-foot elevation contour in the southern valley and below the 84-foot contour in the northern valley. Both areas are dominated by hydrophytes. Figure 4, Probable Area of Wetlands at Camarillo Regional Park, illustrates DMEC's estimate of the extent of wetlands present at Camarillo Regional Park, excluding Calleguas Creek. Figure 4 is based on data from a variety of sources, including Impact Sciences' 1998 wetland delineation (not verified by the Corps [Wakeley pers. comm. 1998]), observations by DMEC staff since 1998, and onsite topography. The location of wetlands as shown on Figure 4 has not been verified by any regulatory agency, and DMEC has not performed a formal delineation onsite of wetlands pursuant to the Corps' procedures (Environmental Laboratory 1987). Regardless, evidence of the potential for wetlands occupying these portions of Camarillo Regional Park is present.

As supporting evidence, DMEC delineated the low-laying areas from detailed topographic data from the area provided by GSA. DMEC used the 68-foot and 70-foot topographic contour intervals to map out the low-laying portions of the park in the southern valley that are known or likely to pond water for a long duration, based in part on direct observations of ponding for long duration in one or more of the basin areas.

Figure 5, Seasonally Ponded and Saturated Low-laying Areas of Camarillo Regional Park, illustrates the lower low-laying areas of the park that are known to regularly pond water or where the soils are saturated to or near the surface. Figure 5 shows those areas in the southern valley portion of the park below the 68-foot topographic contour, representing the area that is known to pond water for long durations during the winter and spring months. These areas are also dominated by hydrophytes, such as Mulefat (*Baccharis salicifolia*) and Arroyo Willow (*Salix lasiolepis*). Figure 4 also shows that a portion of the park in the northern valley below the 82-foot topographic contour and corresponds to the low-laying area that is dominated by Alkali Meadow hydrophytic plant species.

The jurisdictional wetlands onsite likely extend beyond the 68- and 82-foot contour intervals in the southern and northern Valleys, respectively, based on data presented by Impact Sciences (1997) and the Corps, and from onsite observations by DMEC during 1997, 1999, 2000, 2001, 2002, and 2004. Large portions of the southern valley have been observed retaining water well into the spring, particularly during wet years; however, to DMEC's knowledge no actual depth measurements have been recorded.

Figure 6, Additional Ponded/Saturated Low-laying Areas of Camarillo Regional Park, illustrates the areas of the park DMEC delineated that also contain one or more wetland criteria. Figure 6 shows the 70-foot contour interval in the southern valley of the park, and the 84-foot contour interval in the northern valley to compare those areas with onsite hydrophytic vegetation and landscape position.

Figure 4. Probable Area of Jurisdictional Wetlands at Camarillo Regional Park

The mustard-colored areas represent areas DMEC expects to be Corps jurisdictional wetlands, totaling 73.2 acres. Additional wetlands as defined by CDFG and the County of Ventura would likely include the boating pond. The light blue and bright green lines are the 68- and 70-foot contours in the southern valley, respectively, while the aqua and bluish lines in the northern valley are the 82- and 84-foot contours, respectively. The yellow lines represent parcel boundaries as of 1998. Compare this figure with Figure 3, which illustrates the area of wetlands delineated by Impact Sciences, showing a total of only 53.7 acres, including Calleguas Creek.

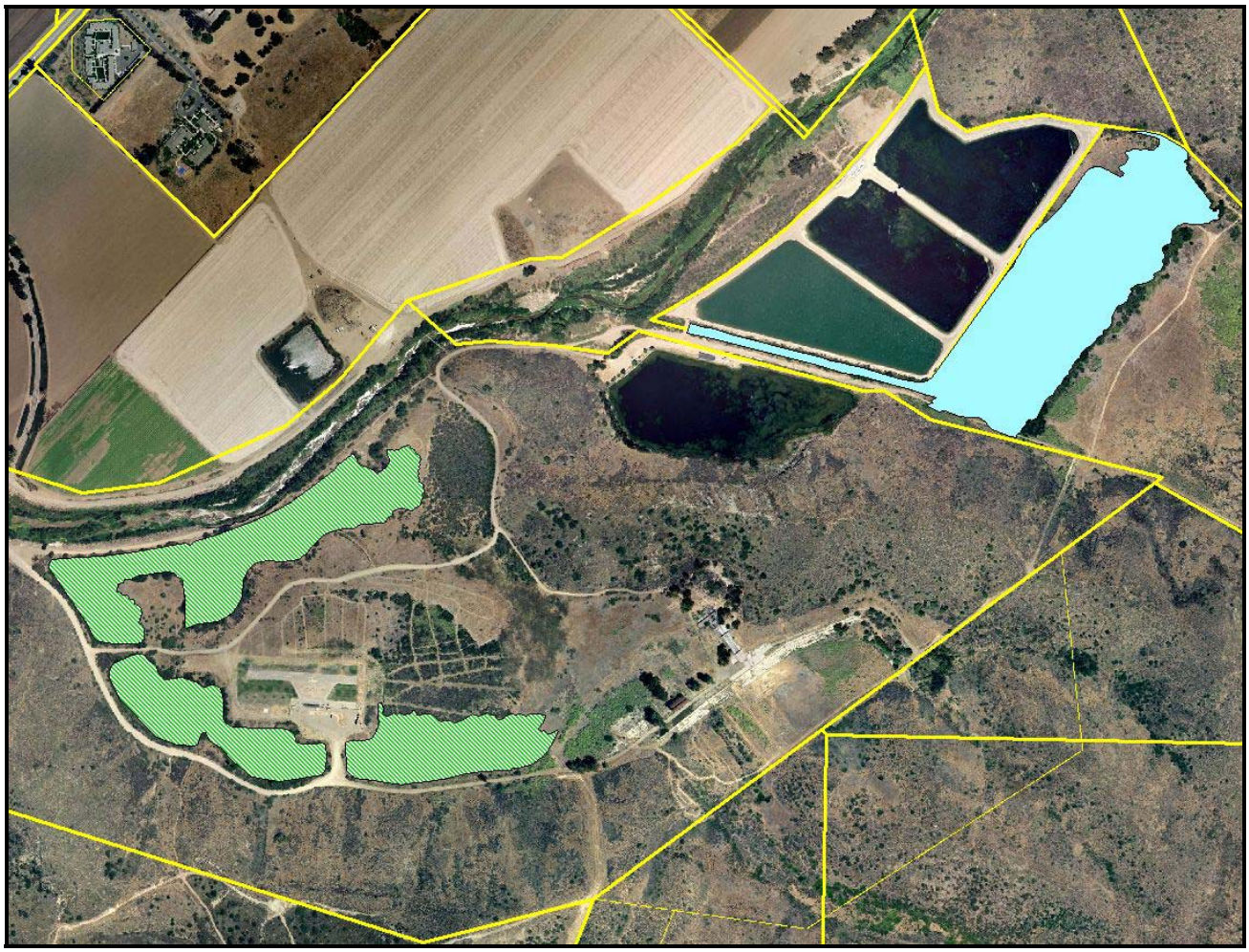
Willow Riparian Woodland, Freshwater Marsh, Southern Willow Scrub, Mulefat Scrub, and Alkali Meadow wetlands dominate these areas, including Calleguas Creek, respectively, which are shown in the photographs below (Figure 7a, b, c, d, e, and f, Photographs of Wetland Habitats at Camarillo Regional Park).

While the actual acreage of wetlands present at Camarillo Regional Park is not known or verified by the Corps and/or CDFG, substantial wetland acreage is present in the low-laying portions of both the northern and southern valleys of the park.

Depending on the purpose of the project proposed at Camarillo Regional Park, the presence of jurisdictional wetlands represents either a major constraint, or an opportunity. Any golf course proposed for the park will be confined substantially onsite by existing wetlands, and will likely impact existing wetland functionality. Wetland enhancement and creation projects will be benefited by the presence of these wetlands.

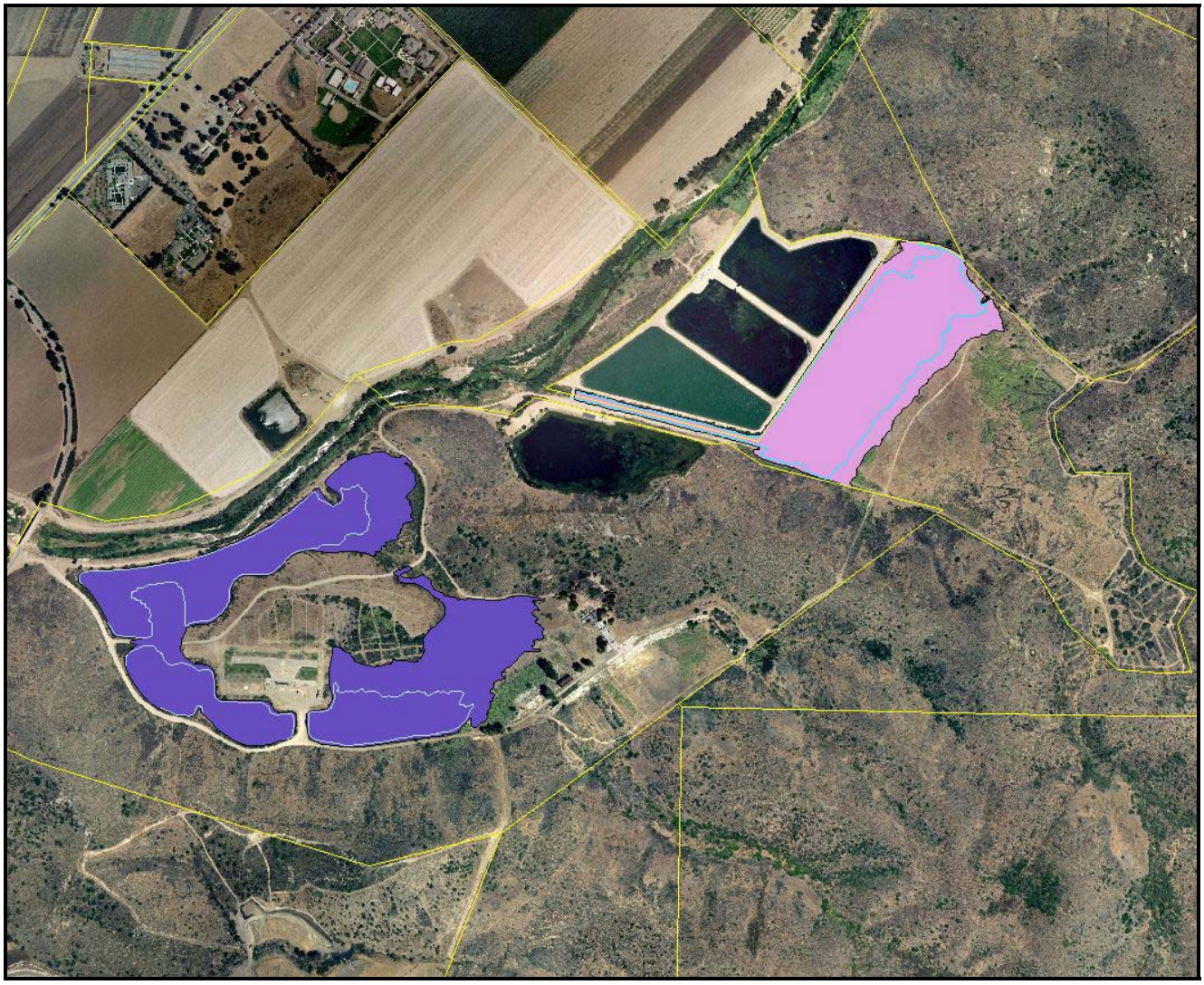
The amount of wetlands onsite, excluding the 22.5 acres of wetlands along Calleguas Creek, is estimated at 50.73 acres. A verified formal delineation of jurisdictional wetlands is required to determine the total area of wetlands onsite.

Figure 5. Seasonally Ponded and Saturated Low-laying Areas of Camarillo Regional Park



The green areas are those low-laying areas that occur at or below the 68-foot contour interval, and where surface water ponds during the winter and spring months, excluding Calleguas Creek. The light blue area includes land at or below the 82-foot contour interval, and where the soil is known to be saturated during the winter and spring. These areas are almost certainly within the Corps' jurisdiction as wetlands. The yellow lines are parcel boundaries.

Figure 6. Additional Ponded/Saturated Low-laying Areas of Camarillo Regional Park



This map is similar to Figure 5; however, the areas in the southern valley of the park at or below the 70-foot topographic contour are shown in purple. The lavender-colored area in the northern valley illustrates that portion at or above the 84-foot topographic contour interval. The areas below the 68-foot and 82-foot contours (light blue lines) are included, as shown on Figure 5. The areas between the 68- and 70-foot and 82- and 84-foot contours, respectively, also contain hydrophytic vegetation in some areas and are possibly considered wetlands by the Corps, and likely meet the CDFG's and County's definitions of wetlands. The areas between the 68- and 70-foot, and between the 82- and 84-foot contours, are expected to pond water for a long duration at least during years with higher-than-average rainfall.

Figure 7. Photographs of Wetland Habitats at Camarillo Regional Park

Left (7a): Calleguas Creek at eroded levee adjacent to southern valley, view NW. Right (7b): Southern Willow Scrub wetland habitat in lowland area of southern valley of Camarillo Regional Park. Dated 6-May-2004.

Left (7c): Southern valley of park from central dividing ridge, view SW, with Coastal Sage Scrub in foreground. Right (7d): Northern valley from central dividing ridge, view NW. Two northernmost Camrosa ponds visible downslope (WNW) of Alkali Meadow and Southern Willow Scrub habitats; Ruderal grassland seen on right side of photo. Dated 3-Jun-2004.

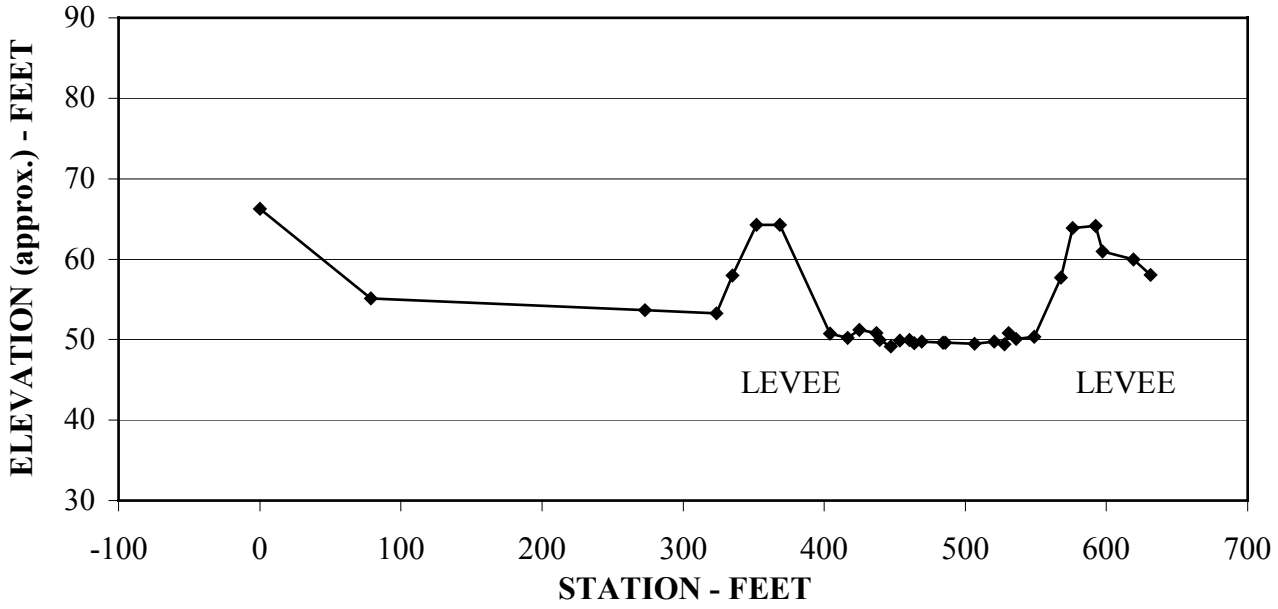
Left (7e): Photo of Alkali Meadow wetland in northern valley, view southward, dated October 2002. Right (7f): Alkali Meadow wetland, view northward, dated 6-May-2004. Note salt precipitates on soil surface.

SITE CHARACTERISTICS

Calleguas Creek is Strahler Stream Order 5 (1:24,000)(Strahler 1957) and has a contributing area of approximately 248 square miles (sq. mi.). Mugu Lagoon is approximately 5.6 river-miles downstream.

Calleguas Creek is straightened and confined between levees throughout this reach (see Figure 2; Figure 8, Cross-sectional Survey of Calleguas Creek at Camarillo Regional Park[3]). While the natural vegetation within Calleguas Creek is currently lush and relatively well developed, the Ventura County Watershed Protection District periodically (about every 5 years) removes woody vegetation and accumulated sediments from within the confined channel as part of its flood facilities maintenance. Reduction of such maintenance activities (which removes important wildlife habitats) is one of the goals of the Calleguas Creek Watershed Management Plan, but is dependent upon increased flood capacity in this reach of Calleguas Creek.

Figure 8. Cross-sectional Survey of Calleguas Creek at Camarillo Regional Park



Field estimates of bankfull width and mean bankfull depth are 108 ft. and 2.0 ft., respectively. The floodprone area width – the width of inundation at moderately high flows - is 159 ft. Channel slope is in the 0-2-percent class; precise field measurement would undoubtedly indicate that it is less than 1 percent. Channel bed materials are natural, predominantly sand-sized grains. Levee banks are rock riprap.

The channel is spanned downstream by the north access road for the CSU Channel Islands and Camrosa Water District facilities. An unpaved road is maintained on the toe slope of the Santa Monica/Conejo Mountains within the park (see Figure 5 for a clear view of the roads). The onsite roads provide access to the levees, the Camarillo Regional Park facilities, and some Camrosa Water District facilities (Figure 9, Photograph of Camrosa Water District Pond at Camarillo Regional Park). Figure 9 shows the southwestern corner of the southernmost pond, which is kept clean of natural vegetation; regardless, numerous waterfowl are known to visit these ponds. These ponds are not likely under the Corps' jurisdiction. No other major structures exist onsite.

Sparse riparian vegetation persists on the rock riprap banks and within the active floodway. Floodplain Riparian Scrub, including many ruderal (nonnative) species (Sawyer and Keeler-Wolf 1995) predominates, with Giant Reed Series and Arroyo Willow Series (with Cattail associations) elsewhere. Various nonnative plant species form scattered ground cover throughout the site. Abundant hydric soils and hydrophytic vegetation persist on

[3] The cross-section was taken adjacent to the southern valley portion of Camarillo Regional Park.

the Camarillo Regional Park land south of the channel. These are separated from the active floodway by a levee. Agricultural lands comprise most of the delta plain area north of the channel.

Figure 9. Photograph of Camrosa Water District Pond at Camarillo Regional Park

Camarillo Regional Park is located immediately adjacent to Calleguas Creek. The vegetation to the southeast consists of native riparian, grassland, and scrub types. The hillside slopes adjacent to the lowland areas are dominated by native Coastal Sage Scrub and Southern Cactus Scrub plant communities, dominated by California Sagebrush (*Artemisia californica*), California Buckwheat (*Eriogonum fasciculatum*), Coastal Prickly Pear (*Opuntia littoralis*), and Purple Sage (*Salvia leucophylla*), as well as over 200 other native and naturalized vascular plant species.

The proposed golf course site includes areas that have been disturbed/developed, and consists of old dairy facilities, a model airplane airstrip and associated parking area and facilities, access roads (in the southern valley), and an abandoned archery range (in the northern valley). The slopes are relatively undisturbed. The model airstrip has been built on fill material that was intended for a federal prison, which was never build. Excavated areas around this building pad are now topographic depressions dominated by hydrophytic vegetation and become ponded for long durations during the wet season.

Predominant native plants observed in the riparian corridor within the banks of Calleguas Creek include: Mugwort (*Artemisia douglasiana*), Brewer's Saltbush (*Atriplex lentiformis* ssp. *breweri*), Mulefat (*Baccharis salicifolia*), Arroyo Willow (*Salix lasiolepis*), Red Willow (*S. lucida* ssp. *lasiandra*), Chaparral Bushmallow (*Malacothamnus fasciculatus*), Laurelleaf Sumac (*Malosma laurina*), Blue Elderberry (*Sambucus mexicana*), California Bulrush (*Schoenoplectus* [*Scirpus*] *californicus*), and Narrowleaf Cattail (*Typha domingensis*). Nonnative plants observed throughout Camarillo Regional Park include Giant Reed (*Arundo donax*), Black Mustard (*Brassica nigra*), Italian Thistle (*Carduus pycnocephalus*), Sweet Fennel (*Foeniculum vulgare*), Summer Mustard (*Hirschfeldia incana*), Tree Tobacco (*Nicotiana glauca*), Smilo Grass (*Piptatherum miliaceum*), Castor Bean (*Ricinus communis*), and Milk Thistle (*Silybum marianum*).

BIOLOGICAL RESOURCES

Biological resources include the Camarillo Regional Park flora, the vegetation types existing onsite that are formed by that flora, and the wildlife species inhabiting the vegetation and habitats of the project site.

Flora

Approximately 225 vascular plant species have been observed or reported at Camarillo Regional Park, plus at least 27 species of lichens. Table 1, Plants of Camarillo Regional Park, provides a list of all vascular plants and lichens observed or reported to occur onsite. Table 1 includes each plant's scientific name, common name, habit (growth form), wetland indicator status, and family.

The flora of Camarillo Regional Park consists of 225 vascular plant taxa, of which 153 (68%) are native and 73 (32%) are nonnative. This ratio of native to nonnative species is higher than found for the entire California flora, which is 25% naturalized nonnative (Hickman 1993). Sixteen (16) (7%) of the native vascular plant species are considered special-status species (Magney 2004), with one species listed as Threatened. About 83 species of the plants found onsite are typically found in wetland habitats (includes all OBL, FACW, and FAC wetland indicator status plants as listed in Reed [1988]), while the remaining species are typically found in upland/terrestrial habitats. The wetland plants at Camarillo Regional Park represent 37% of the flora at the park. At least 29 species of lichens occur at Camarillo Regional Park, which occur primarily in upland habitats.

Table 1. Plants of Camarillo Regional Park

Scientific Name[4]	Common Name	Habit[5]	W.I.S.[6]	Family
Vascular Plants				
*Acacia longifolia**	Golden Wattle	S	.	Fabaceae
*Acroptilon repens**	Russian Knapweed	PH	(FAC)	Asteraceae
Agrostis sp.	Bentgrass	PG	FACW	Poaceae
*Amaranthus albus**	White Amaranth	AH	FACU	Amaranthaceae
Amaranthus blitoides	Prostrate Amaranth	AH	FACW	Amaranthaceae
Ambrosia psilostachya var. *californica*	Western Ragweed	BH	FAC	Asteraceae
Ambrosia acanthicarpa	Burweed	AH	.	Asteraceae
*Apium graveolens**	Wild Celery	PH	FACW*	Apiaceae
*Anagallis arvensis**	Scarlet Pimpernel	AH	FAC	Primulaceae
*Anthemis cotula**	Mayweed	AH	FACU	Asteraceae
*Artemisia biennis**	Biennial Wormwood	BH	FAC	Asteraceae
Artemisia californica	California Sagebrush	S	.	Asteraceae
Artemisia douglasiana	Mugwort	PH	FACW	Asteraceae
Artemisia dracunculus	Tarragon	PH	(FAC+)	Asteraceae
*Arundo donax**	Giant Reed	PG	FACW	Poaceae
Asclepias fascicularis	Narrowleaf Milkweed	PH	FAC	Apocynaceae
Aster subulatus var. *ligulatus*	Slender Saltmarsh Aster	PH	FACW	Asteraceae
Atriplex lentiformis ssp. *breweri*	Brewer Big Saltbush	S	FAC	Chenopodiaceae
*Atriplex semibaccata**	Australian Saltbush	PH	FAC	Chenopodiaceae
Atriplex triangularis	Spearscale	AH	FACW	Chenopodiaceae
*Avena barbata**	Slender Wild Oat	AG	(FACU-)	Poaceae
*Avena fatua**	Wild Oat	AG	.	Poaceae
Azolla filiculoides	Mosquito Fern	AF	OBL	Azollaceae
Baccharis pilularis	Coyote Bush	S	(FACU)	Asteraceae
Baccharis salicifolia	Mulefat	S	FACW	Asteraceae

[4] * = Introduced/nonnative plant species; **bold type** = special-status species, as defined in Magney (2004).

[5] Species Habit Definitions: AH=annual herb; PH=perennial herb; BH=biennial herb; AG=annual grass and graminoids; PG=perennial grass and graminoids; AV=annual vine; PV=perennial vine; PF=perennial fern; S=shrub; T=tree; CR=crustose lichen; FO=foliose lichen.

[6] W.I.S. = Wetland Indicator Status code definitions according to Reed (1988):
OBL = obligate wetland species, occurs almost always in wetlands (>99% probability).
FACW = facultative wetland species, usually found in wetlands (67-99% probability).
FAC = facultative species, equally likely to occur in wetlands or nonwetlands (34-66% probability).
FACU = facultative upland species, usually found in nonwetlands (67-99% probability).
+ or - symbols are modifiers that indicate greater or lesser affinity for wetland habitats.
NI = no indicator has been assigned due to a lack of information to determine indicator status.
* = a tentative assignment to that indicator status by Reed (1988).
Parentheses around a status indicates a wetland status as suggested by David L. Magney based on extensive field observations.

Scientific Name[4]	Common Name	Habit[5]	W.I.S.[6]	Family
Bloomeria crocea var. *crocea*	Golden Stars	PH	.	Themidaceae
*Brassica nigra**	Black Mustard	AH	.	Brassicaceae
Bolboschoenus* [*Scirpus*] *maritimus	Alkali or Prairie Bulrush	PH	OBL	Cyperaceae
*Brassica nigra**	Black Mustard	AH	.	Brassicaceae
*Brassica rapa**	Field Mustard	AH	.	Brassicaceae
Brickellia californica	California Brickellbush	S	FACU	Asteraceae
*Bromus catharticus**	Rescue Brome	AH	.	Poaceae
*Bromus diandrus**	Ripgut Brome	AH	(FAC-)	Poaceae
*Bromus hordeaceus**	Soft Chess	AH	FAC-	Poaceae
Bromus madritensis ssp. *rubens**	Red Brome	AH	NI	Poaceae
Calystegia macrostegia	Morning-glory	PV	.	Convolvulaceae
Calochortus sp.	Mariposa Lily	PG	.	Liliaceae
*Capsella bursa-pastoris**	Shepherd's Purse	AH	.	Brassicaceae
*Cardaria pubescens**	White-top	PH	(FACU)	Brassicaceae
*Carduus pycnocephalus**	Italian Thistle	AH	.	Asteraceae
*Carpobrotus edulis**	Hottentot Fig	S	.	Aizoaceae
Castilleja exserta ssp. *exserta*	Purple Owl's-clover	AH	.	Orobanchaceae
Ceanothus spinosus	Greenbark Ceanothus	S	.	Rhamnaceae
*Centaurea melitensis**	Tocalote	AH	.	Asteraceae
Chamaesyce albomarginata	Rattlesnake Spurge	AH	.	Euphorbiaceae
*Chamaesyce maculate**	Spotted Spurge	AH	.	Euphorbiaceae
Chamaesyce melanadenia	Squaw Spurge	AH	.	Euphorbiaceae
*Chamomilla suaveolens**	Pineapple Weed	AH	FACU	Asteraceae
*Chenopodium album**	Lambsquarters	AH	FAC	Chenopodiaceae
*Chenopodium ambrosioides**	Mexican Tea	A/BH	FAC	Chenopodiaceae
Chenopodium berlandieri	Pitseed Goosefoot	AH	.	Chenopodiaceae
Chenopodium californicum	California Goosefoot	PH	.	Chenopodiaceae
*Chenopodium murale**	Nettle-leaved Goosefoot	AH	(FACU)	Chenopodiaceae
Chlorogalum pomeridianum ssp. *p.*	Soap Lily	PG	.	Agavaceae
*Cirsium vulgare**	Bull Thistle	AH	FACU	Asteraceae
Claytonia perfoliata	Miner's Lettuce	AH	.	Portulacaceae
*Conium maculatum**	Poison Hemlock	BH	FACW	Apiaceae
*Convolvulus arvensis**	Bindweed	PV	.	Convolvulaceae
*Conyza bonariensis**	So. American Horseweed	AH	.	Asteraceae
Conyza canadensis	Common Horseweed	AH	FAC	Asteraceae
Conyza coulteri	Coulter's Horseweed	AH	FAC+	Asteraceae
Cordylanthus rigidus ssp. setigerus	Rigid Birds-beak	AH	.	Orobanchaceae
Coreopsis gigantea	Giant Coreopsis	S	.	Asteraceae
*Cortaderia jubata**	Purple Pampas Grass	PG	(FACU)	Poaceae
Crassula connata	Sand Pygmy-stonecrop	AH	FAC	Crassulaceae
Cressa truxillensis var. truxillensis	Spreading Alkali-weed	PH	FACW	Convolvulaceae
Croton californicus var. *californicus*	California Croton	PH	.	Euphorbiaceae
*Crypsis schoenoides**	Swamp Grass	AG	OBL	Poaceae
Cryptantha sp.	Forget-Me-Not	AH	.	Boraginaceae
Cucurbita foetidissima	Calabazilla	PH	.	Cucurbitaceae
Cuscuta californica	California Dodder	AV	.	Cucurbitaceae
*Cynodon dactylon**	Bermuda Grass	PG	FAC	Poaceae
Cyperus eragrostis	Umbrella Flatsedge	PH	FACW	Cyperaceae
Cyperus esculentus	Yellow Nut-grass	PH	FACW	Cyperaceae

Scientific Name[4]	Common Name	Habit[5]	W.I.S.[6]	Family
Datura wrightii	Jimson Weed	AH	.	Solanaceae
Daucus pusillus	Rattlesnake Weed	AH	.	Apiaceae
Deinandra fasciculata	Fascicled Tarplant	AH	.	Asteraceae
Dichelostemma capitatum ssp. *capitatum*	Blue Dicks	PG	.	Themidaceae
Distichlis spicata	Saltgrass	PG	FACW	Poaceae
Dodecatheon clevelandii	Los Padres Shooting Star	PH	.	Primulaceae
Dudleya blochmaniae* ssp. *blochmaniae	Blochman's Live-forever	PH	.	Crassulaceae
Dudleya blochmaniae* X *D. verityi	Hybrid Live-forever	PH	.	Crassulaceae
Dudleya lanceolata	Lanceleaf Live-forever	PH	.	Crassulaceae
Dudleya pulverulenta ssp. *pulverulenta*	Chalky Live-forever	PH	.	Crassulaceae
Dudleya verityi	Verity Live-forever	PH	.	Crassulaceae
Encelia californica	California Bush Sunflower	S	.	Asteraceae
Epilobium canum var. *canum*	California Fuchsia	PH	.	Onagraceae
Epilobium ciliatum var. *ciliatum*	Northern Willow-herb	AH	FACW	Onagraceae
*Eragrostis cilianensis**	Stinkgrass	AG	FACU	Poaceae
Eremocarpus setigerus	Dove Weed	AH	.	Euphorbiaceae
Ericameria pinifolia	Pine Goldenbush	S	.	Asteraceae
Eriogonum cinereum	Ashy-leaved Buckwheat	S	.	Polygonaceae
Eriogonum elongatum var. *elongatum*	Long-stemmed Buckwheat	PH	.	Polygonaceae
Eriogonum fasciculatum var. *foliolosum*	California Buckwheat	S	.	Polygonaceae
Eriophyllum confertiflorum var. *c.*	Golden Yarrow	PH	.	Asteraceae
*Erodium cicutarium**	Redstem Filaree	AH	.	Geraniaceae
Eschscholzia californica	California Poppy	AH	.	Papaveraceae
*Eucalyptus camaldulensis**	River Red Gum	T	(FACW-)	Myrtaceae
Eucrypta chrysanthemifolia ssp. *c.*	Common Eucrypta	AH	.	Boraginaceae
Filago californica	California Fluffweed	AH	.	Asteraceae
*Foeniculum vulgare**	Sweet Fennel	PH	FACU	Apiaceae
Fraxinus velutina	Velvet Ash	T	FACW	Oleaceae
Galium angustifolium ssp. *angustifolium*	Chaparral Bedstraw	PH	.	Rubiaceae
Galium nuttallii ssp. *nuttallii*	San Diego Bedstraw	PH	.	Rubiaceae
Pseudognaphalium biolettii [*Gnaphalium bicolor*]	Bicolored Everlasting	AH	.	Asteraceae
Pseudognaphalium californicum	Green Everlasting	A/BH	.	Asteraceae
Gnaphalium leucocephalum	Whiteleaf Everlasting	AH	.	Asteraceae
*Gnaphalium luteo-album**	Cudweed Everlasting	AH	FACW-	Asteraceae
Gnaphalium palustre	Lowland Cudweed	AH	FACW-	Asteraceae
***Pseudognaphalium stramineum* [*Gnaphalium stramineum*]**	Cotton-batting Cudweed	AH	FAC-	Asteraceae
Hazardia squarrosa var. *grindelioides*	Sawtooth Goldenbush	S	.	Asteraceae
Heliotropium curassavicum	Alkali Heliotrope	PH	OBL	Boraginaceae
Hesperoyucca [*Yucca*] *whipplei*	Our Lord's Candle	S	.	Agavaceae
Heteromeles arbutifolia	Toyon	S	.	Rosaceae
Heterotheca grandiflora	Telegraph Weed	PH	.	Asteraceae
*Hirschfeldia incana**	Summer Mustard	PH	(FACU)	Brassicaceae
Hordeum murinum ssp. *leporinum**	Hare Barley	AG	NI	Poaceae
Isocoma menziesii var. *vernonioides*	Coastal Goldenbush	S	FACW*	Asteraceae
Isomeris arborea	Bladderpod	S	.	Brassicaceae
Juglans californica* var. *californica	S. Calif. Black Walnut	T	FAC	Juglandaceae
*Lactuca serriola**	Prickly Wild Lettuce	AH	FAC	Asteraceae

Scientific Name[4]	Common Name	Habit[5]	W.I.S.[6]	Family
*Lamarckia aurea**	Goldentop	AG	.	Poaceae
Lemna valdiviana	Big Duckweed	AH	OBL	Lemnaceae
Lepidium sp.	Peppergrass	AH	.	Brassicaceae
Leptochloa uninervia	Mexican Sprangletop	AG	FACW	Poaceae
Lessingia filaginifolia var. *filaginifolia*	Cudweed-aster	PH	.	Asteraceae
Leymus condensatus	Giant Wild Rye	PG	FACU	Poaceae
Leymus triticoides	Creeping Wild Rye	PG	FAC-	Poaceae
Lotus scoparius var. *scoparius*	Deerweed	PH/S	.	Fabaceae
Ludwigia peploides	Yellow Waterweed	PH	OBL	Onagraceae
Lupinus bicolor	Bicolored Lupine	AH	.	Fabaceae
Lupinus concinnus	Bajada Lupine	AH	.	Fabaceae
Lupinus longifolius	Long-leaved Bush Lupine	S	.	Fabaceae
Lupinus succulentus	Fleshy Lupine	AH	.	Fabaceae
Malacothamnus fasciculatus var. *f.*	Chaparral Bushmallow	S	.	Malvaceae
Malacothrix saxatilis var. *tenuifolia*	Tenuate-leaved Cliff-aster	PH	.	Asteraceae
Malosma laurina	Laurelleaf Sumac	S	.	Anacardiaceae
*Malva parviflora**	Cheeseweed	AH	.	Malvaceae
Malvella leprosa	Alkali-mallow	PH	FAC	Malvaceae
Marah macrocarpus var. *macrocarpus*	Large-fruited Man-root	PV	.	Cucurbitaceae
*Marrubium vulgare**	White Horehound	S	FAC	Lamiaceae
*Medicago polymorpha**	Bur Clover	AH	(FACU-)	Fabaceae
Melica imperfecta	Coast Melic Grass	PG	.	Poaceae
*Melilotus alba**	White Sweetclover	AH	FACU+	Fabaceae
*Melilotus indica**	Sourclover	AH	FAC	Fabaceae
Mimulus aurantiacus	Bush Monkeyflower	S	.	Phrymaceae
Mirabilis californica	Wishbone Bush	PH	.	Nyctaginaceae
Nassella lepida	Foothill Needlegrass	PG	.	Poaceae
Nassella pulchra	Purple Needlegrass	PG	.	Poaceae
*Nicotiana glauca**	Tree Tobacco	S	FAC	Solanaceae
*Opuntia ficus-indica**	Indian-fig	S	.	Cactaceae
Opuntia littoralis	Coastal Prickly-pear	S	.	Cactaceae
Opuntia prolifera	Coastal Cholla	S	.	Cactaceae
Oxalis sp.	Wood-sorrel	AH	.	Oxalidaceae
Pellaea andromedifolia var. *andromedifolia*	Coffee Fern	PF	.	Pteridaceae
Pellaea mucronata var. *mucronata*	Birdsfoot Fern	PF	.	Pteridaceae
Pentagramma triangularis ssp. *triangularis*	Goldenback Fern	PF	.	Pteridaceae
Phacelia cicutaria	Caterpillar Phacelia	AH	.	Boraginaceae
Phacelia ramosissima	Branching Phacelia	PH	.	Boraginaceae
Phacelia viscida	Viscid Phacelia	AH	.	Boraginaceae
*Phoenix canariensis**	Canary Island Date Palm	T	(FACU)	Arecaceae
*Picris echioides**	Prickly Ox-tongue	AH	FAC*	Asteraceae
*Piptatherum miliaceum**	Smilo Grass	PG	(FACU)	Poaceae
Plagiobothrys sp.	Popcornflower	AH	.	Boraginaceae
Plantago erecta	Western Plantain	AH	OBL	Plantaginaceae
*Plantago lanceolata**	English Plantain	PH	FAC-	Plantaginaceae
*Plantago major**	Common Plantain	PH	FACW-	Plantaginaceae
Platanus racemosa var. *racemosa*	California Sycamore	T	FACW	Platanaceae
Pluchea odorata	Saltmarsh Fleabane	A/PH	OBL	Asteraceae
*Polygonum arenastrum**	Common Knotweed	AH	FAC	Polygonaceae

Scientific Name[4]	Common Name	Habit[5]	W.I.S.[6]	Family
Polygonum punctatum	Spotted Smartweed	PH	OBL	Polygonaceae
Polypodium californicum	California Polypody	PF	.	Polypodiaceae
*Polypogon monspeliensis**	Rabbitsfoot Grass	AG	FACW+	Poaceae
Populus fremontii ssp. *fremontii*	Fremont Cottonwood	T	FACW	Salicaceae
Prunus ilicifolia ssp. *ilicifolia*	Hollyleaf Cherry	S	.	Rosaceae
Pterostegia drymarioides	Fairy Mist	AH	.	Polygonaceae
Quercus agrifolia var. *agrifolia*	Coast Live Oak	T	(FACU)	Fagaceae
Rafinesquia californica	California Chicory	AH	.	Asteraceae
*Raphanus sativus**	Wild Radish	AH	.	Brassicaceae
Rhamnus ilicifolia	Hollyleaf Redberry	S	.	Rhamnaceae
Rhus integrifolia	Lemonade Berry	S	.	Anacardiaceae
Rhus ovata	Sugar Bush	S	.	Anacardiaceae
*Ricinus communis**	Castor Bean	S	FACU	Euphorbiaceae
*Rorippa nasturtium-aquaticum**	Water Cress	PH	OBL	Brassicaceae
*Rumex crispus**	Curly Dock	PH	FACW-	Polygonaceae
Rumex maritimus	Golden Dock	PH	OBL	Polygonaceae
***Ruppia* sp.**	Wigeon Grass	AH	OBL	Ruppiaceae
Salicornia virginica	Virginia Pickleweed	PH	OBL	Chenopodiaceae
Salix exigua	Narrowleaf Willow	S	OBL	Salicaceae
Salix laevigata	Red Willow	T	FACW	Salicaceae
Salix lasiolepis var. *lasiolepis*	Arroyo Willow	S/T	FACW	Salicaceae
*Salsola tragus**	Russian Thistle	AH	FACU+	Chenopodiaceae
Salvia leucophylla	Purple Sage	S	.	Lamiaceae
Salvia mellifera	Black Sage	S	.	Lamiaceae
Sambucus mexicana	Blue Elderberry	S/T	FAC	Caprifoliaceae
*Schinus molle**	Peruvian Pepper Tree	T	.	Anacardiaceae
*Schismus barbatus**	Mediterranean Grass	AG	.	Poaceae
Schoenoplectus* [*Scirpus*] *americanus	Olney's Threesquare	PH	OBL	Cyperaceae
Schoenoplectus* [*Scirpus*] *californicus	California Bulrush	PH	OBL	Cyperaceae
Scrophularia californica var. californica	California Figwort	PH	.	Scrophulariaceae
Selaginella bigelovii	Bigelow's Spike-moss	PF	.	Selaginellaceae
Silene laciniata ssp. *major*	Fringed Indian Pink	PH	.	Caryophyllaceae
*Silybum marianum**	Milk Thistle	AH	.	Asteraceae
Sisyrinchium bellum	Blue-eyed Grass	PG	.	Iridaceae
Solanum douglasii	Douglas Nightshade	PH/S	FAC	Solanaceae
Solanum xanti var. *xanti*	Chaparral Nightshade	S	.	Solanaceae
*Sonchus asper**	Prickly Sow-thistle	AH	FAC	Asteraceae
*Sonchus oleraceus**	Common Sow-thistle	AH	NI*	Asteraceae
Spergularia marina	Saltmarsh Sand-spurrey	AH	OBL	Caryophyllaceae
Stebbinsoseris heterocarpa	Stebbins' Chicory	AH	.	Asteraceae
Stephanomeria exigua	Small Wreath Plant	AH	.	Asteraceae
Stephanomeria virgata	Twiggy Wreath Plant	AH	.	Asteraceae
*Tamarix ramosissima**	Mediterranean Tamarisk	T	FAC	Tamaricaceae
Toxicodendron diversilobum	Poison Oak	PV	(FACU)	Anacardiaceae
Typha domingensis	Narrow-leaved Cattail	PH	OBL	Typhaceae
Typha latifolia	Broad-leaved Cattail	PH	OBL	Typhaceae
Uropappus lindleyi	Silver Puffs	AH	.	Asteraceae
Urtica dioica ssp. *holosericea*	Giant Creek Nettle	PH	FACW	Urticaceae
Verbena lasiostachys var. *lasiostachys*	Western Verbena	PH	FAC-	Verbenaceae

Scientific Name[4]	Common Name	Habit[5]	W.I.S.[6]	Family
*Veronica anagallis-aquatica**	Common Speedwell	PH	OBL	Veronicaceae
Vulpia myuros var. *myuros**	Rattail Fescue	AG	FACU*	Poaceae
*Washingtonia robusta**	Mexican Fan Palm	T	(FACW)	Arecaceae
Xanthium spinosum	Spiny Clotbur	AH	FAC+	Asteraceae
Xanthium strumarium	Cocklebur	AH	FAC+	Asteraceae
Lichens[7]				
Acarospora cf. *chlorophana*	Chartreuse Acarospora	CR	.	Acarosporaceae
Buellia capitis-regnum	Buellia	CR	.	Physciaceae
Caloplaca bolacina	Jewel Lichen	CR	.	Caloplacaceae
Candelariella cf. *vitelina*	Common Yolk Lichen	CR	.	Lecanoraceae
Candelariella sp.	Candelariella	CR	.	Lecanoraceae
Cladonia chlorophaea	Mealy Goblet Lichen	FO	.	Cladoniaceae
Dimelaena radiata	Moonglow	CR	.	Physciaceae
Dimelaena cf. *thysanota*	Mountain Lichen	CR	.	Physciaceae
Flavopunctelia flaventior	Shield Lichen	FO	.	Parmeliaceae
Lecanora muralis	Stonewall Lichen	CR	.	Lecanoraceae
Lecanora sp.	Rim Lichen	CR	.	Lecanoraceae
Lecidella asema	Lecidella	CR	.	Lecidiaceae
Lecidea cf. *subplebeja*	Button Lichen	CR	.	Lecidiaceae
Leprocaulon microscopicum	Mealy Lichen	CR	.	(not designated)
Parmotrema chinense	Broad Shield Lichen	FO	.	Parmeliaceae
Pertusaria flavacunda	Knob Lichen	CR	.	Pertusariaceae
Physcia callosa	Blister Lichen	CR	.	Physciaceae
Physcia clementei	Smaller Star Lichen	CR	.	Physciaceae
Physcia sp.	Blister Lichen	CR	.	Physciaceae
Physcia trabacia	Blister Lichen	CR	.	Physciaceae
Texosporium sancti-jacobi [8]	Texosporium	FO	.	Caliciaceae
Vermilacinia [*Niebla*] sp. 1	Vermilacinia	FR	.	Ramalinaceae
Vermilacinia [*Niebla*] sp. 2	Vermilacinia	FR	.	Ramalinaceae
Vermilacinia [*Niebla*] sp. 3	Vermilacinia	FR	.	Ramalinaceae
Xanthoparmelia cf. *mexicana*	Rock Shield Lichen	FO	.	Parmeliaceae
Xanthoparmelia sp. 2	Rock Shield Lichen	FO	.	Parmeliaceae
Xanthoria cf. *candelaria*	Flame Lichen	FO	.	Teloschistaceae
Xanthoria elegans	Flame Lichen	FO	.	Teloschistaceae

Vegetation Types

Camarillo Regional Park has a varied landscape, including steep mountain slopes and cliff faces and lowland areas, containing both upland and wetland habitats. Wetlands onsite are categorized as Riverine and Palustrine Systems, according to the U.S. Fish and Wildlife Service (USFWS) *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The following wetland/riparian habitat types (classes) comprise the vegetation at and adjacent to the project site:

- Riverine Aquatic Bed;
- Riverine Unconsolidated Bottom;
- Palustrine Persistent Emergent Wetland;

[7] A lichen survey of Camarillo Regional Park was conducted by Charis Bratt, lichenologist currently with the Santa Barbara Botanic Garden, on 19 July 1999 on behalf of the California Native Plant Society and the California Lichen Society.

[8] This lichen was not observed at Camarillo Regional Park; however, it was recently discovered in the vicinity in habitats that are present onsite (Riefner and Rosentreter 2004), and may occur at Camarillo Regional Park. This lichen is rare in California (Magney 1999, Riefner and Rosentreter 2004).

- Palustrine Alkaline Scrub/Shrub Wetland;
- Palustrine Mixed-broad-leaved Scrub/Shrub Wetland; and
- Palustrine Broad-leaved Winter-deciduous Forested Wetland. (Cowardin et al. 1979.)

These habitat types are considered sensitive plant communities by the California Department of Fish and Game (CDFG) (Holland 1986), and are tracked in CDFG's California Natural Diversity Data Base (CNDDB 2004). The subsection below describes each wetland habitat onsite, and describes the plant communities making up those wetland habitats.

The upland habitats, and the plant communities making up those habitats, are also described below following the Wetland Habitats descriptions. The upland habitat types include the following: California Annual Grassland, Coastal Sage Scrub, Chaparral, Rock Outcrop, and Ruderal.

Camarillo Regional Park consists primarily of natural open space habitats, with portions of the park having been previously developed (flood control levees, model aircraft airport, dairy, quarry, model boat pond, and connecting roads). Approximately 296.1 acres of the park contain natural vegetation, with the developed portions of the park occupying approximately 30.0 acres. A small percentage of the areas dominated by natural vegetation have been disturbed at some time in the past, primarily in the lowland portions of the park, but have become revegetated naturally.

WETLAND HABITATS

Wetland plant communities/vegetation types at Camarillo Regional Park are classified into two general systems, according to the U.S. Fish and Wildlife Service wetlands classification system (Cowardin et al. 1979); and they include Riverine and Palustrine. Descriptions of each plant community within each system observed at the park are provided below.

Riverine System

A Riverine system includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean-derived salts in excess of 0.5‰. Channel is defined as a conduit that periodically or continuously contains moving water, or that forms a connecting link between two bodies of standing water. (Cowardin et al. 1979.) Riverine habitats at Camarillo Regional Park, restricted to the bed of Calleguas Creek, occupies approximately 2.74 acres.

Riverine Aquatic Bed

Riverine Aquatic Bed includes wetlands and deepwater habitats dominated by plants that grow principally on or below the water surface for most of the growing season in most years. Water regimes include: subtidal; irregularly or intermittently exposed; and regularly, permanently, semipermanently, or seasonally flooded. Riverine Aquatic Bed habitats represent a diverse group of plant communities that require surface water for optimum growth and reproduction. They are best developed in relatively permanent water or under conditions of repeated flooding. Plants are either attached to the substrate or free-floating in the water above the bottom or below the surface. (Cowardin et al. 1979)

Plant species predominating this plant community include Mosquito Fern (*Azolla filiculoides*) and Big Duckweed (*Lemna valdiviana*). Riverine Aquatic Bed habitat within Calleguas Creek at Camarillo Regional Park occupies approximately 0.8 acre of the streambed.

Riverine Unconsolidated Bottom

Riverine Unconsolidated Bottom includes all wetland and deepwater habitats with at least 25 percent cover of particles smaller than stones, consisting of predominantly sand with finer and courser sediments intermixed, and a vegetative cover of less than 30 percent (Cowardin et al. 1979). Unconsolidated Bottom exists within the immediate creek bottom (within the scour lines) of Calleguas Creek and several of the lowland areas within the

park, and consists primarily of Riverwash materials (non-soils) within the creek. Riverwash forms a natural barren habitat typical of active stream channels, and consists of highly stratified, water-deposited layers of stony, gravely, cobble-stone sand. It contains relatively small amounts of silt and clay and typically results from streambank erosion. Riverwash material is frequently inundated during high water flows immediately following storms. It is subject to frequent disturbance, scouring, and deposition, and the development and establishment of riparian vegetation is severely limited (Edwards et al. 1970).

Riverine Unconsolidated Bottom habitat within Calleguas Creek at Camarillo Regional Park occupies approximately 2.0 acres of the streambed.

Palustrine System

The Palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived slats is below 0.5‰. The Palustrine System is bounded by either upland or by any of the other four systems.

Palustrine Persistent Emergent Wetland

Palustrine Persistent Emergent Wetland is characterized by herbaceous hydrophytes that regenerate primarily from rhizomes. The floodplain and lowland areas (northern and southern valleys and Calleguas Creek) are predominated by approximately 23.9 acres of Palustrine Persistent Emergent Wetlands. The three plant communities representing emergent wetland onsite include Freshwater Marsh, Cismontane Alkali Marsh, and Alkali Meadow.

Freshwater Marsh

The Freshwater Marsh observed onsite is predominately Bulrush Series, which is dominated by California Bulrush (*Schoenoplectus* [*Scirpus*] *californicus*) and/or Olney's Three-square (*S. americanus*), while associate species include Narrowleaf Cattail (*Typha domingensis*), Broad-leaved Cattail (*T. latifolia*), Water Cress (*Rorippa nasturtium-aquaticum*), Yellow Water Weed (*Ludwigia peploides*), Spotted Smartweed (*Polygonum punctatum*), and Common Speedwell (*Veronica anagallis-aquatica*). Bulrush Series forms a variable (continuous to open), herbaceous, scrubby groundlayer of less than four meters tall. It occurs in peaty, saturated soils of variably flooded and often ponded habitats with water chemistry of freshwater, mixohaline, hyperhaline, or mixosaline at elevations below 2,100 meters (Sawyer and Keeler-Wolf 1995). This habitat is considered a sensitive habitat by CDFG, and occupies approximately 16.9 acres, mostly within Calleguas Creek.

Cismontane Alkali Marsh

Cismontane Alkali Marsh (Holland 1986) is dominated by perennial, emergent, herbaceous monocots forming a dense and complete herbaceous layer to two meters tall. Cismontane Alkali Marsh is classified by the U.S. Fish and Wildlife Service (Cowardin et al. 1979) as Palustrine Alkaline Persistent Emergent Wetland. Cismontane Alkali Marsh grows where standing water or saturated soil is present during most of a year. High evaporation and low input of freshwater render these marshes somewhat salty, especially during the summer. Salinity may vary considerably, and salinity may increase during seasons of low freshwater runoff. Cismontane Alkali Marsh is also alkaline and usually includes salts other than sodium chloride.

This habitat is predominated by Alkali Bulrush (*Bolboschoenus* [*Scirpus*] *maritimus*) and Southern Cattail (*Typha domingensis*), but is also influenced by herbaceous associate species, including Spearscale (*Atriplex triangularis*), Spreading Alkali-Weed (*Cressa truxillensis* var. *truxillensis*), Alkali-mallow (*Malvella leprosa*), and Virginia Pickleweed (*Salicornia virginica*). Brewer Saltbush (*Atriplex lentiformis* ssp. *breweri*) and Mediterranean Tamarisk (*Tamarix ramosissima*) were observed as emergent shrubs throughout the Cismontane Alkali Marsh existing onsite.

Since this plant community is predominated by Alkali Bulrush and Southern Cattail, this habitat can also be classified as Bulrush-Cattail Series (Sawyer and Keeler-Wolf 1995). Bulrush-Cattail Series occurs in variably flooded and often ponded habitats with water chemistry of fresh, mixohaline, hyperhaline, mixosaline, or hypersaline and occurs at elevations below 2,100 meters. This habitat is considered a sensitive habitat by CDFG. It occupies approximately 0.82 acre within the northern valley of Camarillo Regional Park closely associated with the Alkali Meadow wetlands.

Alkali Meadow

Alkali Meadow consists of persistent plant species that normally remain standing at least until the beginning of the next growing season. The Alkali Meadow observed onsite is similar to Saltgrass Series (Sawyer and Keeler-Wolf 1995), which is predominated by Saltgrass (*Distichlis spicata*). Saltgrass Series forms a variable ground layer of less than one meter tall, and requires irregular flooding or permanently saturated soils with a shallow water table and tolerates haline to saline water chemistry. Other important associate species contributing to Alkali Meadow at Camarillo Regional Park include: Spreading Alkali-weed (*Cressa truxillensis* var. *truxillensis*), Swamp Grass (*Crypsis schoenoides*), Alkali Heath (*Frankenia salina*), Alkali-mallow (*Malvella leprosa*), Spearscale (*Atriplex triangularis*), and Curly Dock (*Rumex crispus*). Other species of Palustrine Alkali Scrub/Shrub (described below) are also typical in this Alkali Meadow plant community as well. This habitat is considered a sensitive habitat by CDFG. Alkali Meadow occupies approximately 8.15 acres of the northern valley of Camarillo Regional Park.

Palustrine Scrub/Shrub Wetland

Palustrine Scrub/Shrub Wetland habitats consist of evergreen and winter-deciduous broad-leaved shrubs that occupy regularly to seasonally flooded or saturated substrates. These scrub/shrub wetlands at Camarillo Regional Park include Palustrine Alkaline Scrub/Shrub Wetland and Palustrine Mixed-broad-leaved Scrub/Shrub Wetland, both of which are further described below. Palustrine Scrub/Shrub Wetlands onsite occupy approximately 22.63 acres, including a portion of Calleguas Creek.

Palustrine Alkaline Scrub/Shrub Wetland

Palustrine Alkaline Scrub/Shrub Wetland onsite is dominated by hydrophytes capable of withstanding alkaline and saline saturated soil conditions. Alkali Scrub/Shrub at Camarillo Regional Park is predominated by Mediterranean Tamarisk (*Tamarix ramosissima*) and Brewer Saltbush in the shrub stratum. Brewer Saltbush is native, while Mediterranean Tamarisk is a highly invasive non-native plant species that successfully replaces many native riparian willow plant communities in both large and small-scale ecosystems throughout California. The understory species include species such as Virginia Pickleweed (*Salicornia virginica*), Saltmarsh Fleabane (*Pluchea odorata*), Spreading Alkali-weed. Other species of Alkali Meadow (described above) are typical in this Alkali Scrub/Shrub plant community as well. These herbaceous species form a relatively rare wetland plant community in Ventura County, and the Tamarisk poses a great threat to this Alkali Scrub/Meadow habitat type. Palustrine Alkaline Scrub/Shrub Wetland occupies approximately 8.07 acres of Camarillo Regional Park, entirely within the northern valley portion of the park.

Palustrine Mixed Broad-leaved Scrub/Shrub Wetland

Palustrine Mixed Broad-leaved Scrub/Shrub Wetland includes areas predominated by woody, broad-leaved, deciduous and evergreen plant species less than six meters tall (shrubs). The plant species of this plant community include true shrubs that are small or stunted due to environmental conditions. Scrub/Shrub Wetlands may represent a successional stage leading to Forested Wetland, or may be relatively stable communities. (Cowardin et al. 1979.)

The predominant vegetation type onsite is classified as Palustrine Mixed Broad-leaved Scrub/Shrub Wetland, and it covers approximately 14.56 acres onsite. Palustrine Mixed-broad-leaved Scrub/Shrub Wetland,

occurring along Calleguas Creek in the vicinity of Camarillo Regional Park, includes three predominant plant communities: Arroyo Willow-Mulefat Scrub, Mulefat Scrub, and Mulefat-Coyote Brush Scrub.

Arroyo Willow-Mulefat Scrub

Arroyo Willow-Mulefat Scrub is co-dominated by Arroyo Willow (*Salix lasiolepis*) and Mulefat (*Baccharis salicifolia*), which indicates that these species are represented more or less equally in the shrub riparian canopy onsite. Arroyo Willow-Mulefat Scrub, or Southern Willow Scrub (Holland 1986), forms dense riparian thickets with little understory development. Site factors include loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows; and this early seral type requires repeated flooding to prevent succession to Riparian Forest. This habitat is considered a sensitive habitat by CDFG.

Arroyo Willow-Mulefat Series generally occurs in seasonally flooded or saturated, freshwater, wetland habitats, such as floodplains and low-gradient depositions along rivers and streams, at elevations below 1,800 meters (Sawyer and Keeler-Wolf 1995).

Arroyo Willow-Mulefat Scrub was observed primarily along Calleguas Creek, and this plant community occupies approximately 0.53 acre of Camarillo Regional Park. Important associate riparian species to the Arroyo Willow-Mulefat canopy along Calleguas Creek include: Mugwort (*Artemisia douglasiana*), Poison Hemlock (*Conium maculatum*), Water Cress (*Rorippa nasturtium-aquaticum*), Narrow-leaved Willow (*Salix exigua*), and Common Speedwell (*Veronica anagallis-aquatica*).

Mulefat Scrub

Mulefat Scrub is is dominated by *Baccharis salicifolia*, which is a glabrous, often sticky shrub with many short, spreading branches. *B. salicifolia* has a wetland indicator status of FACW (Reed 1988). Mulefat Series (Sawyer and Keeler-Wolf 1995) is found at elevations below 1,250 meters, requires freshwater habitats that are seasonally flooded or saturated (i.e. canyon bottoms, irrigation ditches, and stream channels), and occurs in pure stands or may mix with other wetland species (such as those listed above in Arroyo Willow-Mulefat Scrub). Mulefat Scrub occupies approximately 14.03 acres at Camarillo Regional Park.

Mulefat-Coyote Brush Scrub

Mulefat-Coyote Brush Scrub is co-dominated by *Baccharis salicifolia* and *Baccharis pilularis,* which indicates that these species are represented equally in the shrub floodplain canopy onsite. Coyote Brush is typically a more upland species of stabilized dunes of coastal bars, river mouths, spits along the coastline, coastal bluffs, open slopes, and terraces (Sawyer and Keeler-Wolf 1995). Mulefat-Coyote Brush Scrub is very similar to Mulefat Scrub; however, the canopy is significantly influenced by the equal contribution of Coyote Brush. This plant community forms a continuous canopy over a sparse ground layer, and indicates an ecotonal area between the more hydrophytic-dominated plant communities and the more upland Coastal Sage Scrub plant communities. Mulefat-Coyote Brush Scrub occupies approximately 3 acres at Camarillo Regional Park.

Palustrine Broad-leaved Winter-deciduous Forested Wetland

In addition to Alkali Meadow and Freshwater Marsh, the floodplain and lowland areas (northern and southern valleys and Calleguas Creek) are predominated by Palustrine Broad-leaved Winter-deciduous Forested Wetland, or Southern Willow Riparian Forest. Palustrine Broad-leaved Winter-deciduous Forested Wetland is characterized by woody vegetation that is at least six meters tall (trees). It includes dominant riparian species with large leaves (as apposed to coniferous or needle-like leaves) that are either evergreen or winter-deciduous (falling during the winter season). (Cowardin et al. 1979.)

Arroyo Willow Riparian Forest

Arroyo Willow Riparian Forest is dominated by Arroyo Willow (*Salix lasiolepis*), which is a broad-leaved winter-deciduous tree. The National Inventory of Wetland Plants (Reed 1988) lists Arroyo Willow with a wetland indicator status of FACW (facultative wetland species that is usually found in wetlands [Reed 1988]). Arroyo Willow Riparian Forest, or Southern Willow Riparian Forest (Holland 1986), is characterized as a tall, open, winter-deciduous, broad-leaved willow canopy growing over a shrubby understory. Site factors include sub-irrigated and frequently overflowed lands along rivers and stream, and the dominant species require moist, bare mineral soil for germination and establishment. This habitat is considered a sensitive habitat by CDFG.

This plant community is also classified as Arroyo Willow Series, which occurs in seasonally flooded or saturated freshwater wetland habitats, such as floodplains and low-gradient depositions along rivers and streams, and it is abundant in marshes, meadows, and springs. This series occurs at elevations below 1,800 meters and forms a continuous canopy over a sparse shrub layer and variable ground layer (depending on canopy thickness). Other emergent winter-deciduous riparian trees may be present. (Sawyer and Keeler-Wolf 1995.)

Arroyo Willow Riparian Forest occurs along Calleguas Creek and occupies approximately 8.03 acres of Camarillo Regional Park. Important associate tree and shrub species include Red Willow (*Salix laevigata*), Narrow-leaved Willow (*Salix exigua*), and Mulefat. Scattered trees include California Sycamore (*Platanus racemosa*), Fremont Cottonwood (*Populus fremontii* ssp. *fremontii*), and Velvet Ash (*Fraxinus velutina*). One Coast Live Oak (*Quercus agrifolia*) tree was also observed in this plant community.

UPLAND PLANT COMMUNITIES

Upland plant communities at Camarillo Regional Park are classified according to the California Native Plant Society's classification system (Sawyer and Keeler-Wolf 1995), which has been adopted by the California Department of Fish and Game and federal resource agencies. The upland plant communities are described below, and they include the following: California Annual Grassland, Venturan Coastal Sage Scrub, Chaparral, Rock Outcrops, and Ruderal. Each of these may have one or more mapable plant associations.

California Annual Grassland

California Annual Grassland is dominated by annual grasses that are primarily Mediterranean in origin. Dominant genera include *Bromus*, *Avena*, *Vulpia*, and *Hordeum*. Many species of native forbs and bulbs, as well as naturalized annual forbs are found in California Annual Grassland. Floristic richness is affected to a high degree by land use activity, such as intensity and duration of grazing. Heavily grazed grasslands often have lower species richness. California Annual Grassland can occur on all aspects on most geomorphic features where soils are deep, particularly where slopes are gradual, at elevations between sea level and 1,200 meters. Grassland species composition may vary from stand to stand (Sawyer and Keeler-Wolf 1995).

California Annual Grassland occurs on gradual slopes of Camarillo Regional Park below 300 feet in elevation and occupies approximately 37.87 acres onsite. Common forbs found onsite include: Rancher's Fire (*Amsinckia menziesii* var. *intermedia*), Fasciculed Tarplant (*Deinandra fasciculata*), Purple Owl's-clover (*Castilleja exserta* ssp. *exserta*), lupines (*Lupinus* spp.), Dove Weed (*Eremocarpus setigerus*), California Poppy

(*Eschscholzia californica*), Common Eucrypta (*Eucrypta chrysanthemifolia* ssp. *chrysanthemifolia*), everlastings (*Gnaphalium* and *Pseudognaphalium* spp.), Caterpillar Phacelia (*Phacelia cicutaria*), Western Ragweed (*Ambrosia psilostachya* var. *californica*), Narrowleaf Milkweed (*Asclepias fascicularis*), Goldenstars (*Bloomeria crocea*), Soap Plant (*Chlorogalum pomeridianum*), Blue Dicks (*Dichelostemma capitatum* ssp. *capitatum*), and Western Verbena (*Verbena lasiostachys*).

Venturan Coastal Sage Scrub

Venturan Coastal Sage Scrub is a type of shrubland that is dominated by drought-tolerant, drought-deciduous, low-growing, soft-leaved, grayish-green, spring-flowering, fire-adapted shrubs and subshrubs. Venturan Coastal Sage Scrub forms various stands with specific characteristics and site requirements; therefore, it is often considered as a collection of species-specific plant series. Venturan Coastal Sage Scrub occurs on dry, more or less rocky slopes, often at lower elevations. (Holland 1986.)

Coyote Brush Scrub, Southern Cactus Scrub, and Scrub-Chaparral Ecotone are the three predominant Coastal Sage Scrub types observed at Camarillo Regional Park, and collectively Venturan Coastal Sage Scrub occupies approximately 110.09 acres of Camarillo Regional Park. Venturan Coastal Sage Scrub is typically dominated by one or more shrub species, but almost always includes California Sagebrush (*Artemisia californica*), while species of sages (*Salvia* spp.) are also quite common.

Coastal Sage Scrub communities are considered to be at risk in the Southwestern Region (especially in the Western Transverse Ranges Subregion and the adjacent South Coast Subregion) of significant reductions in area, diversity, and richness. Less than 7% of Coastal Sage Scrub plant communities are currently protected from southern Santa Barbara County south to San Diego County, while much less is protected, if any, in the Santa Paula/Fillmore region. Approximately 85% of the Coastal Sage Scrub communities in southern California have been lost to urban and agricultural development. Coastal Sage Scrub series, dominated by California Sagebrush, are at the greatest risk because little of this Coastal Sage Scrub type is currently protected, with very little, if any, protected in Ventura County. Southern Cactus Scrub and California Sagebrush Scrub are particularly considered sensitive, as rare animal species (such as the federally threatened California Gnatcatcher [*Polioptila californica*]) typically occupy stands dominated by Coast Prickly-pear and California Sagebrush. (Davis et al. 1995.)

Coyote Brush Scrub

Coyote Brush (Scrub) Series is a type of Coastal Sage Scrub dominated almost exclusively by Coyote Brush (*Baccharis pilularis*). Coyote Brush is a medium-sized, sclerophyllous-leaved (small and thick), evergreen shrub to two meters high, and occurs in association with other typical Coastal Sage Scrub species. This series can occur as an almost pure stand of Coyote Brush, especially in lowland areas, and occurs on gentle to steep slopes, and in lowland areas often associated with riparian habitats. *B. pilularis* also occurs in scrub and oak woodland communities on stabilized dunes of coastal bars, river mouths, coastline spits, coastal bluffs, open slopes, and ecotonal areas with grasslands (Hickman 1993). The variable stands of Coyote Brush Series typically include a co-dominant and important associates (such as those listed for Coastal Sage Scrub above) over a variable ground layer. Coyote Brush Scrub forms a continuous or intermittent canopy (less than 2 m tall) and often forms a pure stand. Coyote Brush Series occurs at elevations below 1,000 meters. (Sawyer and Keeler-Wolf 1995.)

Coyote Brush Scrub occupies approximately 17.94 acres of the Coastal Sage Scrub habitat at Camarillo Regional Park, and it includes several important associates, such as: Purple Sage (*Salvia leucophylla*), California Bush Sunflower (*Encelia californica*), Ashy-leaved Buckwheat (*Eriogonum cinereum*), California Buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), Bladderpod (*Isomeris arborea*), Chaparral Mallow (*Malacothamnus fasciculatus* var. *fasciculatus*), Giant Wildrye (*Leymus condensatus*), Sticky Bush Monkeyflower (*Mimulus aurantiacus*), Sawtooth Goldenbush (*Hazardia squarrosa* var. *grindelioides*), and Deerweed (*Lotus scoparius*). Southern California Black Walnut (*Juglans californica* var. *californica*), a special-status pant species, was also observed occupying this habitat onsite, occupying approximately 0.09 acre.

Southern Cactus Scrub

Southern Cactus Scrub (Magney 1992) is dominated by *Opuntia littoralis* (Coast Prickly-pear) and *Opuntia prolifera* (Coastal Cholla). Coast Prickly Pear has flat elliptic stem segments with straight long yellowish spines, while Coastal Cholla has tree-like stems of cylindrical segments with reddish- or yellowish-brown spines. Southern Cactus Scrub consists of scrub vegetation dominated by cacti and coastal sage scrub species. Southern Cactus Scrub, or Maritime Succulent Scrub (Holland 1986), occurs primarily on south-facing slopes on the Conejo Mountains, Simi Hills, and Camarillo Hills, and occurs on steep upland slopes with shallow soils, often with exposed parent material, at elevations between sea level and 1,300 meters.

Coast Prickly-pear Scrub is considered a sensitive plant community by CDFG consisting of predominantly succulent, malacophyllous (fleshy leaved or stemmed plants), and drought-tolerant, deciduous shrubs of less than two meters tall, and growth of these shrub types is concentrated in the spring. This scrub plant community forms an intermittent shrub canopy over a variable to sparse groundlayer of grasses or succulent herbs. Common and characteristic species of Southern Cactus Scrub include: California Bush Sunflower (*Encelia californica*), California Sagebrush, California Buckwheat, Purple Sage, Black Sage (*Salvia mellifera*), Blue Elderberry (*Sambucus mexicana*), Giant Coreopsis (*Coreopsis gigantea*), and Our Lord's Candle (*Hesperoyucca whipplei*). The understory is composed of Foothill Needlegrass (*Nassella lepida*) and Bentgrass (*Agrostis* sp.). Southern Cactus Scrub occupies approximately 3.88 acres of the park.

Scrub-Chaparral Ecotone

Scrub-Chaparral Ecotone (Coastal Sage-Chaparral Scrub) represents a gradation and intermingling of coastal sage scrub types and chaparral types. More specifically, it represents a complex ecotone from the woody, evergreen, Chaparral shrubs to the typical semi-woody, soft-leaved, summer-deciduous Coastal Sage Scrub shrubs and subshrubs, with scattered exposed Rock Outcrop. These areas can be designated as Scrub-Chaparral or by combining the specific associations. Examples include Black Sage Scrub with Chamise Chaparral, or Chamise Chaparral mixed with Sagebrush-Buckwheat Scrub. These represent ecotonal areas between chaparral and scrub communities with component species of both or seral sites and are usually patches of scrub with strong component of chaparral species within a chaparral matrix. Several species from each of these different habitat types may occupy one stand at once, and species diversity is often high in mixed ecotonal stands such as these. (Descriptions of Venturan Coastal Sage Scrub plant communities found at Camarillo regional Park are provided above, while descriptions of Chaparral plant communities observed at the park are provided below.)

Chaparral

Chaparral is a type of shrubland dominated by evergreen shrubs with small, thick, leathery, dark green, sclerophyllous leaves. The shrubs are relatively tall and dense, and are adapted to periodic wildfires by stump sprouting or germination from a dormant seed bank. The evergreen shrubs included in chaparral are also adapted to drought by deep extensive root systems, while their small, thick leaf-structure prevents permanent damage from moisture loss. Many shrubs typical of Coastal Sage Scrub also grow intermixed as associates with chaparral species. Chaparral typically occurs on moderate to steep south-facing slopes with dry, rocky, shallow soils. It is more abundant at higher elevations where temperatures are lower and moisture supplies are more ample.

Bigpod Ceanothus Chaparral

Bigpod Ceanothus Chaparral is very similar to Snowball Ceanothus Chaparral but occurs at lower elevations and is dominated by *Ceanothus megacarpus* var. *megacarpus* with Chamise (*Adenostoma fasciculatum*) as an important canopy shrub. It occurs on xeric slopes in the Santa Monica Mountains. Bigpod Ceanothus is an evergreen shrub (less than four meters tall) with firm, one-ribbed, dull green leaves, white to pale lavender flowers, and horn-tipped fruit; and it occurs on dry slopes in canyons near the coast, at elevations below 750 meters (Hickman 1993).

Bigpod Ceanothus Series (Sawyer and Keeler-Wolf 1995) forms tall dense stands and is adapted to periodic wildfires by producing a large seed bank each year, is long-lived absent fires; however, does not resprout after a wildfire. Bigpod Ceanothus Chaparral typically forms a continuous to intermittent tall canopy, consisting of few associate species, growing over a sparse ground layer (emergent trees may be present). This chaparral type occurs on xeric upland slopes, usually fairly near the coast, and grows in shallow, rocky, poorly differentiated soils (Holland 1986).

The predominant Bigpod Ceanothus canopy contributors include: Greenbark Ceanothus (*Ceanothus spinosus*), Toyon (*Heteromeles arbutifolia*), Laurelleaf Sumac (*Malosma laurina*), Hollyleaf Cherry (*Prunus ilicifolia* ssp. *ilicifolia*), Hollyleaf Redberry (*Rhamnus ilicifolia*), Lemonadeberry (*Rhus integrifolia*), Sugarbush (*Rhus ovata*), and Our Lord's Candle (*Hesperoyucca whipplei*).

Rock Outcrops

Rock outcrop is described as exposed parent material with little or no plant species present. Rock outcrop consists of large boulders and exposed bedrock, and they generally lack soil. These hard surfaces provide substrate to nonvascular plants, such as lichens and bryophytes (mosses, liverworts). Rock outcrop may consist of large and small sandstone or granite boulders, and some exposed bedrock, that is covered or partially covered with crustose (crust-like) and foliose (leaf-like) lichens.

Rock Outcrop, at Camarillo Regional Park, occurs scattered throughout the dryer, south-facing, scrubby slopes, and occupy approximately 1.79 acres of the park, with another 7.42 acres included within Venturan Coastal Sage Scrub. The predominant plant species scattered throughout the Rock outcrops onsite include: Blochman's Dudleya (*Dudleya blochmaniae* ssp. *blochmaniae*), Verity's Dudleya (*D. verityi*), Hybrid Dudleya (*D. blochmaniae* X *D. verityi*), Purple Needlegrass (*Nassella pulchra*), Lemonadeberry (*Rhus integrifolia*), California Bush Sunflower (Encelia californica), and California Sagebrush (*Artemisia californica*).

Ruderal

Ruderal Grassland/Herbaceous is a plant community that is typically in early successional stages as a result of a severe human disturbance, or because the land is subject to recurrent natural disturbance. This plant community is dominated by annual and perennial, introduced/nonnative, pioneering, herbaceous plants that readily colonize disturbed ground. The ability of exotic species to invade disturbed areas arises from their relationship to old-world ancestors that have co-existed with humans for millennia, and thus are more adapted to exploit disturbed land. Ruderal communities may provide a certain degree of erosion control for recently graded areas, but such communities are also a threat to the natural biodiversity because they continually distribute invasive, highly competitive non-native propagules into otherwise native vegetation. However, if Ruderal Grassland is left undisturbed, it can undergo succession towards more stable, and less weedy, plant communities, such as Coastal Sage Scrub or Riparian scrub.

Ruderal herbaceous vegetation occupies approximately 29.06 acres of Camarillo Regional Park, and consists of mostly pioneering and weedy forbs that quickly colonize disturbed soils. Predominant and characteristic plants of the Ruderal Grassland/Herbaceous plant communities at Camarillo Regional Park include: Russian Knapweed (*Acroptilon repens*), Purple Pampas Grass (*Cortedaria jubata*), Bermuda Grass (*Cynodon dactylon*), Sweet Fennel (*Foeniculum vulgare*), Prickly Wild Lettuce (*Lactuca serriola*), White Horehound (*Marrubium vulgare*), Milk Thistle (*Silybum marianum*), Tree Tobacco (*Nicotiana glauca*), Prickly Ox-tongue (*Picris echioides*), Wild Radish (*Raphanus sativus*), Castor Bean (*Ricinus communis*), Russian Thistle (*Salsola tragus*), Cheeseweed (*Malva parviflora*), Black Mustard (*Brassica nigra*), and Summer Mustard (*Hirschfeldia incana*). An additional 4.38 acres consists of ornamental landscaping, primarily in the form of planted trees.

Wildlife

Many species of wildlife are known to occur at Camarillo Regional Park and within Calleguas Creek, and frequent the Palustrine and Riverine System habitats on a seasonal basis, and they regularly use resources provided by the creek. A total of 137 species of wildlife present or expected onsite in both wetland and upland habitat, and include:

- Fishes (3 native species, 3 nonnative);
- Amphibians (4 native species, 1 nonnative);
- Reptiles (16 native species);
- Birds (82 native species, 3 nonnative);
- Mammals (26 native species, 1 nonnative); and
- Invertebrates (thousands of native and several nonnative species – no attempt made to identify).

Fish species richness and diversity in Calleguas Creek at Camarillo Regional Park are low compared to other similar-sized streams in the region. Amphibian species richness is relatively low at the park, due primarily because of farming activities to the west and past disturbances to the project site. Reptile species richness is normal for this area with five species observed and another nine native species expected and likely present at the park. Bird species richness is relatively high, due to the variety of habitats present at the park. Mammal species diversity is relatively high, also likely a result of the variety of habitats present, and proximity to extensive natural habitats eastward in the Conejo Mountains. Invertebrate species richness and diversity is expected to be relatively high as a result of the presence of a wide variety of habitats at the park.

Palustrine and Riverine habitats provide numerous important wildlife resources. The structure of the riparian community, in addition to the relatively high plant species diversity and richness, provides habitat necessary for foraging, nesting, and cover for many species. In addition, streams and rivers such as Calleguas Creek are important sources of water for a variety of upland wildlife species. Riparian zones along rivers are also often used as migration/movement corridors by various species of wildlife including small and large mammals, birds, and reptiles. These movement corridors often connect habitat patches, and allow for physical and genetic exchange between animal populations. Wildlife can use riparian zones for cover while traveling across otherwise open areas.

The riparian wetland habitats onsite provide habitat for a number of wildlife, including invertebrates (aquatic and terrestrial), amphibians, reptiles, birds, and mammals. Table 2, Fauna Observed and Expected at Camarillo Regional Park, contains wildlife species (listed phylogenetically) that were either observed or detected (tracks, scat, burrows, skeleton, etc.) by DMEC, or are known to occur onsite based on previous recordings (Impact Sciences 1997). Scientific nomenclature follows the AOI (1989) for birds, Burt and Grossenheider (1976) for mammals, Jennings (1983) and Stebbins (1985) for amphibians and reptiles, and Moyle (1976) for fishes.

Table 2. Fauna Observed and Expected at Camarillo Regional Park

	Scientific Name	Observed[10]	Expected
Fishes			
Goldfish*	*Carassius auratus**		X
Brown Bullhead	*Ictalurus nubulosus*		X
Arroyo Chub	*Gila orcutti*	X	
California Killfish	*Fundulus parvipinnis*		X
Mosquitofish*	*Gambusia affinis**		X
Green Sunfish*	*Lepomis cyanellus**		X

[9] An * indicates nonnative species. Bold type indicates special-status wildlife species.
[10] Observed species include those observed by DMEC biologists or reported onsite by Impact Sciences (1997).

Common Name[9]	Scientific Name	Observed[10]	Expected
Western Toad	*Bufo boreas*	X	
California Treefrog	*Hyla californiae*		X
Western Spadefoot	*Scaphiopus hammondi*		X
Pacific Chorus Frog	*Pseudacris regilla*	X	
Bullfrog*	*Rana catesbeiana**	X	
tad pole	(*Hyla* spp. and/or *Rana catesbeiana*)	X	
Reptiles			
Western Fence Lizard	*Sceloporus occidentalis*	X	
Side-blotched Lizard	*Uta stansburiana*	X	
Western Skink	*Eumeces skiltonianus*		X
Coastal Western Whiptail	*Cnemidophorus tigris multiscutatus*	X	
Southern Alligator Lizard	*Elgaria* [*Gerrhonotus*] *multicarinatus*		X
California Mountain Kingsnake	*Lampropeltis zonata*		X
Common Kingsnake	*Lampropeltis getulus californiae*	X	
San Diego Gopher Snake	*Pituophis melanoleucus annectens*	X	
Long-nosed Snake	*Rhinocheilus lecontei*		X
Lyre Snake	*Trimorphodon vandenburghi*		X
Night Snake	*Hypsiglena torquata*		X
Racer	*Coluber constrictor*		X
Ringneck Snake	*Diadophis punctatus*		X
Striped Racer	*Masticophis lateralis*	X	
Western Rattlesnake	*Crotalus viridis*		X
Birds			
Black-crowned Night Heron	*Nycticorax nycticorax*	X	
Green Heron	*Butorides virescens*	X	
Snowy Egret	*Egretta thula*		X
Great Egret	*Casmerodius albus*		X
Great Blue Heron	*Ardea herodias*	X	
Mallard	*Anas platyrhynctos*	X	
Northern Shoveler	*Anas clypeata*	X	
Ruddy Duck	*Oxyura jamaicensis*	X	
Turkey Vulture	*Cathartes aura*	X	
White-tailed Kite	*Elanus leucurus*	X	
Northern Harrier	*Circus cyaneus*		X
Cooper's Hawk	*Accipiter cooperii*	X	
Red-shouldered Hawk	*Buteo lineatus*	X	
Red-tailed Hawk	*Buteo jamaicensis*	X	
American Kestrel	*Falco sparverius*	X	
California Quail	*Callipepla californica*	X	
American Coot	*Fulica Americana*	X	
Killdeer	*Charadrius vociferous*	X	
Band-tailed Pigeon	*Columba fasciata*	X	
Rock Dove*	*Columba livia**	X	
Mourning Dove	*Zenaida macroura*	X	
Greater Roadrunner	*Geococcyx californicus*	X	

Common Name[9]	Scientific Name	Observed[10]	Expected
Barn Owl	*Tyto alba*	X	
Great Horned Owl	*Bubo virginianus*		X
White-throated Swift	*Aeronautes saxatilis*	X	
Black-chinned Hummingbird	*Archilochus alexandri*		X
Anna's Hummingbird	*Calypte anna*	X	
Allen's Hummingbird	*Selasphorus sasin*	X	
Belted Kingfisher	*Ceryle alcyon*		X
Acorn Woodpecker	*Picioides villosus*		X
Nuttall's Woodpecker	*Picoides nuttallii*	X	
Downy Woodpecker	*Picoides pubescens*	X	
Northern Flicker	*Colaptes cafer*	X	
Western Flycatcher	*Empidonax difficilis*		X
Western Wood-pewee	*Contopus sordidulus*	X	
Pacific-slope Flycatcher	*Empidonax difficilis*	X	
Ash-throated Flycatcher	*Myiarchus cinerascens*	X	
Black Phoebe	*Sayornis nigricans*	X	
Say's Phoebe	*Sayornis saya*	X	
Western Kingbird	*Tyrannus verticalis*	X	
Loggerhead Shrike	*Lanius ludovicianus*	X	
Western Scrub-jay	*Aphelocoma caerulescens*	X	
American Crow	*Corvus brachyrhynchos*	X	
Common Raven	*Corvus corax*	X	
Barn Swallow	*Hirundo rustica*	X	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	
Cliff Swallow	*Petrochelidon pyrrhonota*	X	
Wrentit	*Chamaea fasciata*	X	
Bushtit	*Psaltriparus minimus*	X	
Oak Titmouse	*Baeolophus inornatus*		X
Rock Wren	*Salpinctes obsoletus*		X
Bewick's Wren	*Thryomanes bewickii*	X	
Coastal Cactus Wren	*Campylorhynchus brunneicapillus*	X	
House Wren	*Trogodytes aedon*	X	
Ruby-crowned Kinglet	*Regulus calendula*		X
Western Bluebird	*Sialia mexicana*		X
American Robin	*Turdus migratorius*	X	
Northern Mockingbird	*Mimus polyglottos*	X	
California Thrasher	*Toxostoma redivivum*	X	
European Starling*	*Sturnus vulgaris**	X	
Phainopepla	*Phainopepla nitens*	X	
Yellow-rumped Warbler	*Dendroica coronata*		X
Yellow Warbler	*Dendroica petechia*		X
Yellow-breasted Chat	*Icteria virens*	X	
Common Yellowthroat	*Geothlypis trachas*	X	
Western Tanager	*Piranga ludoviciana*	X	
California Towhee	*Pipilo crissalis*	X	
Spotted [Rufous-sided] Towhee	*Pipilo erythrophthalmus*	X	

Common Name[9]	Scientific Name	Observed[10]	Expected
So. Calif. Rufous-crowned Sparrow	*Aimophila ruficeps canescens*	X	
Chipping Sparrow	*Spizella passerina*	X	
Lark Sparrow	*Chondestes grammacus*	X	
Song Sparrow	*Melospiza melodia*	X	
White-crowned Sparrow	*Zonotrichia leucophrys*		X
Dark-eyed Junco	*Junco hyemalis*		X
Blue Grosbeak	*Buiraca caerulea*	X	
Western Meadowlark	*Sturnella neglecta*	X	
Red-winged Blackbird	*Agelaius phoeniceus*	X	
Brewer's Blackbird	*Euphagus cyanocephalus*	X	
Brown-headed Cowbird	*Molothrus ater*	X	
Hooded Oriole	*Icterus cucullatus*	X	
House Finch	*Carpodacus mexicanus*	X	
American Goldfinch	*Carduelis tristis*		X
Lesser Goldfinch	*Carduelis psaltria*	X	
House Sparrow*	*Passer domesticus**		X
Mammals			
Virginia Opossum	*Didelphis virginiana*	X	
Ornate Shrew	*Sorex ornatus*		X
Broad-footed Mole	*Scapanus latimanus*		X
California Myotis Bat	*Myotis californicus*		X
Western Pipistrelle	*Pipistrellus Hesperus*		X
Big Brown Bat	*Eptesicus fuscus*		X
Desert Cottontail	*Sylvilagus audubonii*	X	
California Ground Squirrel	*Spermophilus beecheyi*	X	
Botta's Pocket Gopher	*Thomomys bottae*	X	
California Pocket Mouse	*Chaetodipus californicus*	X	
Agile Kangaroo Rat	*Dipodomys agilis*	X	
Western Harvest Mouse	*Reithrodontomys megalotis*	X	
California Mouse	*Peromyscus californicus*		X
Deer Mouse	*Peromyscus maniculatus*	X	
Brush Mouse	*Peromyscus boylii*		X
Cactus Mouse	*Peromyscus eremicus*	X	
Dusky-footed Woodrat	*Neotoma fuscipes*	X	
San Diego Desert Woodrat	*Neotoma lepida intermedia*	X	
California Vole	*Microtus californicus*	X	
Coyote	*Canis latrans*	X	
Gray Fox	*Vulpes cinereoargenteus*	X	
Raccoon	*Procyon lotor*	X	
Striped Skunk	*Mephitis mephitis*	X	
Feral Cat*	*Felis catus**		X
Bobcat	*Lynx rufus*		X
Mountain Lion	*Felis concolor*		X
Mule Deer	*Odocoileus hemionus*	X	
Invertebrates			
Funnel Web Spider	Agelenidae	X	

Common Name[9]	Scientific Name	Observed[10]	Expected
Pallid-winged Grasshopper	*Trimeroyropis pallidipennis*	X	
Purple-brown Dragonfly	Aeshnidae		X
Red Skimmer	*Libellula saturata*	X	
Circumpolar Bluet	*Enallagma cyanigerum*	X	
Field Cricket	*Gryllus pennsylvanicus*	X	
Flower Bug	Anthocoridae	X	
Vanduzee's Cicada	*Okanagana vanduzeei*	X	
Water (Whirligig) Beetle	Gyrinidae	X	
Ladybird Beetle	Coccinellidae	X	
Brown Weevil	Curculionidae	X	
California Sister Butterfly	*Limenitis bredowii*	X	
Chalcedon Checkerspot Butterfly	*Occidryas chalcedona*		X
European Cabbage Butterfly	*Pieris rapae*	X	
Fritillary Butterfly	*Speyeria* sp.		X
Monarch Butterfly	*Danaus plexippus*	X	
Sara Orangetip Butterfly	*Anthocharis sara*		X
Sulphur Butterfly	Pieridae	X	
Western Tiger Swallowtail Butterfly	*Papilio rutulus*	X	
California Bumblebee	*Bombus californicus*	X	
European Honey Bee	*Apis mellifera*	X	
Gold Metallic Wasp	Chrydididae	X	
Red & Black Ant	Formicidae	X	
Blue Bottle Fly	*Calliphora vomitoria*	X	
Crane Fly	Tipulidae	X	
Flesh Fly	*Sarcophaga* sp.	X	
Green Bottle Fly	*Phaenicia sericata*	X	
House Fly	Muscidae	X	
Large Bee Fly	*Bombylius* sp.	X	
Gnat	Tabanidae	X	

HGM ASSESSMENT ENVIRONMENTAL DATA

Physical environmental conditions are an important component of the natural environment as they directly or indirectly determine habitat conditions for the flora and fauna. Specific physical environmental parameters of Calleguas Creek and adjacent areas within Camarillo Regional Park are also important for determining the level at which each wetland function is operating. Table 3, Existing Channel Conditions, lists the values measured at the assessment area within Calleguas Creek adjacent to park for the HGM assessment.

Table 3. Existing Channel Conditions[11]

Parameter	Measured Value
Average Stream Width	108 ft
Mean Depth	2 ft

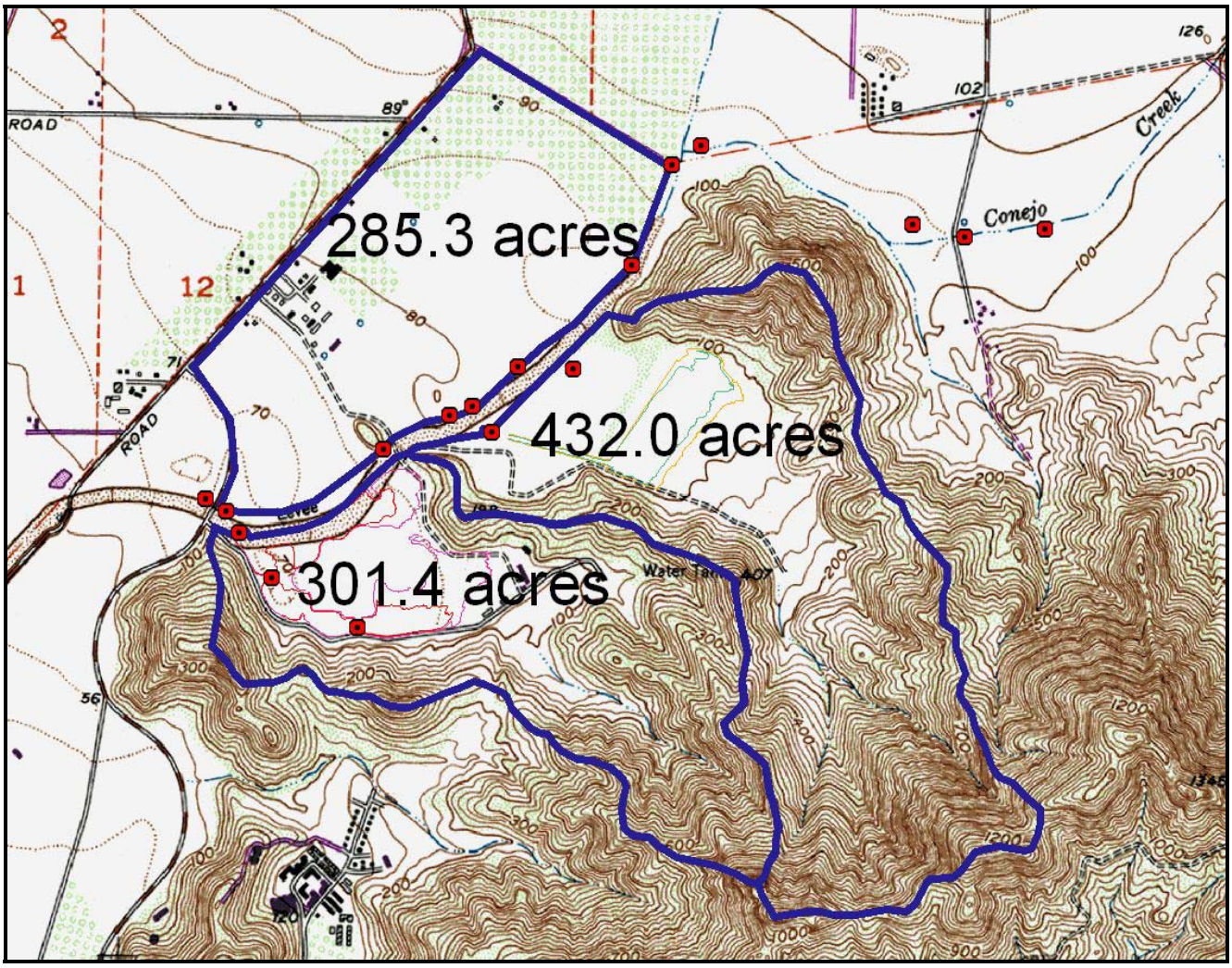
[11] Conditions assessed on 14 June 1999 by Mark Rains and Cher [Wellonen] Batchelor and by David Magney on 6 May 2004.

Parameter	Measured Value
Channel Roughness	5 %
Dominant Bed Material Class Size	sand-sized grains
Channel Bed Material Embeddedness	0 %
Channel Bed Matrix (dominant bed material)	100% sands
In-channel Coarse Woody Debris (volume)	30 cf
Decomposition Classes (# of classes of decay observed)	2
Pool Density (no. of pools/100 ft)	1
Herbaceous Cover on Channel Banks	~20 %
Seedling Cover on Channel Banks	1 %
Shrub Cover on Channel Banks	~40 %
Tree Cover on Channel Banks	~25 %
Vine Cover on Channel Banks	0 %
Basal Area of Trees	~30 sq. ft/acre
Basal Area of Snags	0 sq.ft/acre
Average Total Number of Vegetation Strata	3
Ratio of Native to Exotic Dominant Plants	8:0
Off-Channel Coarse Woody Debris (volume)	~35 cf
Canopy Cover Over Stream	10 %
Soil Profile Integrity in Buffer Area	Disturbed in part
Sediment Inputs into Channel	1
Surface Water Inputs into Channel	2
Man-made Features on Channel Banks	3
Man-made Features Crossing Channel (# of features)	3
Animal Signs (# of wildlife classes observed)	4
Buffer Width (average width of vegetated buffers)	50 ft.
Buffer Condition (% cleared of natural vegetation)	50 %
Buffer Continuity (man-made breaks in buffer area)	2

These data are used in the HGM wetland functional assessment for the project site and are described in the following section.

That portion of Calleguas Creek adjacent to Camarillo Regional Park and draining into the creek contains three subwatersheds, exclusive of the contributing area above the park. The two subwatersheds within Camarillo Regional Park are directly associated with the northern and southern valleys, and measure 432.0 and 321.4 acres, respectively. The subwatershed to the northwest, dominated by farmland, occupies 285.3 acres. The three contributing subwatersheds are mapped on Figure 10, Map of Project Site Subwatersheds and Water Input Points, and also illustrate the known surface water input points along Calleguas Creek and Conejo Creek onsite and immediately upstream of Camarillo Regional Park.

Figure 10. Map of Project Site Subwatersheds and Water Input Points



The blue lines represent the boundaries of the three subwatersheds that contribute surface and subsurface water flows locally to the Calleguas Creek. The red dots represent surface water flow input points or culverts discharging surface flows from one area to the next.

PROJECT SCENARIOS FOR CAMARILLO REGIONAL PARK

Four separate but related project scenarios are considered and analyzed in this assessment and compared to baseline (existing conditions):

A. 18-hole golf course project,
B. Golf course and enhancement of remaining wetlands project,
C. Wetlands enhancement only project, and
D. Wetlands expansion project.

Baseline/Existing Conditions

Presently, Camarillo Regional Park, operated by the Parks Department of the County of Ventura General Services Agency (GSA), is a passive recreation, open space park. It contains a paved model airplane runway

and related facilities, a large pond formerly used from remote-controlled model boats, and an old archery range. See Figures 2, 4, and 7 for graphics and photographs of existing conditions at Camarillo Regional Park. The low-laying areas of the park contain approximately 50.7 acres of permanent and seasonal wetlands (including about 22.5 acres within Calleguas Creek), a small amount of grassland vegetation, Coyote Brush Scrub, and ruderal habitats. The hills, representing the westernmost edge of the Conejo/Santa Monica Mountains, are dominated by Southern Cactus Scrub and Coastal Sage Scrub vegetation with intrusions of volcanic rock outcrops.

Scenario A - Golf Course Project

GSA is currently proposing to build a 18-hole golf course onsite as a means to generate income for the Parks Department. Figure 11, Scenario A Golf Course Project, illustrates the general bounds of the proposed golf course and related facilities. The boundaries of the golf course were delineated based on a conceptual design map obtained from GSA.

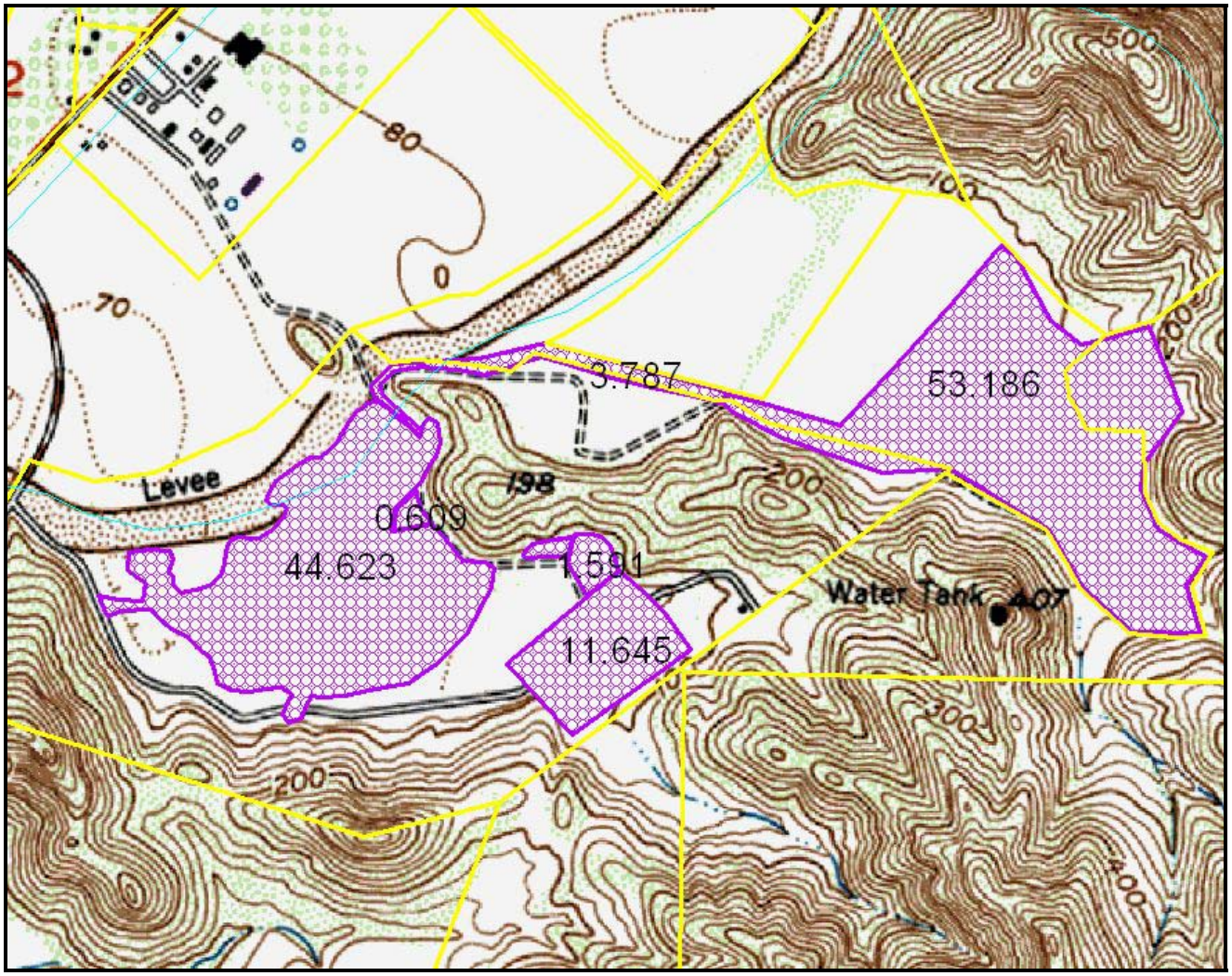
The proposed golf course would occupy approximately 117 acres of the park, located entirely on the lowland areas of the park. GSA is attempting to minimize the total area of wetlands that would be directly impacted by the golf course facilities; however, designs will be prepared by one or more golf course developers, not GSA; therefore, the actual location and extent of the golf course facilities are not yet known. Regardless, the footprint will likely be generally similar to that depicted in Figure 11.

A previous golf course and 16,000-seat amphitheater project, proposed by GSA in 1997, was determined to be inconsistent with Ventura County General Plan policies related to impacts to wetlands, wetland buffers, and rare plants, and was rejected. The current golf course proposal will need to address direct and indirect impacts to wetlands and address potential General Plan policies inconsistencies before the Ventura County Board of Supervisors can legally approve it. No project can be approved that is inconsistent with County General Plan policies.

The golf course project would likely result in filling up to approximately 11.8 acres of wetland habitat, most of which would be Corps jurisdictional. Almost certainly, any 18-hole golf course built at Camarillo Regional Park will likely at least fill over 5 acres of Corps jurisdictional wetlands[12]. Little or no buffer would occur between the golf course facilities and existing remaining wetlands, unless hillside habitats were developed. The hillsides at Camarillo Regional Park are considered sensitive plant communities/habitats, and portions of the site are occupied by listed and CDFG-sensitive species.

[12] The 5-acre value is used in this assessment based on the fact that the Corps did not believe in 1998 that the golf course previously proposed would only fill 2.97 acres as stated by GSA and their consultants, Impact Sciences. The 2.97-acre estimate was also based on a wetland delineation that was not verified by the Corps, who at the time, stated that the area of wetlands was likely larger than claimed by Impact Sciences, giving DMEC inadequate supporting evidence that less than 5 acres of wetlands would indeed be filled by the golf course development. Therefore, DMEC believes it is prudent to assume a minimum area filled to be 5 acres until such time the Corps makes a final determination.

Figure 11. Scenario A Golf Course Project



The proposed golf course facilities footprint is shown in deep magenta circle patterning, and would occupy approximately 117 acres of Camarillo Regional Park. The base map is USGS 7.5-minute topographic quadrangle of the area. The yellow lines are parcel boundaries.

The golf course only project would consist of the following components:

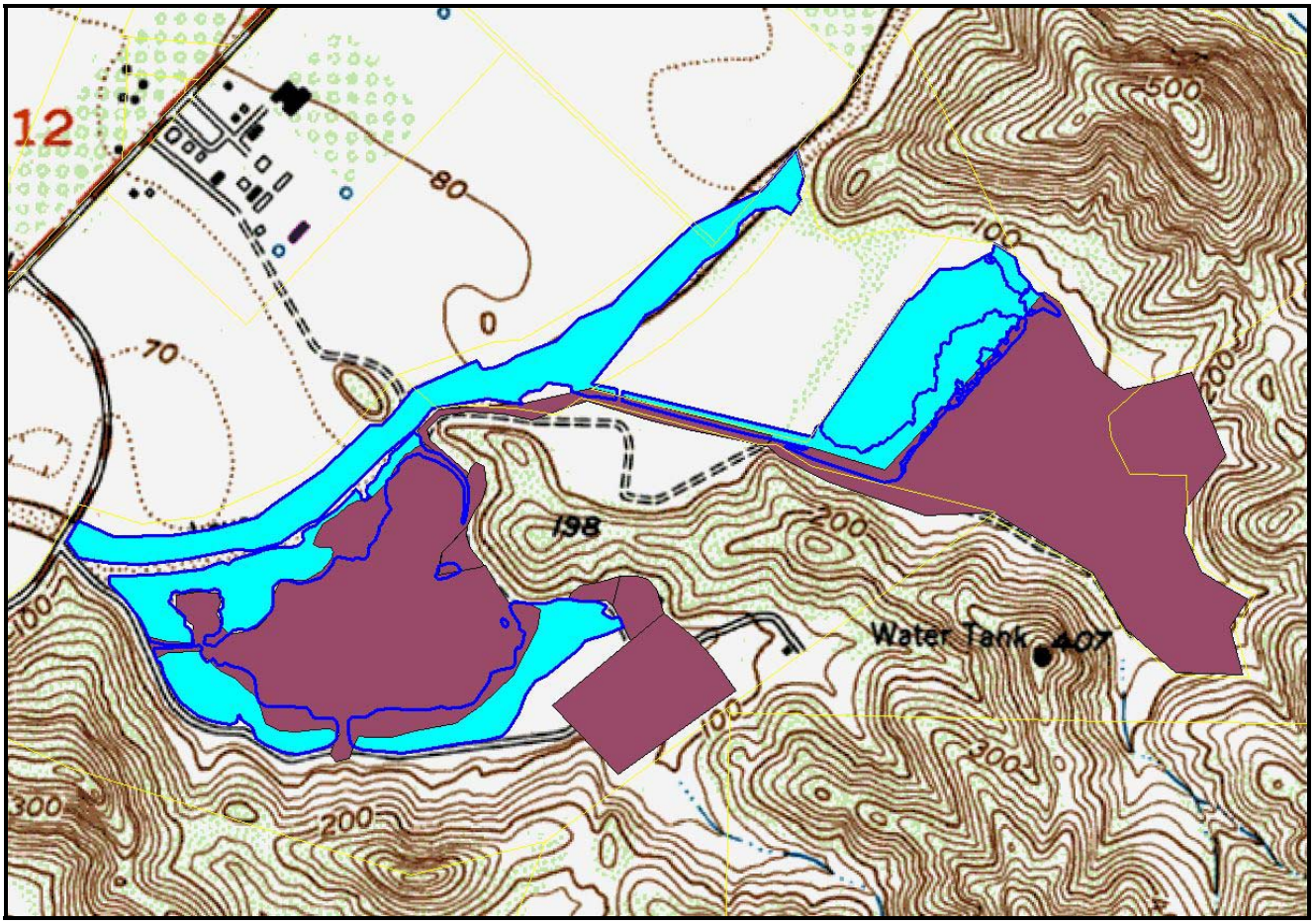
- Build 18-hole golf course (filling between 5 and 11.8 acres of wetland habitat onsite);
- Widen and pave vehicle access road;
- Build driving range;
- Build club house and pro shop;
- Build golf course maintenance and storage facilities;
- Remove model airplane airfield and related facilities; and
- Rebuild/repair the Calleguas Creek levee that eroded.

The assessment of changes to wetland functions as a result of the golf course project is based on the project layout as presented by GSA and illustrated on Figures 2 and 11. The concept plan for the golf course only project is shown will existing wetlands in Figure 12, Scenario A Golf Course Project with Existing Wetlands.

The project-related activities listed above does not include any mitigation for direct or indirect impacts to wetlands; however, such mitigation would most certainly be required if wetlands are indeed significantly impacted. Furthermore, for the purposes of this assessment, project-related impacts to wetland functions, by definition, should not consider mitigation measures as part of the impact assessment. The assessment of the

golf course project with onsite wetland mitigation is discussed and evaluated below as part of the Golf Course and Wetland Enhancement Project.

Figure 12. Scenario A Golf Course Project with Existing Wetlands



The proposed golf course is shown in burgundy color while existing wetlands are shown in light blue 11.8-acres of which are covered up by the golf course footprint), with a dark blue line delineating the boundary of the probable jurisdictional wetlands. Approximately 11.8 acres of existing wetlands are obscured by the golf course overlay. The yellow lines are parcel boundaries.

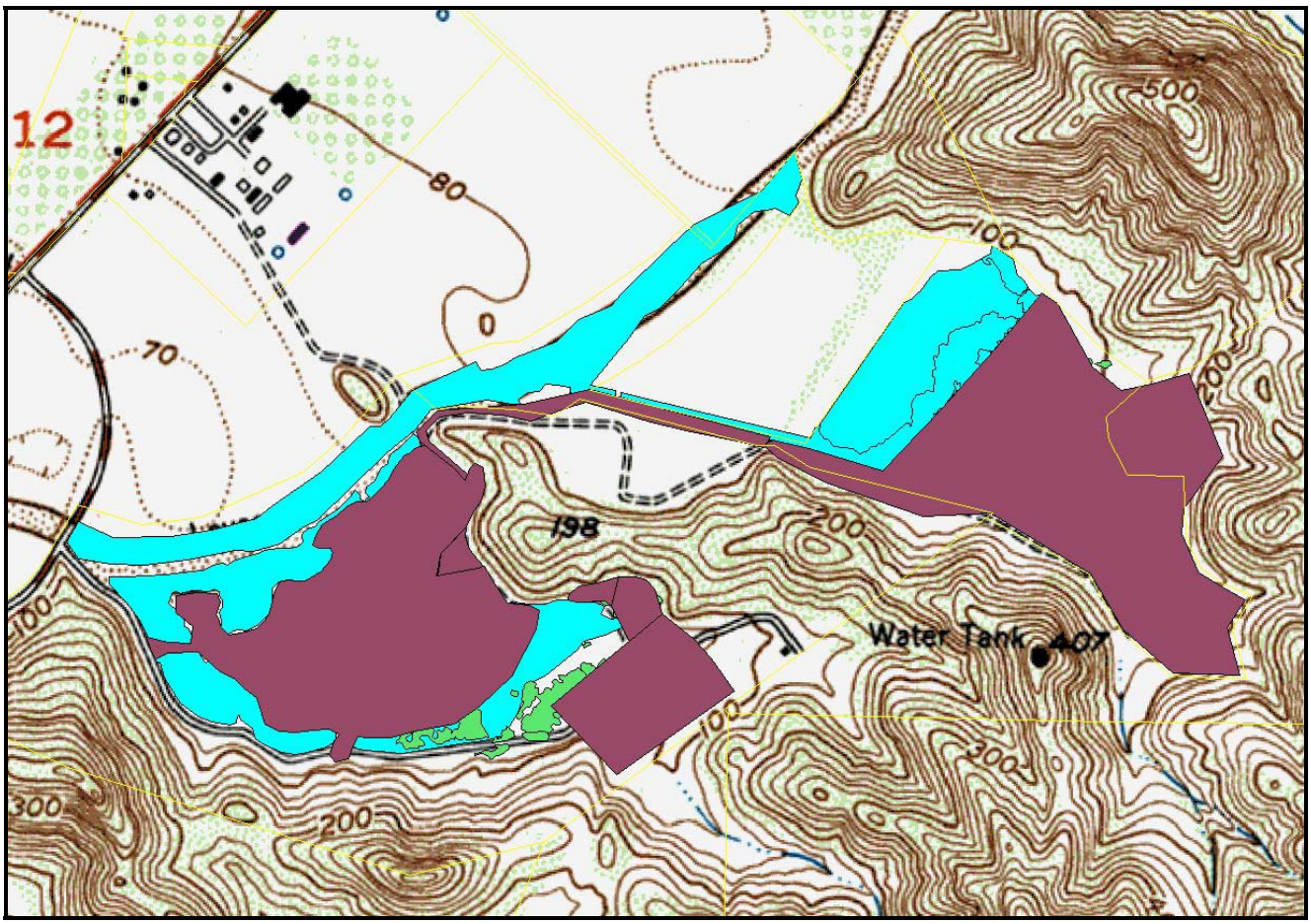
Scenario B - Golf Course and Wetland Enhancement Project

This project scenario is the same as the golf course project described above, but includes enhancing wetlands not filled when building the golf course to improve wetland functions onsite, as illustrated on Figure 13, Scenario B Golf Course and Wetlands Enhancement Project. The golf course and wetland enhancement project would consist of the following components:

- Build 18-hole golf course (filling approximately 11.8 acres of wetland habitat onsite);
- Widen and pave vehicle access road;
- Build driving range;
- Build club house and pro shop;
- Build golf course maintenance facilities;
- Remove left levee along Calleguas Creek adjacent to the southern valley of the park (optional);
- Remove and control invasive exotic plants from the park lowlands; and
- Plant native wetland plant species in selected lowland areas of the park.

While removal of the left levee is identified as optional, including this component is essential to improving the wetland functions of Calleguas Creek. Regardless, any golf course facilities at risk from flooding or erosion would need to be protected through engineered design and construction solutions.

Figure 13. Scenario B Golf Course and Wetlands Enhancement Project



The burgundy areas represent the proposed golf course facilities, which occupy approximately 117 acres of the site. The light blue areas represent the remaining wetlands onsite that would not be filled by the golf course, which measures approximately 61.4 acres. The green areas are portions of the site that are dominated by invasive exotic plants that could be removed as part of the onsite habitat enhancements proposed for this alternative. Additional areas of invasive exotic plant removal are present onsite but are not mapped here.

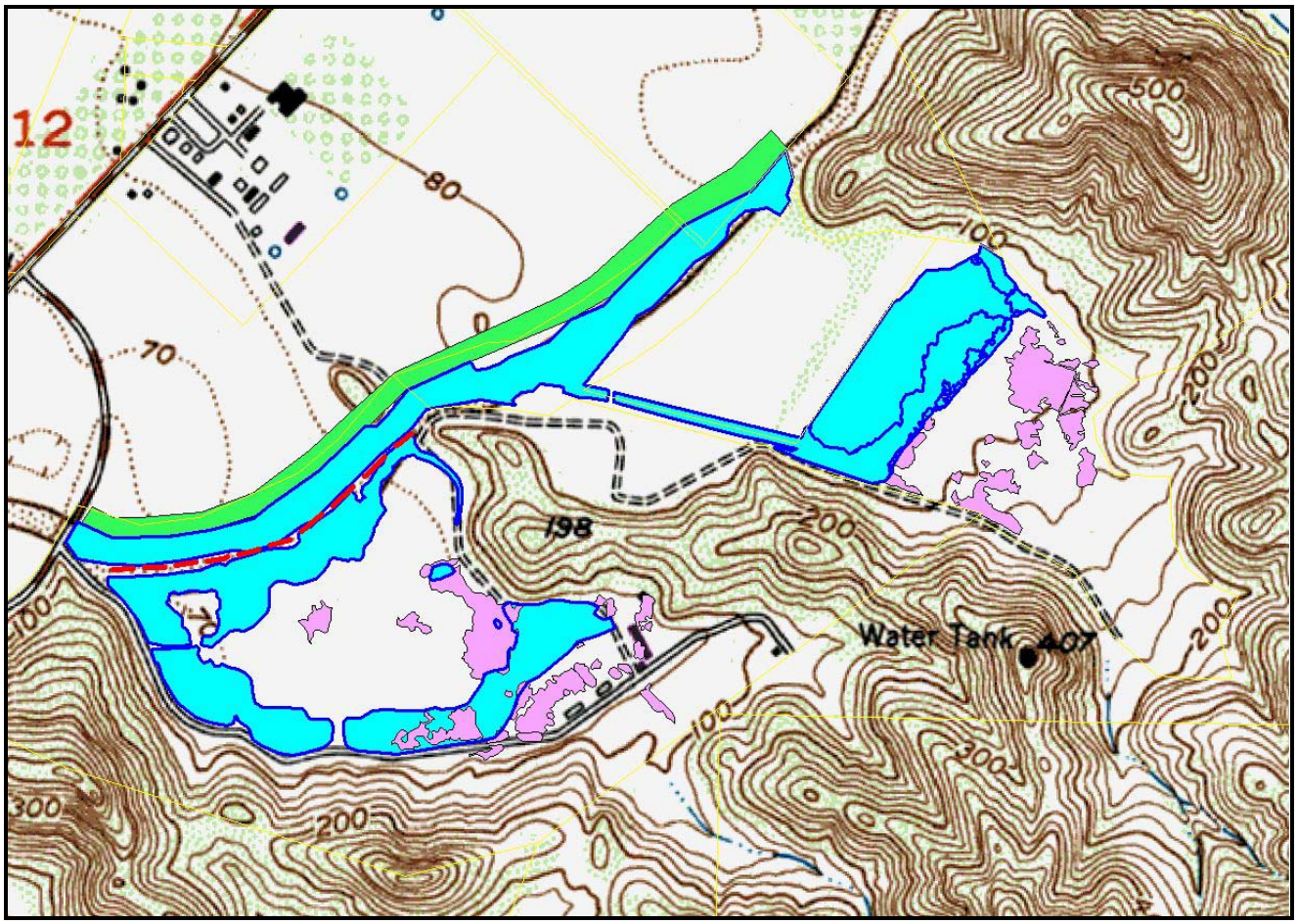
Scenario C - Wetlands Enhancement Only Project

The Coastal Conservancy is considering the feasibility of improving onsite wetland functions by enhancing the existing wetlands present at Camarillo Regional Park. The Coastal Conservancy contracted with DMEC to develop a conceptual wetland enhancement plan for the park in 2002 as part of its participation in the Calleguas Creek Watershed Management Plan Committee. DMEC had previously (DMEC 2000a) prepared a watershed wetland management plan for the Calleguas Creek watershed, under which Camarillo Regional Park was identified as a good candidate for wetland enhancement and floodplain restoration. The Committee voted to adopt the recommendations of that watershed wetland management plan. The wetland enhancement project would consist of the following components to improve wetland functions onsite:

- Remove left levee along Calleguas Creek adjacent to the southern valley of the park (optional);
- Remove and control invasive exotic plants from the park lowlands; and
- Plant native wetland plant species in selected lowland areas of the park.

While removal of the left levee is identified as optional, including this component is essential to improving the wetland functions of Calleguas Creek. The purpose of this project is to improve wetland functions at the park without expanding the total wetland acreage. The wetland enhancement only project components are shown on Figure 14, Scenario C Wetlands Enhancement Project.

Figure 14. Scenario C Wetlands Enhancement Project



The light blue areas indicate existing wetland habitats that would be protected and enhanced without expansion of the wetland area. As indicated by the dashed red line, the left levee along Calleguas Creek would be removed at the mouth of the southern valley to expand floodplain capacity of the creek. The bright green area represents the location of an optional, but recommended, vegetated 100-foot-wide buffer between Calleguas Creek and adjacent farmland. The pink areas represent populations of invasive exotic plants that would be eradicated. The yellow lines are parcel boundaries.

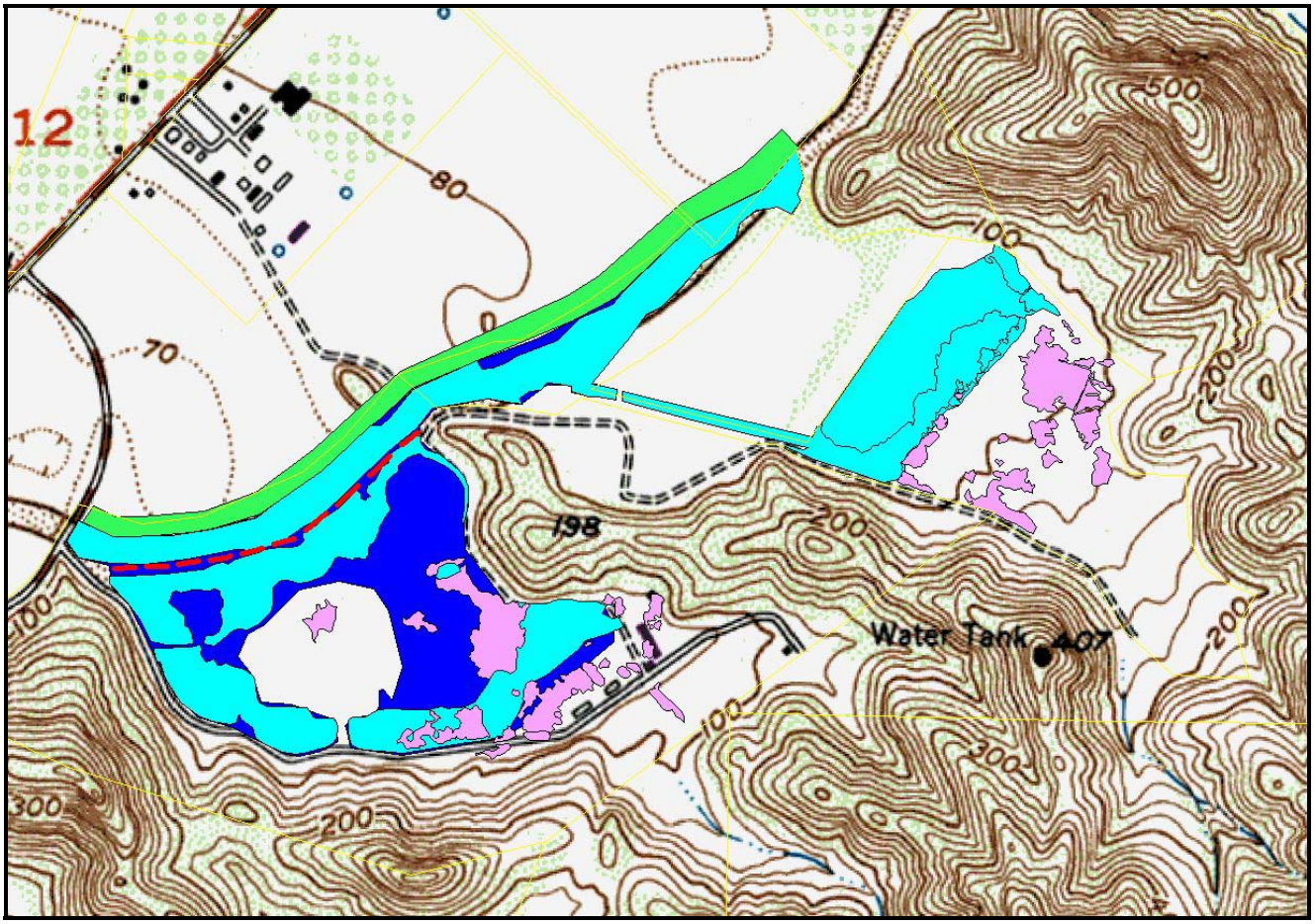
Scenario D - Wetlands Enhancement and Expansion Project

The wetland enhancement and expansion plan is similar to that described above but is more aggressive towards improving wetland functions at the park and for the Calleguas Creek watershed. The wetland enhancement and expansion project would consist of the following components to improve wetland functions onsite:

- Remove left levee along Calleguas Creek adjacent to the southern valley of the park;
- Excavate approximately 10 to 18 acres of fill material in the southern valley area of the park;
- Establish a 100-foot vegetated buffer on the west side of the right levee;
- Realign Calleguas Creek slightly eastward in the southern valley area of the park;
- Remove and control invasive exotic plants from the park lowlands; and
- Plant native wetland plant species in selected lowland areas of the park.

The primary purpose of the wetlands enhancement and expansion project at Camarillo Regional Park is to significantly improve wetland functions of Calleguas Creek and adjacent wetlands. Secondary benefits are increased passive recreational and educational opportunities offered by expanding wetlands readily available and accessible to the public. The concept plan for this project is illustrated in Figure 15, Scenario D Wetlands Enhancement and Expansion Project.

Figure 15. Scenario D Wetlands Enhancement and Expansion Project



The dark blue polygons represent the area that would contain wetland habitat in addition to the wetlands already present (represented by the light blue areas). The red dashed line indicates where the left levee would be removed, to allow Calleguas Creek a direct connection to the wetlands present at the park. The bright green polygon represents the area that a vegetated 100-foot wide buffer would be created. The pink areas represent some of the invasive plant populations that would be eradicated. The existing model airplane airfield and associated facilities would remain. The yellow lines are parcel boundaries.

Removal of the left levee is identified as essential to significantly improving the wetland functions of Calleguas Creek and the park. The existing developed recreational facilities (model airplane airfield and model boat pond) would remain intact. Significant improvements in wetland functions require removal of the left levee, creating a vegetated buffer on the right levee, and removing a portion of the fill material at the former prison site in the southern valley area of the park.

After wetlands at Camarillo Regional Park had been expanded, the park would contain approximately 102 acres of wetlands, including 22.5 acres within Calleguas Creek, a 29 percent increase in wetland area. The wetlands expansion project would increase the total wetlands at Camarillo Regional Park by approximately 29 acres.

WETLAND ASSESSMENT

WETLAND ASSESSMENT METHODS

DMEC assessed the Camarillo Regional Park wetlands to determine what functions are present and what levels each of the wetland functions are operating. DMEC also used the same approach to determine wetland function levels at the project site as if the 18-hole golf course were built without mitigation, and again with enhancement of remaining wetlands onsite. Finally, the site was assessed assuming an expanded wetlands restoration project had been implemented, without a golf course, resulting in four separate assessments of the site.

Since the functions of wetlands can be complex and sometimes difficult to accurately assess, DMEC used a DMEC-proprietary version of an existing draft wetland assessment model. The functions of the wetlands considered under this assessment were based on a rapid assessment method currently under development nationwide by the Corps and EPA, known as the Hydrogeomorphic (HGM) approach (Smith et al. 1995). The HGM approach depends on development of local models for each biogeographic region for each general wetland type: riverine, estuarine, lacustrine fringe, depressional, slope, and flat. The primary wetland type onsite is riverine.

Three regional riverine wetland HGM models have been developed and are undergoing field-testing in California coastal areas that may be applicable to the Calleguas Creek watershed region:

- Draft Guidebook to Hydrogeomorphic Functional Assessment of Riverine Waters/Wetlands in the Santa Margarita Watershed (Santa Margarita HGM) (Lee et al. 1997, 2003);
- Draft Guidebook to Functional Assessments in 3rd and 4th Order Riverine Waters/Wetlands of the Central California Coast (Central Coast HGM) (Lee et al. 1996); and
- Draft Guidebook for Reference-Based Assessment of the Functions of Riverine Waters/Wetlands Ecosystems in the South Coast Region of Santa Barbara County, California (Santa Barbara South Coast HGM) (Lee et al. 2001).

In addition, DMEC has gathered wetland reference data from 49 sites on behalf of the Coastal Conservancy within the Calleguas Creek Watershed, which includes Camarillo Regional Park. DMEC staff used the Central Coast HGM model previously on the Los Osos Sewer Project EIR (Fugro West, Inc. 1996) in the Morro Bay area of San Luis Obispo County, the Cohan Development Wetland Mitigation and Monitoring Plan (ENSR 1997) in Thousand Oaks, Ventura County, and for the Reinke wetland restoration project in Thousand Oaks (DMEC 2000b). The U.S. Environmental Protection Agency (EPA) and Los Angeles District of the Corps is currently considering use of the Santa Margarita HGM model for the South Coast region of Southern California from Point Conception to Mexico (Butterwick pers. comm. 1997, Stein pers. comm. 1997). DMEC (1997) used the Santa Margarita HGM model in assessing project-related impacts for the proposed Bridle Ridge project in Santa Barbara County and the Reinke project in Thousand Oaks. DMEC used the South Coast Santa Barbara HGM model for the Odyssey School middle school project in Las Flores Canyon in Malibu (DMEC 2002) to satisfy Coastal Commission and CDFG biological assessment requirements.

Calleguas Creek and its tributaries are considered Riverine wetlands under the HGM wetland assessment approach. The Santa Barbara County South Coast Streams HGM Model (Lee et al. 2001), developed for Santa Barbara County and EPA, is used here to assess and compare original wetland functions of the Camarillo Regional Park project site with projected post-mitigation project conditions.

The three Riverine models listed above identify the following fourteen (14) critical functions that streams such as Calleguas Creek fulfill:

1. Maintenance of characteristic channel dynamics;
2. Dynamic surface water storage and energy dissipation;
3. Long-term surface water storage;
4. Dynamic subsurface water storage;
5. Nutrient cycling;
6. Detention of imported elements and compounds;
7. Detention of particulates;
8. Organic carbon export;
9. Maintain characteristic plant community;
10. Maintain characteristic detrital biomass;
11. Maintain spatial structure of habitat;
12. Maintain interspersion and connectivity;
13. Maintain taxa richness of aquatic macroinvertebrates; and
14. Maintain spatial distribution of vertebrates.

While methods to rapidly assess Functions 13 and 14 were not developed for the three coastal California riverine HGM regional models by the authors, the application and use of several of the wetland variables described in the models were used by DMEC to indirectly evaluate them in this wetland assessment. The HGM functional assessment approach was used to determine the index for each function for both pre- and post-project conditions. The wetland functions can be grouped into three general functions: hydrologic (Functions 1-4), biochemical (Functions 5-8), and habitat (Functions 9-14).

Riverine wetlands in the Calleguas Creek Watershed can be characterized as performing various hydrology/geomorphology, biogeochemistry, plant habitat, and wildlife habitat functions (Table 4, Ecosystem Functions of Riverine Wetlands) (adapted from DMEC 2000a). The performance of these functions is largely dependent upon the maintenance of natural channel morphology and native plant communities.

A substantial portion of the native vegetation outside of the existing stream and onsite lowlands will be altered by the proposed projects. Thus, the completion of the proposed project will have some negative effects on the overall ecosystem function of Calleguas Creek and the associated riparian wetlands without mitigation. DMEC used the Santa Barbara South Coast HGM for the assessment of wetland functions affected by the three project alternatives.

The HGM model considers the state of twenty-eighteen (28) variables that are assessed in various combinations to measure the level of functioning for each of the fourteen wetland functions, to obtain an index score for each function. Each index is scaled based on reference standards that were established for the Santa Barbara South Coast region, located in Santa Barbara County (Lee et al. 2001). Lee et al. (2001) cautions, however, that the model may not be accurate in all aspects outside the reference domain, the Santa Barbara County south coast region. With this caveat in mind, the Santa Barbara South Coast HGM model is applied to this project. Regardless, the benefits of using the HGM model are that project comparisons are relative to baseline conditions, and should be valid and stable from that perspective.

Table 4. Ecosystem Functions of Riverine Wetlands

Function	Definition
Hydrology/Geomorphology	
Maintain Alluvial Corridor Integrity	Maintenance of physical attributes and processes that result in characteristic channel width, depth, slope, and roughness.
Maintain Surface Water Hydrology	Maintenance of a characteristic hydrograph, including the amount and time of water delivery to the channel network.
Maintain Subsurface Water Hydrology	Maintenance surface and ground water interactions between the channel and the local and regional aquifers.
Sediment Mobilization, Transport, and Storage	Maintenance of a characteristic sediment regime through the maintenance of a hydrograph and sediment delivery to the stream network.
Biogeochemistry	
Element and Compound Cycling	Abiotic and biotic processes that convert elements and compounds from one form to another.
Organic Carbon Export	Export of dissolved and particulate carbon, primarily through leaching and flushing.
Plant Habitat	
Maintain Native Plant Association	Maintenance of characteristic plant associations in terms of species composition of trees, saplings, seedlings, shrubs, and herbs.
Maintain Spatial Structure of Plant Association	Maintenance of the structural characteristics required for supporting native plant habitat and their animal associates.
Maintain Characteristic Detrital Biomass	The production, accumulation, and dispersal of dead plant biomass of all sizes. The sources may be up slope, up gradient, or on site.
Maintain Interspersion and Connectivity for Plant Populations	Maintenance of characteristic spatial relationships between plant habitats such that native plant species are capable of completing their life cycles.
Wildlife Habitat	
Maintain Native Vertebrate Associations	Maintenance of the diversity, density, and spatial distribution of aquatic and terrestrial vertebrates.
Maintain Native Invertebrate Associations	Maintenance of the diversity, density, and spatial distribution of aquatic and terrestrial invertebrates.
Maintain Interspersion and Connectivity for Animal Populations	Maintenance of characteristic spatial relationships between animal habitats such that native animal species are capable of completing their life cycles.

What the model does for this project is (1) provide a systematic method to measure the relative change in wetland functions that the proposed project will have; (2) identify those specific variables and functions that are expected to change; and (3) providing the permitting agencies a relative numerical measurement of pre-project (baseline) and post-project conditions (two projects with variations). Table 5, Riverine HGM Model Variables, lists the 28 variables that were used to scale the index for each wetland function.

Table 5. Riverine HGM Model Variables[13]

Acronym	Variable	Definition
1. VASIGN	Direct Observations and/or Indicators of Animal Presence or Utilization of the Assessment Area	The number of direct (e.g. visual observation of animals) or indirect (e.g. tracks, bedding, scat) observations of animal species presence in or utilization of the Project Assessment Area (PAA).
2. VBUFFCOND	Buffer Condition	Predominant land use or condition of the designated stream buffer - 50 feet (urban) or 100 feet (rural).
3. VBUFFCONT	Buffer Contiguity	The linear extent of the vegetated buffer on both sides of the stream channel, parallel to the top-of-bank (TOB).
4. VBUFFWIDTH	Buffer Width	Buffers (setbacks) are designated widths of land adjacent to the stream (from TOB landward) that are necessary to protect biological productivity, water quality, and hydrological characteristics of the stream.
5. VCHANROUGH	Channel Roughness	Channel roughness is an indicator of the hydraulic resistance produced by natural, immobile features of the channel system below ordinary high water (OHW). Examples of features that produce resistance to flow in channels include (a) boulders transported to the site by episodic large events such as debris flows, (b) bridge abutments, (c) rip-rap, (d) large, buried and fixed coarse woody debris, (e) bedrock, etc. Channel roughness is expressed as percent of the channel cross sectional area occupied by roughness elements that are relatively immobile during flood events.
6. VDECOMP	Decomposition	Mode (most frequent) and average number of decomposition classes of coarse woody debris below OHW and within PAA.
7. VEMBED	Embeddedness of Large Channel Materials	The degree that large class channel bed material is buried in finer sediment. Specifically, embeddedness is the percent burial of the D84 or larger channel bed material by material less than D84.
8. VHERBCC	Herbaceous Cover	Percent cover of herbaceous vegetation, including graminoids, forbs, ferns, and fern allies within the Assessment Area.
9. VINCWD	In Channel Coarse Woody Debris	Volume of down and dead trees and/or limbs (>3" diameter) within the channel and below OHW.
10. VLANDUSE	Land Use	Land use, as calculated from the Enhanced Thematic Mapper (ETM) Land Use Classification map, within the reference site subwatershed.
11. VLONGPROF	Longitudinal Profile	The integrity of the natural longitudinal profile of the channel within and/or upstream and downstream from the main channel cross-section.
12. VOFFCWD	Out of Channel Coarse Woody Debris	Volume of down and dead trees and/or limbs (>3" diameter) above OHW within the PAA.
13. VPATCHAREA	Area of Patches	The relative area of habitat patches, as calculated from the ETM Habitat Patch Analysis map, within the 1,000' radius AA surrounding the reference site.

[13] Adapted from Lee et al. 2001.

Acronym	Variable	Definition
14. VPATCHCONTIG	Contiguity of Patches	The contiguity of habitat patches, as generated from the ETM Habitat Patch Contiguity Analysis, within the reference site subwatershed.
15. VPATCHNUM	Number of Patches	The number of habitat patches, calculated from the ETM Habitat Patch Analysis map, within the 1,000' radius AA surrounding the reference site.
16. VRATIO	Ratio of Native to Non-Native Plant Species	Ratio of native to nonnative dominant plant taxa within the project AA.
17. VREGEN	Regeneration	Regeneration of plants from seedlings, saplings, and clonal shoots within the AA.
18. VRESIDPOOL	Residual Pool	The number and average distance between residual pools >10 ft^2 in area and >0.5 ft deep (at their deepest point) within the PAA at low flow to base flow conditions.
19. VSED	Sediment Deposition	Sources and amount of sediment delivery and deposition to waters/wetlands from upgradient landscape positions.
20. VSHADE	Shade Over the Channel below Ordinary High Water	Tree, shrub, and undergrowth vegetation canopy cover overhanging the active stream channel.
21. VSHRUBCC	Shrub Canopy Cover	Percent canopy cover of shrubs (multiple stemmed woody species) within the AA.
22. VSNAGS	Snags	Basal area of standing dead trees (snags) (> 3" DBH).
23. VSOILINT	Soil Profile Integrity	A measure of the presence and condition of the soil profile (soil horizons) within the AA.
24. VSTRATA	Strata	The number of distinct vegetation layers present within the riparian zone of the project AA. Vegetation strata were defined as follows: • trees (single stem woody species with >3" DBH and > 10 ft. tall); • shrubs (multiple stem woody species); vines or lianas (woody vines); and • herbs, including forbs, graminoids, ferns, and fern allies.
25. VSURFIN	Surface Water In	Surface hydrologic connections into the PAA from the adjacent landscape.
26. VTREEBA	Basal Area of Trees	The basal area of trees (single stem woody species with >3" DBH and > 10 ft. tall) within a representative acre of the Assessment Area.
27. VTREECC	Tree Canopy Cover	Percent canopy cover of trees (single stem woody species with >3" DBH and > 10 ft. tall).
28. VVINECC	Vine Canopy Cover	Percent canopy cover of vines or lianas (woody vines) within the AA.

Index formulas have been developed by Lee et al. (2001) (Functions 1 through 12) and by DMEC (Functions 13 and 14) to capture the components (variables) of each wetland function. These formulas are then used to scale the level at which the wetland is functioning, independently for each function. Table 6, Riverine HGM Model Index Formulas, lists the index formulas used for this assessment. DMEC used the "low gradient" formulas since the stream gradient was less then 2% for the appropriate variables.

Table 6. Riverine HGM Model Index Formulas[14]

Index Formulas for Each Function	
1	((VINCWD)+(VHERB+VSHRUB+VTREEBA)/3+(VBUFFCONT+VBUFFCOND+VBUFFWIDTH)/3+(VCHANROUGH))/4
2	(VSED+VSOILINT+VRESIDPOOL)/3
3	(VLONGPROF+VSOILINT+VSURFIN+VLANDUSE+(VBUFFCONT+VVBUFFCOND+VBUFFWIDTH)/3)/5
4	((VHERB+VSHRUB+VVTREEBA)/3+(VBUFFCONT+VBUFFCOND+VBUFFWIDTH)/3+VEMBED+VSED+VCHANROUGH))/5
5	((VSOILINT+VSED)/2+(VINCWD+VOFFCWD)/2+(VHERB+VSHRUB+VTREEBA)/3+(VBUFFCONT+VBUFFCOND+VBUFFWIDTH)/3+(VDECOMP))/5
6	((VHERB+VSHRUB+VTREEBA)/3+(VBUFFCONT+VBUFFCOND+VBUFFWIDTH)/3+(VSOILINT+VSED)/2+VLONGPROF)/4
7	((VHERBCC+VSHRUBCC+VTREEBA)/3+(VBUFFCONT+VBUFFCOND+VBUFFWIDTH)/3+(VCHANROUGH)+(VSED)+(VEMBED))/5
8	((VINCWD)+(VDECOMP)+(VHERB+VSHRUB+VTREEBA)/3+(VBUFFCONT+VBUFFCOND+VBUFFWIDTH)/3+(VLONGPROF))/5
9	((VTREECC+VSHRUBCC+VVINECC+VHERBCC+VREGEN)/5+VRATIO+VSTRATA+VTREEBA)/4
10	(VSNAG+((VOFFCWD+VINCWD)/2)+VDECOMP)/3
11	((VASIGN+(VBUFFCOND+VBUFFCONT+VBUFFWIDTH)/3+(VSHADE+VRESIDPOOL+VSNAG+VSTRATA)/4)/3
12	((VPATCHNUM+VPATCHAREA+VPATCHCONTIG)/3+VLANDUSE)/2
13	(VASIGN+(VBUFFCOND+VBUFFCONT+VBUFFWIDTH)/3+VHERBCC+VINCWD+VLANDUSE+VOFFCWD+(VPATCHAREA+VPATCHCONTIG+VPATCHNUM)/3+VRATIO+VREGEN+VRESIDPOOL+VSHRUBCC+VSNAGS+VSTRATA+VTREECC+VVINECC)/15
14	(VASIGN+(VBUFFCOND+VBUFFCONT+VBUFFWIDTH)/3+VCHANROUGH+VDECOMP+VHERBCC+VINCWD+VLANDUSE+VLONGPROF+VOFFCWD+(VPATCHAREA+VPATCHCONTIG+VPATCHNUM)/3+VREGEN+VRESIDPOOL+VSHRUBCC+VSNAGS+VSOILINT+VSTRATA+VTREECC+VVINECC)/18

DMEC took visual measurements or estimates on the condition of each of the 28 wetland variables and recorded them onto field data sheets for each assessment area to determine each variable's score. This was performed for baseline (existing) conditions and for four project scenarios:

- Scenario A - 18-hole golf course project;
- Scenario B - 18-hole golf course project with onsite wetland enhancement;
- Scenario C - Enhancement of existing wetlands only; and
- Scenario D - Enhancement and expansion of existing wetland.

Baseline conditions capture wetland functionality as they exist at the time of this assessment without any changes to onsite conditions. Conditions for each of the four project scenarios are based on expected environmental conditions after each of the projects had been implemented and after about five years. Post-project conditions for each variable represents an estimate of environmental conditions and cannot be accurately measured until after the project has been constructed and in place; therefore, the scores for these conditions should be considered preliminary; however, DMEC used best professional judgment for these scores, compared to measured existing conditions. The HGM model allows the modeler to estimate future conditions based on comparisons with other reference sites.

The results of the HGM wetland functional assessments at the Camarillo Regional Park site are presented below in Wetland Function Assessment Results.

HGM Wetland Variable Assessment Areas

This section describes and illustrates the assessment areas and data used in the assessment of wetland functions for each of the five project conditions. The Project Assessment Area (PAA) used for the four project scenarios and existing conditions varies for each variable; however, several variables use the same PAA. The basic PAA

[14] From Lee et al. 2001 except formulas for Functions 13 and 14 developed by DMEC.

for the project site focuses on existing wetlands, as illustrated on Figure 16, Camarillo Regional Park Assessment Area Wetlands. The wetland area within the wetlands PAA is approximately 73.2 acres. Land use activities and types within 1,000 feet of the project site wetlands are captured on Figure 17, Map of 1,000-foot HGM Buffer Assessment Area. The HGM buffer AA includes 539 acres. Habitat patchiness is also determined from the area depicted on Figure 17. The largest PAA includes the subwatershed(s) providing runoff to the project site, as illustrated on Figure 10. The entire watershed for Calleguas Creek upstream of the project site is also included as part of this assessment area since surface flows supporting Calleguas Creek originate from upstream areas. The Calleguas Creek watershed is shown on Figure 18, Map of Calleguas Creek Watershed.

Figure 16. Camarillo Regional Park Assessment Area Wetlands

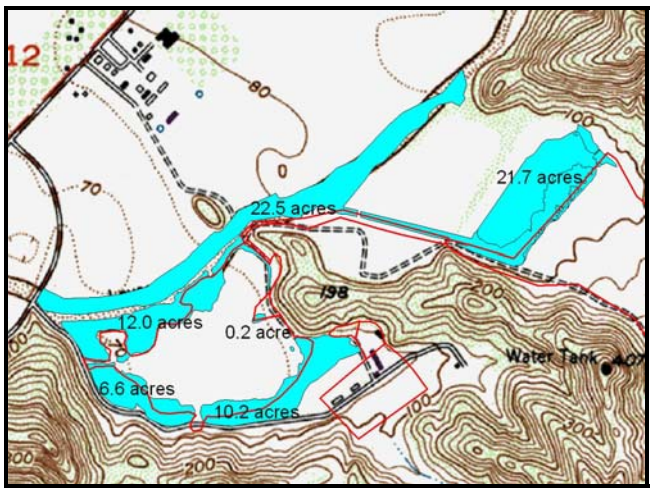


Figure 17. Map of 1,000-foot HGM Buffer Assessment Area

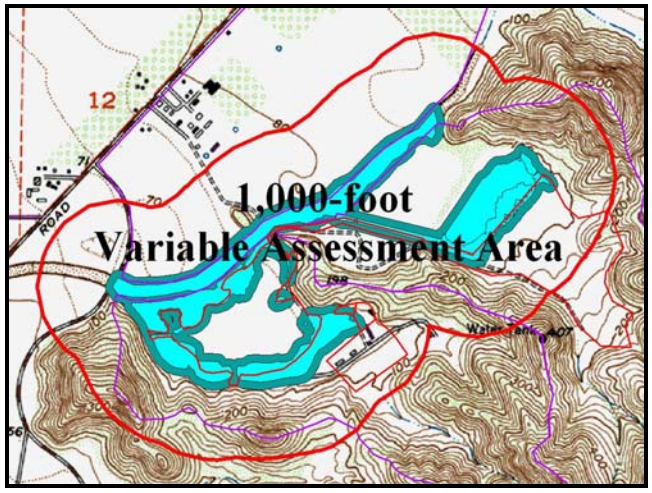
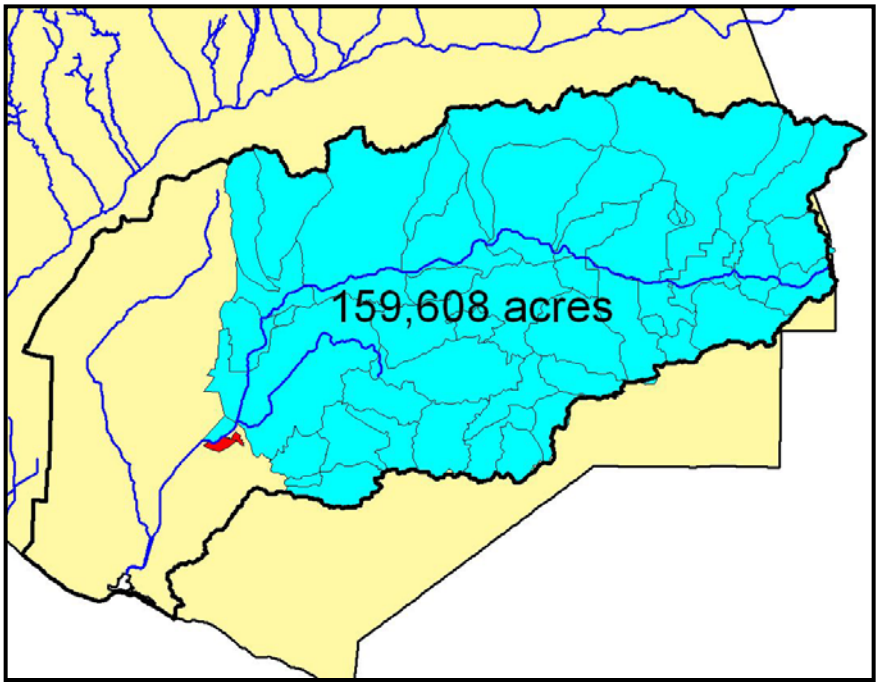


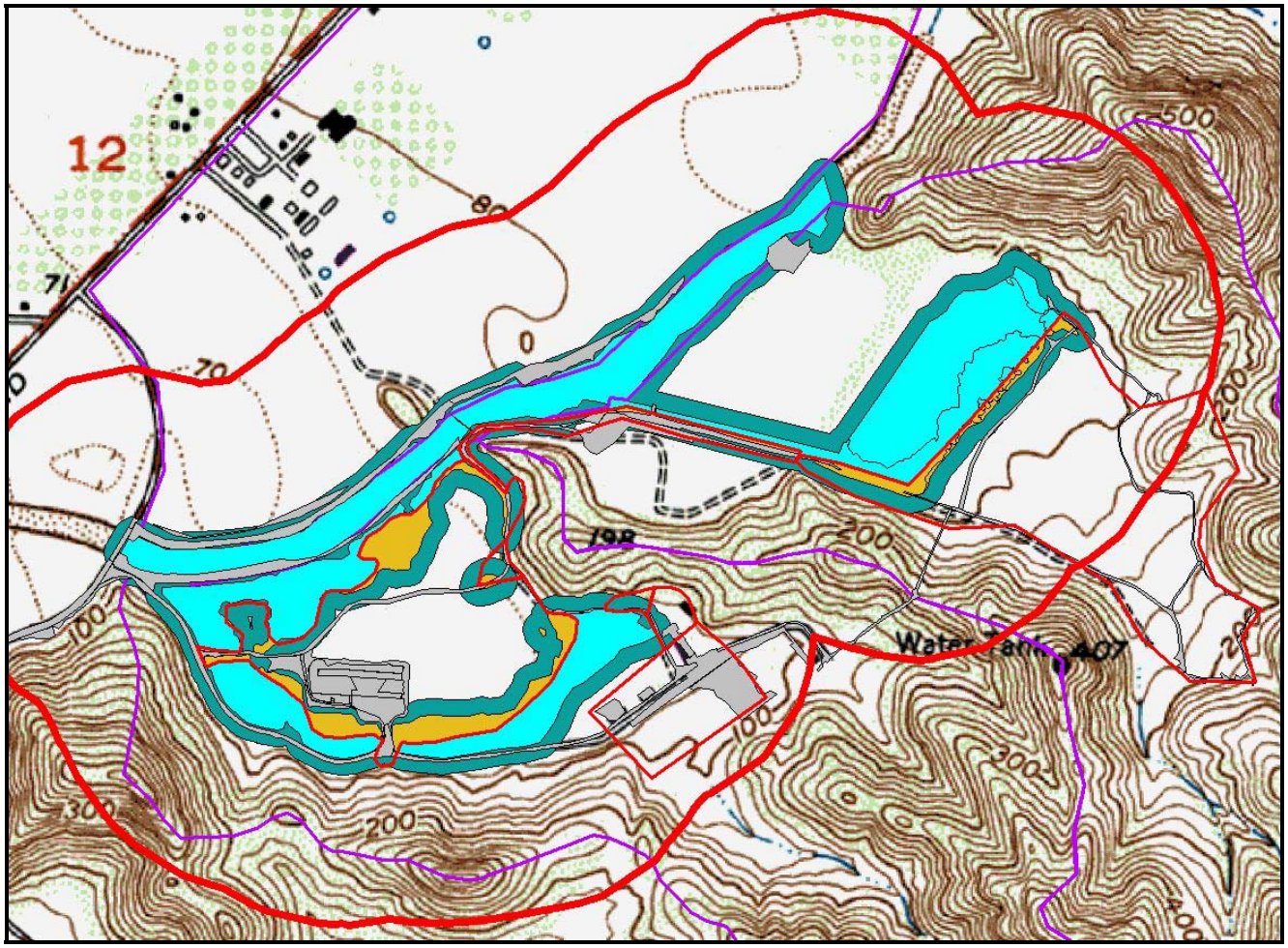
Figure 18. Map of Calleguas Creek Watershed



The light blue areas include all Calleguas Creek subwatersheds upstream of Camarillo Regional Park. The supporting watershed is 159,608 acres. The thick black boundary line represents the entire Calleguas Creek watershed. The dark blue lines represent (clockwise): Calleguas Creek, Revolon Slough, and Conejo Creek.

Conditions of a number of variables are assessed within the 100-foot wetland buffer area illustrated on Figure 19, Map of Project Site 100-foot Buffer Assessment Area and Other Assessment Features, which also includes PAA features used for several of the assessment variables.

Figure 19. Map of Project Site 100-foot Buffer Assessment Area and Other Assessment Features



The light blue areas represent existing wetland habitats wetlands at Camarillo Regional Park and adjacent Calleguas Creek. The mustard areas represent existing wetlands that are likely to be filled by a golf course development, the bounds of which are represented by the thin red lines. The teal-colored areas represent the 100-foot buffer zone around existing wetlands. The thick red line represents the limits of the 1,000-foot HGM variable assessment areas. The purple lines are part of the subwatersheds within and immediately adjacent to the park. The gray areas are the developed portions of the park (generally lacking natural vegetation).

Data for each wetland variable used in the HGM assessment uses a specific assessment area (AA), based on conditions gathered to develop the regional HGM model (reference wetland sites).

REGULATORY CONTEXT

This assessment was prepared to meet regulatory requirements, issued by the Corps and the CDFG, to analyze project alternatives pursuant to Section 404(b)(1) Clean Water Act guidelines. This assessment is also intended to satisfy County of Ventura General Plan wetland protection policies that require an assessment of direct and indirect impacts to wetlands and the County's 100-foot-wetland buffer zone.

Historically, the effectiveness of restoration of waters/wetlands has been measured using an area metric alone. However, the Clinton Administration Wetlands Policy (1993) mandated that:

- "...all wetlands are not the same...";

- a fair, flexible approach should be encouraged that allows restoration of waters/wetland functions; and
- a hydrogeomorphic approach to restoring waters/wetlands functions should be used.

The restoration of functions is a preferable alternative to habitat enhancement and/or creation (Kusler and Kentula 1989). This is reflected in the Memorandum of Agreement (MOA) on Mitigation of 6 February 1990 that guides policy nationally for the U.S. Environmental Protection Agency (EPA), the Corps, and the U.S. Fish and Wildlife Service (USFWS). The MOA sets forth specific guidelines to:

> "...restore and maintain the chemical, physical, and biological integrity of the Nation's waters, including wetlands".

Consistent with these directives, the approach presented herein involves the assessment of, and focus on the restoration of physical, chemical, and biological attributes and processes to potentially impacted waters of the U.S., including wetlands, and wetlands pursuant to the County's definition, on the Camarillo Regional Park project site. By definition, the golf course only project (without onsite mitigation) does not seek to satisfy these directives; however, the assessment of the impacts to wetland functions does, rather than just measuring the total area of direct impact.

WETLAND FUNCTION ASSESSMENT RESULTS

The wetland functions at Camarillo Regional Park were assessed for five separate conditions:

- Existing (baseline) conditions;
- Golf course built without mitigation (Scenario A);
- Golf course with onsite wetland enhancement (Scenario B);
- Onsite wetland enhancement (Scenario C); and
- Wetland expansion and enhancement (Scenario D).

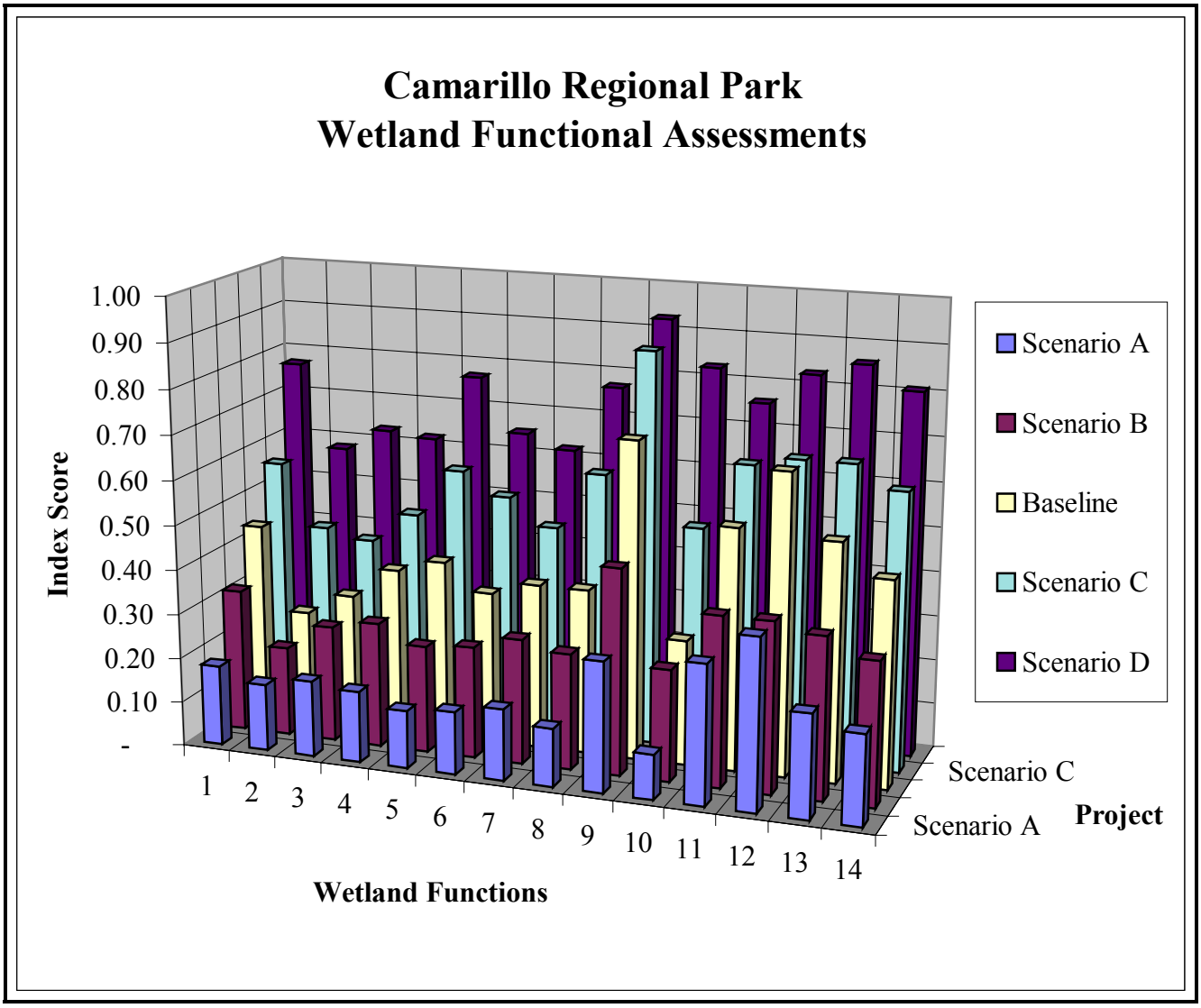
Establishing baseline (existing) conditions was necessary to provide a benchmark from which to measure functional changes in each wetland function index. In summary, the results of the assessment shows that nearly all of the fourteen riverine wetland functions are operating at levels well below reference standards under existing (baseline) conditions. Relative to baseline conditions, the proposed golf course project (Scenario A) would significantly decrease all fourteen wetland functions from existing levels. Even with enhancement of onsite wetlands (Scenario B), over half of the wetland functions would still be significantly impacted. Only the wetland enhancement (Scenario C) and wetland expansion (Scenario D) projects would significantly increase (improve) wetland functions onsite. Figure 20, Rate of Change Comparison Chart of Wetland Functions Between Baseline and Four Project Scenarios, illustrates the relative changes between wetland functional indices for each project scenario compared to baseline conditions.

The golf course project (Scenario A), without considering wetland enhancement onsite, will significantly decrease each of the fourteen wetland functions, as captured by the HGM assessment model. All the wetland functions are currently (under existing conditions) functioning well below reference standards[15]. Detailed discussions for each project scenario are provided below.

The proposed wetland enhancement (DMEC 2000a) (Scenario C) would improve most wetland functions slightly to significantly, depending on the function. Some wetland functions cannot be improved with onsite restoration, primarily because they are based on the condition of the watershed entirely beyond the control of the Coastal Conservancy and/or the County Parks Department, and would require significant actions by all entities within the Calleguas Creek watershed.

[15] Note: The Camarillo Regional Park project site is outside the reference domain of the HGM model used in this assessment (south coast of Santa Barbara County); however, it is within the region in which it is considerable applicable. Furthermore, the comparison of project scenarios against index levels under existing conditions provides a relative comparison, and need not be absolutely tied to the reference domain of southern Santa Barbara County.

Figure 20. Rate of Change Comparison Chart of Wetland Functions Between Baseline and Four Project Scenarios



HGM Wetland Assessment of Existing Conditions

The HGM wetland assessment was conducted for the portion of Calleguas Creek within and adjacent to Camarillo Regional Park, and onsite wetlands. Data sheets and calculations used for this HGM assessment are included as Appendix A.

Using the HGM rapid assessment methods described in the previous section, the Camarillo Regional Park portion of Calleguas Creek and onsite wetlands was found to be functioning significantly below reference standards for all of the fourteen wetland functions (Table 7, Baseline Wetland Function Index Scores).

Table 7. Baseline Wetland Function Index Scores

Wetland Function	Baseline Index Score	Function Description
1	0.44	Maintenance of characteristic channel dynamics
2	0.25	Dynamic surface water storage & energy dissipation
3	0.30	Long-term surface water storage
4	0.37	Dynamic subsurface water storage
5	0.40	Nutrient cycling
6	0.34	Detention of imported elements & components
7	0.37	Detention of particulates
8	0.37	Organic carbon export
9	0.69	Maintain characteristic plant community
10	0.28	Maintain characteristic detrital biomass
11	0.54	Maintain spatial structure of habitat
12	0.67	Maintain habitat interspersion & connectivity
13	0.51	Maintain taxa richness of aquatic macroinvertebrates
14	0.45	Maintain distribution and abundance of vertebrates

Average of all indices: 0.43

An Index Score of 1.0 represents the highest level existing for each function. Only Functions 9 and 12 were found to be operating at relatively high levels, at 69 and 67 percent, respectively, compared to reference standard levels. All other functions were scored below 60 percent. Figure 21, Chart of Camarillo Regional Park Baseline Wetland Function Index Scores, illustrates the relative functionality of each of the fourteen wetland functions at Camarillo Regional Park under existing (baseline) conditions.

Each of the function index scores would be at 1.0 if no development of any kind were located along Calleguas Creek at and near Camarillo Regional Park and the creek was not channelized. The fact that the land northwest of Camarillo Regional Park and Calleguas Creek has been developed in agriculture is the primary reason the wetland functions are all lower than 1.0. It is these baseline index scores that are used to determine changes, if any, to each of the wetland functions as a result of implementing any of the project scenarios at Camarillo Regional Park.

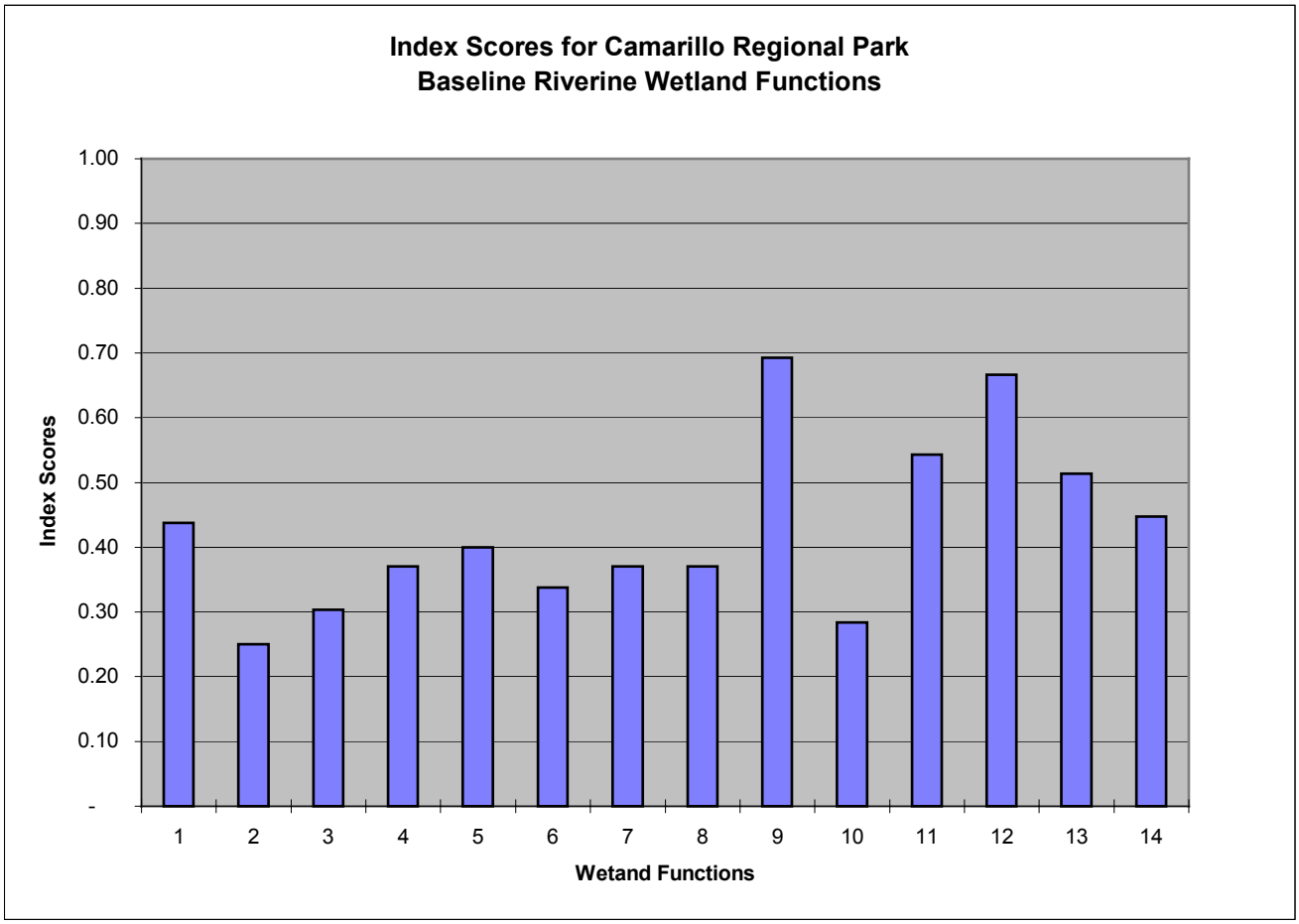
The HGM assessment indicates that, in general, the wetlands associated with Calleguas Creek and Camarillo Regional Park at the project site operates at levels well below the reference standards (existing conditions) based primarily on historic adverse anthropogenic changes to the assessment area (Camarillo Regional Park region).

Notable conditions that caused downward scaling of individual functions from optimal levels were:

- the presence of development (levee and agriculture alongside, and bridge over creek) adjacent to Calleguas Creek;
- the past earthwork and development at Camarillo Regional Park; and
- the presence of unnatural ponds between Calleguas Creek and wetlands in the northern valley.

Regardless, the assessment area was found to be providing significant wetland functions for all functions except Functions 2 and 10, which were found to be functioning at only 0.25 and 0.28, respectively. All wetland functions except Functions 9 and 12 were functioning below 60% of their potential and only four (4 of the functions [Functions 9, 11, 12, and 13]) were functioning above 50% of the reference standards, with an average of the fourteen functional scores at 0.43.

Figure 21. Chart of Camarillo Regional Park Baseline Wetland Function Index Scores



This analysis illustrates the sensitivity of wetland riparian habitats to changes within and adjacent such habitats. Even with 100-foot buffer zones, changes beyond and upstream of a wetland area can have significant effects on wetland functions.

HGM Wetland Assessment of Scenario A: Post-Golf Course Only Conditions

The fourteen wetland functions of the site were assessed as if the 18-hole golf course had been constructed (as shown on Figure 11), without benefit of any enhancement of remaining wetlands. The level at which each wetland function is expected to operate at was considered without any habitat mitigation. The intent is to determine which wetland functions would be affected, and to determine how much (on a relative basis) would the function indices change. Data sheets and calculations used for this HGM assessment are included as Appendix A.

The HGM model found that all fourteen wetland functions were functioning at lower levels for all functions upon golf course build-out compared to existing (baseline) conditions. Most wetland functions would decrease significantly[16] compared to baseline conditions. In other words, the proposed project would significantly change all of the wetland functions (Table 8, Scenario A Wetland Function Index Scores; Figure 22, Chart of Scenario A Wetland Function Index Scores) (compared to Table 7).

[16] A significant change would occur when the index score is changed by 10% or more from baseline conditions.

Table 8. Scenario A Wetland Function Index Scores

Wetland Function	Post-Project Index Score	Function Description
1	0.18	Maintenance of characteristic channel dynamics
2	0.15	Dynamic surface water storage & energy dissipation
3	0.17	Long-term surface water storage
4	0.16	Dynamic subsurface water storage
5	0.13	Nutrient cycling
6	0.14	Detention of imported elements & components
7	0.16	Detention of particulates
8	0.13	Organic carbon export
9	0.29	Maintain characteristic plant community
10	0.10	Maintain characteristic detrital biomass
11	0.31	Maintain spatial structure of habitat
12	0.38	Maintain habitat interspersion & connectivity
13	0.23	Maintain taxa richness of aquatic macroinvertebrates
14	0.20	Maintain distribution and abundance of vertebrates

Average of all indices: 0.19

The wetland functions of Calleguas Creek and Camarillo Regional Park are expected to change significantly for Scenario A (as measured by the HGM model). The decreases will result primarily because a significant amount of work is proposed within Camarillo Regional Park (about 117 acres of development), which will include approximately 5 acres (up to 11.8 acres) of wetlands that would be filled by the project. Furthermore, all of the onsite wetlands would be indirectly affected.

For example, the County's required 100-foot buffer zone would be encroached upon in most areas (see Figure 19). A total of 36.4 acres (47%) of the 100-foot buffer zone would be encroached upon by the golf course facilities as illustrated in Figure 23, Wetland 100-foot Buffer Zone Encroachment Areas. The 100-foot buffer zone around the existing wetlands occupies approximately 66.3 acres. Figure 23 excludes encroachments of the buffer zone where existing roads have not been delineated as part of the golf course. However, the primary access road to the park would almost certainly be upgraded and possibly widened to serve any golf course facility, including paving the road, adding another 8.3 acres of buffer encroached upon, bringing the total percentage of the buffer zone encroached upon to 67%. Most of the existing developed areas of the park are illustrated on Figure 19.

The Camarillo Regional Park portion of Calleguas Creek upon completion of build-out without mitigation was found to be functioning significantly below reference standards for all of the fourteen wetland functions (Table 9, Comparison of Baseline and Scenario A Project Wetland Function Index Scores), and significantly below baseline conditions for most functions.

All fourteen wetland functions will decrease significantly if the golf course is built. The rates of change shown in **bold** in Table 9 highlight those wetland functions that are expected to decrease significantly after the golf course has been constructed. A significant adverse change in the wetland functions is defined here as a 10% or greater changes from existing conditions. Based on the HGM assessment, the proposed golf course is expected to significantly decrease functionality of all fourteen wetland functions, ranging in negative changes of 10% for Function 10, and a 40% negative change for Function 9. No function will decrease less than 10% and no function will increase.

Figure 22. Chart of Scenario A Wetland Function Index Scores

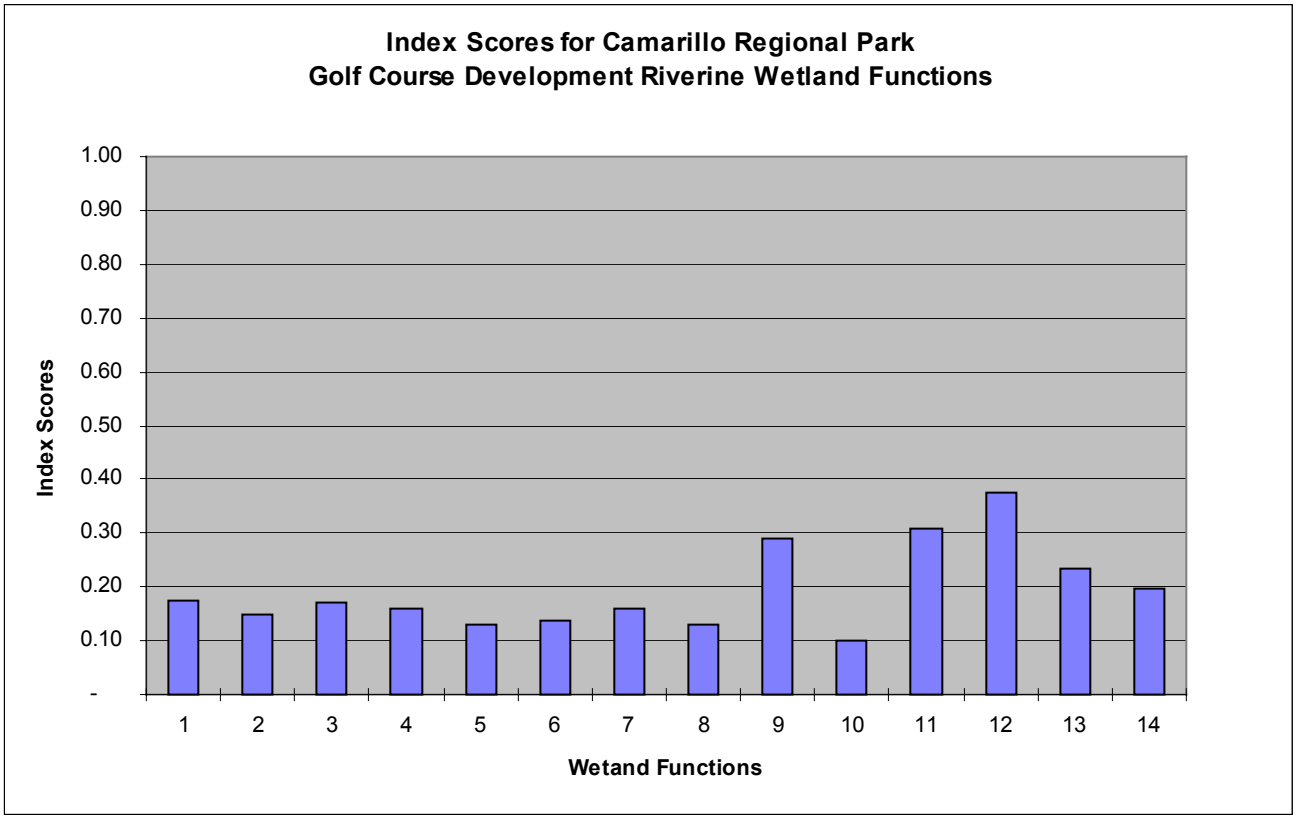
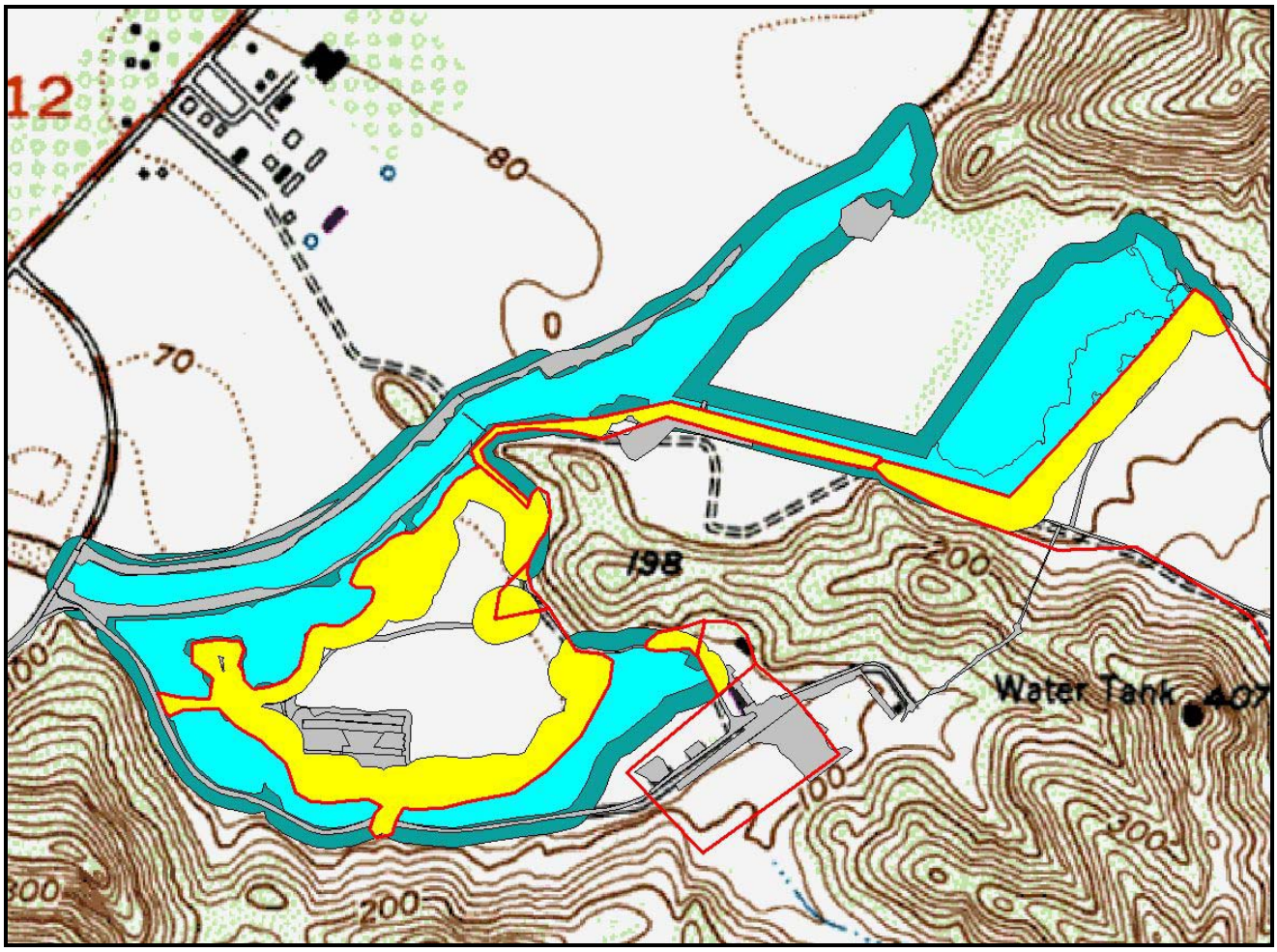


Table 9. Comparison of Baseline and Scenario A Project Wetland Function Index Scores

Wetland Function	Baseline Indices	Project Indices	Rate of Change	Function Description
1	0.44	0.18	**-0.26**	Maintenance of characteristic channel dynamics
2	0.25	0.15	**-0.10**	Dynamic surface water storage & energy dissipation
3	0.30	0.17	**-0.13**	Long-term surface water storage
4	0.37	0.16	**-0.21**	Dynamic subsurface water storage
5	0.40	0.13	**-0.27**	Nutrient cycling
6	0.34	0.14	**-0.20**	Detention of imported elements & components
7	0.37	0.16	**-0.21**	Detention of particulates
8	0.37	0.13	**-0.24**	Organic carbon export
9	0.69	0.29	**-0.40**	Maintain characteristic plant community
10	0.28	0.10	**-0.18**	Maintain characteristic detrital biomass
11	0.54	0.31	**-0.23**	Maintain spatial structure of habitat
12	0.67	0.38	**-0.29**	Maintain habitat interspersion & connectivity
13	0.51	0.23	**-0.28**	Maintain taxa richness of aquatic macroinvertebrates
14	0.45	0.20	**-0.25**	Maintain distribution and abundance of vertebrates
Average rate of function change:			-0.23	

Figure 23. Wetland 100-foot Buffer Zone Encroachment Areas



The yellow areas represent the 36.4 acres of the County's 100-foot buffer zone would be encroached. About 48% of the 66.3 acres of buffer area around existing wetlands would be encroached by the golf course (shown by the red lines). The teal-colored areas represent the 100-foot buffer zone around the existing wetlands, which are represented by the light blue polygons. The gray areas delineate most of the areas onsite that have been developed in the past, such as the dairy, model plane airfield, and assess roads.

HGM Wetland Assessment of Scenario B: Golf Course Conditions with Wetland Enhancement

The fourteen wetland functions were assessed of the site as if the 18-hole golf course had been constructed (as shown on Figure 13), with the benefit of enhancement of remaining wetlands. The level at which each wetland function is expected to operate at was considered with onsite mitigation (enhancement) only. The intent of this alternative is to determine the benefit of onsite wetland enhancement as mitigation for the golf course project, and how much (on a relative basis) would the function indices change compared to both baseline conditions and the golf course only scenario. Data sheets and calculations used for this HGM assessment are included as Appendix A. The results of the assessment are shown in Table 10, Golf Course with Wetland Enhancement Project Wetland Function Index Scores, and as illustrated in the chart of the fourteen function index scores (Figure 24, Chart of Scenario B Wetland Function Index Scores).

Table 10. Scenario B Wetland Function Index Scores

Wetland Function	Post-Project Index Score	Function Description
1	0.32	Maintenance of characteristic channel dynamics
2	0.20	Dynamic surface water storage & energy dissipation
3	0.26	Long-term surface water storage
4	0.28	Dynamic subsurface water storage
5	0.24	Nutrient cycling
6	0.24	Detention of imported elements & components
7	0.28	Detention of particulates
8	0.26	Organic carbon export
9	0.46	Maintain characteristic plant community
10	0.25	Maintain characteristic detrital biomass
11	0.38	Maintain spatial structure of habitat
12	0.38	Maintain habitat interspersion & connectivity
13	0.36	Maintain taxa richness of aquatic macroinvertebrates
14	0.32	Maintain distribution and abundance of vertebrates

Average of all indices: 0.35

The HGM model assessment found that all fourteen wetland functions were found to be functioning at slightly to significantly lower levels for all wetland functions upon golf course build-out compared to existing (baseline) conditions, even with onsite enhancement of the remaining wetlands. All wetland functions would decrease at least 3% compared to baseline conditions, with a majority of the functions decreasing significantly (over 10%), including Functions 1, 5, 6, 8, 9, 11, 12, 13, and 14 (Table 11, Comparison of Baseline and Scenario B Project Wetland Function Index Scores). In other words, the proposed project would negatively affect all of the wetland functions, just not to the same degree as without wetland enhancement. Table 11 provides a direct comparison as to the relative change of each wetland function the golf course project with enhancement of wetlands onsite with that of existing conditions.

Figure 24. Chart of Scenario B Wetland Function Index Scores

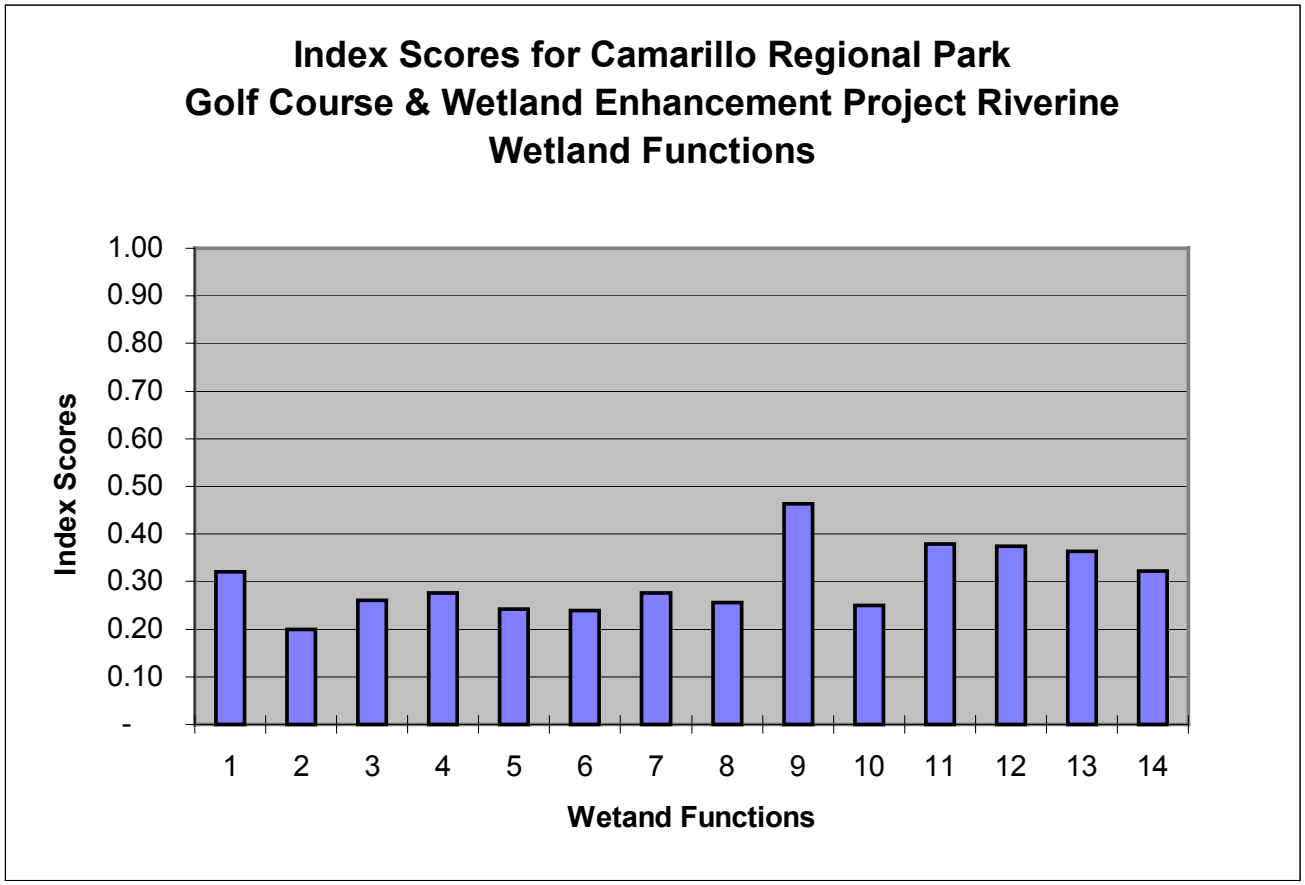


Table 11. Comparison of Baseline and Scenario B Project Wetland Function Index Scores

Wetland Function	Baseline Indices	Project Indices	Rate of Change	Function Description
1	0.44	0.32	**-0.12**	Maintenance of characteristic channel dynamics
2	0.25	0.20	-0.05	Dynamic surface water storage & energy dissipation
3	0.30	0.26	-0.04	Long-term surface water storage
4	0.37	0.28	-0.09	Dynamic subsurface water storage
5	0.40	0.24	**-0.16**	Nutrient cycling
6	0.34	0.24	**-0.10**	Detention of imported elements & components
7	0.37	0.28	-0.09	Detention of particulates
8	0.37	0.26	**-0.11**	Organic carbon export
9	0.69	0.46	**-0.23**	Maintain characteristic plant community
10	0.28	0.25	-0.03	Maintain characteristic detrital biomass
11	0.54	0.38	**-0.16**	Maintain spatial structure of habitat
12	0.67	0.38	**-0.29**	Maintain habitat interspersion & connectivity
13	0.51	0.36	**-0.15**	Maintain taxa richness of aquatic macroinvertebrates
14	0.45	0.32	**-0.13**	Maintain distribution and abundance of vertebrates

Average rate of function change: -0.13

The rates of change shown in **bold** in Table 11 highlight those wetland functions that are expected to decrease significantly after the golf course has been constructed and the remaining wetlands onsite have been enhanced. Significant changes/impacts in the wetland functions is defined here as a 10% or greater. The proposed golf course with enhancement of the remaining wetlands onsite will not improve any of the fourteen wetland functions. Additional mitigation measures will be needed to offset the residual losses to wetland functions as a result of building the golf course than have been described and assumed above.

HGM Wetland Assessment of Scenario C: Wetland Enhancement Only Conditions

The fourteen wetland functions were assessed of the site as if the existing wetlands at Camarillo Regional Park were enhanced as described earlier in this report titled, "Scenario C - Wetlands Enhancement Only Project" (on Page 37) and illustrated on Figure 14 (on Page 38). The level at which each wetland function is expected to operate at was considered with specific wetland habitat enhancement, as described earlier. The intent is to determine which wetland functions would be affected, and how much (on a relative basis) would the function indices change compared to existing conditions. Data sheets and calculations used for this HGM assessment are included as Appendix A.

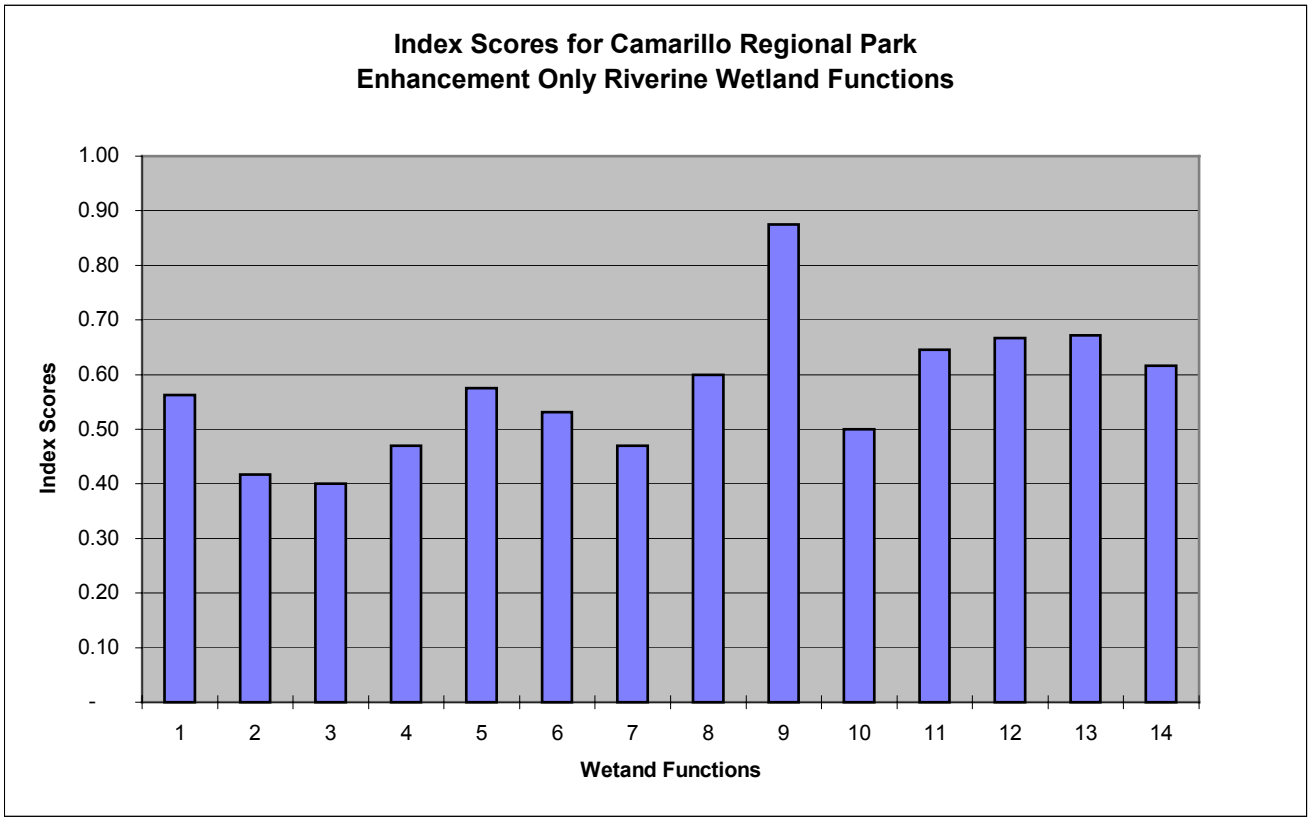
The HGM model found that all fourteen wetland functions were found to be functioning at higher levels for all functions upon wetland enhancement compared to existing conditions (Table 12, Scenario C Wetland Function Index Scores), and is illustrated in the chart of expected wetland function index scores (Figure 25, Chart of Scenario C Wetland Function Index Scores).

Table 12. Scenario C Wetland Function Index Scores

Wetland Function	Post-Project Index Score	Function Description
1	0.56	Maintenance of characteristic channel dynamics
2	0.42	Dynamic surface water storage & energy dissipation
3	0.40	Long-term surface water storage
4	0.47	Dynamic subsurface water storage
5	0.58	Nutrient cycling
6	0.53	Detention of imported elements & components
7	0.47	Detention of particulates
8	0.60	Organic carbon export
9	0.88	Maintain characteristic plant community
10	0.50	Maintain characteristic detrital biomass
11	0.65	Maintain spatial structure of habitat
12	0.67	Maintain habitat interspersion & connectivity
13	0.67	Maintain taxa richness of aquatic macroinvertebrates
14	0.62	Maintain distribution and abundance of vertebrates

Average of all indices: 0.57

Figure 25. Chart of Scenario C Wetland Function Index Scores



The wetland functions of Calleguas Creek and Camarillo Regional Park are expected to increase significantly (as measured by the HGM model), primarily because the flood capacity of Calleguas Creek would increase to include the wetlands in the southern valley and those wetland habitats would be substantially improved structurally and biologically. Table 13, Comparison of Baseline and Scenario C Wetland Function Index Scores, provides a comparison of wetland index scores between existing and post wetland enhancement project conditions, including the relative rate of change for each wetland function.

Thirteen of the fourteen wetland functions will decrease significantly if the onsite wetlands are enhanced as described earlier in this report. The rates of change shown in **bold** in Table 13 highlight those wetland functions that are expected to increase significantly after the Camarillo Regional Park wetlands have been enhanced. A significant change in the wetland functions is defined here as a 10% or greater changes from existing conditions. Based on the HGM assessment, the proposed wetland enhancement project is expected to significantly increase functionality of 13 of the fourteen wetland functions, ranging in positive changes of 10% for Functions 3, 4, and 7, and a 27% positive change for Function 8. No change in Function 12 is expected under the wetland enhancement only project scenario.

Table 13. Comparison of Baseline and Scenario C Wetland Function Index Scores

Wetland Function	Baseline Indices	Project Indices	Rate of Change	Function Description
1	0.44	0.56	**0.12**	Maintenance of characteristic channel dynamics
2	0.25	0.42	**0.17**	Dynamic surface water storage & energy dissipation
3	0.30	0.40	**0.10**	Long-term surface water storage
4	0.37	0.47	**0.10**	Dynamic subsurface water storage
5	0.40	0.58	**0.18**	Nutrient cycling
6	0.34	0.53	**0.19**	Detention of imported elements & components
7	0.37	0.47	**0.10**	Detention of particulates
8	0.37	0.60	**0.27**	Organic carbon export
9	0.69	0.88	**0.19**	Maintain characteristic plant community
10	0.28	0.50	**0.22**	Maintain characteristic detrital biomass
11	0.54	0.65	**0.11**	Maintain spatial structure of habitat
12	0.67	0.67	0.00	Maintain habitat interspersion & connectivity
13	0.51	0.67	**0.16**	Maintain taxa richness of aquatic macroinvertebrates
14	0.45	0.62	**0.17**	Maintain distribution and abundance of vertebrates
Average rate of function change:			0.15	

HGM Wetland Assessment of Scenario D: Wetland Enhancement and Expansion Project Conditions

The fourteen wetland functions were assessed of the site as if the existing wetlands at Camarillo Regional Park were enhanced and expanded as described earlier in this report titled, "Scenario D - Wetlands Enhancement and Expansion Project" (on Page 39) and illustrated on Figure 15 (Page 40). The level at which each wetland function is expected to operate at was considered with specific wetland habitat enhancements and expansion of the total area of wetlands onsite, as described earlier. The intent is to determine which wetland functions would be affected, and how much (on a relative basis) would the function indices change compared to existing conditions. Data sheets and calculations used for this HGM assessment are included as Appendix A.

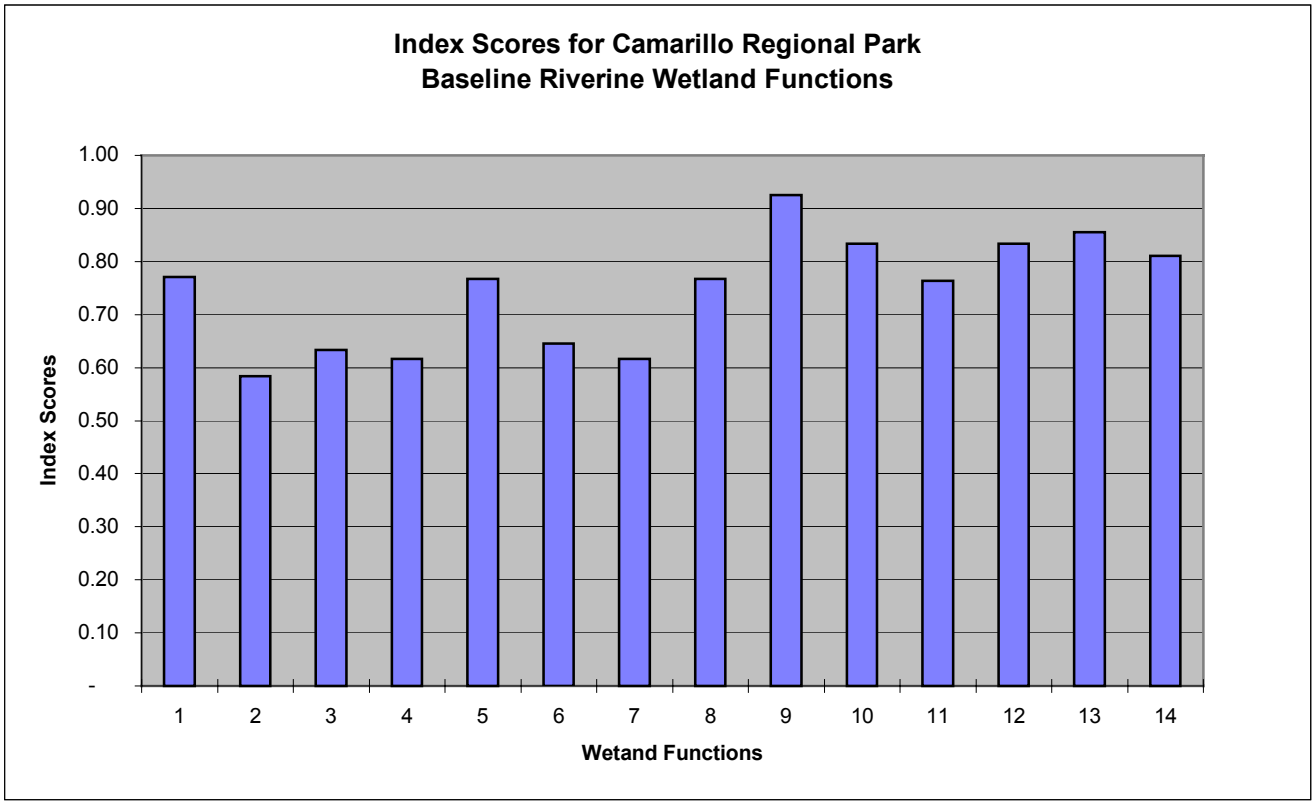
The HGM model found that all fourteen wetland functions were found to be functioning at higher levels for all functions upon wetland enhancement compared to existing conditions (Table 14, Scenario D Wetland Function Index Scores) and is illustrated in the chart of expected wetland function index scores (Figure 26, Chart of Scenario D Wetland Function Index Scores).

Table 14. Scenario D Wetland Function Index Scores

Wetland Function	Post-Project Index Score	Function Description
1	0.77	Maintenance of characteristic channel dynamics
2	0.58	Dynamic surface water storage & energy dissipation
3	0.63	Long-term surface water storage
4	0.62	Dynamic subsurface water storage
5	0.77	Nutrient cycling
6	0.65	Detention of imported elements & components
7	0.62	Detention of particulates
8	0.77	Organic carbon export
9	0.93	Maintain characteristic plant community
10	0.83	Maintain characteristic detrital biomass
11	0.76	Maintain spatial structure of habitat
12	0.83	Maintain habitat interspersion & connectivity
13	0.86	Maintain taxa richness of aquatic macroinvertebrates
14	0.81	Maintain distribution and abundance of vertebrates

Average of all indices: 0.75

Figure 26. Chart of Scenario D Wetland Function Index Scores



All fourteen wetland functions of Calleguas Creek and Camarillo Regional Park are expected to increase significantly (as measured by the HGM model) after the existing wetlands have been enhanced and wetland areas have been expanded as proposed. Table 15, Comparison of Baseline and Scenario D Wetland Function Index Scores, provides a comparison of wetland index scores between existing and post wetland enhancement project conditions, including the relative rate of change for each wetland function.

Table 15. Comparison of Baseline and Scenario D Wetland Function Index Scores

Wetland Function	Baseline Indices	Project Indices	Rate of Change	Function Description
1	0.44	0.77	**0.33**	Maintenance of characteristic channel dynamics
2	0.25	0.58	**0.23**	Dynamic surface water storage & energy dissipation
3	0.30	0.63	**0.33**	Long-term surface water storage
4	0.37	0.62	**0.25**	Dynamic subsurface water storage
5	0.40	0.77	**0.37**	Nutrient cycling
6	0.34	0.65	**0.31**	Detention of imported elements & components
7	0.37	0.62	**0.25**	Detention of particulates
8	0.37	0.77	**0.40**	Organic carbon export
9	0.69	0.93	**0.24**	Maintain characteristic plant community
10	0.28	0.83	**0.55**	Maintain characteristic detrital biomass
11	0.54	0.76	**0.22**	Maintain spatial structure of habitat
12	0.67	0.83	**0.16**	Maintain habitat interspersion & connectivity
13	0.51	0.86	**0.35**	Maintain taxa richness of aquatic macroinvertebrates
14	0.45	0.81	**0.36**	Maintain distribution and abundance of vertebrates
Average rate of function change:			0.31	

All fourteen wetland functions will increase significantly if the onsite wetlands are enhanced and expanded as described earlier in this report. The rates of change shown in **bold** in Table 13 highlight those wetland functions that are expected to increase significantly after the Camarillo Regional Park wetlands have been enhanced and expanded. A significant change in the wetland functions is defined here as a 10% or greater changes from existing conditions. Based on the HGM assessment, the proposed wetland enhancement and expansion project is expected to significantly increase functionality of the fourteen wetland functions, ranging in positive changes of 16% for Function 12, and a 55% positive change for Function 10. The average of the changes in wetland functions is 31% under this project scenario.

FUNCTION BY FUNCTION ASSESSMENT

Below is a discussion of the expected changes and reasons for the changes for each of the fourteen wetland functions. The significance of the change in functionality is stated and general mitigation recommendations are offered.

Function 1 - Maintenance of Characteristic Channel Dynamics

This function captures the physical processes and structural attributes that maintain characteristic channel dynamics. These include: condition of the buffer zone adjacent to the creek, water flow characteristics, bedload, downed and dead branches and stems, channel dimensions, and other features, such as vegetation cover. Eight variables are used to capture this function and include: Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Channel Roughness (VCHANROUGH), Herbaceous Cover (VHERBCC), In-channel Coarse Woody Debris (VINCWD), Shrub Canopy Cover (VSHRUBCC), and Basal Area of Trees (VTREEBA) (Lee et al. 2001).

Scenario A (golf course project without wetland enhancement) is expected to decrease the functionality of maintaining characteristic channel dynamics from and index score of 0.44 to 0.18, or by -26% (see Table 9 and Figure 27, Rate of Change Comparison Chart of Wetland Functions Between Baseline and Four Project Scenarios (A, B, C, and D) [Page 75]). These changes are the result of:: reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing tree and shrub cover.

A 26% reduction in functionality is considered a significant reduction. Mitigation should be required to replace this function onsite to at least baseline conditions. Mitigation measures could include: removing and controlling invasive exotic species; establishing vegetated (with native species) buffers between existing wetlands of at least 100 feet from the edge of the adjacent wetland; increasing tree and shrub density and structural diversity onsite; providing vegetated connections between wetland and upland areas to minimize loss of habitat connectivity.

Scenario B (golf course project w/wetland enhancement) is expected to decrease the functionality of maintaining characteristic channel dynamics from and index score of 0.44 to 0.32, or by -12% (see Table 11 and Figures 20 and 27), for the same reasons as stated for Scenario A, but to a lesser extent. A 12% decrease in this function is considered a significant impact and mitigation should be required to replace this function onsite to at least baseline conditions. While some of the mitigation measures listed above for Scenario A are included as part of this project scenario, significant residual impacts remain to this function. Additional measures could include: establishing vegetated (with native species) buffers between existing wetlands of at least 100 feet from the edge of the adjacent wetland; and, providing vegetated connections between wetland and upland areas to minimize loss of habitat connectivity.

Scenario C (wetland enhancement project) is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.44 to 0.56, or by 12% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. This project scenario provides a 12% net benefit to this wetland function and no adverse impacts would occur.

Scenario D (wetland enhancement and expansion project) is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.44 to 0.77, or by 33% (see Table 15 and Figures 20 and 27). This would result in significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. This project scenario provides a 33% net benefit to this wetland function and no adverse impacts would occur to wetland resources.

Function 2 - Dynamic Surface Water Storage and Energy Dissipation

Function 2 captures the assessment area's dynamic surface water storage and dissipation of energy at bankfull and greater discharges, which are a function of channel characteristics, off-channel sediment inputs, and the integrity of the soil profile. Three variables are used to measure this function: Residual Pools (VRESIDPOOL), Sediment (VSED), and Soil Integrity (VSOILINT).

Scenario A is expected to decrease the functionality of the wetland's dynamic surface water storage and energy dissipation capabilities from and index score of 0.25 to 0.15, or by -10% (see Table 9 and Figures 20 and 27). This is because approximately 5 acres (up to 11.8 acres) of existing wetlands will likely be filled, reducing the site's flood storage capacity and that the existing left levee will most certainly be improved to protect golf course facilities. Furthermore, flood control facilities (Calleguas Creek) maintenance will continue to require removal of natural wetland vegetation and sediment removal from the creek, impacting residual pools, and sediment transport. A 10% reduction in this function is considered a significant adverse impact, and mitigation measures should be required. Filling onsite wetlands should be avoided. Replacement of wetland area filled onsite at a 1:1 ratio would at least partially mitigation for eliminating flood storage capacity elsewhere onsite.

Scenario B is expected to decrease the functionality of the wetland's dynamic surface water storage and energy dissipation capabilities from and index score of 0.25 to 0.20, or by -5% (see Table 11 and Figures 20 and 27),

for the same reasons as stated above, but to a lesser extent. A 5% reduction in this function is adverse but less than significant. Minimizing the total area of flood storage capacity onsite would likely eliminate the residual adverse impact of the project.

Scenario C is expected to increase the functionality of the wetland's dynamic surface water storage and energy dissipation capabilities from and index score of 0.25 to 0.42, or by 17% (see Table 13 and Figures 20 and 27). This is because Scenario C will improve sediment transport conditions and remove a portion of the left levee along Calleguas Creek to increase surface water storage capacity of the creek. A 17% increase in functionality is a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of the wetland's dynamic surface water storage and energy dissipation capabilities from and index score of 0.25 to 0.58, or by 23% (see Table 15 and Figures 20 and 27). This will be a result of improving sediment transport conditions and removing a portion of the left levee along Calleguas Creek to increase surface water storage capacity of the creek. Calleguas Creek would also be allowed to meander eastward and conditions for residual in-channel pools would improve. Sediment conditions would also improve under this scenario. A 23% increase in functionality is a significant benefit. No mitigation is required.

Function 3 - Long-term Surface Water Storage

Function 3 measures a wetland's capability to temporarily store (retain) surface water for long durations (one or more days); associated with standing water not moving over the surface. Water sources may be overbank flow, overland flow or channelized flow from uplands, or direct precipitation. Ten variables are used to capture this wetland function: Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Channel Roughness (VCHANROUGH), Embeddedness of Large Channel Materials (VEMBED), Land Use (VLANDUSE), Longitudinal Profile Integrity (VLONGPROF), Sediment Deposition (VSED), Soil Profile Integrity (VSOILINT), and Surface Water In[puts] (VSURFIN) (Lee et al. 2001).

Scenario A is expected to decrease a wetland's capability to temporarily store surface water for long durations from and index score of 0.30 to 0.17, or by -13% (see Table 9 and Figures 20 and 27). The decrease in functionality is a result of the project reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, and reducing tree and shrub cover. A 13% reduction of this wetland function is considered a significant adverse impact. Mitigation should be required to replace this function onsite to at least baseline conditions; however, onsite mitigation would not likely fully mitigate for the adverse impacts to this function since the developed area would need to be reduced significantly. Establishing a substantial vegetated buffer between Calleguas Creek and agricultural fields on the right bank would provide substantial benefit. Setting back the right levee 50 to 100 feet and establishing a 100-foot buffer would likely significantly mitigate project impacts to this function.

Scenario B is expected to decrease a wetland's capability to temporarily store surface water for long durations from and index score of 0.30 to 0.26, or by -4% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 4% reduction of this wetland function is considered an adverse impact but is not considered significant. Mitigation implemented to restore this function onsite to at least baseline conditions could be implemented, such as establishing a 100-foot vegetated buffer between Calleguas Creek and agricultural fields on the right bank.

Scenario C is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.44 to 0.56, or by 12% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. A 12% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.44 to 0.77, or by 33% (see Table 15 and Figures 20 and 27), as a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody

debris, shrub cover, and tree numbers and size. A 33% increase in this function is considered a significant benefit. No mitigation is required.

Function 4 - Dynamic Subsurface Water Storage

Function 4 captures availability of water storage beneath the wetland surface, with capacity becoming available after periodic drawdown of the water table. Nine variables measure this function: Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Channel Roughness (VCHANROUGH), Embeddedness Large Channel Materials (VEMBED), Herbaceous Cover (VHERBCC), Sediment Deposition (VSED), Shrub Canopy Cover (VSHRUBCC), and Basal Area of Trees (VTREEBA) (Lee et al. 2001).

Scenario A is expected to decrease the site's capability to store water beneath the surface from and index score of 0.37 to 0.16, or by -21% (see Table 9 and Figures 20 and 27). The decrease in functionality is a result of the project reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, and reducing tree and shrub cover. A 21% reduction of this wetland function is considered a significant adverse impact. Mitigation should be required to replace this function onsite to at least baseline conditions; however, onsite mitigation would not likely fully mitigate for the adverse impacts to this function since the developed area would need to be reduced significantly. Establishing a substantial vegetated buffer between Calleguas Creek and agricultural fields on the right bank would provide substantial benefit. Setting back the right levee 50 to 100 feet and establishing a 100-foot buffer would likely significantly mitigate project impacts to this function.

Scenario B is expected to decrease the site's capability to store water beneath the surface from and index score of 0.37 to 0.28, or by -9% (see Table 11 and Figures 20 and 27). The decrease in functionality is a result of the project reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, and reducing tree and shrub cover. A 9% reduction of this wetland function is considered an adverse impact but is less than significant. Mitigation could be implemented to further reduce impact to this function to at least baseline conditions, such as establishing a substantial vegetated buffer between Calleguas Creek and agricultural fields on the right bank would provide substantial benefit.

Scenario C is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.37 to 0.47, or by 10% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. A 10% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.37 to 0.62, or by 25% (see Table 15 and Figures 20 and 27), as a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 25% increase in this function is considered a significant benefit. No mitigation is required.

Function 5 - Nutrient Cycling

Function 5 measures (indirectly) the abiotic and biotic processes that convert elements from one form to another, primarily recycling processes. Since these processes can be complex and not easily measured in the field, the model uses eleven variables to capture the nutrient cycling function, including: Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Decomposition (VDECOMP), Herbaceous Cover (VHERBCC), In-channel Coarse Woody Debris (VINCWD), Off-channel Coarse Woody Debris (VOFFCWD), Sediment Deposition (VSED), Shrub Canopy Cover (VSHRUBCC), Soil Profile Integrity (VSOILINT), and Basal Area of Trees (VTREEBA) (Lee et al. 2001).

Scenario A is expected to decrease the functionality of nutrient cycling from and index score of 0.40 to 0.13, or by -27% (see Table 9 and Figures 20 and 27), as a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing

tree and shrub cover. A 27% decrease in this function is considered a significant adverse impact and mitigation should be required. Mitigation should be required to replace this function onsite to at least baseline conditions; however, as described for Function 4 above, onsite mitigation would not likely fully mitigate for the adverse impacts to this function since the developed area would need to be reduced significantly. Establishing a substantial vegetated buffer between Calleguas Creek and agricultural fields on the right bank would provide substantial benefit. Setting back the right levee 50 to 100 feet and establishing a 100-foot buffer would likely significantly mitigate project impacts to this function.

Scenario B is expected to decrease the functionality of nutrient cycling from and index score of 0.40 to 0.24, or by -16% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 16% decrease in this function is considered a significant adverse impact and mitigation should be required. Mitigation should be required to replace this function onsite to at least baseline conditions; however, as described above, establishing a substantial vegetated buffer between Calleguas Creek and agricultural fields on the right bank would provide substantial benefit.

Scenario C is expected to increase the functionality of nutrient cycling from and index score of 0.40 to 0.58, or by 18% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris, shrub cover, and tree numbers and size. An 18% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.40 to 0.77, or by 37% (see Table 15 and Figures 20 and 27), as a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 37% increase in this function is considered a significant benefit. No mitigation is required.

Function 6 - Detention of Imported Elements and Compounds

Function 6 identifies a site's ability to detain imported nutrients, contaminants, and other elements or compounds present in the environment. Nine variables are used for this function: Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Herbaceous Cover (VHERBCC), Longitudinal Profile integrity (VLONGPROF), Sediment Deposition (VSED), Shrub Canopy Cover (VSHRUBCC), Soil Profile Integrity (VSOILINT), and Basal Area of Trees (VTREEBA) (Lee et al. 2001).

Scenario A is expected to decrease the functionality of detention of imported elements and compounds from and index score of 0.34 to 0.14, or by -20% (see Table 9 and Figures 20 and 27). This reduction is a result of reducing the size of onsite wetlands (by 5 to 11.8 acres), eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing tree and shrub cover onsite. While the onsite wetlands would be reduced by approximately between 7% and 16% (73.2 acres minus 5 or 11.8 acres, including Calleguas Creek wetlands), the wetland's ability to detain imported elements and compounds would be diminished by 20%. Providing substantial buffers between any development onsite and onsite wetlands is the single most effective mitigation measure. Avoiding or reducing direct impacts to filling wetlands is also highly beneficial in reducing this indirect impact to wetland functions.

Scenario B is expected to decrease the functionality of maintaining characteristic channel dynamics from and index score of 0.34 to 0.24, or by -10% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent.

Scenario C is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.34 to 0.53, or by 19% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris, shrub cover, and tree numbers and size. A 19% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.34 to 0.65, or by 31% (see Table 15 and Figures 20 and 27), as a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody

debris, shrub cover, and tree numbers and size. A 31% increase in this function is considered a significant benefit. No mitigation is required.

Function 7 - Detention of Particulates

Function 7 gauges the deposition and detention of inorganic and organic particulates greater than 0.45μm from the water column, primarily through physical processes. This is done by using the same nine variables used for Function 4. See the discussion under Function 4 above for an analysis.

Scenario A is expected to decrease the functionality of deposition and detention of particulates from and index score of 0.37 to 0.16, or by -21% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing tree and shrub cover. A 21% reduction of this wetland function is considered a significant adverse impact. Mitigation should be required to replace this function onsite to at least baseline conditions; however, onsite mitigation would not likely fully mitigate for the adverse impacts to this function since the developed area would need to be reduced significantly. Establishing a substantial vegetated buffer between Calleguas Creek and agricultural fields on the right bank would provide substantial benefit. Setting back the right levee 50 to 100 feet and establishing a 100-foot buffer would likely significantly mitigate project impacts to this function.

Scenario B is expected to decrease the functionality of deposition and detention of particulates from and index score of 0.37 to 0.28, or by -9% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 9% reduction of this wetland function is considered an adverse impact but is less than significant. Mitigation could be implemented to further reduce the impact to this function onsite to at least baseline conditions, such as establishing a substantial vegetated buffer between Calleguas Creek and agricultural fields on the right bank would provide substantial benefit.

Scenario C is expected to increase the functionality of deposition and detention of particulates from and index score of 0.37 to 0.47, or by 10% (see Table 13 and Figures 20 and 27). This is a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. A 10% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of deposition and detention of particulates from and index score of 0.37 to 0.62, or by 25% (see Table 15 and Figures 20 and 27), as a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 25% increase in this function is considered a significant benefit. No mitigation is required.

Function 8 - Organic Carbon Export

Function 8 captures a wetland's ability to export dissolved and particulate organic carbon from the wetland through mechanisms including leaching, flushing, displacement, and erosion. This function is measured through nine variables: Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Decomposition (VDECOMP), Herbaceous Cover (VHERBCC), In-channel Coarse Woody Debris (VINCWD), Longitudinal Profile integrity (VLONGPROF), Shrub Canopy Cover (VSHRUBCC), and Basal Area of Trees (VTREEBA) (Lee et al. 2001).

Scenario A is expected to decrease the functionality of exporting dissolved and particulate organic carbon from and index score of 0.37 to 0.13, or by -24% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, reducing connectivity to adjacent upland habitats, and reducing tree and shrub cover. A 24% decrease in the ability of onsite wetlands to export dissolved and particulate organic carbon is considered a significant adverse impact. Avoiding filling of existing wetlands and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level.

Scenario B is expected to decrease the functionality of exporting dissolved and particulate organic carbon from and index score of 0.37 to 0.26, or by -11% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. An 11% decrease in the ability of onsite wetlands to export dissolved and particulate organic carbon is considered a significant adverse impact, but is less severe than the previous project scenario. While enhancing onsite wetlands reduces that impact to this functions by nearly half, avoiding filling of existing wetlands and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level.

Scenario C is expected to increase the functionality of exporting dissolved and particulate organic carbon from and index score of 0.37 to 0.60, or by 27% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris, shrub cover, and tree numbers and size. A 27% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of exporting dissolved and particulate organic carbon from and index score of 0.37 to 0.77, or by 40% (see Table 15 and Figures 20 and 27). This is a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 40% increase in this function is considered a significant benefit. No mitigation is required.

Function 9 - Maintain Characteristic Plant Community

Function 9 measures the species composition and physical characteristics of living plant biomass, with emphasis on the dynamics and structure of the plant community as revealed by the species of trees, shrubs, seedlings, saplings, and herbs, and by the physical characteristics of the vegetation. The model uses eight variables to capture this function: Herbaceous Cover (VHERBCC), Ratio of Native to Nonnative Dominant Plants (VRATIO), Capacity of Site Regeneration (VREGEN), Shrub Canopy Cover (VSHRUBCC), Vegetation Strata Over Channel (VSTRATA), Basal Area of Trees (VTREEBA), Tree Canopy Cover (VTREECC), and Vine Canopy Cover (VVINECC) (Lee et al. 2001).

Scenario A is expected to decrease the functionality of maintaining characteristic plant communities onsite from and index score of 0.69 to 0.29, or by -40% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, reducing connectivity to adjacent upland habitats, and reducing tree and shrub cover. A 40% decrease in the ability of onsite wetlands to maintain characteristic plant communities onsite is considered a significant adverse impact. Avoiding filling of existing wetlands and developing adjacent natural upland habitat, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level.

Scenario B is expected to decrease the functionality of maintaining characteristic plant communities onsite from and index score of 0.69 to 0.46, or by -23% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 23% decrease in the ability of onsite wetlands to maintain characteristic plant communities onsite is considered a significant adverse impact. While enhancement of onsite wetlands reduces the impact of building a golf course onsite reduces the indirect impact to this wetland function by more than half, avoiding filling of existing wetlands and developing adjacent natural upland habitat, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this impact to a less-than-significant level.

Scenario C is expected to increase the functionality of maintaining characteristic plant communities onsite from and index score of 0.69 to 0.88, or by 19% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris, shrub cover, and tree numbers and size. A 19% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining characteristic plant communities onsite from and index score of 0.69 to 0.93, or by 24% (see Table 15 and Figures 20 and 27), as a result of

significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 24% increase in this function is considered a significant benefit. No mitigation is required.

Function 10 - Maintain Characteristic Detrital Biomass

Function 10 gauges the process of production, accumulation, and dispersal of dead plant biomass of all sizes, from onsite or upslope and upgradient sources. Four variables are used for this function: Decomposition (VDECOMP), In-channel Coarse Woody Debris (VINCWD), Off-channel Coarse Woody Debris (VOFFCWD), and Snags (VSNAGS) (Lee et al. 2001).

Scenario A is expected to decrease the functionality of maintaining characteristic detrital biomass onsite from and index score of 0.28 to 0.10, or by -18% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing tree and shrub cover. An 18% decrease in the ability of onsite wetlands to maintain characteristic detrital biomass onsite is considered a significant adverse impact. Avoiding filling of existing wetlands and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level.

Scenario B is expected to decrease the functionality of maintaining characteristic detrital biomass onsite from and index score of 0.28 to 0.25, or by -3% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 3% decrease in the ability of onsite wetlands to maintain characteristic detrital biomass onsite is considered an adverse impact but less than significant. Enhancing remaining wetlands onsite as described for this project scenario nearly completely mitigates for the project's indirect impacts to this wetland function. Avoiding filling of existing wetlands and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to eliminate this indirect impact to onsite wetlands.

Scenario C is expected to increase the functionality of maintaining characteristic detrital biomass onsite from and index score of 0.28 to 0.50, or by 22% (see Table 13 and Figures 20 and 27), as a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. A 22% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining characteristic detrital biomass onsite from and index score of 0.28 to 0.83, or by 55% (see Table 15 and Figures 20 and 27), as a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 55% increase in this function is considered a significant benefit. No mitigation is required.

Function 11 - Maintain Spatial Structure of Habitat

Function 11 captures the capacity of a wetland to support animal populations and guilds by providing heterogeneous habitats. Eight variables are used to measure this function: Animal Signs (VASIGN), Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Residual Pools (VRESIDPOOL), Shade (VSHADE), Snags (VSNAGS), and Strata (VSTRATA) (Lee et al. 2001).

Scenario A is expected to decrease the functionality of maintaining spatial structure of habitat from and index score of 0.54 to 0.31, or by -23% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing tree and shrub cover. A 23% decrease in the ability of onsite wetlands to maintain spatial structure of habitat onsite is considered a significant adverse impact. Avoiding filling of existing wetlands and creating substantial naturally vegetated buffers between the development and wetlands would be needed to reduce this indirect impact to a less-than-significant level.

Scenario B is expected to decrease the functionality of maintaining spatial structure of habitat from and index score of 0.54 to 0.38, or by -16% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 16% decrease in the ability of onsite wetlands to maintain spatial structure of habitat onsite is considered a significant adverse impact. While enhancing remaining onsite wetlands as part of the golf course project is expected to mitigate the adverse indirect impacts to habitat structure for wildlife by over half, a significant residual impact will remain unmitigated under this project scenario. Avoiding filling of existing wetlands and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level.

Scenario C is expected to increase the functionality of maintaining spatial structure of habitat from and index score of 0.54 to 0.65, or by 11% (see Table 13 and Figures 20 and 27). This is a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. An 11% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining spatial structure of habitat from and index score of 0.54 to 0.76, or by 22% (see Table 15 and Figures 20 and 27). This is a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 22% increase in this function is considered a significant benefit. No mitigation is required.

Function 12 - Maintain Habitat Interspersion and Connectivity

Function 12 is intended to capture the capacity of the wetland to permit access of terrestrial or aerial organisms to contiguous areas of food and cover, and is measured through four variables: Land Use (VLANDUSE), Area of [habitat] Patches (VPATCHAREA), Contiguity of [habitat] Patches (VPATCHCONTIG), and Number of [habitat] Patches (VPATCHNUM) (Lee et al. 2001).

Scenario A is expected to decrease the functionality of maintaining habitat interspersion and connectivity from and index score of 0.67 to 0.38, or by -29% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, developing on adjacent upland habitats, and reducing tree and shrub cover. A 29% decrease in the ability of onsite wetlands to maintain habitat interspersion and connectivity onsite is considered a significant adverse impact. Avoiding filling of existing wetlands, avoiding or minimizing unnatural barriers to adjacent upland habitats, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level. Since a golf course development at this site requires so much land, which would create substantial connectivity barriers for many species of wildlife, it is possible that the project-related impacts to this wetland function cannot be mitigated to a less-than-significant level.

Scenario B is expected to decrease the functionality of maintaining characteristic channel dynamics from and index score of 0.67 to 0.38, or by -29% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 29% decrease in the ability of onsite wetlands to maintain habitat interspersion and connectivity onsite is considered a significant adverse impact. Enhancement of remaining wetlands onsite will not reduce impacts to this wetland function. Avoiding filling of existing wetlands, avoiding or minimizing unnatural barriers to adjacent upland habitats, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level. Since a golf course development onsite requires so much land, which would create substantial connectivity barriers for many wildlife species, it is possible that project-related impacts to this wetland function cannot be mitigated to a less-than-significant level.

Scenario C is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.67 to 0.67, no change (see Table 13 and Figures 20 and 27). Enhancing onsite wetlands will not change this wetland function. No impacts to this function will occur. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining characteristic channel dynamics from and index score of 0.67 to 0.83, or by 16% (see Table 15 and Figures 20 and 27). This is a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 16% increase in this function is considered a significant benefit. No mitigation is required.

Function 13 - Maintain Taxa Richness of Aquatic Macroinvertebrates

Function 13 measures the species richness and diversity of macroinvertebrates in Calleguas Creek and Camarillo Regional Park wetlands. Lee et al. (2001) declined to develop an index formula for this function because they felt that they could not develop a method for the average user to rapidly measure this function. However, DMEC believes that use of many of the variables already developed for this HGM model can reasonably capture this function, at least indirectly. DMEC herein uses eighteen of the twenty-eight variables to capture this function: Animal Signs (VASIGN), Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Herbaceous Cover (VHERBCC), In-channel Coarse Woody Debris (VINCWD), Land Use (VLANDUSE), Off-channel Coarse Woody Debris (VOFFCWD), Area of [habitat] Patches (VPATCHAREA), Contiguity of [habitat] Patches (VPATCHCONTIG), and Number of [habitat] Patches (VPATCHNUM), Ratio of Native to Nonnative Dominant Plants (VRATIO), Capacity of Site Regeneration (VREGEN), Residual Pools (VRESIDPOOL), Shrub Canopy Cover (VSHRUBCC), Snags (VSNAGS), Vegetation Strata Over Channel (VSTRATA), Tree Canopy Cover (VTREECC), and Vine Canopy Cover (VVINECC).

Scenario A is expected to decrease the functionality of maintaining taxa richness of aquatic macroinvertebrates from and index score of 0.51 to 0.23, or by -28% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing tree and shrub cover. A 28% decrease in the ability of onsite wetlands to maintain taxa richness of aquatic macroinvertebrates onsite is considered a significant adverse impact. Avoiding filling of existing wetlands, avoiding or minimizing unnatural barriers to adjacent upland habitats, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level. Since a golf course development at this site requires so much land, which would create substantial connectivity barriers for many species of wildlife, it is possible that the project-related impacts to this wetland function cannot be mitigated onsite to a less-than-significant level.

Scenario B is expected to decrease the functionality of maintaining taxa richness of aquatic macroinvertebrates from and index score of 0.51 to 0.36, or by -15% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 15% decrease in the ability of onsite wetlands to maintain taxa richness of aquatic macroinvertebrates onsite is considered a significant adverse impact. Enhancement of remaining wetlands onsite will reduce impacts to this wetland function by approximately half, which will result in a significant residual adverse impact to this function. Avoiding filling of existing wetlands, avoiding or minimizing unnatural barriers to adjacent upland habitats, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level. Since a golf course development at this site requires so much land, which would create substantial connectivity barriers for many species of wildlife, it is possible that the project-related impacts to this wetland function cannot be mitigated onsite to a less-than-significant level.

Scenario C is expected to increase the functionality of maintaining taxa richness of aquatic macroinvertebrates from and index score of 0.51 to 0.67, or by 16% (see Table 13 and Figures 20 and 27). This is a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. A 16% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining taxa richness of aquatic macroinvertebrates from and index score of 0.51 to 0.86, or by 35% (see Table 15 and Figures 20 and 27). This is a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area,

coarse woody debris, shrub cover, and tree numbers and size. A 35% increase in this function is considered a significant benefit. No mitigation is required.

Function 14 - Maintain Distribution and Abundance of Vertebrates

Function 14 measures the species distribution and abundance of vertebrates in Calleguas Creek and Camarillo Regional Park wetlands. Lee et al. (2001) declined to develop an index formula for this function because they felt that they could not develop a method for the average user to rapidly measure this function. However, DMEC believes that use of many of the variables already developed for this model can reasonably capture this function, at least indirectly. DMEC herein uses twenty-two of the twenty-eight variables to capture this function: Animal Signs (VASIGN), Buffer Condition (VBUFFCOND), Buffer Contiguity (VBUFFCONT), Buffer Width (VBUFFWIDTH), Channel Roughness (VCHANROUGH), Decomposition (VDECOMP), Herbaceous Cover (VHERBCC), In-channel Coarse Woody Debris (VINCWD), Land Use (VLANDUSE), Longitudinal Profile Integrity (VLONGPROF), Off-channel Coarse Woody Debris (VOFFCWD), Area of [habitat] Patches (VPATCHAREA), Contiguity of [habitat] Patches (VPATCHCONTIG), and Number of [habitat] Patches (VPATCHNUM), Capacity of Site Regeneration (VREGEN), Residual Pools (VRESIDPOOL), Shrub Canopy Cover (VSHRUBCC), Snags (VSNAGS), Soil Profile Integrity (VSOILINT), Vegetation Strata Over Channel (VSTRATA), Tree Canopy Cover (VTREECC), and Vine Canopy Cover (VVINECC).

Scenario A is expected to decrease the functionality of maintaining species distribution and abundance of vertebrates from and index score of 0.45 to 0.20, or by -25% (see Table 9 and Figures 20 and 27). This is a result of reducing the size of onsite wetlands, eliminating or reducing buffer areas adjacent to wetlands, increasing the patchiness of adjacent upland habitats, and reducing tree and shrub cover. A 25% decrease in the ability of onsite wetlands to maintain species distribution and abundance of vertebrates onsite is considered a significant adverse impact. Avoiding filling of existing wetlands, avoiding or minimizing unnatural barriers to adjacent upland habitats, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level. Since a golf course development at this site requires so much land, which would create substantial connectivity barriers for many species of wildlife, it is possible that the project-related impacts to this wetland function cannot be mitigated onsite to a less-than-significant level. Furthermore, many of the vertebrates that could cross a golf course separating upland and wetland habitats would be considered hazardous or nuisances and active eradication efforts would possibly be implemented in the future to protect the golf course facilities and humans using the golf course.

Scenario B is expected to decrease the functionality of maintaining species distribution and abundance of vertebrates from and index score of 0.45 to 0.32, or by -13% (see Table 11 and Figures 20 and 27), for the same reasons as stated above, but to a lesser extent. A 13% decrease in the ability of onsite wetlands to maintain species distribution and abundance of vertebrates onsite is considered a significant adverse impact. While enhancing onsite remaining wetlands as part of this project scenario reduces the impact to this function by approximately half, a residual significant indirect impact would remain. Avoiding filling of existing wetlands, avoiding or minimizing unnatural barriers to adjacent upland habitats, and creating substantial naturally vegetated buffers between any development and onsite wetlands would be needed to reduce this indirect impact to a less-than-significant level. Since a golf course development requires so much land, which would create substantial connectivity barriers for many species of wildlife, it is possible that the project-related impacts to this wetland function cannot be mitigated onsite to a less-than-significant level. As stated in the previous paragraph, many of the vertebrates that could cross a golf course separating upland and wetland habitats would be considered hazardous or nuisances and active eradication efforts would possibly be implemented in the future to protect the golf course facilities and humans using the golf course.

Scenario C is expected to increase the functionality of maintaining species distribution and abundance of vertebrates from and index score of 0.45 to 0.62, or by 17% (see Table 13 and Figures 20 and 27). This is a result of improving wetland buffer conditions and herbaceous cover, and increasing coarse woody debris (downed and decaying wood), shrub cover, and tree numbers and size. A 17% increase in this function is considered a significant benefit. No mitigation is required.

Scenario D is expected to increase the functionality of maintaining species distribution and abundance of vertebrates from and index score of 0.45 to 0.81, or by 36% (see Table 15 and Figures 20 and 27). This is a result of significantly improving wetland buffer conditions and herbaceous cover, and by increasing total wetland area, coarse woody debris, shrub cover, and tree numbers and size. A 36% increase in this function is considered a significant benefit. No mitigation is required.

CONCLUSIONS

DMEC concludes through this assessment that Camarillo Regional Park contains substantial acreage (approximately 73.2 acres) of significant and important wetlands within and adjacent to Calleguas Creek. Developing a golf course on approximately 117 acres of the 327-acre park property would result in direct and indirect significant impacts to wetlands and all fourteen wetland functions. While enhancing wetlands not filled by the golf course development would reduce impacts to most of the wetland functions somewhat, residual significant and unmitigated indirect impacts will remain, requiring additional onsite and offsite mitigation. Enhancing or expanding wetlands onsite will significantly improve wetland habitats and functions onsite, and would further the stated goals of the Calleguas Creek Watershed Management Plan Committee.

Summary of Changes to Wetland Functions for Proposed Scenarios

Each of the four project scenarios at Camarillo Regional Park will change one or more wetland functions significantly. Table 16, Rate of Wetland Function Change Comparison Table, summarizes the modeled changes in wetland functional indices for each of the project scenarios compared to baseline conditions. Figure 27, Rate of Change Comparison Chart of Wetland Functions Between Baseline and Four Project Scenarios, graphically illustrates the differences in wetland functionality for each project scenario for each wetland function.

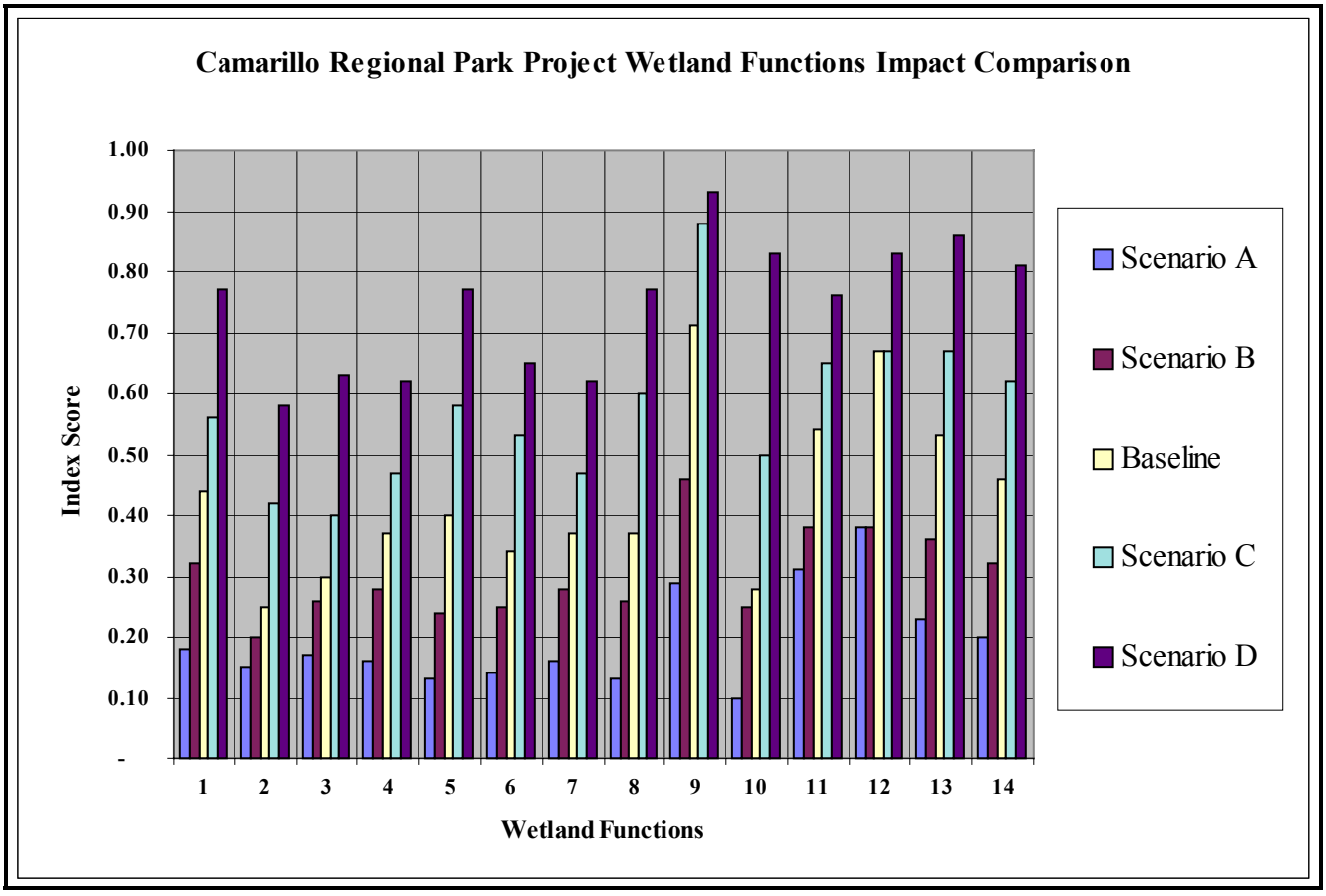
Table 16. Rate of Wetland Function Change Comparison Table for Four Project Scenarios

Wetland Function	Baseline Index Score	A Index Score	B Index Score	C Index Score	D Index Score	Function Description
1	0.44	0.18	0.32	0.56	0.77	Maintenance of characteristic channel dynamics
2	0.25	0.15	0.20	0.42	0.58	Dynamic surface water storage & energy dissipation
3	0.30	0.17	0.26	0.40	0.63	Long-term surface water storage
4	0.37	0.16	0.28	0.47	0.62	Dynamic subsurface water storage
5	0.40	0.13	0.24	0.58	0.77	Nutrient cycling
6	0.34	0.14	0.24	0.53	0.65	Detention of imported elements & components
7	0.37	0.16	0.28	0.47	0.62	Detention of particulates
8	0.37	0.13	0.26	0.60	0.77	Organic carbon export
9	0.69	0.29	0.46	0.88	0.93	Maintain characteristic plant community
10	0.28	0.10	0.25	0.50	0.83	Maintain characteristic detrital biomass
11	0.54	0.31	0.38	0.65	0.76	Maintain spatial structure of habitat
12	0.67	0.38	0.38	0.67	0.83	Maintain habitat interspersion & connectivity
13	0.51	0.23	0.36	0.67	0.86	Maintain taxa richness of aquatic macroinvertebrates
14	0.45	0.20	0.32	0.62	0.81	Maintain distribution and abundance of vertebrates
Average of indices:	0.43	0.19	0.35	0.57	0.75	

Red index scores represent those functions under specific scenarios where the wetland functional index decreased by 10% or more, representing significant and substantial changes. Orange index scores represent scores that are substantially lower than baseline but

are less then significant. Green index scores represent no change or less than 10% increase in functionality. Blue index scores represent index scores that increased significantly (greater than 10%).

Figure 27. Rate of Change Comparison Chart of Wetland Functions Between Baseline and Four Project Scenarios (A, B, C, and D)



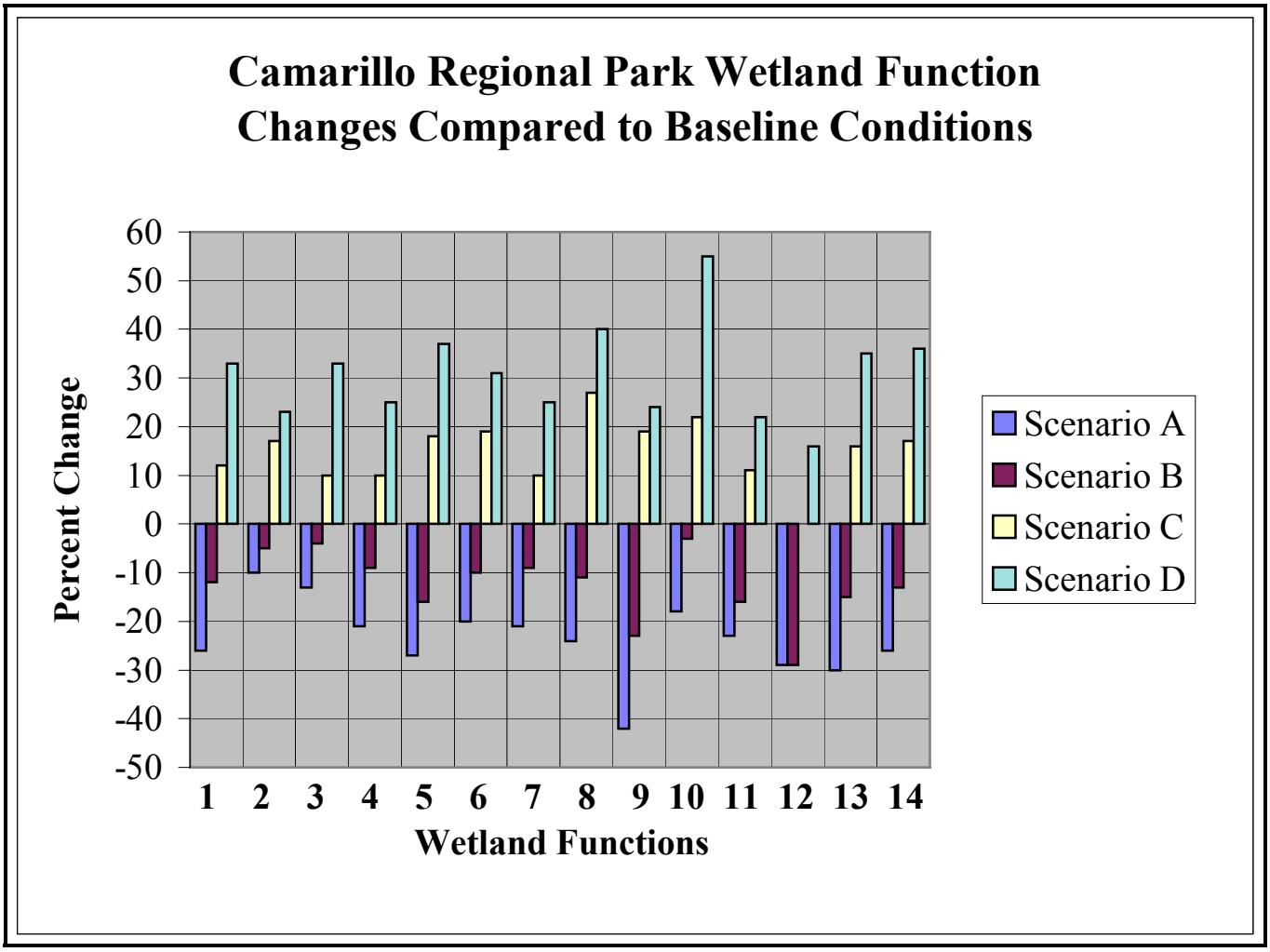
The golf course only and golf course with wetland enhancement (Scenarios A and B, respectively) will result in decreases in wetland functions onsite, with significant impacts (negative changes of 10% or greater) resulting from both scenarios. Scenario A will result in significantly greater adverse impacts to wetland functions, significantly lowering all fourteen wetland functions compared to existing conditions. Offsetting some of those decreases in functions with onsite wetland enhancement reduces the severity of the adverse impacts for five of the fourteen wetland functions (see Tables 11 and 16 and Figures 20 and 27). Implementation of either of the golf course project scenarios will most certainly require substantial offsite mitigation for wetland related impacts, both direct and indirect.

The two wetland improvement project scenarios (Scenarios C and D) both significantly improve wetland functions onsite, but the wetland expansion and enhancement project improves conditions a magnitude more. The more aggressive wetlands project proposed for Camarillo Regional Park would fulfill the stated goals of the Calleguas Creek Watershed Management Plan Committee for this area of the watershed and help restore wetland in the region, which has lost historically over 95% of its wetlands (Dahl 1990).

A percent-change comparison of the four project scenarios is presented in Figure 27, Percent Change Comparison Chart of Wetland Functions Between Four Project Scenarios (A, B, C, and D) From Baseline Conditions, as another method to compare the benefits and impacts of each project scenario related to wetland

functions at Camarillo Regional Park. The differences between the four project scenarios can be clearly seen in Figure 28.

Figure 28. Percent Change Comparison Chart of Wetland Functions Between Four Project Scenarios (A, B, C, and D) From Baseline Conditions



Baseline conditions for each wetland function is represent by the 0 line on the graph, by which each function index value is compared for each project scenario. For example, Function 1 for Scenario A is 26 percent lower than for baseline conditions for that function. Note that Function 12 for project Scenario 12 shows no change in functionality compared to baseline conditions.

The HGM wetland functional assessment model is intended to be used independently for each wetland function, without summing the index scores for the fourteen functions (Smith et al. 1995). Regardless, if a simple comparison of the percent increase in wetland functions (e.g. 20%) is made with the constructing of the golf course, with and without onsite wetland riparian restoration/enhancement, physical, chemical, and biological functions of the existing wetland riparian habitats would function 23% and 13% lower, respectively. The two wetland-improvement scenarios (C and D) would function 15% and 31% higher, respectively. A comparison for each wetland function, as recommended by Smith et al. (1995), is described and assessed briefly below.

Some variables have greater importance to various wetland functions either because they are used as part of the measurement of many functions or because they are one of only two or three variables used in a function. The variables used repeatedly (i.e. more than six functions) include VBUFFCOND, VBUFFCONT, VBUFFWIDTH, VHERBCC, VINCWD, VSED, VSHRUBCC, and VTREEBA (see Table 6 for definitions of the variables).

The variables that have higher relative importance because they are one of only a few variables used to calculate the index scores for wetland functions include: VDECOMP, VINCWD, VLANDUSE, VOFFCWD, VPATCHAREA, VPATCHCONTIG, VPATCHNUM, VRESIDPOOL, VSED, VSNAGS, and VSOILINT. The result is that changes to these variables have a greater affect on one or more of the wetland functions at a given site. For example, changes to the assessment area that significantly affect the Snags (VSNAGS) in the assessment area will result in substantial changes in Functions 10 and 11, with less influences on Functions 13 and 14. These facts provide both insights into what environmental variables are important, but also where project focus or mitigation should be considered.

As determined by this wetland functions assessment, develop that involves removing large amounts of natural habitat and connectivity between onsite wetlands and adjacent upland habitats results in significant adverse impacts to each of the fourteen different wetland functions. Encroaching into the 100-foot buffer zone around existing wetlands is also an important factor. Regardless, a variety of actions could be taken to avoid or minimize project-related impacts to wetland functions, which will vary from function to function. As expected, the two wetland enhancement projects do indeed improve wetland functions onsite; the degree of improvement depends on the specific actions implemented.

Regardless or which project scenario is chosen and implemented, a few specific habitat improvement actions became obvious during this assessment, which would provide some of the greatest wetland function improvement onsite. These include:

- Establishing a 100-foot vegetated buffer between Calleguas Creek and adjacent farmland to the northwest (right bank of the creek);
- Moving the right bank levee outward (north and west) to create additional wetlands onsite, and establish a 100-foot vegetated buffer zone between the new levee and adjacent farmland; and
- Installing vegetated swales and other structures adjacent to the golf course or existing facilities to capture all runoff from the facilities to protect water quality of adjacent wetlands, including Calleguas Creek.

These measures are included because they will provide some of the greatest benefits to maintaining and/or improving wetland functions of Calleguas Creek at Camarillo Regional Park. Most or all the 100-foot zone between Calleguas Creek and existing farmland is on County property, with portions currently used for farming or farm assess. Moving the right levee outward would provide the greatest benefit possible by establishing continuous vegetation cover between the creek and the levee; however, the cost to move the levee would be quite high. Regardless, any project should consider the benefit to cost ratio before determining the final components of any project at Camarillo Regional Park.

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Mr. Peter Brand, of the Coastal Conservancy, provided information about the project site history and details about the project site and proposed projects, and reviewed the final draft of the report. Mr. Scott Ellison of Ventura County Planning Division provided biological resource information on the previously proposed golf course projects.

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PERSONAL COMMUNICATIONS

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APPENDIX A.
FUNCTIONAL ASSESSMENT WORKSHEETS

BASELINE PROJECT
GOLF COURSE ONLY PROJECT
GOLF COURSE WITH ENHANCEMENT PROJECT
WETLAND ENHANCEMENT ONLY PROJECT
WETLAND ENHANCEMENT AND EXPANSION PROJECT

Project Name: Camarillo Regional Park Wetlands Baseline Date: 3 May 2004
Project Site: Camarillo Regional Park County: Ventura
Assessor/Observer: David L. Magney City:

	South Santa Barbara Coast Streams													
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Vasign											0.75		0.75	0.75
Vbuffcond	0.50		0.50	0.50	0.50	0.50	0.50	0.50			0.50		0.50	0.50
Vbuffcont	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
Vbuffwidth	0.50		0.50	0.50	0.50	0.50	0.50	0.50			0.50		0.50	0.50
Vchanrough	0.50		0.50	0.50			0.50							0.50
Vdecomp					0.50			0.50		0.50				0.50
Vembed			0.10	0.10			0.10							
Vherbcc	0.50			0.50	0.50	0.50	0.50	0.50	0.50				0.50	0.50
Vincwd	0.25				0.25			0.25		0.25			0.25	0.25
Vlanduse			0.50									0.50	0.50	0.50
Vlongprof			0.10			0.10		0.10						0.10
Voffcwd					0.25					0.25			0.25	0.25
Vpatcharea												0.75	0.75	0.75
Vpatchcontig												1.00	1.00	1.00
Vpatchnum												0.75	0.75	0.75
Vratio									1.00				1.00	
Vregen									0.75				0.75	0.75
Vresidpool		0.25									0.25		0.25	0.25
Vsed		0.25	0.25	0.25	0.25	0.25	0.25							
Vshade											0.75			
Vshrubcc	0.75			0.75	0.75	0.75	0.75	0.75	0.75				0.75	0.75
Vsnags										0.10	0.10		0.10	0.10
Vsoilint		0.25	0.25		0.25	0.25								0.25
Vstrata									0.75		0.75		0.75	0.75
Vsurfin			0.25											
Vtreeba	0.50			0.50	0.50	0.50	0.50	0.50	0.50					
Vtreecc									0.50				0.50	0.50
Vvinecc									0.10				0.10	0.10

Project Name: Camarillo Regional Park Golf Course
Date: 14 May 2004
Project Site: Camarillo Regional Park
County: Ventura
Assessor/Observer: David L. Magney
City:

Variable	South Santa Barbara Coast Streams													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Vasign											0.50		0.50	0.50
Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
Vbuffcont	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
Vbuffwidth	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
Vchanrough	0.25		0.25	0.25			0.25							0.25
Vdecomp					0.10			0.10		0.10				0.10
Vembed			0.10	0.10			0.10							
Vherbcc	0.10			0.10	0.10	0.10	0.10	0.10	0.10				0.10	0.10
Vincwd	0.10				0.10			0.10		0.10			0.10	0.10
Vlanduse			0.25									0.25	0.25	0.25
Vlongprof			0.10			0.10		0.10						0.10
Voffcwd					0.10					0.10			0.10	0.10
Vpatcharea												0.25	0.25	0.25
Vpatchcontig												0.75	0.75	0.75
Vpatchnum												0.50	0.50	0.50
Vratio									0.50				0.50	
Vregen									0.25				0.25	0.25
Vresidpool		0.25									0.25		0.25	0.25
Vsed		0.10	0.10	0.10	0.10	0.10	0.10							
Vshade											0.50			
Vshrubcc	0.25			0.25	0.25	0.25	0.25	0.25	0.25				0.25	0.25
Vsnags										0.10	0.10		0.10	0.10
Vsoilint		0.10	0.10		0.10	0.10								0.10
Vstrata									0.25		0.25		0.25	0.25
Vsurfin			0.25											
Vtreeba	0.25			0.25	0.25	0.25	0.25	0.25	0.25					
Vtreecc									0.10				0.10	0.10
Vvinecc									0.10				0.10	0.10

Project Name: Camarillo Regional Park Golf Course & Enhancement Date: 14 May 2004

Project Site: Camarillo Regional Park County: Ventura

Assessor/Observer: David L. Magney City:

Variable	South Santa Barbara Coast Streams													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Vasign											0.50		0.50	0.50
Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
Vbuffcont	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
Vbuffwidth	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
Vchanrough	0.50		0.50	0.50			0.50							0.50
Vdecomp					0.25			0.25		0.25				0.25
Vembed			0.10	0.10			0.10							
Vherbcc	0.25			0.25	0.25	0.25	0.25	0.25	0.25				0.25	0.25
Vincwd	0.25				0.25			0.25		0.25			0.25	0.25
Vlanduse			0.25									0.25	0.25	0.25
Vlongprof			0.25			0.25		0.25						0.25
Voffcwd					0.25					0.25			0.25	0.25
Vpatcharea												0.25	0.25	0.25
Vpatchcontig												0.75	0.75	0.75
Vpatchnum												0.50	0.50	0.50
Vratio									0.75				0.75	
Vregen									0.50				0.50	0.50
Vresidpool		0.25									0.25		0.25	0.25
Vsed		0.25	0.25	0.25	0.25	0.25	0.25							
Vshade											0.75			
Vshrubcc	0.50			0.50	0.50	0.50	0.50	0.50	0.50				0.50	0.50
Vsnags										0.25	0.25		0.25	0.25
Vsoilint		0.10	0.10		0.10	0.10								0.10
Vstrata									0.50		0.50		0.50	0.50
Vsurfin			0.50											
Vtreeba	0.25			0.25	0.25	0.25	0.25	0.25	0.25					
Vtreecc									0.25				0.25	0.25
Vvinecc									0.25				0.25	0.25

Project Name: Camarillo Regional Park Wetlands Enhancement Date: 13 May 2004
Project Site: Camarillo Regional Park County: Ventura
Assessor/Observer: David L. Magney City:

Variable	South Santa Barbara Coast Streams													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Vasign											0.75		0.75	0.75
Vbuffcond	0.50		0.50	0.50	0.50	0.50	0.50	0.50			0.50		0.50	0.50
Vbuffcont	0.50		0.50	0.50	0.50	0.50	0.50	0.50			0.50		0.50	0.50
Vbuffwidth	0.50		0.50	0.50	0.50	0.50	0.50	0.50			0.50		0.50	0.50
Vchanrough	0.50		0.50	0.50			0.50							0.50
Vdecomp					0.75			0.75		0.75				0.75
Vembed			0.10	0.10			0.10							
Vherbcc	0.75			0.75	0.75	0.75	0.75	0.75	0.75				0.75	0.75
Vincwd	0.50				0.50			0.50		0.50			0.50	0.50
Vlanduse			0.50									0.50	0.50	0.50
Vlongprof			0.50			0.50		0.50						0.50
Voffcwd					0.50					0.50			0.50	0.50
Vpatcharea												0.75	0.75	0.75
Vpatchcontig												1.00	1.00	1.00
Vpatchnum												0.75	0.75	0.75
Vratio									1.00				1.00	
Vregen									1.00				1.00	1.00
Vresidpool		0.50									0.50		0.50	0.50
Vsed		0.50	0.50	0.50	0.50	0.50	0.50							
Vshade											1.00			
Vshrubcc	0.75			0.75	0.75	0.75	0.75	0.75	0.75				0.75	0.75
Vsnags										0.25	0.25		0.25	0.25
Vsoilint		0.25	0.25		0.25	0.25								0.25
Vstrata									1.00		1.00		1.00	1.00
Vsurfin			0.25											
Vtreeba	0.75			0.75	0.75	0.75	0.75	0.75	0.75					
Vtreecc									0.75				0.75	0.75
Vvinecc									0.50				0.50	0.50

Project Name: Camarillo Regional Park Wetlands Expansion Date: 14 May 2004

Project Site: Camarillo Regional Park County: Ventura

Assessor/Observer: David L. Magney City:

Variable	South Santa Barbara Coast Streams													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Vasign											0.75		0.75	0.75
Vbuffcond	0.75		0.75	0.75	0.75	0.75	0.75	0.75			0.75		0.75	0.75
Vbuffcont	0.50		0.50	0.50	0.50	0.50	0.50	0.50			0.50		0.50	0.50
Vbuffwidth	0.75		0.75	0.75	0.75	0.75	0.75	0.75			0.75		0.75	0.75
Vchanrough	0.75		0.75	0.75			0.75							0.75
Vdecomp					1.00			1.00		1.00				1.00
Vembed			0.25	0.25			0.25							
Vherbcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
Vincwd	0.75				0.75			0.75		0.75			0.75	0.75
Vlanduse			0.75									0.75	0.75	0.75
Vlongprof			0.50			0.50		0.50						0.50
Voffcwd					0.75					0.75			0.75	0.75
Vpatcharea												1.00	1.00	1.00
Vpatchcontig												1.00	1.00	1.00
Vpatchnum												0.75	0.75	0.75
Vratio									1.00				1.00	
Vregen									1.00				1.00	1.00
Vresidpool		0.75									0.75		0.75	0.75
Vsed		0.50	0.50	0.50	0.50	0.50	0.50							
Vshade											1.00			
Vshrubcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
Vsnags										0.75	0.75		0.75	0.75
Vsoilint		0.50	0.50		0.50	0.50								0.50
Vstrata									1.00		1.00		1.00	1.00
Vsurfin			0.75											
Vtreeba	0.75			0.75	0.75	0.75	0.75	0.75	0.75					
Vtreecc									1.00				1.00	1.00
Vvinecc									0.75				0.75	0.75