David Magney Environmental Consulting

WETLAND FUNCTIONAL ASSESSMENT OF THE GRAMCKOW PROPERTY PROJECT, RANCHO MATILIJA, CALIFORNIA

(COUNTY OF VENTURA PROJECT: ZO 04-0000008)

Prepared for:

VENTURA COUNTY PLANNING DIVISION

On Behalf of:

MARTIN GRAMCKOW

July 2006

DMEC Mission Statement:

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

DMEC

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(County of Ventura Project: ZO 04-0000008)

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SECTION 1. PROJECT DESCRIPTION

PROJECT LOCATION

The Gramckow property is located in the Ojai Valley region of Ventura County, California, west of the city of Ojai and immediately north of State Route 150, also known as Baldwin Road. The property is located immediately west of the Rancho Matilija development, and east of the secondary access road (Ranch Road) into that development (Figure 1, Location of the Gramckow Project Site). The property is located within the Matilija USGS California Quadrangle at the approximate geographic coordinates of 34.42829°N latitude and 119.31521°W longitude, and is at an elevation of approximately 600 feet above mean sea level.

The project site consists of the south-eastern portion of the property, as shown on Figure 2, Aerial Photograph of the Gramckow Property and Project Site. The project site is bordered by two tributaries to Live Oak Creek, referred to as the west and east tributaries. Live Oak Creek is itself a tributary to the Ventura River.

PROJECT BACKGROUND

Martin Gramckow is applying to the County of Ventura to convert two existing lots to three legal lots. If this request is approved, Mr. Gramckow intends to develop or to sell for development the southeastern-most parcel, which would be approximately 11 acres. This future parcel will herein be referred to as the project site. The intended development for that parcel is one single-family dwelling, with associated landscape, hardscape, and outbuildings. See Figure 3, Project Site with Proposed Building Site, for a depiction of the area. Rincon Consultants, Inc., conducted a Biological Resources Initial Study for the County of Ventura on 15 August 2005 (Ventura County Planning Division 2005). Because the parcel in question is bounded by two streams and Ventura County General Plan policy restricts development within 100 feet of the edge of any wetland or riparian habitat, the Ventura County Planning Division required a specific assessment as to whether the proposed project could be built within the 100-foot buffer zone and not significantly adversely impact the stream habitats. The County requires such as assessment to be conducted by a County-approved, qualified biologist.

David Magney Environmental Consulting (DMEC), a County-approved biological consulting firm, conducted a reconnaissance-level site survey on 16 February 2006. During that survey, DMEC was able to clearly determine that the proposed project would require development within each of the 100-foot riparian buffer zones that would potentially impact habitat functions of the riparian corridor along Live Oak Creek and its two tributaries. Therefore, after discussing the approach with Planning Division staff, DMEC conducted a wetland functional assessment using the Hydrogeomorphic (HGM) wetland functional assessment method to objectively demonstrate how the proposed project and any associated mitigation would change wetland functions onsite.

ASSESSMENT OBJECTIVES

Riparian wetland ecosystems are known to provide a wide range of physical, biochemical, and biological functions. The objective of this study is to assess the environmental impacts of construction of a single-family house and associated structures within the 100-foot riparian habitat protection zones of two small creeks where discretionary development is generally prohibited. More specifically, the purpose of this HGM wetland functional assessment is to objectively and quantitatively determine the ways and the degree to which the proposed project will change wetland functions of the two tributaries of Live Oak Creek at the project site.

This assessment provides a comparative analysis of how the proposed project will change known wetland functions. This is accomplished in three steps. First, the assessment determines the level at which each wetland function is operating, compared to reference standard sites. Second, the assessment measures what changes to wetland functions will occur as a result of constructing the project. Third, the assessment determines how the proposed enhancement and mitigation will improve the wetland functions. This assessment provides a numerical scoring of the project site under three scenarios existing conditions, at build-out, and after mitigation completion (if needed). If any of the wetland functions are significantly negatively impacted, then possible mitigation measures are proposed and assessed on how they will improve the wetland functions.

The overall mitigation objective is to have no net loss of wetland extent or functions resulting from project implementation. Riparian ecosystem functions that will be disturbed or reduced as a result of construction, grading, or restoration activities will be restored onsite and in-kind. This mitigation targets the restoration of ecosystem functions through the restoration of geomorphic and biological attributes and processes on the Gramckow property (project site).

Figure 1. Location of the Gramckow Project Site

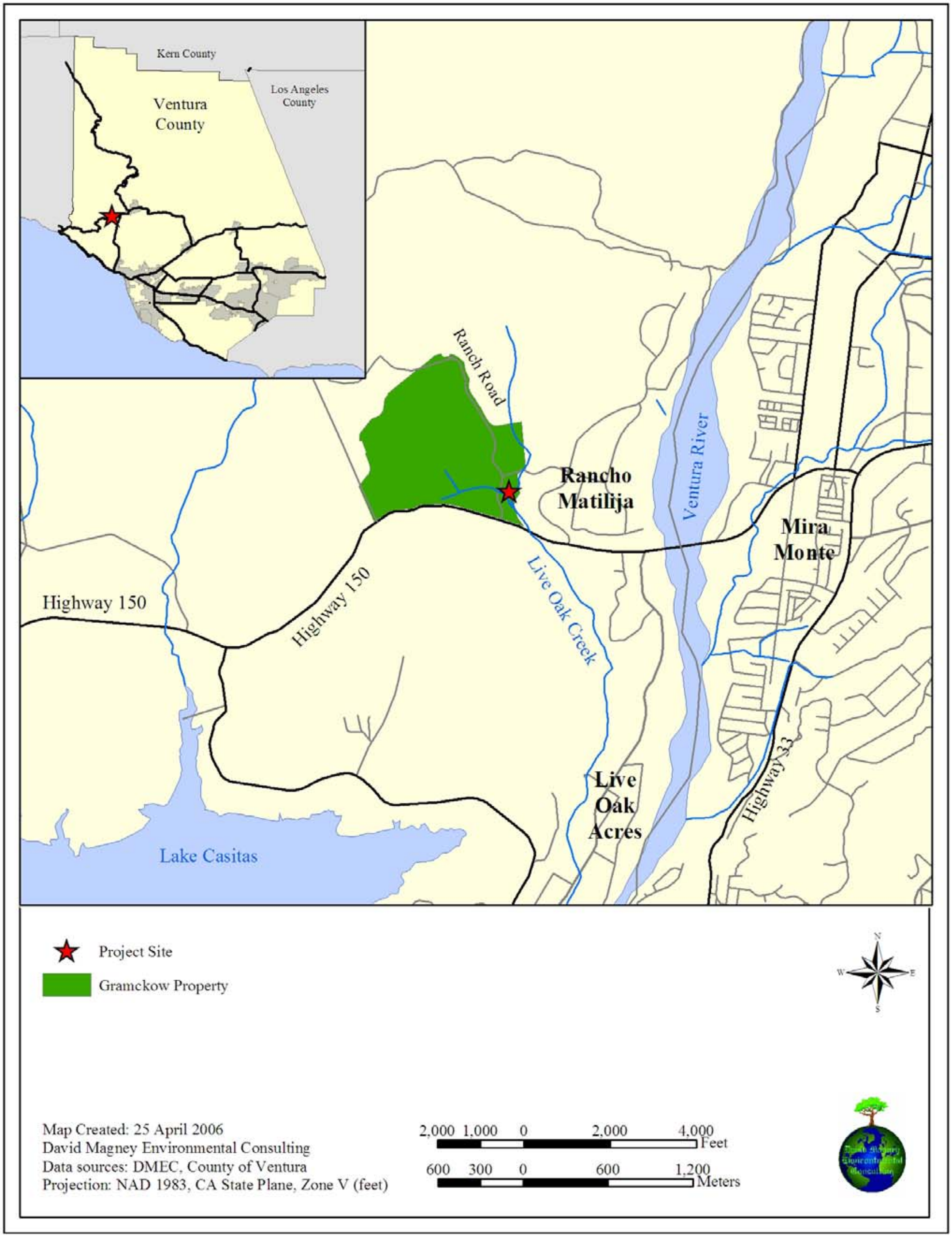
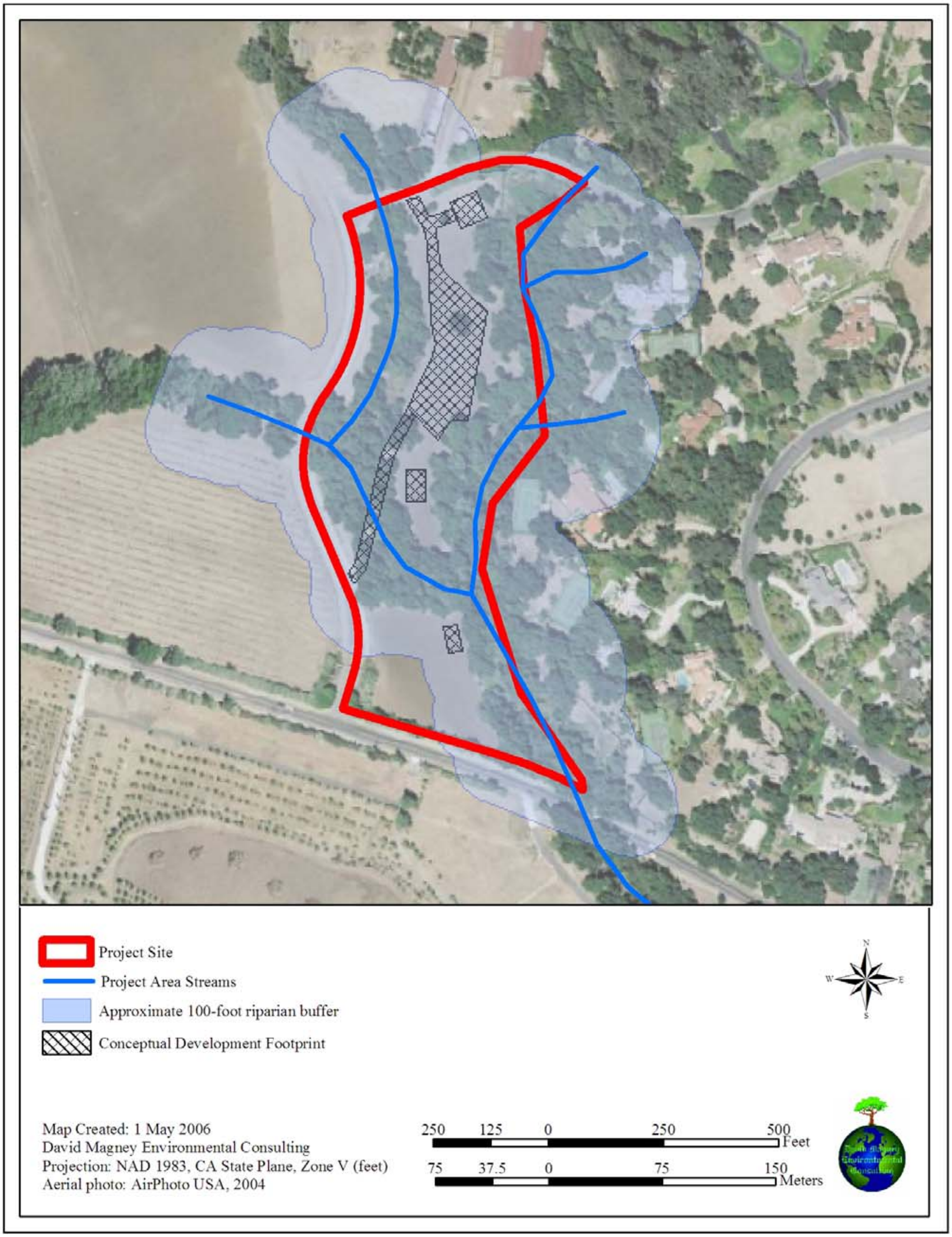


Figure 2. Aerial Photograph of the Gramckow Property and Project Site

Figure 3. Project Site with Proposed Building Site



SECTION 2. ENVIRONMENTAL SETTING

This section discusses the general site characteristics; the property flora, fauna, and habitats, including special-status resources; and jurisdictional waters.

SITE CHARACTERISTICS

The west and east Tributaries of Live Oak Creek occur along the west and east edges of the project site. State Route 150 (Baldwin Road) is immediately south of the project site. Dense old-growth *Quercus agrifolia* Alliance (Coast Live Oak Riparian Woodland) and *Platanus racemosa-Salix* Alliance (Sycamore-Willow Riparian Woodland) vegetation occurs along these tributaries to the immediate east and west of the proposed building site. Outside the boundaries of the property, the land use includes a residential development (Rancho Matilija) to the east and agricultural land to the north, south, and west.

The Gramckow project site is significantly disturbed. The proposed building site has been plowed at least annually for fire hazard control, and is currently inhabited by scattered ruderal plant species. The rest of the property, except Live Oak Creek and tributaries, has been converted to agricultural crops or contains farm buildings. Although the riparian areas of the two tributaries are dominated by native old-growth riparian tree species, the undergrowth is dominated by escaped ornamental species and introduced invasive plant species. In particular, the groundlayer is dominated by the impenetrable brambles of *Vinca major* (Greater Periwinkle) and *Rubus discolor* (Himalayan Blackberry).

The proposed building site occurs within historical upper riparian floodplain habitat of Live Oak Creek, and is adjacent to extant riparian wetlands categorized as both Riverine System (where flowing water occurs and vegetation is largely lacking) and Palustrine System (wetland habitat dominated by riparian vegetation), 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 Riverine wetland HGM model used for this report combines both Riverine and Palustrine System habitats under "Riverine."

The Live Oak Creek watershed drains approximately 2,090 acres of land, or 3.3 square miles. It ranges in elevation from 1,327 feet above mean sea level (msl) at its highest point to 360 feet above msl where it enters the Ventura River. The project site is in the upper one-third of the watershed, located about 7,500 feet downstream of the highest point and about 15,000 feet upstream of the confluence with the Ventura River.

Numerous species of wildlife are known to occur within the vicinity of Live Oak Creek and its tributaries, and frequent the Palustrine and Riverine System habitats on a seasonal basis. Local wildlife species regularly utilize the food, water, and cover resources provided by these creeks. The Palustrine habitat observed onsite is Coast Live Oak-California Sycamore Riparian Woodland, and this habitat is discussed further in the Habitat Types subsection below.

DMEC

FLORA

The flora of the Gramckow property includes the vascular (flowering) and nonvascular (e.g. fungi, mosses, liverworts, lichens) plants existing onsite. Table 1, Plants Observed at the Gramckow Property, lists all plant species observed during the HGM assessment and the biological resources surveys conducted onsite. DMEC observed 5 species of fungus, 5 species of lichen, and 2 species of moss, all of which are native species. DMEC also observed 75 vascular plant taxa, including, 31 (41%) native species and 44 (59%) introduced naturalized and ornamental species. The vascular plant and lichen floras of the site are relatively depauperate compared to similar-sized areas elsewhere in the region and California. Based on this ratio of natives to nonnatives, the Gramckow property is relatively disturbed in terms of native species richness.

Table 1. Plants Observed at the Gramckow Property

Scientific Name[1]	Common Name	Habit[2]	WIS[3]	Family
Fungi				
Astreus cf. *hygrometricus*	False Earth Star	eFu	-	Sclerodermataceae
Coriolus cf. *versicolor*	Shelf Fungus	pFu	-	Polyporaceae
Russula cf. *veternosa*	Red-capped Russula	eFu	-	Russulaceae
Russula sp. (cf. *brunneola*)	Brown-capped Russula	eFu	-	Russulaceae
Polyporaceae (unidentified)	White Polypore Fungus	pFu	-	Polyporaceae
Lichens				
Flavopunctelia sp.	Flavopunctelia Lichen	FoL	-	Parmeliaceae
Physcia cf. sp.	Physcia Lichen	FoL	-	Physciaceae
Ramalina sp.	Ramalina Lichen	FrL	-	Ramalinaceae
Trapelia sp.	Trapelia Soil Lichen	CL	-	Trapeliaceae
Xanthoria cf. *elegans*	Egg-yolk Lichen	FoL	-	Teloschistaceae
Mosses				
Bryum argenteum	Crown Cap Moss	M	-	Bryaceae
Grimmia sp.	Grimmia Dry Rock Moss	M	-	Grimmiaceae
Vascular Plants				
Ailanthus altissima *	Tree-of-Heaven	T	FACU	Hippocastinaceae
Ambrosia psilostachya var. *californica*	Western Ragweed	BH	FAC	Asteraceae
Anagallis arvensis *	Scarlet Pimpernel	AH	FAC	Primulaceae
Artemisia douglasiana	Mugwort	PH	FACW	Asteraceae
Avena barbata *	Slender Wild Oat	AG	.	Poaceae
Baccharis pilularis	Coyote Brush	S	(FACU)	Asteraceae

[1] * = Introduced/naturalized plant species. + = Escaped ornamental nonnative plant species. **Bold** = Special-status species. Scientific and common names follow Hickman (1993), Flora of North America Committee (2001-2004), and Boyd (1999).

[2] Habit definitions: AG = annual grass or graminoid; PG = perennial grass or graminoid; AH = annual herb; PH = perennial herb; PV = perennial vine; PF = perennial fern or fern ally; S= shrub; T = tree; CL = crustose lichen; FoL = foliose lichen; FrL = fruticose lichen; eFu = ephemeral fungus; pFu = perennial Fungus; M = moss.

[3] WIS = Wetland Indicator Status. The following code definitions are 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 indicate a wetland status as suggested by David L. Magney based on extensive field observations.

Scientific Name[1]	Common Name	Habit[2]	WIS[3]	Family
Baccharis salicifolia	Mulefat	S	FACW	Asteraceae
Brassica rapa *	Field Mustard	AH	.	Brassicaceae
Bromus diandrus *	Ripgut Grass	AG	(FACU)	Poaceae
Bromus hordeaceus *	Soft Chess	AG	FACU-	Poaceae
Calandrinia ciliata	Redmaids	AH	FACU*	Portulaceae
Carduus pycnocephalus *	Italian Thistle	AH	.	Asteraceae
Ceratonia siliqua *	Carob	T	.	Fabaceae
Chamomilla suaveolens	Pineapple Weed	AH	FACU	Asteraceae
Chenopodium album *	Lamb's Quarters	AH	FAC	Chenopodiaceae
Cirsium vulgare *	Bull Thistle	BH	FACU	Asteraceae
Citrus limon +	Lemon Tree	T	.	Rutaceae
Claytonia perfoliata ssp. *perfoliata*	Miner's Lettuce	AH	FAC	Portulaceae
Convolvulus arvensis *	Bind Weed	PV	.	Convolvulaceae
Cyperus eragrostis	Umbrella Sedge	PG	FACW	Cyperaceae
Erodium botrys *	Broadleaf Filaree	AH	.	Geraniaceae
Erodium cicutarium *	Redstem Filaree	AH	.	Geraniaceae
Erodium moschatum *	Whitestem Filaree	AH	.	Geraniaceae
Eucalyptus camaldulensis *+	River Red Gum	T	(FAC+)	Myrtaceae
Fraxinus velutina	Velvet Ash	T	FACW	Oleaceae
Geranium dissectum *	Dissected Geranium	AH	.	Geraniaceae
Gladiolus sp. *+	Gladiolus	AG		Iridaceae
Heteromeles salicifolia	Toyon	S	.	Rosaceae
Hirschfeldia incana *	Summer Mustard	PH	.	Brassicaceae
Hordeum murinum ssp. *glaucum* *	Summer Barley	AG	.	Poaceae
Juglans californica* var. *californica	**So. California Black Walnut**	T	FAC	Juglandaceae
Juncus mexicanus	Mexican Rush	PG	FACW	Juncaceae
Lactuca serriola *	Prickly Wild Lettuce	AH	FAC	Asteraceae
Lamium amplexicaule *	Henbit	AH	.	Lamiaceae
Malva parviflora *	Cheeseweed	AH	.	Malvaceae
Marrubium vulgare *	White Horehound	S	FAC	Lamiaceae
Medicago polymorpha *	Burclover	AH	.	Fabaceae
Melilotus indica *	Sourclover	A/BH	FACU+	Fabaceae
Nassella pulchra	Purple Needlegrass	PG	.	Poaceae
Nerium oleander +	Oleander	S	.	Apocynaceae
Oxalis albicans* ssp. *pilosa	**Hairy White Wood Sorrel**	PH	.	Oxalidaceae
Oxalis pes-caprae *	Bermuda Buttercup	PH	.	Oxalidaceae
Phoenix canariensis *	Canary Island Date Palm	T	.	Arecaceae
Picris echioides *	Bristly Ox-tongue	AH	(FACW-)	Asteraceae
Piptatherum miliaceum *	Smilo Grass	PG	(FACU-)	Poaceae
Plantago lanceolata *	English Plantain	PH	FAC-	Plantaginaceae
Platanus racemosa var. *racemosa*	California Sycamore	T	FACW	Platanaceae
Polygonum arenastrum *	Common Knotweed	AH	FAC	Polygonaceae
Prunus ilicifolia ssp. *ilicifolia*	Holly-leaved Cherry	S	.	Rosaceae
Quercus agrifolia var. *agrifolia*	Coast Live Oak	T	.	Fagaceae
Quercus lobata	Valley Oak	T	FAC*	Fagaceae
Raphanus sativus *	Wild Radish	AH	.	Brassicaceae

Scientific Name[1]	Common Name	Habit[2]	WIS[3]	Family
Ribes speciosum	Fuchsia-flowered Gooseberry	S	.	Grossulariaceae
Rorippa nasturtium-aquaticum	Water Cress	PH	OBL	Brassicaceae
Rubus discolor *	Himalayan Blackberry	PV	FAC	Rosaceae
Rubus ursinus	Pacific Blackberry	PV	FACW*	Rosaceae
Rumex crispus *	Curly Dock	PH	FACW-	Polygonaceae
Salix lasiolepis	Arroyo Willow	T	FACW	Salicaceae
Salix laevigata	Red Willow	T	FACW	Salicaceae
Sambucus mexicana	Blue Elderberry	S	FAC	Caprifoliaceae
Scirpus californicus	California Bulrush	PG	OBL	Cyperaceae
Senecio vulgaris *	Common Groundsel	AH	NI*	Asteraceae
Silene gallica *	Windmill Pink	AH	.	Caryophyllaceae
Sisyrinchium bellum	Blue-eyed Grass	PG	FAC	Iridaceae
Sonchus asper *	Prickly Sow-thistle	AH	FAC	Asteraceae
Sonchus oleraceus *	Common Sow-thistle	AH	NI*	Asteraceae
Spergula arvensis ssp. *arvensis**	Stickwort	AH	.	Caryophyllaceae
Stachys albens	Woolly Hedge Nettle	PH	OBL	Lamiaceae
Toxicodendron diversilobum	Poison Oak	S/V	(FACU)	Anacardiaceae
Typha domingensis	Southern Cattail	PG	OBL	Typhaceae
Urtica dioica ssp. *holosericea*	Giant Creek Nettle	PH	FACW	Urticaceae
Veronica anagallis-aquatica *	Water Speedwell	PH	OBL	Veronicaceae
Vicia villosa ssp. *villosa* *	Hairy Vetch	AH	.	Fabaceae
*Vinca major**+	Greater Periwinkle	PV	.	Apocynaceae
Xanthium strumarium	Cocklebur	AH	FAC+	Asteraceae

DMEC conducted a search of the California Department of Fish and Game's (CDFG's) California Natural Diversity Database (CNDDB) RareFind3 (CDFG 2006a) for the Matilija, Ojai, Wheeler Springs, White Ledge Peak, and Ventura, California USGS Quadrangles. Eighteen (18) special-status plant species are known to occur, and are tracked by CNDDB, within the vicinity of these quadrangles and the Gramckow property, and they include the following:

- *Aphanisma blitoides* (Aphanisma)
- *Astragalus didymocarpus* var. *milesianus* (Miles's Milkvetch)
- *Astragalus pycnostachyus* var. *lanosissimus* (Ventura Marsh Milkvetch)
- *Atriplex serenana* var. *davidsonii* (Davidson's Saltscale)
- *Calochortus palmeri* var. *palmeri* (Palmer's Mariposa Lily)
- *Calochortus weedii* var. *vestus* (Late-flowered Mariposa Lily)
- *Chaenactis glabriuscula* var. *orcuttiana* (Orcutt's Pincushion)
- *Delphinium umbraculorum* (Umbrella Larkspur)
- *Fritillaria ojaiensis* (Ojai Fritillary)
- *Horkelia cuneata* ssp. *puberula* (Mesa Horkelia)
- *Lasthenia glabrata* ssp. *coulteri* (Coulter's Goldfields)
- *Layia heterotricha* (Pale-yellow Layia)
- *Nolina cismontane* (Chaparral Nolina)
- *Oxytheca parishii* var. *abramsii* (Abrams's Oxytheca)
- *Sagittaria sanfordii* (Sanford's Arrowhead)
- *Sidalcea neomexicana* (Salt Spring Checkerbloom)
- *Streptanthus campestris* (Southern Jewelflower)

DMEC also conducted a literature search of California Native Plant Society's *Inventory of Rare and Endangered Plants of California* (CNPS 2001) and the *Checklist of Ventura County Rare Plants* (Magney 2005) to account for other special-status plant species not tracked by CNDDB with potential to occur in the vicinity of the proposed project site. Projects reviewed under California Environmental Quality Act (CEQA) should consider impacts to Locally Important species as potentially significant. Generally, any impacts to a population of one or more of the plants listed herein would be considered significant. Two (2) special-status species, not tracked by CNDDB, were observed onsite, including *Juglans californica* var. *californica* (Southern California Black Walnut) and *Oxalis albicans* ssp. *pilosa* (Hairy White Wood Sorrel). *J. californica* var. *californica* has a status of CNPS List 4 (Plants of Limited Distribution), and *O. albicans* ssp. *pilosa* is considered Locally Uncommon in Ventura County with only six to ten occurrences within the County.

FAUNA

Palustrine and Riverine habitats provide numerous important wildlife resources for a number of wildlife, including invertebrates (aquatic and terrestrial), fish, amphibians, reptiles, birds, and mammals. The structure of the riparian community, in addition to the relatively high plant structural diversity, provides habitat necessary for foraging, nesting, and cover for many species. In addition, streams such as Live Oak Creek are important sources of water for a variety of upland wildlife species. Riparian zones along rivers and streams are also used as migration corridors by various species of wildlife including small and large mammals, birds, and reptiles. These migration 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.

Numerous species of wildlife are known to occur within Live Oak Creek, frequenting the Palustrine and Riverine System habitats on a seasonal basis and regularly using resources provided by the creek. DMEC conducted wildlife surveys on 21 (morning survey), 29 (night survey), and 30 (HGM assessment) March 2006. Table 2, Wildlife Species of the Gramckow Project Area, contains a list of animal species that were directly observed in the area of the Gramckow project site, were detected by sign (e.g. tracks, calls [vocalization], scat), or are expected based on suitable habitat onsite and in the region. Seventy (70) wildlife species were observed or detected onsite, including 1 fish, 3 amphibians, 3 (total expected is 9) reptiles, 31 birds, 8 mammals, and 25 invertebrates. Scientific nomenclature follows the AOI (1989) for birds, Burt and Grossenheider (1976) for mammals, Jennings (1983) and Stebbins (1985) for amphibians and reptiles, Moyle (1976) for fishes, and Arnett and Jacques (1981) and Hogue (1993) for invertebrates.

Figure 4, Wildlife Observation Locations at the Gramckow Property (following Table 2), shows where all wildlife were observed during the biological resources surveys conducted on the property and during the HGM assessment conducted within the creeks onsite.

Table 2. Wildlife Species of the Gramckow Project Area

Scientific Name[4]	Common Name	Evidence
	Fish	
Order Cypriniformes; Family Cyprinidae*	Minnow	Observed
	Amphibians	
Batrachoseps nigriventris	Black-bellied Slender Salamander	Observed
Bufo boreas	Western Toad	Observed
Bufo boreas halophilus	California Toad	Expected
Hyla regilla	Pacific Treefrog	Observed
Rana aurora draytonii	California Red-legged Frog	Expected
*Rana catesbiana**	Bullfrog	Expected
	Reptiles	
Elgaria multicarinatus	San Diego Alligator Lizard	Expected
Phrynosoma coronatum (*blainvillei*)	Coast (San Diego) Horned Lizard	Expected
Sceloporous occidentalis	Western Fence Lizard	Observed
Thamnophis couchi	Western Aquatic Garter Snake	Expected
Uta stansburiana elegans	California Side-blotched Lizard	Observed
Cnemidophorus tigris	Western Whiptail	Observed
Pituophis melanoleucus	Gopher Snake	Expected
Salvadora hexalepis virgultea	Coast Patch-nosed Snake	Expected
Crotalus viridis	Western Rattlesnake	Expected
	Birds	
Cathartes aura	Turkey Vulture	Observed
Accipiter cooperii	Cooper's Hawk	Expected
Buteo lineatus	Red-shouldered Hawk	Expected
Buteo jamaicensis	Red-tailed Hawk	Observed
Falco sparverius	American Kestrel	Observed
Agelaius phoeniceus	Red-winged Blackbird	Detected (call)
Aphelocoma californica	Western Scrub-jay	Observed
Mimus polyglottos	Northern Mockingbird	Observed
Corvus caurinus	American Crow	Observed
Corvus corax	Common Raven	Observed
Euphagus cyanocephalus	Brewer's Blackbird	Observed
Molothrus ater	Brown-headed Cowbird	Expected
Turdus migratorius	American Robin	Observed
Zenaida macroura	Mourning Dove	Observed
Ardea herodias	Great Blue Heron	Expected
Nycticorax nycticorax	Black-crowned Night Heron	Expected
Butorides virescens	Green Heron	Expected
Ardea alba	Great Egret	Expected
Egretta thula	Snowy Egret	Expected
Callipepla californica	California Quail	Observed
Petrochelidon pyrrhonota	Cliff Swallow	Observed

[4] An asterisk "*" after the scientific name indicates non-native species.

Scientific Name[4]	Common Name	Evidence
Hirundo rustica	Barn Swallow	Observed
Tachycineta thalassina	Violet-green Swallow	Observed
Melanerpes formicivorus	Acorn Woodpecker	Observed
Picoides nuttallii	Nuttall's Woodpecker	Expected
Picioides pubescens	Downy Woodpecker	Expected
Picioides villosus	Hairy Woodpecker	Expected
Colaptes auratus	Northern Flicker	Observed
Pipilo crissalis	California Towhee	Observed
Pipilo maculatus	Spotted Towhee	Observed
Empidonax difficilis	Pacific-slope Flycatcher	Observed
Myiarchus cf. *cinerascens*	Ash-throated Gnatcatcher	Expected
Sayornis nigricans	Black Phoebe	Observed
Sayornis saya	Say's Phoebe	Expected
Sturnella neglecta	Western Meadowlark	Expected
Baeolophus inornatus	Oak Titmouse	Observed
Calypte anna	Anna's Hummingbird	Observed
Carduelis psaltria	Lesser Goldfinch	Expected
Carduelis tristis	American Goldfinch	Observed
Carpodacus cassinii	House Finch	Observed
Ceryle alcyon	Belted Kingfisher	Observed
Charadrius vociferus	Killdeer	Detected (call)
Dendroica petechia	Yellow Warbler	Expected
Geothlypis trichas	Common Yellowthroat	Expected
Junco hyemalis	Dark-eyed Junco	Observed
Melospiza melodia	Song Sparrow	Observed
Zonotrichia leucophrys	White-crowned Sparrow	Expected
Psaltriparus minimus	Common Bushtit	Observed
*Sturnus vulgaris**	European Starling	Observed
Mammals		
Antrozous pallidus	Pallid Bat	Expected
Eumops perotis	Western Mastiff Bat	Expected
Lasiurus borealis	Red Bat	Expected
Lasiurs cinereus	Hoary Bat	Expected
Myotis spp.	Myotis Bats	Expected
Plecotus townsendii	Western Big-eared Bat	Expected
Tadarida brasiliensis	Mexican Freetail Bat	Expected
Didelphis virginiana	Virginia Opossum	Expected
Peromyscus maniculatus	Deer Mouse	Expected
*Rattus rattus**	Black Rat	Expected
Scapanus townsendii	Townsend's Mole	Expected
Microtus californicus	California Vole	Expected
Mustela frenata	Longtail Weasel	Expected
Neotoma fuscipes	Dusky-footed Woodrat	Detected (nests)
Thomomys bottae	Valley Pocket Gopher	Detected (burrows)
Sciurus griseus cf.	Western Gray Squirrel	Observed
*Sciurus niger**	Eastern Fox Squirrel	Expected

Scientific Name[4]	Common Name	Evidence
Spermophilus beecheyi	California Ground Squirrel	Observed
Mephitis mephitis	Striped Skunk	Expected
Spilogale gracilis	Western Spotted Skunk	Expected
Sylvilagus audubonii	Audubon Cottontail	Expected
Pipistrellus hesperus	Western Pipistrel	Expected
Procyon lotor	Raccoon	Detected (tracks)
Canis latrans	Coyote	Detected (scat, calls)
Urocyon cinereoargenteus	Gray Fox	Expected
Felis concolor	Mountain Lion	Expected
Lynx rufus	Bobcat	Detected (scat)
Odocoileus hemionus	Mule Deer	Detected (tracks)
Ursus americanus	Black Bear	Expected
Invertebrates		
Annelida	Earthworm	Observed
Aranae	Spider	Observed
Dipluridae	Funnelweb spider	Observed
Chilopoda	Centipede	Observed
Diplopoda	Millipede	Observed
Isopoda	Sowbug	Observed
Order Hemiptera (True Bugs)		
-	True Bug	Observed
Family Gerridae; *Gerris* cf. *remigis*	Water Strider	Observed
Order Trichoptera (Caddis Flies)		
-	Caddis fly larva	Observed
Order Coleoptera (Beetles)		
Family Chrysomelidae	Leaf Beetle	Observed
Family Carabidae; *Amara* sp.	Black soil beetle	Observed
Family Hydrophyllidae; *Tropisternus* sp.	Scavenger water beetle	Observed
FamilyCurculionidae	Weevil	Observed
Order Lepidoptera (Butterflies, Moths)		
Family Nymphalidae; *Vanessa cardui*	Painted Lady Butterfly	Observed
-	Moth	Observed
Order Diptera (Flies)		
Family Tipulidae; *Holorusia rubiginosa*	Giant Crane Fly	Observed
Family Rhagionidae; *Symphoromyia* sp.	Snipe Fly	Observed
Family Simuliidae; *Simulium* sp.	Black Fly	Observed
Family Culicidae; *Ochlerotatus triseriatus*	Tree Hole Mosquito	Observed
Family Cecidomyiidae; *Rhopalomyia californica*	Coyote Brush Gall Fly	Observed
Order Hymenoptera (Wasps, Bees)		
Family Apidae; *Apis mellifera**	European Honey Bee	Observed
Family Anthophoridae; *Xylocopa* sp.	Carpenter Bee	Observed
Family Vespidae; *Vespula* cf. *pensylvanica*	Yellow Jacket	Observed
Family Formicidae; *Iridomyrmex* sp.	Argentine Ant	Observed
Family Cynipidae; *Amphibolips confluenta*	Oak Apple Gall Wasp	Observed

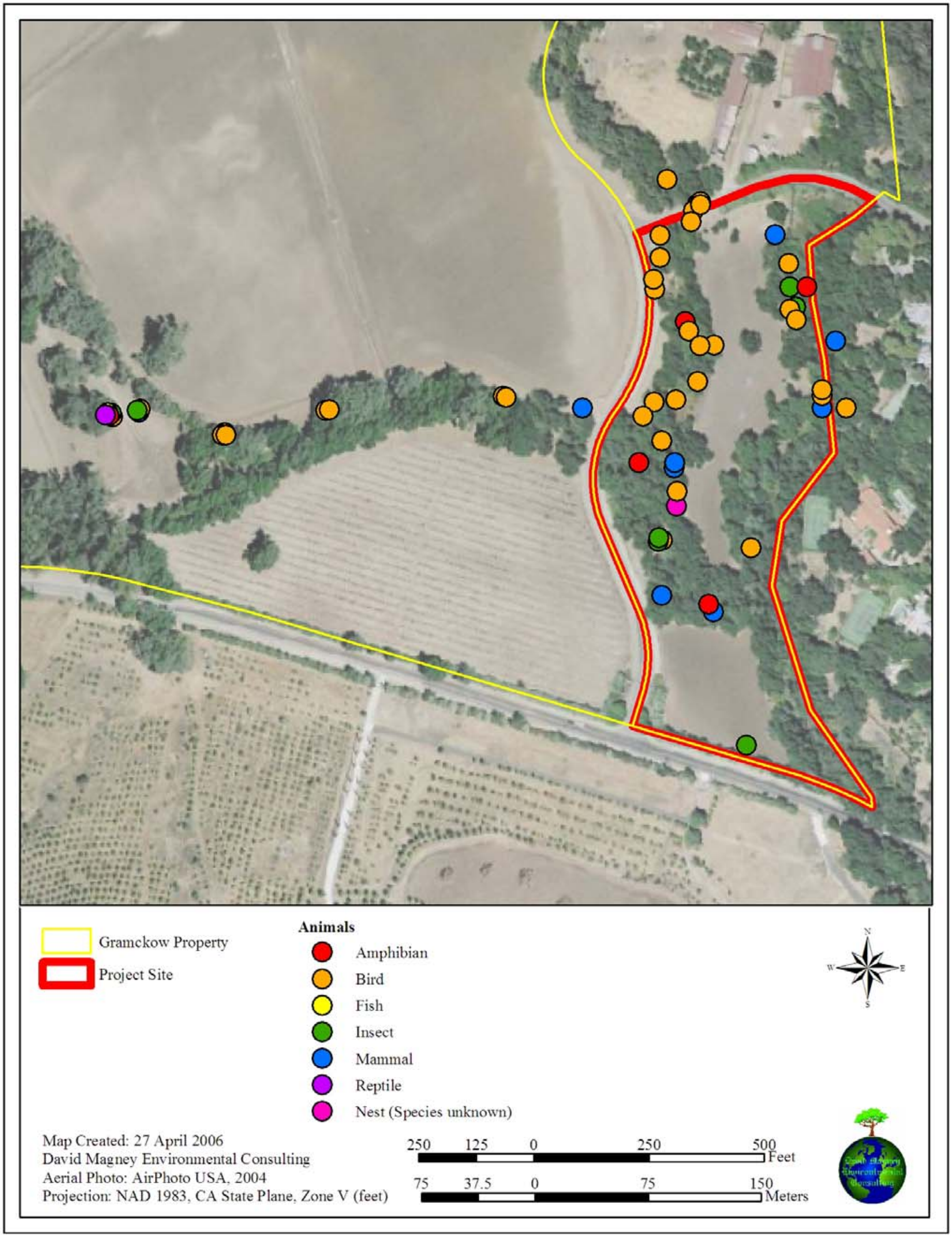
DMEC conducted a search of the CDFG's CNDDB RareFind3 (CDFG 2006a) for the Matilija, Ojai, Wheeler Springs, White Ledge Peak, and Ventura, California USGS Quadrangles. Nineteen (19) special-status wildlife species are known to occur and are tracked within the vicinity of these quadrangles and the Gramckow property, and they include the following:

- *Agelaius tricolor* (Tricolored Blackbird)
- *Anniella pulchra pulchra* (Silvery Legless Lizard)
- *Bufo californicus* (Arroyo Toad)
- *Chaetodipus californicus femoralis* (Dulzura Pocket Mouse)
- *Charadrius alexandrinus nivosus* (Western Snowy Plover)
- *Choeronycteris mexicana* (Mexican Long-tongued Bat)
- *Coelus globosus* (Globose Dune Beetle)
- *Danaus plexippus* (Monarch Butterfly)
- *Emys (=Clemmys) marmorata pallida* (Southwestern Pond Turtle)
- *Eucyclogobius newberryi* (Tidewater Goby)
- *Gila orcutti* (Arroyo Chub)
- *Gymnogyps californianus* (California Condor)
- *Oncorhynchus mykiss irideus* (Southern Steelhead - Southern California ESU)
- *Phrynosoma coronatum (blainvillii population)* (Coast [San Diego] Horned Lizard)
- *Rana aurora draytonii* (California Red-legged Frog) (potential habitat observed in the vicinity of the project site);
- *Thamnophis hammondii* (Two-Striped Garter Snake)
- *Vireo bellii pusillus* (Least Bell's Vireo)

The CNDDB Special Animals List (CDFG 2006b) was also referenced to account for any species observed that are considered special-status according to that list. No species observed on the Gramckow property are listed on the CDFG Special Animals List.

DMEC

Figure 4. Wildlife Observation Locations at the Gramckow Property



HABITAT TYPES

The Gramckow property occurs within historical riparian habitat, and is adjacent to extant riparian wetlands. The predominant wetland habitat type onsite is classified as the Palustrine System, 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 areas between the two creek tributaries are agricultural fields with little vegetation except pioneering introduced plant species.

The proposed building site is located on the flat land between the west and east tributaries of Live Oak Creek. The vegetated creek buffers are occupied by Palustrine Mixed Broad-leaved Forested Wetland, which was observed onsite as *Quercus agrifolia-Platanus racemosa* Alliance (Coast Live Oak-California Sycamore Alliance) (Sawyer and Keeler-Wolf 1995).

Palustrine Mixed Broad-Leaved Forested Wetland

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 salts is below 0.5%. The Palustrine System is bounded by upland or by any of the other four systems (including Riverine, Lacustrine, Marine, and Estuarine). Palustrine Mixed, Broad-leaved, Forested Wetland is characterized by woody vegetation that is at least six meters tall (trees). It is dominated by riparian species with large (broad) leaves (as opposed to coniferous or needle-like leaves), and is co-dominated by both evergreen and winter-deciduous (falling during the winter season) plant species. (Cowardin et al. 1979.)

The Palustrine wetland observed and classified at the Gramckow property is also described here as *Quercus agrifolia-Platanus racemosa* Alliance (Sawyer and Keeler-Wolf 1995) or Southern Coast Live Oak Riparian Forest (Holland 1986).

According to Sawyer and Keeler-Wolf (1995), *Quercus agrifolia-Platanus racemosa* Alliance forms a mixed-canopy, winter-deciduous and evergreen riparian woodland dominated by the native broad-leaved, winter-deciduous *Platanus racemosa* var. *racemosa* (California Sycamore) and the native broad-leaved evergreen *Quercus agrifolia* var. *agrifolia* (Coast Live Oak). *P. racemosa* has smooth, pale bark and large, densely hairy, palmately lobed leaves. It is common along streamsides or in canyons and is listed with a wetland indicator status of FACW (Reed 1988). *Q. agrifolia* is a wide-topped tree with furrowed, dark gray bark and spine-toothed, convex, dark green leaves. *Quercus agrifolia-Platanus racemosa* Alliance grows in seasonally flooded (permanently saturated at depth) wetland soils of freshwater riparian corridors, braided depositional channels of intermittent streams, springs, seeps, and riverbanks. This series may also occur on more upland rocky canyon slopes, in alluvial, open-cobbly, and rocky soils, at elevations below 1,200 meters. A shrubby thicket of evergreen and deciduous shrubs may be scattered with willow species below the 35-meter-tall, dense tree canopy, and the ground layer can be quite variable. This alliance requires sandstone or shale-derived soils.

According to Holland (1986), Southern Coast Live Oak Riparian Forest (*Quercus agrifolia* Alliance) is an open to locally dense evergreen sclerophyllous riparian woodland dominated by Coast Live Oak. This plant community observed onsite consists of an important contribution of the broad-leaved, winter-deciduous California Sycamore. Southern Coast Live Oak Riparian Forest appears to be richer in herbs and poorer in understory shrub than other riparian communities. This plant community requires bottomlands and outer floodplains along larger streams, and occurs on fine-grained, rich alluvium in canyons and valleys of coastal southern California (south of Point Conception). This habitat type is considered a sensitive plant community by CDFG (Holland 1986), and is tracked by the CNDDB (CDFG 2006a).

The emergent tree species observed growing amongst and below the oak and sycamore canopy include *Juglans californica* var. *californica* (Southern California Black Walnut), *Quercus lobata* (Valley Oak), *Salix lasiolepis* (Arroyo Willow), and *Salix laevigata* (Red Willow).

The shrubs and vines growing below include *Baccharis salicifolia* (Mulefat), *Heteromeles salicifolia* (Toyon), *Rubus ursinus* (Pacific Blackberry), *Sambucus mexicana* (Blue Elderberry), and *Toxicodendron diversilobum* (Poison Oak).

The herbaceous species observed in the groundlayer below the oak and sycamore canopy include the following: *Artemisia douglasiana* (Mugwort), *Cyperus eragrostis* (Umbrella Sedge), *Juncus mexicanus* (Mexican Rush), *Rorippa nasturtium-aquaticum* (Water Cress), *Rumex crispus* (Curly Dock), *Scirpus californicus* (California Bulrush), *Stachys albens* (Woolly Hedge Nettle), *Urtica dioica* ssp. *holosericea* (Giant Creek Nettle), and *Veronica anagallis-aquatica* (Water Speedwell).

The introduced and invasive species creating competitive conditions within this habitat include *Piptatherum miliaceum* (Smilo Grass), *Ceratonia siliqua* (Carob), *Rubus discolor* (Himalayan Blackberry), and *Vinca major* (Greater Periwinkle).

Agricultural Field

Agricultural Field includes the areas on the Gramckow property that have been cleared historically and presently for annual crops or fire hazard clearance. The area between the two property creek tributaries is the Agricultural Field, and is the area proposed for future development. The Agricultural Field is highly disturbed, and can also be classified as Ruderal Grassland, especially when the annual crops have been plowed and the field has been left for pioneering introduced plant species to colonize the area.

The introduced species predominating these areas onsite include the following: *Anagallis arvensis* (Scarlet Pimpernel), *Avena barbata* (Slender Wild Oat), *Baccharis pilularis* (Coyote Brush), *Brassica rapa* (Field Mustard), *Bromus* spp. (Brome grasses), *Carduus pycnocephalus* (Italian Thistle), *Chamomilla suaveolens* (Pineapple Weed), *Chenopodium album* (Lamb's Quarters), *Convolvulus arvensis* (Bind Weed), *Erodium* spp. (Filarees), *Geranium dissectum* (Dissected Geranium), *Hirschfeldia incana* (Summer Mustard), *Hordeum murinum* ssp. *glaucum* (Summer Barley), *Lactuca serriola* (Prickly Wild Lettuce), *Malva parviflora* (Cheeseweed), *Medicago polymorpha* (Burclover), *Melilotus indica* (Sourclover), *Oxalis pes-caprae* (Bermuda Buttercup), *Picris echioides* (Bristly Ox-tongue), *Plantago lanceolata* (English Plantain), *Polygonum arenastrum* (Common Knotweed), *Raphanus sativus* (Wild Radish), *Senecio vulgaris* (Common Groundsel), and *Sonchus* spp. (Sow-thistles).

Sensitive Habitats

DMEC conducted a search of the CDFG's CNDDB RareFind3 (CDFG 2006a) for the Matilija, Ojai, Wheeler Springs, White Ledge Peak, and Ventura, California USGS Quadrangles. Six (6) sensitive habitats are known to occur, and are tracked, within the vicinity of these quadrangles and the Gramckow property, and they include the following:

- Southern California Coastal Lagoon (*Salicornia virginica* Alliance);
- Southern Riparian Scrub (*Salix lasiolepis-Baccharis salicifolia* Alliance);
- Southern California Steelhead Stream (lacking vegetation);
- Southern Coast Live Oak Riparian Forest (*Quercus agrifolia* Alliance) (**observed onsite**);
- Southern Sycamore Alder Riparian Woodland (*Platanus Racemosa-Alnus rhombifolia* Alliance); and
- California Walnut Woodland (*Juglans californica* var. *californica* Alliance).

JURISDICTIONAL WATERS

A delineation of waters of the U.S., including wetlands, has not been conducted for this project nor for this HGM assessment. However, since the project site is confined between two tributaries to Live Oak Creek, DMEC assumes that the jurisdictional area of the U.S. Army Corps of Engineers (Corps) lies within the bed and banks of Live Oak Creek and its two tributaries. Waters of the State extend laterally to include riparian habitat, such as that predominated by *Platanus racemosa* (California Sycamore), *Salix* spp. (Arroyo and Red Willows), and *Quercus* spp. (Coast Live and Valley Oaks); therefore, that portion of the project site containing the streams can be considered to be a riparian wetland from the perspective of the State of California (CDFG jurisdiction).

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 Live Oak Creek and its two tributaries. This area is considered to be jurisdictional waters of the U.S, including wetlands. This also meets the CDFG wetland jurisdictional criteria as well as adjacent riparian vegetation. The proposed Gramckow project building site is located entirely outside jurisdictional waters of the U.S.

WETLANDS

Jurisdictional wetlands, pursuant to Section 404 of the Clean Water Act, at the project site are located within Live Oak Creek and its two tributaries, which is dominated by hydrophytes and has prolonged inundation. This area is referred to as Sycamore-Willow-Oak Riparian Woodland. No project development is proposed within jurisdictional wetlands other than habitat enhancement.

SECTION 3. HGM WETLAND FUNCTIONAL ASSESSMENT

This section discusses the regulatory context, assessment methods, model assumptions, assessment environmental data, mitigation approach, and mitigation constraints of this HGM wetland functional assessment for the Gramckow property.

REGULATORY CONTEXT

This plan is prepared to meet regulatory requirements of the County of Ventura; i.e., development is not permitted within 100 feet of the edge of any wetland or riparian habitat. The proposed project will not directly affect jurisdictional waters of the U.S., except through implementation of riparian habitat restoration and enhancement.

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 restoration of physical, chemical, and biological attributes and processes to the impacted waters of the U.S., including wetlands, on the Gramckow project site. Overall, ecosystem function will be restored by maintaining natural stream morphology and enhancing riparian habitat conditions with a more compositionally and structurally diverse assemblage of plant communities.

ASSESSMENT METHODS

DMEC assessed the Gramckow project site to determine what wetland functions are present and at 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 site were developed without mitigation, and again with mitigation implemented, resulting in three separate assessments.

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 an assessment method currently under development nationwide by the Corps and EPA, known as the Hydrogeomorphic (HGM) wetland functional assessment method (Smith et al. 1995). The HGM method depends on development of local models for each biogeographic region for each general wetland type: Riverine, Estuarine, Lacustrine Fringe, Depressional, Slope, and Flat. Live Oak Creek and its tributaries are considered Riverine wetlands under the HGM wetland assessment method, which includes the Palustrine System observed onsite. Three regional Riverine wetland HGM models have been development as operational drafts in California coastal areas that may be applicable to the Ojai region of Ventura County:

- 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);
- Draft Guidebook to Hydrogeomorphic Functional Assessment of Riverine Waters/Wetlands in the Santa Margarita Watershed (Santa Margarita HGM) (Lee et al. 1997); 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).

DMEC staff has 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 and the Cohan Development Wetland Mitigation and Monitoring Plan (ENSR 1997) in Thousand Oaks, Ventura County.

DMEC (1998) used the Santa Margarita HGM model in assessing project-related impacts for the proposed Bridle Ridge development project in Santa Barbara County and the Reinke project in Thousand Oaks.

DMEC used the Santa Barbara County South Coast Streams HGM model (Lee et al. 2001), developed for Santa Barbara County and EPA, to assess the Odyssey Program School project site along Las Flores Creek in Malibu (DMEC 2001); and for four project scenarios at Camarillo Regional Park (DMEC 2004).

DMEC used this last, the Santa Barbara County South Coast Streams HGM model (Lee et al. 2001) for the Gramckow project site, to assess wetland functions of the two Live Oak Creek tributaries onsite. Although the project site is outside the reference domain (south coast of Santa Barbara County), DMEC believes that the reference sites of the Santa Barbara South Coast HGM model are fairly representative of conditions of riparian streams in the project area.

The Santa Barbara County South Coast Streams HGM model identifies fourteen critical functions fulfilled by streams such as Live Oak Creek. The performance of these functions is largely dependent upon the maintenance of natural channel morphology and native plant communities. The functions are listed and defined in Table 3, HGM Model Wetland Functions.

The HGM model considers the state of twenty-eight separate variables (Table 4, HGM Model Variables) that are assessed in various combinations for each of the fourteen wetland functions (Table 5, HGM Model Index Formulas). The result is an index score for each function which measures the level of functionality. Each index score 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) caution, 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 with a relatively high level of confidence by DMEC that it is appropriate and valid.

While methods to rapidly assess Functions 13 and 14 were not developed by Lee et al. (1996, 1997, and 2001) for the three regional Riverine wetland HGM models listed above, 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 benefit of using this model is that it provides a systematic method to measure the relative change in wetland functions the proposed project will have, identifying those specific variables and functions that are expected to change, and providing the permitting agencies a relative numerical measurement of pre-project (baseline), post-project (no mitigation) and post-mitigation conditions.

Each of the twenty-eight variables is assessed in a particular area that is specific to each variable, and is therefore known as the Variable Assessment Area (VAA). Figure 5, Assessment Areas of the Gramckow Project Site, shows the perimeter VAA that was defined for each tributary. Although each variable is assessed in its own VAA, this perimeter VAA is depicted to give a general idea of the area in which assessments were conducted.

DMEC took visual measurements or formulated estimates on the condition of each of the twenty-eight wetland variables and recorded them onto field data sheets for each assessment area to determine each variable's score. A scale was assigned to each variable based on these field data. DMEC used the "moderate gradient" scale since the stream gradient at the project site was greater than 2%.

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 determine the level at which the wetland is functioning. This determination is performed independently for each function. Table 5, HGM Model Index Formulas, lists the index formulas used for this assessment.

The calculations described above were performed for baseline (existing) conditions, for post-project conditions without mitigation, and for post-project conditions after mitigation implementation. Post-project conditions represent 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. The results of the HGM wetland functional assessment at the Gramckow project site are presented in Section 4, HGM Wetland Functional Assessment Results.

DMEC

Table 3. HGM Model Wetland Functions[5]

Function		Definition
Hydrology		
1	Energy Dissipation	The transformation and/or reduction of the kinetic energy of water as a function of the roughness of the landscape and channel morphology, and vegetation.
2	Surface and Subsurface Water Storage and Exchange	The presence of soil and/or geologic materials within the creek ecosystem, including the hyporheic zone, that have physical characteristics suitable for detention, retention, and transmission of water.
3	Landscape Hydrologic Connections	The maintenance of the natural hydraulic connectivity among source areas of surface and subsurface flow to riverine waters/wetlands and other down gradient waters/wetlands.
4	Sediment Mobilization, Storage, Transport, and Deposition	The mobilization, transport, and deposition of sediment as determined by characteristics (morphology) of the channel as well as the timing, duration and amount of water delivered to the channel.
Biogeochemistry		
5	Cycling of Elements and Compounds	Short- and long-term transformation of elements and compounds through abiotic and biotic processes that convert chemical species (e.g. nutrients and metals) from one form, or valence, to another.
6	Removal of Imported Elements and Compounds	The removal of imported nutrients, contaminants, and other elements and compounds in surface and groundwater.
7	Particulate Detention	The deposition and retention of inorganic and organic particulates (>0.45µm) from the water column, primarily through physical processes.
8	Organic Matter Transport	The export of dissolved and particulate organic carbon from a wetland. Mechanisms include leaching, flushing, displacement, and erosion.
Plant Community		
9	Plant Community	The physical characteristics and ecological processes that maintain the indigenous living plant biomass.
10	Detrital Biomass	The process of production, accumulation, and dispersal of dead plant biomass of all sizes.
Faunal Support / Habitat		
11	Spatial Structure of Habitats	The capacity of waters/wetlands to support animal populations and guilds through the heterogeneity of structure of vegetative communities.
12	Interspersion and Connectivity of Habitats	The capacity of waters/wetlands to permit aquatic, semi-aquatic, and terrestrial organisms to enter and leave a riverine ecosystem via large, contiguous plant communities to meet life history requirements.
13	Distribution & Abundance of Vertebrate Taxa	The capacity of waters/wetlands to maintain characteristic density and spatial distribution of vertebrates (aquatic, semi-aquatic and terrestrial).
14	Distribution & Abundance of Invertebrate Taxa	The capacity of waters/wetlands to maintain the density and spatial distribution of invertebrates (aquatic, semi-aquatic and terrestrial).

5 From Lee et al. 2001.

Table 4. HGM Model Variables[6]

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 VAA.
2. VBUFFCOND	Buffer Condition	Predominant (>50% areal extent) land use or condition within the Ventura County designated stream buffer of 100 feet.
3. VBUFFCONT	Buffer Contiguity	The linear extent of the vegetated buffer on both sides of the stream channel, parallel to the top of bank.
4. VBUFFWIDTH	Buffer Width	The average width of the existing vegetated buffer within the Ventura County designated stream buffer of 100 feet.
5. VCHANROUGH	Channel Roughness	Channel roughness is an indicator of the hydraulic resistance produced by natural or anthropogenic immobile features of the channel system below ordinary high water (OHW). 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	A measure of the most frequently occurring decomposition class (mode) and the average number of decomposition classes of coarse woody debris (CWD) below ordinary high water (OHW) and within the active channel.
7. VEMBED	Embeddedness of Large Channel Materials	The degree to which "large class" channel bed material is buried in "finer" sediment. Specifically, embeddedness is the percent burial of the material the stream system has the capacity to move (D84 or larger channel bed material) in material that the channel usually moves (D50 material).
8. VHERBCC	Herbaceous Cover	Percent cover of herbaceous vegetation, including graminoids, forbs, ferns, and fern allies within the VAA.
9. VINCWD	In Channel Coarse Woody Debris	Volume of down and dead trees and/or limbs (>3" diameter) within the active channel and below OHW.
10. VLANDUSE	Land Use	Land use within the project site sub-watershed.
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 VAA.
13. VPATCHAREA	Area of Patches	The relative area of habitat patches within the 1,000' radius VAA surrounding the project site.
14. VPATCHCONTIG	Contiguity of Patches	The contiguity of habitat patches within the proposed project site sub-watershed.
15. VPATCHNUM	Number of Patches	The number of habitat patches within the 1,000' radius VAA surrounding the project site.
16. VRATIO	Ratio of Native to Non-Native Plant Species	Ratio of the dominant plant taxa within the VAA that are native to those that have been introduced to the region.
17. VREGEN	Regeneration	Regeneration of plants from seedlings, saplings, and clonal shoots within the VAA.
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 active channel 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 VAA.
22. VSNAGS	Snags	Basal area of standing dead trees (snags) (≥3" DBH).

[6] From Lee et al. 2001.

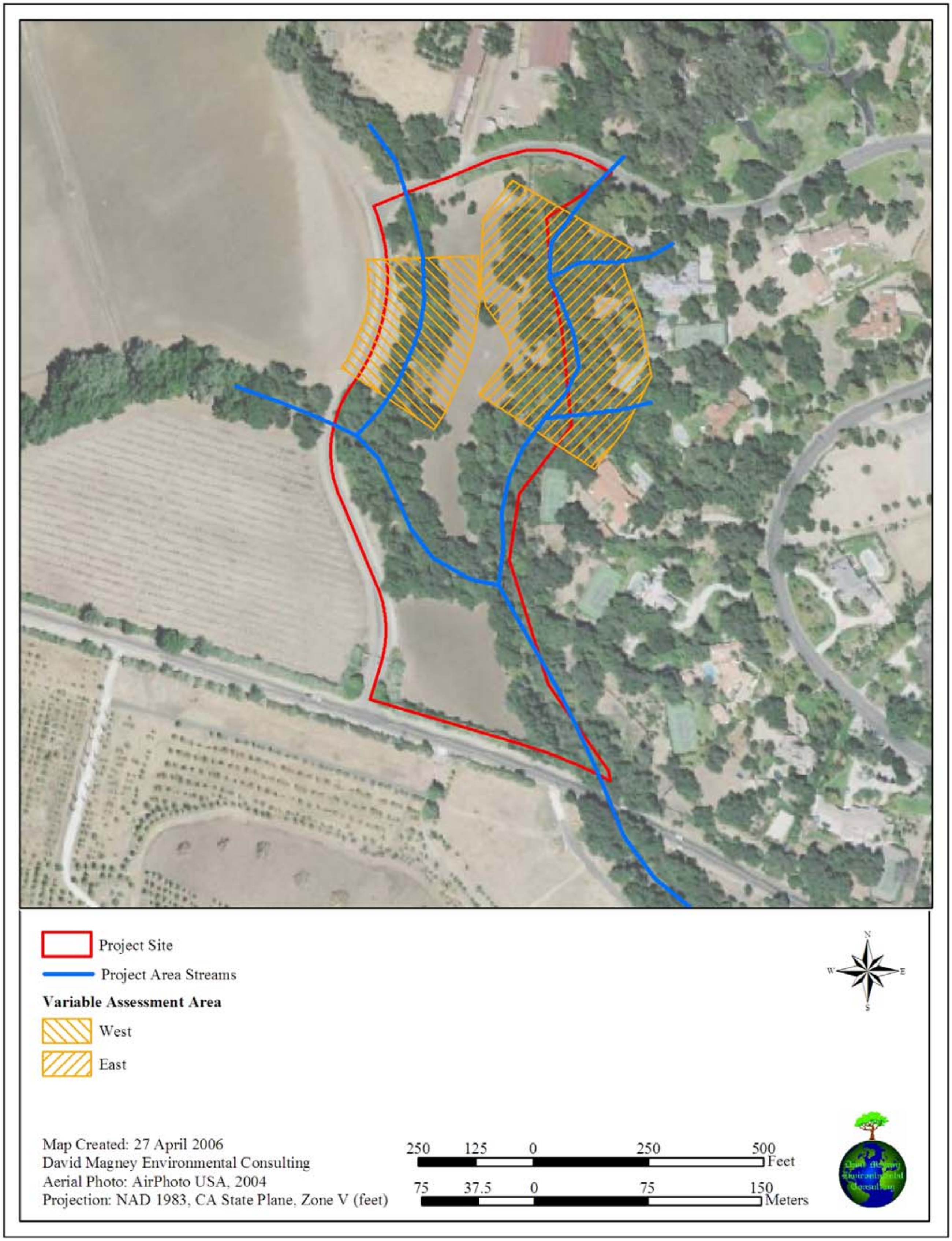
Acronym	Variable	Definition
23. VSOILINT	Soil Profile Integrity	A measure of the presence and condition of representative soil profiles (soil horizons) within the VAA.
24. VSTRATA	Strata	The number of distinct vegetation layers present within the riparian zone of the VAA. Vegetation strata were defined as follows: • trees (single stem woody species ≥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 VAA 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 the VAA.
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 VAA.

Table 5. HGM Model Index Formulas[7]

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

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

Figure 5. Assessment Areas of the Gramckow Project Site



SECTION 4. HGM WETLAND FUNCTIONAL ASSESSMENT RESULTS

The wetland functions at the Gramckow project site were assessed for three separate conditions for each creek tributary: existing (baseline) conditions, developed without mitigation, and developed with proposed mitigation fully implemented.

In summary, these assessments show that the project will have no negative impacts with a change greater than 10% (the threshold of significance for this assessment). On the west tributary, one function (10) is estimated to have a negative impact of 9%, the largest of any of the impacts. Other impacts on the west tributary range from 0% to 6%, while impacts on the east tributary range from 0% for most of the functions to a high of 4%.

In addition, although not required, the property owner has volunteered to perform some mitigation for these impacts. The proposed voluntary mitigation would improve most wetland functions slightly to significantly, depending on the function. Some functions cannot be improved with onsite restoration, primarily because they are based on the condition of the watershed offsite; this land is beyond the control of the property owner.

ASSESSMENT OF EXISTING CONDITIONS

Environmental Data

Physical environmental conditions are an important component of the natural environment because they directly or indirectly determine habitat conditions for the flora and fauna. Specific physical environmental parameters of Live Oak Creek (and tributaries) and adjacent areas are also important for determining the level at which each wetland function is operating. Table 6, Existing Channel Conditions on 30 March 2006, lists the values measured at the assessment areas (west and east creek tributaries) for use in the HGM assessment. If applicable, the variable that each parameter applies to is listed (see Table 4 for the list of variables). These data are summarized from field data sheets included as Appendix B.

DMEC assigned a scale to each variable based on these field data, and using the "moderate gradient" scale since the stream gradient at the project site was greater than 2%. DMEC then applied the formulas listed in Table 5 to determine the level at which the wetland is functioning.

DMEC

Table 6. Existing Channel Conditions on 30 March 2006

Variable	Parameter	Measured Value	
		West Tributary	East Tributary
overall	Stream Gradient Subclass	moderate	moderate
overall	Stream Width at VAA Cross-Section	23.0 ft	40.0 ft
1	Animal Signs (# of wildlife classes observed)	5	5
2	Buffer Condition (dominant use - % vegetation cleared)	plowed field, 75%	housing, 75%
3	Buffer Contiguity (man-made breaks in buffer area)	5	no buffer on east
4	Buffer Width (average width of vegetated buffers)	27.2 ft	29.5 ft
5	Channel Roughness	<5%	<5%
6	Decomposition Classes (# of classes of decay observed)	5	4
7	Dominant Channel Bed Material (size class)	sand (.002-.080 in)	sand (.002-.080 in)
7	Channel Bed Material Embeddedness	none	none
8	Herbaceous Cover on Channel Banks	15.1%	8.4%
9	In-channel Coarse Woody Debris (volume)	25.1 cf	46.4 cf
10	Adjacent Land Use	~50% natural	~50% natural
11	Longitudinal Channel Profile	engineered structure upstream	engineered structure upstream
12	Out-of-Channel Coarse Woody Debris (volume)	91.9 cf	112.0 cf
13	Habitat Patch Area	<25% high or moderate habitat	<25% high or moderate habitat
14	Habitat Patch Contiguity	>50% discontiguous	>50% discontiguous
15	Habitat Patch Number	0 patches	0 patches
16	Ratio of Native to Exotic Dominant Plants	1.0:1	1.4:1
17	Seedling Cover on Channel Banks	1.3%	5.5%
18	Residual Pools (#, average distance between)	3, 49.5 ft	0, n/a
19	Sediment Inputs into Channel	altered by human activities	altered by human activities
20	Shade Index (canopy cover/overhang above channel)	40.8	36.1
21	Shrub Cover on Channel Banks	6.8%	9.3%
22	Basal Area of Snags	5 sf/ac	0 sf/ac
23	Soil Profile Integrity in Assessment Area	currently altered in buffer zone, disturbed in past	currently intact, disturbed in past
24	Average Total Number of Vegetation Strata	2.2	3.4
25	Surface Water Inputs into Channel	altered by human activities	altered by human activities
26	Basal Area of Trees	100 sf/ac	140 sf/ac
27	Tree Cover on Channel Banks	62.6%	59.7%
28	Vine Cover on Channel Banks	53.4%	59.7%

Baseline Wetland Function Index Scores

Using the HGM assessment methods described in the previous section, the project site portions of the two Live Oak Creek tributaries were assessed to determine currently existing conditions. The results of this assessment are reported in Table 7, Baseline Wetland Function Index Scores. The HGM calculations are defined in Table 5, HGM Model Index Formulas. Worksheets showing the calculations are included as Appendix A, and the field data sheets can be found in Appendix B.

Table 7. Baseline Wetland Function Index Scores

Wetland Function	Baseline Index Score		Function Description
	West Tributary	East Tributary	
1	0.52	0.53	Energy Dissipation
2	0.33	0.28	Surface and Subsurface Water Storage and Exchange
3	0.35	0.39	Landscape Hydrologic Connections
4	0.57	0.57	Sediment Mobilization, Storage, Transport, and Deposition
5	0.57	0.60	Cycling of Elements and Compounds
6	0.46	0.50	Removal of Imported Elements and Compounds
7	0.57	0.57	Particulate Detention
8	0.57	0.57	Organic Matter Transport
9	0.72	0.74	Plant Community
10	0.58	0.53	Detrital Biomass
11	0.56	0.50	Spatial Structure of Habitats
12	0.18	0.28	Interspersion and Connectivity of Habitats
13	0.54	0.55	Distribution & Abundance of Vertebrate Taxa
14	0.50	0.50	Distribution & Abundance of Invertebrate Taxa
Average:	**0.50**	**0.51**	

Each of the wetland function index scores would be at 1.0 if no development or human influence of any kind were located within or adjacent to Live Oak Creek and its tributaries. Since this is not the case, the wetland function baseline index scores are all lower than 1.0. These baseline index scores are used to determine changes, if any, to each of the wetland functions as a result of developing the proposed project. Please note that although the HGM wetland functional assessment model is intended to be applied independently for each wetland function, without summing the index scores for the fourteen functions (Smith et al. 1995), DMEC has done so (above) to provide a general quick holistic comparison.

The HGM assessment indicates that, in general, the Live Oak Creek tributaries at the project site operate at a level which is approximately 50% of the reference standards. This is due primarily to historic adverse anthropogenic changes to the assessment area. Notable conditions that caused downward scaling of individual functions from optimal levels were the:

- Presence of development upstream (mostly roads and agriculture);
- Presence of development downstream and to the east (road alongside, and bridge over creek and highway, tilling practices in the last 5 years, and development); and
- Presence of rural urban development at Rancho Matilija immediately adjacent to the project site.

Despite these findings, the Live Oak Creek tributaries at the project site operate at levels between 0.45 and 0.60 of the reference standards for most of the wetland functions, thus providing sufficient wetland functionality for these functions. There are three exceptions: Functions 2, 3, and 12 were found to be functioning at only 0.33, 0.35, and 0.18 for the west tributary and 0.28, 0.39, and 0.28 for the east tributary, respectively. In addition, Function 9 was providing high functionality, assessed at greater than 70% of the reference standards for both tributaries.

ASSESSMENT OF POST-PROJECT CONDITIONS

The second step of the HGM model involves assessing the fourteen wetland functions as if the proposed project had been developed, but no habitat mitigation had been performed. The intent is to determine which wetland functions would be affected, and how much the function index scores would change. The HGM calculations are defined in Table 5, and the worksheets showing the calculations are included as Appendix A.

Project Assumptions

Based on the conceptual development footprint provided by the property owner (see Figure 3), DMEC assumed the construction of a single-family house and related outbuildings, landscaping and driveway on the project site. DMEC expects this to have some impacts on the environment, such as increasing impervious surface and permanent conversion of natural vegetation with landscaping and similar features typically found at residences. This HGM assessment is based on the assumption that the house will be built on the flat land that exists between the two Live Oak Creek tributaries, roughly equidistant from each of them. No work is proposed within the bed or banks of the two tributaries. These assumptions have been verified by the property owner, Mr. Gramckow.

Post-Project Wetland Function Index Scores

After applying the simulated post-project conditions, none of the functions in either tributary were found to be affected by more than 10%, which is the threshold for significance for this assessment. On the west tributary, although all but two functions (2 and 12) were negatively affected by the proposed development, all impacts were 9% or less. On the east tributary, only Functions 9, 12, 13, and 15 were negatively affected by the proposed development, and all impacts were 4% or less. The complete results can be seen in Table 8, Post-Project Wetland Function Index Scores. (Please note that although the HGM wetland functional assessment model is intended to be applied independently for each wetland function, without summing the index scores for the fourteen functions [Smith et al. 1995], DMEC has done so [below and in Table 9] to provide a general quick holistic comparison. The impact assessment only considers the changes on a function by function basis.)

Table 8. Post-Project Wetland Function Index Scores

Wetland Function	Baseline Index Score		Post-project Index Score		Rate of Change (%)	
	West Tributary	East Tributary	West Tributary	East Tributary	West Tributary	East Tributary
1	0.52	0.53	0.51	0.53	-2	0
2	0.33	0.28	0.33	0.28	0	0
3	0.35	0.39	0.34	0.39	-3	0
4	0.57	0.57	0.56	0.57	-2	0
5	0.57	0.60	0.56	0.60	-2	0
6	0.46	0.50	0.45	0.50	-2	0
7	0.57	0.57	0.56	0.57	-2	0
8	0.57	0.57	0.56	0.57	-2	0
9	0.72	0.74	0.71	0.73	-1	-1
10	0.58	0.53	0.53	0.53	-9	0
11	0.56	0.50	0.53	0.50	-5	0
12	0.18	0.28	0.18	0.27	0	-4
13	0.54	0.55	0.51	0.54	-6	-2
14	0.50	0.50	0.47	0.48	-6	-4
Average:	**0.50**	**0.51**	**0.49**	**0.50**	**-3**	**-1**

ASSESSMENT OF MITIGATED-PROJECT CONDITIONS

The third step of the HGM model involves assessing the fourteen wetland functions as if habitat mitigation had been performed after the proposed project had been developed. The onsite wetland functions were assessed as if the proposed project had been constructed and, in addition, the proposed riparian enhancement mitigation had been fully implemented and the five year monitoring period was complete. The goal was to determine which wetland functions would be affected, and how much the function index scores would change. The HGM calculations are defined in Table 5, and the worksheets showing the calculations are included as Appendix A.

While the proposed project would not result in significant impacts to any of the wetland functions, many of the functions would be adversely affected to a less-than-significant level. The property owner has volunteered to perform some mitigation for these impacts. DMEC used the HGM model to identify those variables most highly affected by the proposed project in order to target specific measures that could be implemented to mitigate for the identified decreases in functionality.

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 4 for definitions of the variables). The variables that have higher relative importance because they are one of only a few variables used to calculate 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 effect on one or more of the wetland functions at a given site. See the tables in Appendix A for a comparison of expected changes in each wetland variable for each scenario.

Mitigation Approach

The general technical approach to the restoration/enhancement by DMEC is to focus on the physical and biological processes related to stream flow and sediment mobilization, transport, and deposition. Use of best management practices (BMPs) in and adjacent to the developed and landscaped portions of the project site should minimize indirect adverse impacts to the biological resources of the Live Oak Creek tributaries. Typical BMPs that should be implemented include:

- All construction activities should avoid riparian habitat areas;
- Silt fencing should be installed streamward/downslope of work areas to keep all sediments originating onsite from entering stream habitats;
- All construction equipment maintenance should be conducted within a containment area, and spill clean-up equipment and materials should be available onsite;
- Preserved habitat areas should be temporarily fenced off to prevent accidental entry by construction workers;
- Pesticides should be used sparingly or not at all within 100 feet of aquatic habitats;
- Landscaping irrigation should not be in amounts that add runoff into natural streams.
- This list is not intended to be all inclusive.

In order to mitigate any impacts, DMEC identified four actions through the HGM method that would directly and/or indirectly improve or protect existing wetland functions onsite:

- Removal of non-native plants;
- Replacement of non-native vines with native vines;
- No clearing of downed wood within the riparian zone; and
- No clearing of brush for fire clearance within the riparian zone.

Specifically, the approach for the restoration/enhancement at the Gramckow project site includes, but is not necessarily limited to:

- Removing existing nonnative, exotic plants from the entire project site;
- Collecting cuttings and seeds, if necessary, and propagating wetland/riparian plants;
- Planting with native plant material (pole cuttings and seeds) and nursery-grown plants;
- Monitoring the work of the grading and planting contractors; and
- Monitoring the mitigation plantings for a five-year period.

Mitigation Constraints

The episodic nature of weather and, therefore, stream discharge and sediment supply must be taken into consideration. Flood events are episodic on the South Coast of California (from Point Conception to the Mexican border). For example, over a 29-year period (water years 1960-1988), annual peak flows in the Ventura River near Meiners Oaks varied from 38 cfs to 28,000 cfs (USGS Gage #11116550). Daily variations in flows also can be highly variable. During the 12 February 1992 flood, discharge in the Ventura River near Ventura increased from 100 cfs to 46,700 cfs in a period of three hours (Keller and Capelli 1992). While Live Oak Creek and its tributaries certainly do not carry the flows or velocities of the Ventura River, its dynamic hydroregime is relatively similar, although much lower in volume of both sediments and water.

High sediment flux events also are episodic and often are related to wildfires coupled with high flows. Sediment rating curves may shift upward 10 to 20 percent following significant wildfires, resuming their pre-fire relationships after two to five years (Wells and Brown 1982, Taylor 1983, Hecht 1984). A specific example is the Sisquoc River east of Santa Maria, California where more than half of the bed load transported during a 60-year period was probably associated with the 1966 fire that burned approximately 35 percent of the watershed and the January to February 1969 high flows (Hecht 1993).

Fluvial geomorphologists have long recognized the unique geomorphic responses to episodic flood/high sediment flux events. Short-term variations in flow can result in a channel morphology that is adjusted to high flows but is not in equilibrium with subsequent low flows (Schumm and Lichty 1963). For example, the channel morphology created during high flows on alluvial fans may be completely reconfigured during low-flow events. The result is that subsequent high flows may not follow the previous paths and kinetic energy may be dissipated in previously unaffected areas (Dawdy 1979).

The episodic nature of flows and sediment fluxes cannot be controlled in stream restoration efforts. Thus, restoration in episodic stream systems must account for this inherent uncertainty. The episodic paradigm is based on episodic cycles of perturbation and recovery, not on the development of equilibrium landforms and mature habitats. Concepts and tools that are useful in other systems, such as channel-forming discharge dimensions, are less useful and must assume less significant roles. Similarly, design specifications and success criteria must be flexible to allow the natural physical processes to operate on the landscape.

In conclusion, if the recommended mitigation measures are implemented successfully, and remain in a natural state for the life of the project, the proposed project should not result in significant impacts to wetland functions. With the proposed mitigation, the project would improve wetland functions onsite.

Mitigated-Project Wetland Function Index Scores

After applying the simulated post-mitigation conditions, the wetland functions on the two Live Oak Creek tributaries are expected to improve overall. Four functions (1, 2, 9, and 14) would all increase by more than 10% (the threshold of significance for this assessment) on both tributaries, while Function 10 would increase by more than 10% on the east tributary. Five functions (4, 5, 6, 7, and 8) would increase by between 6-9% on both tributaries, while function 10 would increase by 9% on the west tributary. One function, 13, would increase by between 4-6% on both tributaries. The remaining three functions (3, 11, and 12) show little to no increase from baseline as a result of the proposed voluntary mitigation, as well as little to no increase from the post-project, unmitigated condition. The complete results can be seen in Table 9, Mitigated-Project Wetland Function Index Scores.

Table 9. Mitigated-Project Wetland Function Index Scores

Wetland Function	Baseline Index Score		Mitigated-Project Index Score		Rate of Change (%)	
	West Tributary	East Tributary	West Tributary	East Tributary	West Tributary	East Tributary
1	0.52	0.53	0.59	0.59	+13	+11
2	0.33	0.28	0.42	0.37	+27	+32
3	0.35	0.39	0.34	0.39	-3	0
4	0.57	0.57	0.62	0.62	+9	+9
5	0.57	0.60	0.62	0.65	+9	+8
6	0.46	0.50	0.50	0.53	+9	+6
7	0.57	0.57	0.62	0.62	+9	+9
8	0.57	0.57	0.62	0.62	+9	+9
9	0.72	0.74	0.86	0.86	+19	+16
10	0.58	0.53	0.63	0.63	+9	+19
11	0.56	0.50	0.55	0.51	-2	+2
12	0.18	0.28	0.18	0.27	0	-4
13	0.54	0.55	0.57	0.57	+6	+4
14	0.50	0.50	0.57	0.56	+14	+12
Average:	**0.50**	**0.51**	**0.55**	**0.56**	**+9**	**+10**

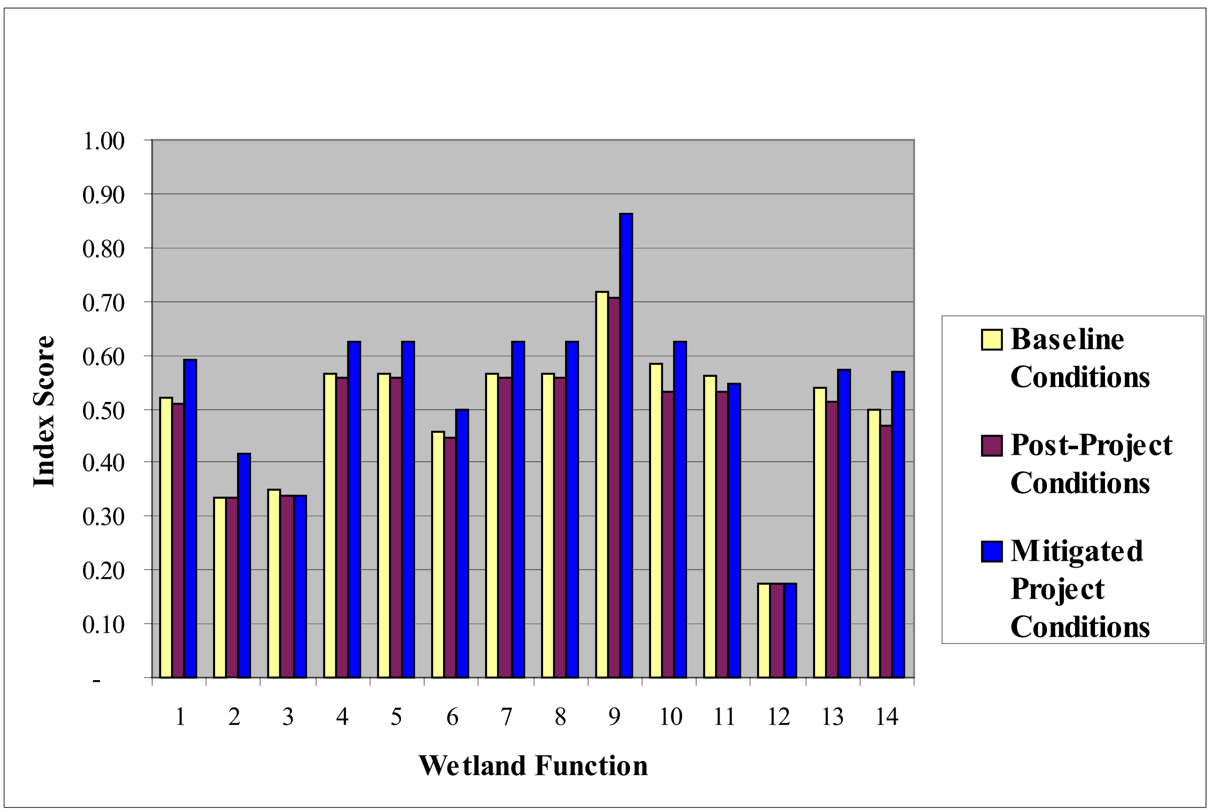
ASSESSMENT COMPARISON

This section discusses and compares the three parts of the HGM assessment; the baseline (pre-project), the post-project, and the mitigated-project. Tables 10 a & b, Comparison of Pre-, Post-, and Mitigated-Project Wetland Function Index Scores, display the results of the three assessments side-by-side so that comparisons can be made. Figures 6 a & b, Change Comparison Chart of Wetland Functions Between Pre-, Post-, and Mitigated-Project Conditions, are intended as companions to Tables 10 a & b, and graphically illustrate the wetland function index scores for baseline (existing) conditions and compare them to projected post-project and mitigated-project index scores. These figures illustrate the differences between the three scenarios.

**Table 10a. West Tributary of Live Oak Creek –
Comparison of Pre-, Post-, and Mitigated-Project Wetland Function Index Scores**

Wetland Function	Baseline Score	Post-Project Score	Rate of Change (%)	Mitigated-Project Score	Rate of Change (%)[8]
1	0.52	0.51	-2	0.59	+13
2	0.33	0.33	0	0.42	+27
3	0.35	0.34	-3	0.34	-3
4	0.57	0.56	-2	0.62	+9
5	0.57	0.56	-2	0.62	+9
6	0.46	0.45	-2	0.50	+9
7	0.57	0.56	-2	0.62	+9
8	0.57	0.56	-2	0.62	+9
9	0.72	0.71	-1	0.86	+19
10	0.58	0.53	-9	0.63	+9
11	0.56	0.53	-5	0.55	-2
12	0.18	0.18	0	0.18	0
13	0.54	0.51	-6	0.57	+6
14	0.50	0.47	-6	0.57	+14

Figure 6a. West Tributary of Live Oak Creek – Change Comparison Chart of Wetland Functions between Pre-, Post-, and Mitigated-Project Conditions

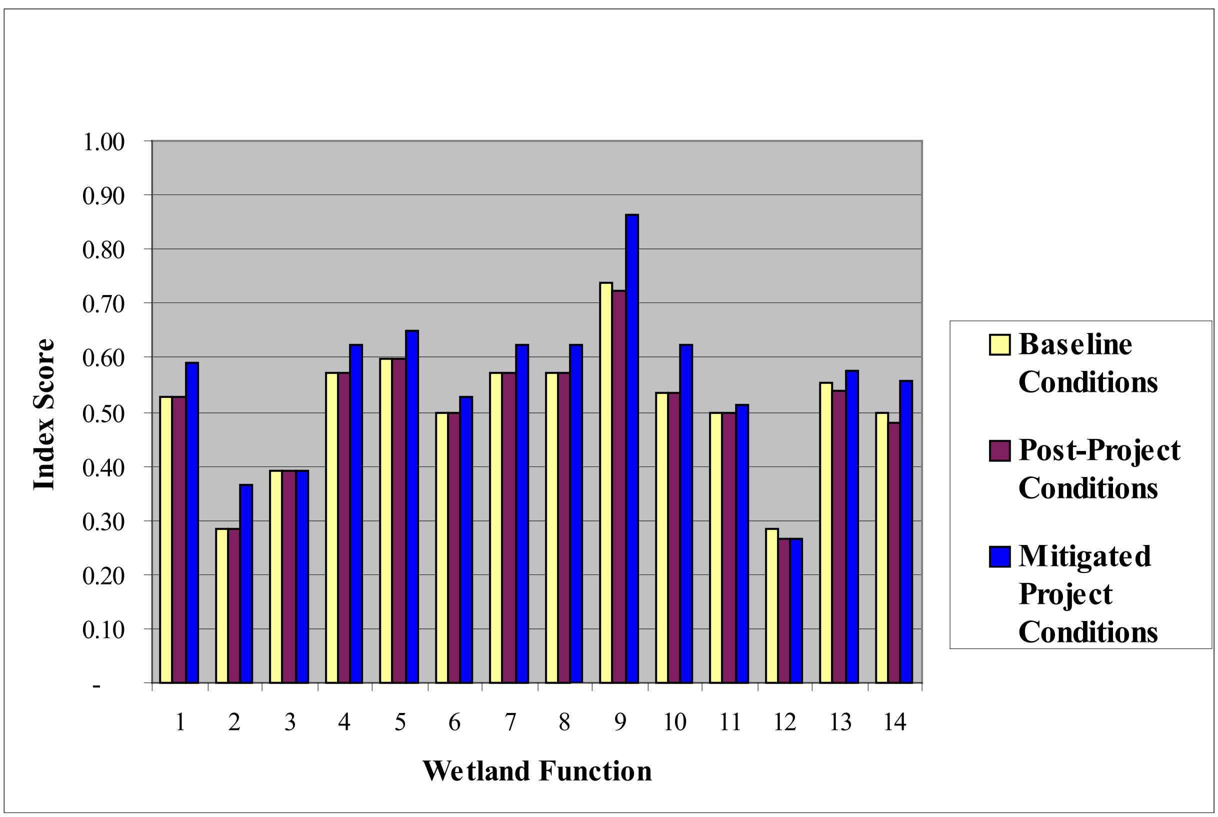


[8] Note: the rate of change represents the percent change from existing (baseline) conditions.

**Table 10b. East Tributary of Live Oak Creek –
Comparison of Pre-, Post-, and Mitigated-Project Wetland Function Index Scores**

Wetland Function	Baseline Score	Post-Project Score	Rate of Change (%)	Mitigated-Project Score	Rate of Change (%)[9]
1	0.53	0.53	0	0.59	+11
2	0.28	0.28	0	0.37	+32
3	0.39	0.39	0	0.39	0
4	0.57	0.57	0	0.62	+9
5	0.60	0.60	0	0.65	+8
6	0.50	0.50	0	0.53	+6
7	0.57	0.57	0	0.62	+9
8	0.57	0.57	0	0.62	+9
9	0.74	0.73	-1	0.86	+16
10	0.53	0.53	0	0.63	+19
11	0.50	0.50	0	0.51	+2
12	0.28	0.27	-3	0.27	-4
13	0.55	0.54	-2	0.57	+4
14	0.50	0.48	-4	0.56	+12

Figure 6b. East Tributary of Live Oak Creek – Change Comparison Chart of Wetland Functions between Pre-, Post-Project, and Mitigated-Project Conditions



[9]Note: the rate of change represents the percent change from existing (baseline) conditions.

Function-by-Function Assessment

This section contains a discussion of the expected changes and reasons for the changes for each of the 14 wetland functions. Comparisons for each wetland function, as recommended by Smith et al. (1995), are described and assessed briefly below.

FUNCTION 1. ENERGY DISSIPATION

Function 1 captures the ability of the wetland to transform and/or reduce the kinetic energy of water. Factors considered are vegetation and the roughness of the landscape and channel morphology. Eight variables are used to capture this function and include: Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Channel Roughness ($V_{CHANROUGH}$), Herbaceous Cover (V_{HERBCC}), In-channel Coarse Woody Debris (V_{INCWD}), Shrub Canopy Cover ($V_{SHRUBCC}$), and Basal Area of Trees (V_{TREEBA}) (Lee et al. 2001).

The proposed project is expected to slightly decrease the ability to dissipate the kinetic energy of water on the west tributary from an index score of 0.52 to 0.51, or by 2%; while no change is expected for this function on the east tributary, where the baseline index score is 0.53, as is the post-project score. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant*.

The proposed voluntary mitigation is expected to increase the ability to dissipate the kinetic energy of water on the west tributary from an index score of 0.52 to 0.59, or by 13%; and on the east tributary from an index score of 0.53 to 0.59, or by 11%. (See Table 10 and Figure 6.) These improvements are considered to be *significant*.

FUNCTION 2. SURFACE AND SUBSURFACE WATER STORAGE AND EXCHANGE

Function 2 captures the ability of the wetland to detain, retain, and transmit water based on the soil and other geologic materials. Three variables are used to measure this function: Residual Pools ($V_{RESIDPOOL}$), Sediment (V_{SED}), and Soil Integrity ($V_{SOILINT}$) (Lee et al. 2001).

The proposed project is expected to have no effect on the surface and subsurface water storage and exchange capabilities on either tributary, with the index score remaining unchanged at 0.33 for the west tributary and 0.28 for the east tributary. due to the poor condition of the buffer zone under existing conditions. (See Table 10 and Figure 6.) There would be *no impact* to this function.

The proposed voluntary mitigation is expected to improve the surface and subsurface water storage and exchange capabilities on the west tributary from an index score of 0.33 to 0.42, or by 27%; and on the east tributary from an index score of 0.28 to 0.37, or by 32%. (See Table 10 and Figure 6.) These improvements are considered to be *significant*.

FUNCTION 3. LANDSCAPE HYDROLOGIC CONNECTIONS

Function 3 measures the assessment area's ability to maintain the wetlands' natural hydraulic connectivity. Seven variables are used to capture this wetland function: Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Land Use ($V_{LANDUSE}$), Longitudinal Profile integrity ($V_{LONGPROF}$), Soil Profile Integrity ($V_{SOILINT}$), and Surface Water In[puts] (V_{SURFIN}) (Lee et al. 2001).

The proposed project is expected to slightly decrease the landscape hydrologic connections on the west tributary from an index score of 0.35 to 0.34, or by 3%; while no change is expected for this function on the east tributary, where the baseline index score is 0.39, as is the post-project score. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant*.

The proposed voluntary mitigation is not expected to have any effect on this function; index scores are expected to remain at the post-project levels of 0.34 for the west tributary and 0.39 for the east tributary. (See Table 10 and Figure 6.)

FUNCTION 4. SEDIMENT MOBILIZATION, STORAGE, TRANSPORT, AND DEPOSITION

Function 4 captures the ability of the watercourse to mobilize, store, transport, and deposit sediment. This is determined by the morphology of the channel as well as the timing, duration, and amount of water delivered to the channel. Nine variables are used to measure this function: Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Channel Roughness ($V_{CHANROUGH}$), Embeddedness of Large Channel Materials (V_{EMBED}), Herbaceous Cover (V_{HERBCC}), Sediment Deposition (V_{SED}), Shrub Canopy Cover ($V_{SHRUBCC}$), and Basal Area of Trees (V_{TREEBA}) (Lee et al. 2001).

The proposed project is expected to slightly decrease the sediment mobilization, storage, transport, and deposition capabilities on the west tributary from an index score of 0.57 to 0.56, or by 2%; while no change is expected for this function on the east tributary, where the baseline index score is 0.57, as is the post-project score. (Table 10 and Figure 6.) These impacts are considered to be *less than significant*.

The proposed voluntary mitigation is expected to increase the sediment mobilization, storage, transport, and deposition capabilities on both tributaries from an index score of 0.57 to 0.62, or by 9%. (See Table 10 and Figure 6.)

FUNCTION 5. CYCLING OF ELEMENTS AND COMPOUNDS

Function 5 measures the short and long-term transformation of elements and compounds through abiotic and biotic processes that convert chemical species (e.g. nutrients and metals) from one form, or valence, to another. The model uses eleven variables to capture the element and compound cycling function, including: Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Decomposition (V_{DECOMP}), Herbaceous Cover (V_{HERBCC}), In-channel Coarse Woody Debris (V_{INCWD}), Off-channel Coarse Woody Debris (V_{OFFCWD}), Sediment Deposition (V_{SED}), Shrub Canopy Cover ($V_{SHRUBCC}$), Soil Profile Integrity ($V_{SOILINT}$), and Basal Area of Trees (V_{TREEBA}) (Lee et al. 2001).

The proposed project is expected to slightly decrease the element and compound cycling ability on the west tributary from an index score of 0.57 to 0.56, or by 2%; while no change is expected for this function on the east tributary, where the baseline index score is 0.60, as is the post-project score. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant.*

The proposed voluntary mitigation is expected to increase the element and compound cycling ability on the west tributary from an index score of 0.57 to 0.62, or by 9%; and on the east tributary from an index score of 0.60 to 0.65, or by 8%. (See Table 10 and Figure 6.)

FUNCTION 6. REMOVAL OF IMPORTED ELEMENTS AND COMPOUNDS

Function 6 identifies a site's ability to remove imported nutrients, contaminants, and other elements or compounds present in the environment. Nine variables are used for this function: Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Herbaceous Cover (V_{HERBCC}), Longitudinal Profile integrity ($V_{LONGPROF}$), Sediment Deposition (V_{SED}), Shrub Canopy Cover ($V_{SHRUBCC}$), Soil Profile Integrity ($V_{SOILINT}$), and Basal Area of Trees (V_{TREEBA}) (Lee et al. 2001).

The proposed project is expected to slightly decrease the ability to remove imported elements and compounds of the west tributary from an index score of 0.46 to 0.45, or by 2%; while no change is expected for this function on the east tributary, where the baseline index score is 0.50, as is the post-project score. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant.*

The proposed voluntary mitigation is expected to increase the ability to remove imported elements and compounds of the west tributary from an index score of 0.46 to 0.50, or by 9%; and of the east tributary from an index score of 0.50 to 0.53, or by 6%. (See Table 10 and Figure 6.)

FUNCTION 7. PARTICULATE DETENTION

Function 7 gauges the deposition and retention 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 and the same formula used for Function 4. See the discussion under Function 4 above for further analysis.

FUNCTION 8. ORGANIC MATTER TRANSPORT

Function 8 captures a wetland's ability to export dissolved and particulate organic carbon through mechanisms including leaching, flushing, displacement, and erosion. This function is measured through nine variables: Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Decomposition (V_{DECOMP}), Herbaceous Cover (V_{HERBCC}), In-channel Coarse Woody Debris (V_{INCWD}), Longitudinal Profile integrity ($V_{LONGPROF}$), Shrub Canopy Cover ($V_{SHRUBCC}$), and Basal Area of Trees (V_{TREEBA}) (Lee et al. 2001).

The proposed project is expected to slightly decrease the ability to transport organic matter on the west tributary from an index score of 0.57 to 0.56, or by 2%; while no change is expected for this function on the east tributary, where the baseline index score is 0.57, as is the post-project score. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant.*

The proposed voluntary mitigation is expected to increase the ability to transport organic matter on both tributaries from an index score of 0.57 to 0.62, or by 9%. (See Table 10 and Figure 6.)

FUNCTION 9. PLANT COMMUNITY

Function 9 measures the physical characteristics and ecological processes that maintain the indigenous 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 (V_{HERBCC}), Ratio of Native to Nonnative Dominant Plants (V_{RATIO}), Capacity of Site Regeneration (V_{REGEN}), Shrub Canopy Cover ($V_{SHRUBCC}$), Vegetation Strata Over Channel (V_{STRATA}), Basal Area of Trees (V_{TREEBA}), Tree Canopy Cover (V_{TREECC}), and Vine Canopy Cover (V_{VINECC}) (Lee et al. 2001).

The proposed project is expected to slightly decrease the ability to maintain characteristic plant communities on the west tributary from an index score of 0.72 to 0.71, or by 1%; and on the east tributary from an index score of 0.74 to 0.73, or by 1%. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant.*

The proposed voluntary mitigation is expected to increase the ability to maintain characteristic plant communities on the west tributary from an index score of 0.72 to 0.86, or by 19%; and on the east tributary from an index score of 0.74 to 0.86, or by 16%. (See Table 10 and Figure 6.) These improvements are considered to be *significant*.

FUNCTION 10. DETRITAL BIOMASS

Function 10 gauges the process of production, accumulation, and dispersal of dead plant biomass of all sizes. Four variables are used for this function: Decomposition (V_{DECOMP}), In-channel Coarse Woody Debris (V_{INCWD}), Off-channel Coarse Woody Debris (V_{OFFCWD}), and Snags (V_{SNAGS}) (Lee et al. 2001).

The proposed project is expected to decrease ability to maintain characteristic detrital biomass on the west tributary from an index score of 0.58 to 0.53, or by 9%; while no change is expected for this function on the east tributary, where the baseline index score is 0.53, as is the post-project score. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant.*

The proposed voluntary mitigation is expected to increase ability to maintain characteristic detrital biomass on the west tributary from an index score of 0.58 to 0.63, or by 9%; and on the east tributary from an index score of 0.53 to 0.63, or by 19%. (See Table 10 and Figure 6.) The improvement for the east tributary is considered to be *significant*.

FUNCTION 11. SPATIAL STRUCTURE OF HABITATS

Function 11 captures the capacity of a wetland to support animal populations and guilds through the heterogeneity of structure of vegetative communities. Eight variables are used to measure this function: Animal Signs (V_{ASIGN}), Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Residual Pools ($V_{RESIDPOOL}$), Shade (V_{SHADE}), Snags (V_{SNAGS}), and Strata (V_{STRATA}) (Lee et al. 2001).

The proposed project is expected to decrease the ability to maintain spatial structure of habitat on the west tributary from an index score of 0.56 to 0.53, or by 5%; while no change is expected for this function on the east tributary, where the baseline index score is 0.50, as is the post-project score. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant.*

On the west tributary, the proposed voluntary mitigation is expected to reduce the impact on the ability to maintain spatial structure of habitat from 5% to 2%. The index score after mitigation is expected to be 0.55, an increase from the post-project index score of 0.53, while still a decrease from the baseline index score of 0.56. On the east tributary, the proposed voluntary mitigation is expected to increase the ability to maintain spatial structure of habitat from an index score of 0.50 to 0.51, or by 2%. (See Table 10 and Figure 6.)

FUNCTION 12. INTERSPERSION AND CONNECTIVITY OF HABITATS

Function 12 is intended to measure the capacity of a wetland to permit aquatic, semi-aquatic, and terrestrial organisms to enter and leave a riverine ecosystem via large, contiguous plant communities to meet life history requirements, and is measured through four variables: Land Use ($V_{LANDUSE}$), Area of [habitat] Patches ($V_{PATCHAREA}$), Contiguity of [habitat] Patches ($V_{PATCHCONTIG}$), and Number of [habitat] Patches ($V_{PATCHNUM}$) (Lee et al. 2001).

On the west tributary, the proposed project is expected to have no effect on the ability to maintain habitat interspersion and connectivity: the baseline index score is 0.18, as is the post-project score. A slight decrease is expected for this function on the east tributary, where the baseline index score is 0.28, and the post-project score is 0.27, or 4%. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant.*

The proposed voluntary mitigation is not expected to have any effect on this function; index scores are expected to remain at the post-project levels of 0.18 for the west tributary and 0.27 for the east tributary. (See Table 10 and Figure 6.)

FUNCTION 13. DISTRIBUTION AND ABUNDANCE OF VERTEBRATE TAXA

Function 13 measures the capacity of the assessment area to maintain characteristic density and spatial distribution of vertebrates – aquatic, semi-aquatic, and terrestrial. 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. DMEC herein uses twenty-two of the twenty-eight variables to capture this function: Animal Signs (V_{ASIGN}), Buffer Condition ($V_{BUFFCOND}$), Buffer Contiguity ($V_{BUFFCONT}$), Buffer Width ($V_{BUFFWIDTH}$), Channel Roughness ($V_{CHANROUGH}$), Decomposition (V_{DECOMP}), Herbaceous Cover (V_{HERBCC}), In-channel Coarse Woody Debris (V_{INCWD}), Land Use ($V_{LANDUSE}$), Longitudinal Profile integrity ($V_{LONGPROF}$), Off-channel Coarse Woody Debris (V_{OFFCWD}), Area of [habitat] Patches ($V_{PATCHAREA}$), Contiguity of [habitat] Patches ($V_{PATCHCONTIG}$), and Number of [habitat] Patches ($V_{PATCHNUM}$), Capacity of Site Regeneration (V_{REGEN}), Residual Pools ($V_{RESIDPOOL}$), Shrub Canopy Cover ($V_{SHRUBCC}$), Snags (V_{SNAGS}), Soil Profile Integrity ($V_{SOILINT}$), Vegetation Strata Over Channel (V_{STRATA}), Tree Canopy Cover (V_{TREECC}), and Vine Canopy Cover (V_{VINECC}).

The proposed project is expected to decrease the ability to maintain distribution and abundance of vertebrate taxa on the west tributary from an index score of 0.54 to 0.51, or by 6%; and on the east tributary from an index score of 0.55 to 0.54, or by 2%. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant*.

The proposed voluntary mitigation is expected to increase the ability to maintain distribution and abundance of vertebrate taxa on the west tributary from an index score of 0.54 to 0.57, or by 6%; and on the east tributary from an index score of 0.55 to 0.57, or by 4%. (See Table 10 and Figure 6.)

FUNCTION 14. DISTRIBUTION AND ABUNDANCE OF INVERTEBRATE TAXA

Function 14 measures the capacity of the assessment area to maintain characteristic density and spatial distribution of invertebrates – aquatic, semi-aquatic, and terrestrial. 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. DMEC herein uses nineteen 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).

The proposed project is expected to decrease the ability to maintain distribution and abundance of invertebrate taxa on the west tributary from an index score of 0.50 to 0.47, or by 6%; and on the east tributary from an index score of 0.50 to 0.48, or by 4%. (See Table 10 and Figure 6.) These impacts are considered to be *less than significant*.

The proposed voluntary mitigation is expected to increase the ability to maintain distribution and abundance of invertebrate taxa on the west tributary from an index score of 0.50 to 0.57, or by 14%; and on the east tributary from an index score of 0.50 to 0.56, or by 12%. (See Table 10 and Figure 6.) These improvements are considered to be *significant*.

SECTION 5. CONCLUSIONS AND RECOMMENDATIONS

DMEC concludes through this assessment that the proposed project would not cause significant changes (greater than 10 percent) to any of the 14 wetland functions provided by Riverine wetland ecosystems on the project site. Although no mitigation is required when applying a 10% change threshold of significance, DMEC believes that these less-than-significant impacts can be mitigated through specific voluntary actions, including eradicating invasive exotic vines and trees onsite, and increasing species-richness onsite by replacing the invasive species with native vines and trees. DMEC further concludes that the proposed wetland restoration and mitigation plan for the Gramckow project site, if implemented, will enhance 11 of the wetland functions onsite over baseline (existing) conditions.

Mr. Gramckow is constrained in his ability to change existing conditions offsite that would be required to significantly improve all wetland functions, especially Functions 3, 11, and 12; however, DMEC believes that this wetland assessment demonstrates numerically and objectively that the proposed voluntary wetland mitigation will provide better wetland habitat than the existing conditions onsite.

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SECTION 6. ACKNOWLEDGEMENTS

This report was written by David Magney, Teri Reynolds, and Cher Batchelor. Mr. Magney, Ms. Batchelor, Ms. Reynolds, Stephen Hoskinson, and Wendy Cole gathered data on baseline conditions. Mr. Magney, Ms. Batchelor, and Mr. Hoskinson performed the onsite functional assessment for existing conditions and Mr. Magney performed the functional assessments for post-project and project-with-mitigation scenarios. Mr. Magney prepared the charts and tables, Ms. Reynolds prepared the figures, and Marlane Malarkey produced the report.

Mr. Martin Gramckow, property owner, provided information about the project site history and details about the proposed project.

SECTION 7. REFERENCES CITED

American Ornithologist's Union (AOI). 1989. *Checklist of North American Birds*. 7th edition. Allen Press. Lawrence, Kansas.

Arnett, R.H., Jr. and R.L. Jacques, Jr. 1981. *Simon and Schuster's Guide to Insects.* Simon and Schuster, New York, New York.

Burt, W.H., and R.P. Grossenheider. 1976. *A Field Guide to the Mammals: North America North of Mexico*. 3rd edition. (The Peterson Field Guide Series.) Houghton Mifflin Company. Boston, Massachusetts.

California Department of Fish and Game. 2006a. California Natural Diversity Database search of RareFind3. (Updated 4 April 2006) The Resource Agency, State of California, Sacramento, California.

California Department of Fish and Game. 2006b. Special Animals List (824 taxa). February 2006. The Resources Agency, Biogeographic Data Branch. (available at http://www.dfg.ca.gov/whdab/pdfs/SPAnimals.pdf).

California Native Plant Society. 2001. *Inventory of Rare and Endangered Plants of California*. Sixth edition. (Special Publication No. 1.) Rare Plant Scientific Advisory Committee, David Tibor, Convening Editor, Sacramento, California. September.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* (FWS/OBS-79/31.) U.S. Fish and Wildlife Service, Washington, DC.

David Magney Environmental Consulting. 1998. *Botanical Resources of the Bridle Ridge Development Project, Santa Barbara County*. May 1998. (PN 97-0162.) Ojai, California. Prepared for County of Santa Barbara, Santa Barbara, California. Prepared on behalf of Rincon Consultants, Inc., Ventura, California.

David Magney Environmental Consulting (DMEC). 2000a. *Calleguas Creek Watershed Restoration and Preservation Plan*. October 2000. (PN 97-0141.) Ojai, California, with Geo InSight International, Secor International Incorporated, and Wildlands, Inc. Prepared for California State Coastal Conservancy, Oakland, California and U.S. Environmental Protection Agency, San Francisco, California.

David Magney Environmental Consulting (DMEC). 2000b. *Wetland Functional Assessment of the Reinke Development Mitigation Plan, Thousand Oaks, California*. November 2000. (PN 00-0131.) Ojai, California. Prepared for Rudy Reinke, Thousand Oaks, California.

David Magney Environmental Consulting. 2001. *Wetland Functional Assessment of the Odyssey Program Middle School Project, Malibu, California*. December 2001. (PN 00-0301.) Ojai, California. Prepared for Odyssey Program, Malibu, California.

David Magney Environmental Consulting. 2004. *Wetland Functional Assessment of the Camarillo Regional Park Wetlands and Golf Course Projects, Ventura County, California*. 24 August 2004. (PN 02-0121-2.) Ojai, California. Prepared for California State Coastal Conservancy, Oakland, California.

Dawdy, D. R. 1979. Flood Frequency Estimates on Alluvial Fans. *Journal of the Hydraulics Division*. 105:1407-1413.

ENSR. 1997. *Wetland Mitigation and Monitoring Plan for the Cohan Development, Newbury Park, California* (Tract No. 4862-2) (8709-042), Camarillo, California. June 1997. Prepared for the City of Thousand Oaks, California and Cohan Investments, Sherman Oaks, California.

Fugro West, Inc. 1996. Los Osos Sewer Project Draft EIR, Morro Bay, California. Ventura, California. Prepared for the County of San Luis Obispo, California.

Gilvear, D., and S. Bradley. 1997. Geomorphological Adjustment of a Newly Engineered Upland Sinuous Gravel-Bed River Diversion: Evan Water, Scotland. *Regulated Rivers: Research and Management* 13:377-389.

Hecht, B. 1984. Sequential Changes in Bed Habitat Conditions in the Upper Carmel River Following the Marble-Cone Fire of August, 1977. In: R. E. Warner and K.M. Hendrix (Ed.), *California Riparian Systems: Ecology, Conservation, and Productive Management*. University of California Press, Berkeley. 134-141 pp.

Hecht, B. 1993. *South of the Spotted Owl: Restoration Strategies for Episodic Channels and Riparian Corridors in Central California.* 1993 Society of Wetland Scientists Western Meeting. Davis, California.

Hogue, C.L. 1993. *Insects of the Los Angeles Basin*. Second edition. Natural History Museum Foundation, Los Angeles, California.

Holland, R. F. 1986. *Preliminary Description of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, California.

Jennings, M.R. 1983. *An Annotated Checklist of the Amphibians and Reptiles of California*. *California Department of Fish and Game* 69(3):151-171.

Keller, E.A., M.H. Capelli. 1992. Ventura River Flood of February 1992: A Lesson Ignored? *Water Resources Bulletin* 28:813-832.

Kondolf, G.M. 1993. Lag in Stream Channel Adjustment to Livestock Exclosure, White Mountains, California. *Restoration Ecology* 1(4):226-230.

Kusler, J., and M. Kentula, Ed. 1989. *Wetland Creation and Restoration: The Status of the Science*. (EPA/600/3-89/038.) U.S. Environmental Protection Agency, Washington, DC.

Lee, L.C., M.C. Rains, J.A. Mason, and W.J. Kleindl. 1996. *Draft Guidebook to Functional Assessments in 3rd and 4th Order Riverine Waters/Wetlands of the Central California Coast*. The National Wetland Science Training Cooperative, Seattle, Washington. Prepared for U.S. Environmental Protection Agency, Region IX, San Francisco, California. April.

Lee, L.C., M.C. Rains, J.A. Mason, and W.J. Kleindl. 1997. *Guidebook to Hydrogeomorphic Functional Assessment of Riverine Waters/Wetlands in the Santa Margarita Watershed*. Peer review draft. The National Wetland Science Training Cooperative, Seattle, Washington. Prepared for U.S. Environmental Protection Agency, Region IX, San Francisco, California. February.

Lee, L.C., P.L. Fiedler, S.R. Stewart, D.J. Partridge, J.A. Mason, E.M. Inlander, and M.C. Rains. 2004. *Draft Operational Guidebook for Referenced Based Assessments of the Functions of Riverine Waters/Wetlands in the Santa Margarita Watershed, Riverside and San Diego Counties, California*. March 2004. San Diego Regional Water Quality Control Board, Technical Publication. San Diego, California.

Lee, L.C., Fiedler, P.L., Stewart, S.R., Curry, R.R., Partridge, D.J., Mason, J.A., Inlander, I.M., Almay, R.B., Aston, D.L., Spencer, M.E. 2001. *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 County Water Agency, Santa Barbara, California.

Magney, D.L. 2005. Checklist of Ventura County Rare Plants. 5 April 2005. California Native Plant Society, Channel Islands Chapter, Ojai, California. Published on www.cnpsci.org.

Moyle, P.B. 1976. *Inland Fishes of California.* University of California Press, Los Angeles.

Reed, P.B., Jr. 1988. *National List of Plant Species that Occur in Wetlands: California (Region 0)*. (Biological Report 88[26.10].) U.S. Fish and Wildlife Service, Ft. Collins, Colorado.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society, Sacramento, California.

Schumm, S.A., and R.W. Lichty. 1963. *Channel Widening and Flood-Plain Construction Along Cimarron River in Southwestern Kansas*. (U.S. Geological Survey Professional Paper 352-D.) U.S. Government Printing Office, Washington, D.C.

Smith, R.D., A. Ammann, C. Bartoldus, and M.M. Brinson. 1995. *An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices*. (Wetlands Research Program Technical Report WRP DE.) Waterways Experiment Station, U.S. Army Corps of Engineers, Vicksburg, Mississippi.

Stebbins, R.C. 1985. *A Field Guide to Western Reptiles and Amphibians*. (The Peterson Field Guide Series.) Houghton Mifflin Company, Boston, Massachusetts.

Taylor, B.D. 1983. Sediment Yields in Coastal Southern California. *Journal of Hydraulic Engineering* 109:71-85.

Ventura County Planning Division. 2005. Biological Resources Initial Study. 8 August 2005. Prepared by Rincon Consultants, Inc.

Wells, W.G.I., and W.M. Brown III. 1982. Effects of Fire on Sedimentation Processes. In: *Sediment Management for Southern California Mountains, Coastal Plains, and Shoreline. Part D: Special Inland Studies*. (Environmental Quality Laboratory Report No. 17-D.) California Institute of Technology, Pasadena, California. 83-122 pp.

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APPENDICES

APPENDIX A.
FUNCTIONAL ASSESSMENT WORKSHEETS
FOR PRE-, POST-, AND MITIGATED-PROJECT CONDITIONS

APPENDIX B.
FIELD DATA SHEETS

APPENDIX A.
FUNCTIONAL ASSESSMENT WORKSHEETS FOR PRE-, POST-, AND MITIGATED-PROJECT CONDITIONS

DMEC

Project Name: **Gramckow Project** Date: **30 Mar 2006**

Project Site: **West Tributary, Live Oak Creek** County: **Ventura**

Assessor/Observer: **D. Magney, C. Batchelor, T. Reynolds, S. Hoskinson, & W. Cole** City: **Unincorporated**

Project Phase: **Baseline (Existing) Conditions**

Santa Barbara South Coast Streams														
	Stream Function													
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1. Vasign											0.75		0.75	0.75
2. Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
3. Vbuffcont	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
4. Vbuffwidth	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
5. Vchanrough	0.75			0.75			0.75						0.75	
6. Vdecomp					1.00			1.00		1.00			1.00	
7. Vembed				0.75			0.75							
8. Vherbcc	0.50			0.50	0.50	0.50	0.50	0.50	0.50				0.50	0.50
9. Vincwd	0.25				0.25			0.25		0.25			0.25	0.25
10. Vlanduse			0.25									0.25	0.25	0.25
11. Vlongprof			0.50			0.50		0.50					0.50	
12. Voffcwd					0.75					0.75			0.75	0.75
13. Vpatcharea												0.10	0.10	0.10
14. Vpatchcontig												0.10	0.10	0.10
15. Vpatchnum												0.10	0.10	0.10
16. Vratio									0.25					0.25
17. Vregen									0.10				0.10	0.10
18. Vresidpool		0.50									0.50		0.50	0.50
19. Vsed		0.25		0.25	0.25	0.25	0.25							
20. Vshade											1.00			
21. Vshrubcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
22. Vsnags										0.25	0.25		0.25	0.25
23. Vsoilint		0.25	0.25		0.25	0.25							0.25	
24. Vstrata									1.00		1.00		1.00	1.00
25. Vsurfin			0.50											
26. Vtreeba	1.00			1.00	1.00	1.00	1.00	1.00	1.00					
27. Vtreecc									0.75				0.75	0.75
28. Vvinecc									0.75				0.75	0.75

Results	**0.52**	**0.33**	**0.35**	**0.57**	**0.57**	**0.46**	**0.57**	**0.57**	**0.72**	**0.58**	**0.56**	**0.18**	**0.54**	**0.50**

Project Name: **Gramckow Project**

Project Site: **West Tributary, Live Oak Creek**

Assessor/Observer: **D. Magney**

Project Phase: **Post-Project - no mitigation**

Date: **30 Mar 2006**

County: **Ventura**

City: **Unincorporated**

Santa Barbara South Coast Streams

Variable	Stream Function													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Vasign											0.75		0.75	0.75
2. Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
3. Vbuffcont	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
4. Vbuffwidth	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
5. Vchanrough	0.75			0.75			0.75						0.75	
6. Vdecomp					1.00			1.00		1.00			1.00	
7. Vembed				0.75			0.75							
8. Vherbcc	0.50			0.50	0.50	0.50	0.50	0.50	0.50				0.50	0.50
9. Vincwd	0.25				0.25			0.25		0.25			0.25	0.25
10. Vlanduse			0.25									0.25	0.25	0.25
11. Vlongprof			0.50			0.50		0.50					0.50	
12. Voffcwd					0.75					0.75			0.75	0.75
13. Vpatcharea												0.10	0.10	0.10
14. Vpatchcontig												0.10	0.10	0.10
15. Vpatchnum												0.10	0.10	0.10
16. Vratio									0.25					0.25
17. Vregen									0.10				0.10	0.10
18. Vresidpool		0.50									0.50		0.50	0.50
19. Vsed		0.25		0.25	0.25	0.25	0.25							
20. Vshade											1.00			
21. Vshrubcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
22. Vsnags										0.10	0.10		0.10	0.10
23. Vsoilint		0.25	0.25		0.25	0.25							0.25	
24. Vstrata									1.00		1.00		1.00	1.00
25. Vsurfin			0.50											
26. Vtreeba	1.00			1.00	1.00	1.00	1.00	1.00	1.00					
27. Vtreecc									0.50				0.50	0.50
28. Vvinecc									0.75				0.75	0.75

Results	**0.51**	**0.33**	**0.34**	**0.56**	**0.56**	**0.45**	**0.56**	**0.56**	**0.71**	**0.53**	**0.53**	**0.18**	**0.51**	**0.47**

Project Name: **Gramckow Project**
Project Site: **West Tributary, Live Oak Creek**
Assessor/Observer: **D. Magney**
Project Phase: **Post-Project - with mitigation**

Date: **30 Mar 2006**
County: **Ventura**
City: **Unincorporated**

Santa Barbara South Coast Streams

	Stream Function													
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1. Vasign											0.75		0.75	0.75
2. Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
3. Vbuffcont	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
4. Vbuffwidth	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
5. Vchanrough	0.75			0.75			0.75						0.75	
6. Vdecomp					1.00			1.00		1.00			1.00	
7. Vembed				0.75			0.75							
8. Vherbcc	0.75			0.75	0.75	0.75	0.75	0.75	0.75				0.75	0.75
9. Vincwd	0.50				0.50			0.50		0.50			0.50	0.50
10. Vlanduse			0.25									0.25	0.25	0.25
11. Vlongprof			0.50			0.50		0.50					0.50	
12. Voffcwd					0.75					0.75			0.75	0.75
13. Vpatcharea												0.10	0.10	0.10
14. Vpatchcontig												0.10	0.10	0.10
15. Vpatchnum												0.10	0.10	0.10
16. Vratio									0.75					0.75
17. Vregen									0.25				0.25	0.25
18. Vresidpool		0.50									0.50		0.50	0.50
19. Vsed		0.50		0.50	0.50	0.50	0.50							
20. Vshade											1.00			
21. Vshrubcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
22. Vsnags										0.25	0.25		0.25	0.25
23. Vsoilint		0.25	0.25		0.25	0.25							0.25	
24. Vstrata									1.00		1.00		1.00	1.00
25. Vsurfin			0.50											
26. Vtreeba	1.00			1.00	1.00	1.00	1.00	1.00	1.00					
27. Vtreecc									0.75				0.75	0.75
28. Vvinecc									0.75				0.75	0.75

Results	**0.59**	**0.42**	**0.34**	**0.62**	**0.62**	**0.50**	**0.62**	**0.62**	**0.86**	**0.63**	**0.55**	**0.18**	**0.57**	**0.57**

DMEC

Project Name: **Gramckow Project**

Date: **30 Mar 2006**

Project Site: **East Tributary, Live Oak Creek**

County: **Ventura**

Assessor/Observer: **D. Magney, C. Batchelor, T. Reynolds, S. Hoskinson, & W. Cole**

City: **Unincorporated**

Project Phase: **Baseline (Existing) Conditions**

Santa Barbara South Coast Streams														
	Stream Function													
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Vasign											0.75		0.75	0.75
2. Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
3. Vbuffcont	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
4. Vbuffwidth	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
5. Vchanrough	0.75			0.75			0.75						0.75	
6. Vdecomp					1.00			1.00		1.00			1.00	
7. Vembed				0.75			0.75							
8. Vherbcc	0.75			0.75	0.75	0.75	0.75	0.75	0.75				0.75	0.75
9. Vincwd	0.25				0.25			0.25		0.25			0.25	0.25
10. Vlanduse			0.25									0.25	0.25	0.25
11. Vlongprof			0.50			0.50		0.50					0.50	
12. Voffcwd					0.75					0.75			0.75	0.75
13. Vpatcharea												0.10	0.10	0.10
14. Vpatchcontig												0.75	0.75	0.75
15. Vpatchnum												0.10	0.10	0.10
16. Vratio									0.25					0.25
17. Vregen									0.25				0.25	0.25
18. Vresidpool		0.10									0.10		0.10	0.10
19. Vsed		0.25		0.25	0.25	0.25	0.25							
20. Vshade											1.00			
21. Vshrubcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
22. Vsnags										0.10	0.10		0.10	0.10
23. Vsoilint		0.50	0.50		0.50	0.50							0.50	
24. Vstrata									1.00		1.00		1.00	1.00
25. Vsurfin			0.50											
26. Vtreeba	1.00			1.00	1.00	1.00	1.00	1.00	1.00					
27. Vtreecc									0.75				0.75	0.75
28. Vvinecc									0.75				0.75	0.75

Results	**0.53**	**0.28**	**0.39**	**0.57**	**0.60**	**0.50**	**0.57**	**0.57**	**0.74**	**0.53**	**0.50**	**0.28**	**0.55**	**0.50**

DMEC

Project Name: **Gramckow Project**

Date: **30 Mar 2006**

Project Site: **East Tributary, Live Oak Creek**

County: **Ventura**

Assessor/Observer: **D. Magney**

City: **Unincorporated**

Project Phase: **Post-Project - no mitigation**

Santa Barbara South Coast Streams														
	Stream Function													
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Vasign											0.75		0.75	0.75
2. Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
3. Vbuffcont	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
4. Vbuffwidth	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
5. Vchanrough	0.75			0.75			0.75						0.75	
6. Vdecomp					1.00			1.00		1.00			1.00	
7. Vembed				0.75			0.75							
8. Vherbcc	0.75			0.75	0.75	0.75	0.75	0.75	0.75				0.75	0.75
9. Vincwd	0.25				0.25			0.25		0.25			0.25	0.25
10. Vlanduse			0.25									0.25	0.25	0.25
11. Vlongprof			0.50			0.50		0.50					0.50	
12. Voffcwd					0.75					0.75			0.75	0.75
13. Vpatcharea												0.00	0.00	0.00
14. Vpatchcontig												0.75	0.75	0.75
15. Vpatchnum												0.10	0.10	0.10
16. Vratio									0.25					0.25
17. Vregen									0.25				0.25	0.25
18. Vresidpool		0.10									0.10		0.10	0.10
19. Vsed		0.25		0.25	0.25	0.25	0.25							
20. Vshade											1.00			
21. Vshrubcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
22. Vsnags										0.10	0.10		0.10	0.10
23. Vsoilint		0.50	0.50		0.50	0.50							0.50	
24. Vstrata									1.00		1.00		1.00	1.00
25. Vsurfin			0.50											
26. Vtreeba	1.00			1.00	1.00	1.00	1.00	1.00	1.00					
27. Vtreecc									0.50				0.50	0.50
28. Vvinecc									0.75				0.75	0.75

Results	**0.53**	**0.28**	**0.39**	**0.57**	**0.60**	**0.50**	**0.57**	**0.57**	**0.73**	**0.53**	**0.50**	**0.27**	**0.54**	**0.48**

Project Name: **Gramckow Project**
Project Site: **East Tributary, Live Oak Creek**
Assessor/Observer: **D. Magney**
Project Phase: **Post-Project - with mitigation**

Date: **30 Mar 2006**
County: **Ventura**
City: **Unincorporated**

Santa Barbara South Coast Streams														
	Stream Function													
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1. Vasign											0.75		0.75	0.75
2. Vbuffcond	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
3. Vbuffcont	0.10		0.10	0.10	0.10	0.10	0.10	0.10			0.10		0.10	0.10
4. Vbuffwidth	0.25		0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25
5. Vchanrough	0.75			0.75			0.75						0.75	
6. Vdecomp					1.00			1.00		1.00			1.00	
7. Vembed				0.75			0.75							
8. Vherbcc	0.75			0.75	0.75	0.75	0.75	0.75	0.75				0.75	0.75
9. Vincwd	0.50				0.50			0.50		0.50			0.50	0.50
10. Vlanduse			0.25									0.25	0.25	0.25
11. Vlongprof			0.50			0.50		0.50					0.50	
12. Voffcwd					0.75					0.75			0.75	0.75
13. Vpatcharea												0.00	0.00	0.00
14. Vpatchcontig												0.75	0.75	0.75
15. Vpatchnum												0.10	0.10	0.10
16. Vratio									0.75					0.75
17. Vregen									0.25				0.25	0.25
18. Vresidpool		0.10									0.10		0.10	0.10
19. Vsed		0.50		0.50	0.50	0.50	0.50							
20. Vshade											1.00			
21. Vshrubcc	1.00			1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00
22. Vsnags										0.25	0.25		0.25	0.25
23. Vsoilint		0.50	0.50		0.50	0.50							0.50	
24. Vstrata									1.00		1.00		1.00	1.00
25. Vsurfin			0.50											
26. Vtreeba	1.00			1.00	1.00	1.00	1.00	1.00	1.00					
27. Vtreecc									0.75				0.75	0.75
28. Vvinecc									0.75				0.75	0.75
Results	**0.59**	**0.37**	**0.39**	**0.62**	**0.65**	**0.53**	**0.62**	**0.62**	**0.86**	**0.63**	**0.51**	**0.27**	**0.57**	**0.56**

APPENDIX B.
FIELD DATA SHEETS