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Memorandum – Biological Resources

To: Mr. Paul Bertram

From: Vince Scheidt, Biological Consultant
Julia Groebner, Associate Biologist

Date: ~~November 9,2007 February 29, 2012~~ Revised January 9, 2015

RE: Preliminary Constraints Analysis and Mitigation Bank Feasibility Study for the Bertram property, APN 319-060-05 & -07, Lakeside

We have completed a preliminary biological resources evaluation of your approximately 71-acre APN 319060-05 & -07 (Bertram) property located north of Willow Road in the Lakeside area of unincorporated San Diego County. The intent of this survey was to evaluate onsite biological resources, including habitats and sensitive species, identify sensitive areas, and assess the probability of successfully conserving the property by establishing an informal or formal (agency-approved) Conservation Bank or other habitat preserve onsite.

We conducted field surveys of the property on October 3 and 31, 2007, with a limited-area follow-up survey on July 12, 2010. A diverse array of plants and animals were identified onsite, including five sensitive species. We assume that numerous additional sensitive species would have been identified using different surveying techniques and at different times of the year. As a result of this assessment, the following biological resources have been identified in association with this property:

Habitats

The entire site was burned in the Cedar Fire of 2003. However, the onsite habitats are currently regrowing, although the height and cover of the vegetation have not reached their pre-fire conditions. In addition, the intense two-year drought (2006-2007) has severely limited vegetation regrowth. The property is dominated by native vegetation and is mostly surrounded by open, undisturbed lands, although low density residential and agricultural development abut the site to the southeast and southwest.

The onsite habitats include the following:

1. Chamise Chaparral (Holland Code 37200). The northernmost portion of APN 391-060-05 supports Chamise Chaparral. The chaparral is heterogeneous in nature, with some area dominated by Chamise (*Adenostoma fasciculatum*) and Mission Manzanita (*Xylococcus bicolor*), and others dominated by Buck-brush Lilac (*Ceanothus leucodermis*). Additional indicators in the habitat include Interior Scrub Oak (*Quercus berberidifolia*), Interior Redberry (*Rhamnus pilosa*), and herbaceous species such as Matchweed (*Gutierrezia* sp.), Caterpillar Phacelia (*Phacelia cicutaria hispida*), Rock Rose (*Helianthemum scoparium*), and others. The onsite chaparral is fairly open and of low stature at this time due to the Cedar Fire, with the average vegetative height less than 2 meters. This habitat-type exhibits large-block habitat connectivity with Chamise Chaparral to the north and northwest. The biological resource value of this habitat-type is moderately high.

2. Diegan Coastal Sage Scrub (Holland Code 32500). The majority of the site supports Diegan Coastal Sage Scrub (CSS) in various stages of regeneration. As discussed previously, this site burned in the Cedar Fire of 2003. The onsite CSS is characterized by scattered, widely spaced shrubs, such as California Sagebrush (*Artemisia californica*) and Laurel Sumac (*Malosma laurina*), among herbaceous species such as Deerweed (*Lotus scoparius*). Other CSS species found onsite in lesser numbers include Bush Mallow (*Malacothamnus densiflorus*), Flat-top Buckwheat (*Eriogonum fasciculatum*), and Broom Baccharis (*Baccharis sarothroides*). Some areas of the CSS are strongly infused with weedy species, such as Wild Oat (*Avena fatua*), Black Mustard (*Brassica nigra*), and the various brome grasses (*Bromus* spp). In fact, much of the site is dominated by the weedy species listed above and these areas could be alternatively mapped as sub-sere Non-native Grassland (see below), which will probably eventually transition to CSS as the climax community. This habitat-type continues offsite to the east and west. The biological resource value of this habitat-type is high.

3. Coastal Sage–Chaparral Scrub (Holland Code 37G00). Several small patches of Coastal Sage–Chaparral Scrub (CSCS) are found near the northern end of APN 391-060-05, at a slightly lower elevation than the Chamise Chaparral. CSCS is an ecotonal habitat-type, indicated by a mixture of hard- and soft-woody shrubs. Species found in the CSCS include all of those listed in the Chamise Chaparral and CSS sections, above. The biological resource value of this habitat-type is moderately high.

4. Southern Willow Scrub (Holland Code 63320). A very small patch of Southern Willow Scrub (SWS) vegetation is found near the central-western property boundary in a lateral drainage that enters the site from the northwest. Several small Southwestern Willows (*Salix gooddingii*) dominate this habitat-type, which also supports Deer Grass (*Muhlenbergia rigens*) and Mule Fat (*Baccharis glutinosa*). The patch of SWS is approximately 20 feet by 8 feet in size. The biological resource value of this habitat-type is high.

5. Disturbed Habitat (Holland Code 11300). A graded dirt road crosses through the southern portion of the site, eventually exiting at the property's central eastern boundary. This road consists of bare dirt and qualifies as supporting Disturbed Habitat. There are graded areas associated with the road – these also qualify as supporting Disturbed Habitat. The biological resource value of this habitat type is low.

6. Urban/Developed Habitat (Holland Code 12000). Urban/Developed Habitat is found at the southeastern property corner in the form of two trailers and associated older ornamental vegetation. The biological resource value of this habitat-type is low.

7. Freshwater Seep (Holland Code 45400). A tiny patch of Freshwater Seep vegetation is found beneath several large boulders near the center of the property on the boulder-dominated south-facing slope. This habitat-type is indicated by a stand of Cattails (*Typha angustifolia*) and Stachys (*Stachys rigida*). At the time of the field surveys this area supported standing water, indicating that water is available in this location year-round. The Freshwater Seep measures approximately 12 feet by 8 feet in size. The biological resource value of this habitat-type is high.

8. Non-native Grassland (Holland Code 42200). As discussed above, portions of the onsite CSS exhibit a strong infusion of weedy species (Wild Oat, Black Mustard, the various brome grasses) that recruited into the habitat following the Cedar Fire. Areas that are dominated by these species are mapped as sub-sere Non-native Grassland (NNG), which is a less sensitive habitat-type than CSS. Attachment A of this report presents a discussion of the NNG associated with the site. The biological resource value of this habitat-type is moderate.

Wetlands

The site supports several drainages, the largest of which runs through the center of the site from northeast to southwest. This main drainage supports occasional hydrophytes, such as Mule Fat and others. Several lateral drainages, which drain the northern and southern slopes of the site, intersect the main drainage at various places along its length. The western-most lateral drainage supports a small area of SWS vegetation. Portions, or all, of the onsite drainages likely qualify as "waters of the state", "waters of the U.S.", and state (California Department of Fish and Game) wetlands. The area mapped as Freshwater Seep likely also qualifies as "waters of the state", "waters of the U.S.", and state wetlands. It is possible that the SWS and Freshwater Seep area also qualify as U.S. (Army Corps of Engineers) wetlands, although the xeric conditions of the site suggest otherwise. Determining the proper designations for the onsite drainages would require a formal jurisdictional wetland delineation, which may be required by the various regulatory agencies should you choose to move forward with conservation of this property as a formal Mitigation Bank.

Sensitive Species

One sensitive plant species, Palmer's Goldenbush (*Ericameria palmeri*), was detected onsite during the updated biology survey. An unusual population of this very rare plant was detected above the main drainage near the western end of the property. All specimens in this population lack ray flowers.

Six sensitive animal species were observed onsite. These are California Gnatcatcher *(Polioptila californica)*, San Diego Coast Horned Lizard *(Phrynosoma coronatum blainvillei)*, Southern California Rufous-crowned Sparrow (*Aimophila ruficeps canescens*), Golden Eagle (*Aquila chrysaetos*), Mule Deer (*Odocoileus hemionus*), and Granite Night Lizard (*Xantusia henshawi henshawi*). An updated California Gnatcatcher survey was completed in 2012, the results are included in this report as Attachment B. Additional sensitive species certainly occur onsite – these should be searched for during the spring and at other times of the year using different survey techniques. For a complete list of plants and animals detected onsite, see Table 1 at the end of this report.

Conclusions and Recommendations

At this time, the site appears to support an opportunity for conservation banking. Credits which could possibly be offered include:

1. Chamise Chaparral acreage-credits (preservation credits)
2. "occupied" CSS acreage-credits (California Gnatcatcher habitat preservation credits)
3. CSCS acreage-credits (preservation credits)
4. NNG acreage-credits (preservation credits)
5. SWS acreage-credits (preservation credits)
6. Palmer's Goldenbush (narrow endemic species preservation credits)

The wetlands (SWS and Freshwater Seep) are very small, and are considered a part of the adjoining habitat with respect to the assignment of preservation credits. The value of the Palmer's Goldenbush, along with probably other sensitive species, would be in providing an offsite mitigation property that supports these species. This is required for species-based mitigation programs as implemented by the City and County of San Diego.

Thanks for the opportunity to provide this preliminary assessment. Please contact us if you have any questions.

Figure 1. Habitats – Bertram Property

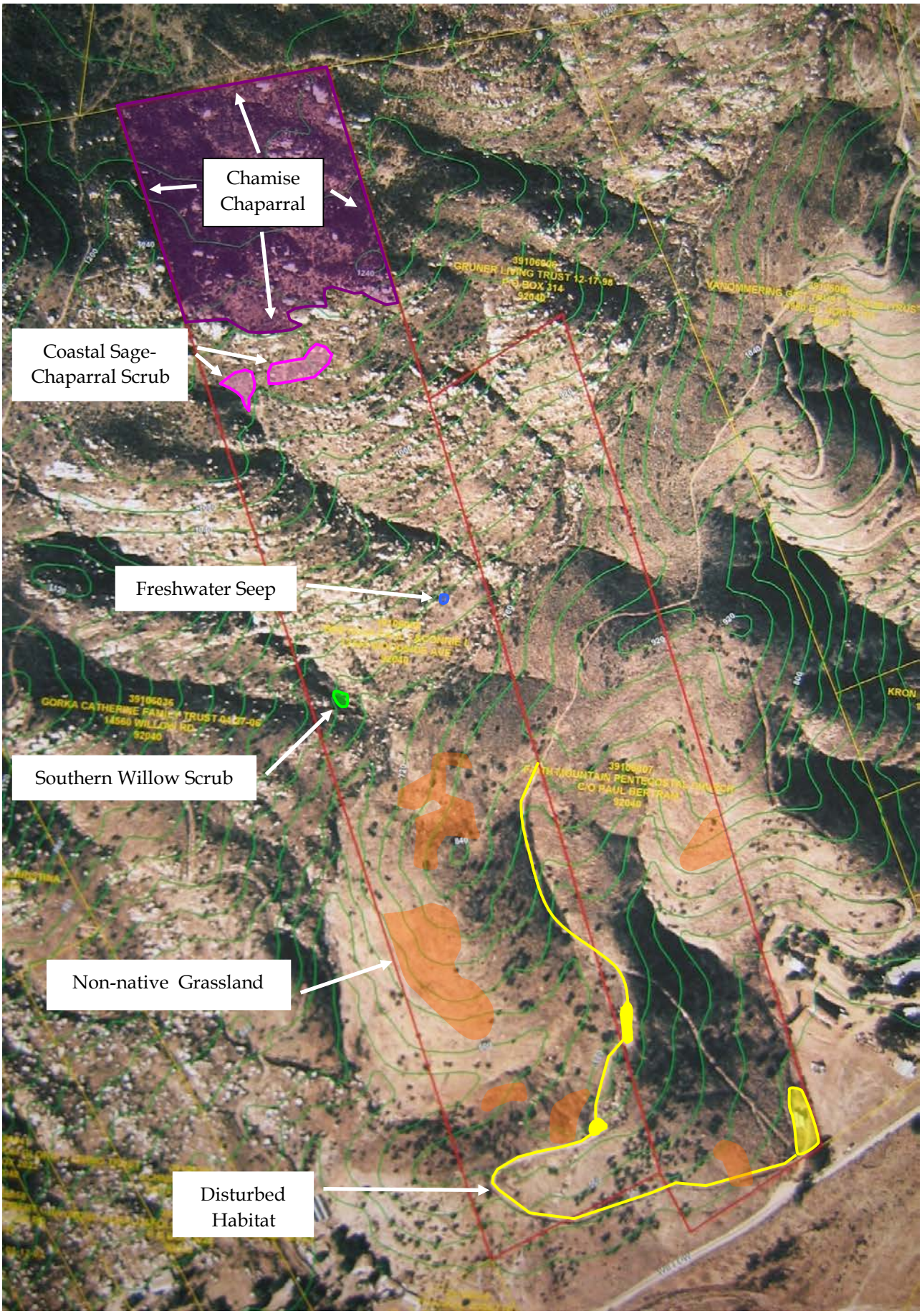

Table 1. Flora and Fauna Detected – Bertram Property

Scientific Name	Common Name
Plants	
Amsinckia intermedia	Fiddleneck
Antirrhinum nuttallianum	Nuttall's Snapdragon
Artemisia californica	California Sagebrush
Avena barbata *	Slender Wild Oat
Avena fatua *	Wild Oat
Baccharis glutinosa	Mule Fat
Baccharis sarothroides	Broom Baccharis
Brassica geniculata *	Perennial Mustard
Brassica nigra *	Black Mustard
Brassica tournefortii *	Saharan Mustard
Brickellia californica	California Brickellbush
Bromus diandrus *	Ripgut Brome
Bromus mollis *	Soft Brome
Bromus rubens *	Foxtail Brome
Calystegia macrostegia	Morning Glory
Camissonia bistorta	Southern Sun Cup
Camissonia californica	False Mustard
Carya illinoinensis	Pecan
Caulanthus heterophyllus	Slender-pod Mustard
Ceanothus leucodermis	Buck-brush Lilac
Centaurea melitensis *	Tocalote
Chaenactis artemisiaefolia	White Pincushion
Chaenactis glabriuscula	Yellow Pincushion
Chamaesyce albomarginata	Rattlesnake Spurge
Cheilanthes newberryi	Cotton Fern
Chenopodium murale *	Goosefoot
Chrysanthemum sp.*	Chrysanthemum
Clematis sp.	Clematis
Collinsia heterophylla	Chinese Houses
Conyza canadensis *	Common Horseweed
Cryptantha intermedia	Common Cryptantha
Cucurbita foetidissima	Stinking Gourd
Cuscuta sp.	Dodder
Cynodon dactylon *	Bermuda Grass
Datura meteloides *	Jimsonweed
Daucus pusillus	Rattlesnake Weed
Descurainia sp.	Tansy Mustard
Dichelostemma pulchellum	Blue Dicks
Distichlis spicata	Desert Salt Grass
Dudleya pulverulenta	Chalk Live-forever
Eremocarpus setigerus	Dove Weed
Ericameria palmeri	**Palmer's Goldenbush**
Eriogonum fasciculatum	Flat-top Buckwheat
Eriophyllum confertiflorum	Golden Yarrow
Erodium botrys *	Long-beaked Stork's-bill
Erodium cicutarium *	Red-stem Stork's-bill
Erodium sp.	Stork's-bill
Eucalyptus camaldulensis *	Murray Red Gum
Festuca megalura *	Foxtail Fescue
Filago californica	California Filago
Filago gallica *	Narrow-leaf Filago

Table 1. Flora and Fauna Detected – Bertram Property

Scientific Name	Common Name
Plants (cont)	
Galium angustifolium	Narrow-leaf Bedstraw
Gastridium ventricosum *	Nitgrass
Gnaphalium bicolor	Bicolor Cudweed
Grevillea robusta *	Silk Oak
Gutierrezia sp.	Matchweed
Hazardia squarrosa	Hazardia
Helianthemum scoparium	Rock Rose
Helianthus annuus *	Common Sunflower
Helianthus gracilentus	Slender Sunflower
Heterotheca grandiflora	Telegraph Weed
Hordeum murinum *	Wild Barley
Hypochaeris glabra *	Smooth Cat's-tongue
Isocoma menziesii	Coastal Goldenbush
Juglans sp.	Walnut
Lactuca serriola *	Wild Lettuce
Lamarckia aurea *	Goldentop
Lathyrus laetiflorus	Chaparral Pea
Lepidium sp.	Peppergrass
Lepidospartum squamatum	Scale-broom
Lotus hamatus	Grab Lotus
Lotus scoparius	Deerweed
Lotus strigosus var. *strigosus*	Bishop's Lotus
Lupinus bicolor	Bicolor Lupine
Lupinus hirsutissimus	Stinging Lupine
Lupinus truncatus	Collar Lupine
Malacothamnus densiflorus	Bush Mallow
Malosma laurina	Laurel Sumac
Malva parviflora *	Cheeseweed
Marah macrocarpus	Man Root
Marrubium vulgare *	Horehound
Melica frutescens	Tall Melic
Mirabilis californicus	Wishbone Bush
Muhlenbergia microsperma	Small-seed Muhly
Muhlenbergia rigens	Deer Grass
Nemophila sp.	Blue-eyes
Nicotiana glauca *	Tree Tobacco
Opuntia littoralis	Prickly Pear
Pellaea andromedifolia	Coffee Fern
Pennisetum setaceum *	African Fountain Grass
Penstemon spectabilis	Showy Penstemon
Phacelia cicutaria hispida	Caterpillar Phacelia
Phacelia parryi	Parry's Phacelia
Phacelia ramosissima	Phacelia
Pholistoma sp.	Fiesta Flower
Polypogon monspeliensis *	Rabbitfoot Grass
Porophyllum gracile	Odora
Quercus agrifolia	Coast Live Oak
Quercus berberidifolia	Interior Scrub Oak
Rhamnus pilosa	Interior Redberry
Salix gooddingii	Southwestern Willow
Salsola pestifer *	Russian Thistle

Table 1. Flora and Fauna Detected – Bertram Property

Scientific Name	Common Name
Plants (cont)	
Salvia apiana	White Sage
Salvia columbariae	Chia
Sambucus mexicanus	Elderberry
Schinus molle *	Peruvian Peppertree
Schismus barbatus *	Schismus
Scrophularia californica	Bee Plant
Selaginella bigelovii	Bigelow's Spikemoss
Silene gallica *	Common Catchfly
Silene sp.	Catchfly
Sisymbrium altissimum *	Tumble Mustard
Sonchus asper *	Sow Thistle
Sonchus oleraceus *	Sow Thistle
Stachys rigida	Stachys
Stephanomeria virgata	Stephanomeria
Stipa pulchra	Purple Stipa
Trichostema lanceolatum	Vinegar Weed
Trifolium sp. *	Clover
Typha angustifolia	Cattails
Urtica urens *	Dwarf Nettle
Vicia sp.	Vetch
Xylococcus bicolor	Mission Manzanita
Yucca whipplei	Our Lord's Candle
Birds	
Aimophila ruficeps canescens	**So. Cal. Rufous-crowned Sparrow**
Ammodramus sandwichensis	Savannah Sparrow
Aquila chrysaetos	**Golden Eagle**
Archilochus anna	Anna's Hummingbird
Buteo jamaicensis	Red-tailed Hawk
Carduelis psaltria	Lesser Goldfinch
Carpodacus mexicanus	Housefinch
Columbia livia	Rock Dove
Corvus corax	Common Raven
Pipilo crissalis	California Towhee
Polioptila caerulea	Blue-gray Gnatcatcher
Polioptila californica	**California Gnatcatcher**
Thryomanes bewickii	Bewick's Wren
Mammals	
Canis latrans	Coyote
Lynx rufus	Bobcat
Neotoma sp.	Woodrat
Odocoileus hemionus	**Mule Deer**
Spermophilus beecheyi	California Ground Squirrel
Sylvilagus audubonii	Desert Cottontail Rabbit
Thomomys bottae	Valley Pocket Gopher
Urocyon cinereoargenteus	Gray Fox
Butterflies	
Apodemia mormo virgulti	Behr's Metalmark
Brephidium exile	Pygmy Blue

Table 1. Flora and Fauna Detected – Bertram Property

Scientific Name	Common Name
Butterflies (cont)	
Icaricia acmon	Acmon Blue
Pontia protodice	Common White
Strymon melinus	Gray Hairstreak
Reptiles	
Phrynosoma coronatum blainvillei	**San Diego Coast Horned Lizard**
Uta stansburiana	Side-blotched Lizard
Xantusia henshawi henshawi	**Granite Night Lizard**

* denotes non-native taxon
bold denotes sensitive taxon

Attachment A.
Non-native Grassland Delineation Memo

Vincent N. Scheidt

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Memorandum

To: Mr. Paul Bertram

From: Vince Scheidt, Biological Consultant

Date: February 5, 2014

RE: Non-native Grassland on the Bertram Conservation Bank Property, APN 319-060-05 & -07

Per the request of Dave Lawhead with the California Department of Fish and Wildlife, we have attempted to reasonably separate the Non-native Grassland (NNG) element from the Coastal Sage Scrub (CSS) element on the approximately 71-acre APN 319-060-05 & -07 (Bertram Conservation Bank) property. The intent of this was to broadly map and calculate the acreages of "pure" NNG vs. "pure" CSS, as much of this habitat appears to be ecotonal and successional due to the 2003 Cedar Fire.

As reported, portions of the onsite CSS exhibit a strong infusion of weedy species (Wild Oat, Black Mustard, the various brome grasses) that recruited into the habitat following the fire. Large-block areas that are overwhelmingly dominated by these species are now mapped as NNG. As a result of this, the total amount of CSS has been reduced by 2.9 acres, and a new category (NNG), totaling 2.9 acres has been identified and mapped (Figure 1).

The onsite habitat acreage now consists of:

Habitat-type	Prior Acreage-Credits	Current Acreage-Credits
Chamise Chaparral	9.4	9.4
Diegan Coastal Sage Scrub	60.2	57.2
Coastal Sage–Chaparral Scrub	0.5	0.5
Non-native Grassland	--	2.9
Southern Willow Scrub	trace (0.04)	--
Fresh Water Seep	trace (0.02)	--
Disturbed	0.9	--
Total	**71.06**	**71.00**

Please contact us if you have any questions.

Figure 1. Non-Native Grassland Habitat – Bertram property

Attachment B.
California Gnatcatcher Survey Report

REPORT OF A PROTOCOL FIELD SURVEY
FOR
CALIFORNIA GNATCATCHER
(*POLIOPTILA CALIFORNICA*)

THE BERTRAM PROPERTY, APN 319-060-05 & -07
LAKESIDE, CALIFORNIA

Prepared for

Mr. Paul Bertram
9119 Dulene Drive
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Prepared by

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November 2012

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TE788133

INTRODUCTION

The Bertram Property, APN 319-060-05 & -07, consists of two adjoining parcels totaling approximately 71 acres. The property is located north of Willow Road in the Lakeside area of unincorporated San Diego County, California (Figure 1). The intent of this survey was to evaluate onsite California Gnatcatcher presence in conjunction with conserving the property by establishing an informal or formal (agency-approved) Conservation Bank or other habitat preserve.

Because the Bertram Property supports Coastal Sage Scrub (CSS), the property was surveyed for the presence of California Gnatcatcher (*Polioptila californica*), a federally-listed Threatened Species, which is known to inhabit this habitat-type. The results of this survey are presented in this report.

GOAL OF STUDY

The goal of the study was to survey the Bertram Property for the presence or absence of California Gnatcatchers. Any other sensitive species detected during the surveys would be documented. This directed study is provided pursuant to the current U.S. Fish and Wildlife Service (FWS) survey protocol recommendations for this species.

Protocol surveys for California Gnatcatcher have not been completed in the past. However, gnatcatchers were noted on this site in 2010 during general biology surveys completed by the author (VS) for an unrelated land-use project that was being considered at that time. Vocalizations characteristic of this species were detected on the southeastern portion of the property (Figure 2).

METHODS

Fieldwork associated with this study consisted of a series of three focused reconnaissance site visits. All surveys were conducted by the author (VS), in possession of Federal 10 (a)(1)(a) Recovery Permit TE788133. Brandon Myers (BM), Field Assistant, assisted with the study. Field surveys were completed by slowly walking random transects through all areas of potential habitat. Specimens were visually searched for at all times, and playback calls of this species were broadcast using a hand-held minicassette tape player to assist with the detection of specimens. Weather conditions were conducive to California Gnatcatcher field surveying on each of the selected dates. Particular attention was paid to areas that had the highest probability of supporting this species, based on the experience of the surveyor. Binoculars were used to aid in observations, and all avifauna detected were noted (Table 1).

Surveys were completed on the following dates and under the following survey conditions:

Date	Hours	Personnel	Conditions
30 October 2012	07:45 – 11:30	VS, BM	Clear skies; high 40°s to high 60°s; no wind
6 November 2012	07:45 – 11:30	VS, BM	Clear skies; low 60°s to mid 70°s; no wind
15 November 2012	07:30 – 11:30	VS, BM	Overcast skies; low to mid 60°s; light northwest wind

RESULTS

California Gnatcatcher Habitat Assessment

The Bertram Property supports moderate to high quality CSS. Indicator plant species present in the habitat include Flat-top Buckwheat (*Eriogonum fasciculatum*), California Sagebrush (*Artemisia californica*), Laurel Sumac (*Malosma laurina*), and many others. Also present are areas of Southern Willow Scrub, Chamise Chaparral, and Non-native Grassland. All of these adjoin the onsite CSS.

The Bertram Property burned in 2003, which removed all surface vegetation. However, by the time of the current directed survey (2012), most of the vegetation had regrown. At this time, many area of the site may be characterized as seral, which is an intermediate stage in an ecosystem advancing towards its climax community structure. With respect to gnatcatcher occupancy, the quality of the onsite habitat is presently considered moderate, based on sere, elevations, slope, aspect, and edge effects.

California Gnatcatcher Breeding Surveys

The initial detection of California Gnatcatcher on the Bertram property occurred on July 12, 2010. This consisted of vocalizations which were heard near the southeastern end of the property (see Figure 2). In 2012, a single mature male California Gnatcatcher was observed the Bertram Property on the third day of surveying (Figure 2). No specimens were detected on either of the previous days during the protocol survey in spite of careful surveying. The project site is considered “occupied” by this federally-listed Threatened Species.

Additional Special Status Species

Various additional Special Status Species were detected during the surveys of this site. This includes Palmer’s Goldenbush *(Ericameria palmeri)* (see Figure 2), Southern California Rufous-crowned Sparrow *(Aimophila ruficeps canescens),* San Diego Coast Horned Lizard *(Phrynosoma coronatum blainvillei)*, Golden Eagle (*Aquila chrysaetos*), Mule Deer (*Odocoileus hemionus*), and Granite Night Lizard (*Xantusia henshawi henshawii).* Most of these species were represented onsite by multiple observations.

Table 1. Avifauna Detected - The Bertram Property

Scientific Name	Common Name
Aimophila ruficeps canescens	Southern California Rufous-crowned Sparrow
Archilochus anna	Anna's Hummingbird
Bubo virginianus	Great Horned Owl
Buteo jamaicensis	Red-tailed Hawk
Carduelis psaltria	Lesser Goldfinch
Carpodacus mexicanus	Housefinch
Chamaea fasciata	Wrentit
Circus cyaneus	Northern Harrier
Corvus corax	Common Raven
Dendroica coronata	Audubon's Warbler
Pipilo crissalis	California Towhee
Polioptila californica	California Gnatcatcher
Psaltriparus minimus	Bushtit
Thryomanes bewickii	Bewick's Wren
Zonotrichia leucophrys	White-crowned Sparrow

Figure 1. Regional Location - The Bertram Property:

Portion of the U.S.G.S. "San Vicente Reservoir, California" 7.5' Quadrangle Map

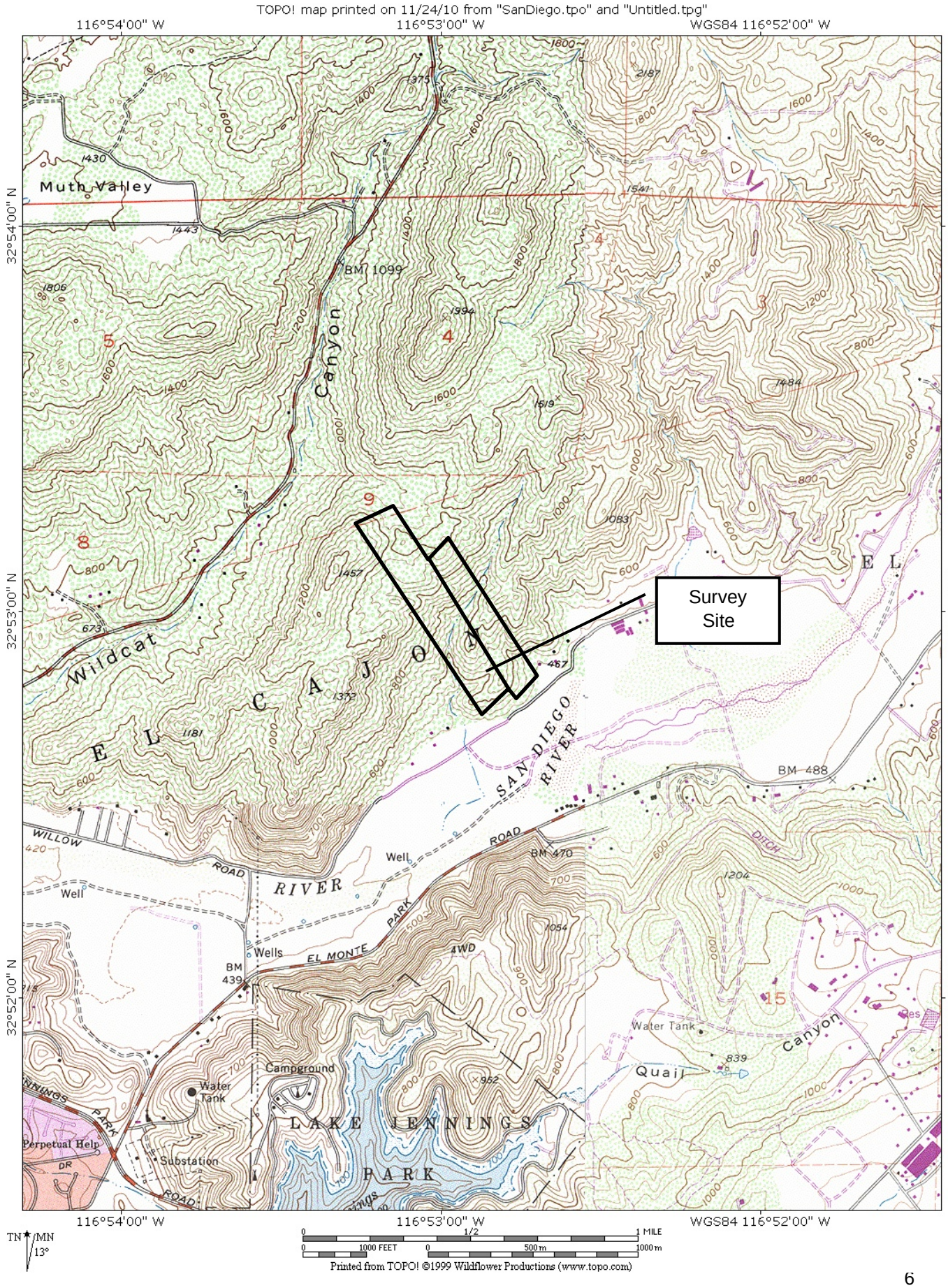
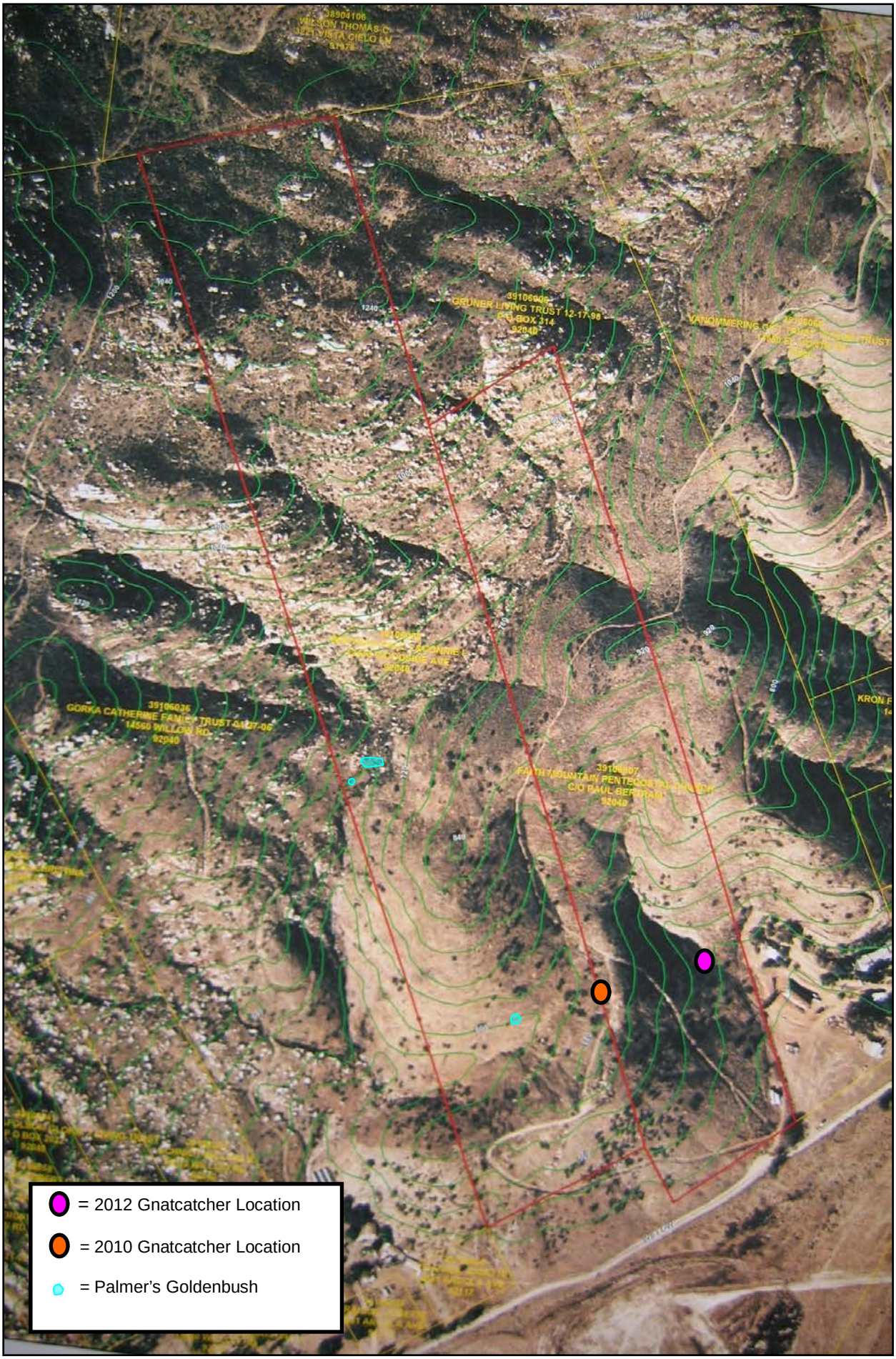


Figure 2. California Gnatcatchers and Palmer's Goldenbush Locations (2010 and 2012)



WILLOW ROAD CONSERVATION BANK
FENCING AND SIGNAGE PLAN

OVERVIEW

The purpose of the Willow Road Conservation Bank Fencing and Signage Plan is to protect the conservation bank property from unauthorized intrusions. Consequently fencing and signage are planned for areas where intrusions are most likely. Fencing and signage locations are show on Attachment B.

Chain link fence (eight feet high) and an accompanying locked gate and signage are proposed at Willow Road on the property's south boundary. This is the point that is most accessible to entry and at which the most significant protections are proposed. The fence will extend for 60** feet along the frontage with Willow Road. The fence will not be a significant detriment to wildlife movement because it is limited in length, and is designed to allow wildlife movement,

High-tensile wire fencing and signage is also proposed for approximately100 feet along the western and eastern boundaries from the frontage. The fencing is proposed to ensure that no intrusions take place around the frontage fencing.

Signage will be employed at 100 foot intervals along the western and eastern boundaries from the frontage north for approximately ** feet. The purpose it to deter accidental entry from adjacent properties. Signage is not needed beyond the ** foot point because the land becomes very steep as it ascends to the northern ridge.

HIGH-TENSILE WIRE FENCING

High-tensile smooth-wire fencing has become increasingly popular in the United States because it has a longer life and costs less to buy and install than nearly all other types of high-quality, conventional fencing. High-tensile wire fence systems were first developed in New Zealand over 40 years ago. The fencing is called "high-tensile" because it is constructed of high tensile wire that can be strung extremely taut without breaking and "smooth wire" because the wires aren't barbed. Due to the greater tensile strength of the strands, high-tensile wire can be pulled much tighter than standard wire. High-quality brands of high-tensile wire fencing can withstand over 1,800 pounds of pressure or low temperature contraction without losing elasticity, yet the wire is flexible enough to bend, wrap, and tie in knots during construction. It is normally 12 or 12 ½ gauge, type III galvanized, and rated at 170,000-200,000 psi. If properly installed, the fence should last in excess of 50 years in dry climates and still retain 50% or more of its original wire diameter.

A high-tensile wire fence consists of wires held in tension along wooden, steel, or poly-plastic posts with battens or stays in between. High-tensile wire fencing has several advantages over conventional fencing methods. High-tensile wire is easy to handle, has a neat appearance, and requires little maintenance after installation. Perhaps most important, high-tensile wire fencing is safer for wildlife. Also, the high elastic limit of high-tensile wire reduces the common stretch and sag problems associated with conventional fence wire.

Vinyl Coated Wire

Vinyl coated wire is available to increase fenceline visibility, which helps prevent wildlife injury and fence damage. It is recommended that a single, white colored strand be utilized as the top wire during fence construction. The vinyl coating comes in several thicknesses, ranging from 3/16" and up. The internal strand must be high-tensile wire. It has been found that vinyl coated wire will dramatically reduce wildlife damage to fences of all heights.

Fence Posts

Posts are available in wood, steel, and poly-plastics. Wooden posts are available as either treated or untreated. If using untreated posts, tree species that are resistant to decay such as black locust, red cedar, Osage orange or catalpa must be utilized. Wooden posts should be 8 inches or larger in diameter for corner posts and 4 inches or larger in diameter for line posts. Steel posts have a flange at the base for added stability and studs or grooves that support the wire. They must be galvanized. Poly-plastic posts are best used as line posts with wooden or steel posts being used at the corners and at predetermined intervals along each section.

Spacing of Wire and Posts

High-tensile wire should start 16+ inches above the ground and be spaced at 16 inches, 38 inches, and 60 inches to the top of the post. Approximately 250 pounds of pressure should be placed on each strand of the fence but wire should not be overstretched. Over stretched wire may break and recoil. Eye and hand protection must always be used when installing or maintaining high-tensile wire fences.

Corner, gate, and brace posts should be wooden or steel, spaced 8-10 feet apart, and set 36 inches in the ground. High-tensile fences require strong and secure corners and end braces due to the tension being placed on the wire. Wooden line posts should be set 24 inches in the ground, while steel line posts should be buried past the flange. Line posts should be spaced a maximum of 50 feet apart for high tensile wire. When using 50 foot spacing with high tensile wire, 42-inch fiberglass stays or treated wooden line braces (droppers) should be placed at 10-foot intervals between each line post and more frequently if needed.

Double corner braces are set to lean 2 in. out of plumb and away from the direction of pull. The proper construction of "H brace" corners are critical factors in building high-tensile wire fences since the wire can exert over almost 2 tons of pull on the posts. If the ground is soft or noncohesive, the corner posts must be set in concrete, triple braced, or both.

The high tensile wire is installed in the following manner. Each individual strand of wire is first strung out along the fence. Next, the wire is attached to the corner post by wrapping it around the corner or gate post and crimping the end back upon itself with at least 2 crimping sleeves. The wires are then cut in the middle of each strand and an in line fence strainer (tensioner) is installed on the wire using crimping sleeves to close the splice. Each wire is then slightly tightened to remove the slack. The wire is then stapled or otherwise attached to the line posts. With wooden line posts, it is best to use 2 in. galvanized fence staples. It is important not to drive the staples “home” or tight against the wire. The wire should be able to slide freely back and forth between the staple and the post. After all the wires have been stapled, each wire is tightened to 250 lbs. of tension. A tension indicator spring should be installed to determine the proper tension on at least one of the wires. It acts as a calibration device to allow adjustments of the proper tension for the remaining wires. The complete fence should be re adjusted periodically to maintain the tension. Sometimes, the fence can become too tight in the winter or too loose in the summer, depending on temperatures. Also, the corner post can settle over time. Re-tightening the fence is as simple as adjusting the in line fence strainers with a wrench.

The completed high tensile wire fence is extremely strong and resistant to damage by wildlife, etc. If the fence does become loose, it is a very simple task to retighten.

Check list:

Bottom wire @ approximately 16 inches above the ground
Center wire @ 38 inches above the ground
Top wire @ 60 inches above the ground
Top strand white vinyl covered high-tensile wire
All wire pulled to 250 pounds of tension
Wire tensioners installed on each strand; one per brace section

Typical Signage Detail – Open Space Fencing

Permanent, high visibility metal signs shall be placed at 100-foot intervals along all segments of the Open Space Fence. These signs shall read:

KEEP OUT
NO TRESPASSING
Sensitive Environmental Resources
Access Restricted by Conservation Easement
Unauthorized entry is prohibited.
INFORMATION:
Contact Habitat Manager,
[TBD]
www.willowroadconservationbank.com

This property contains California Gnatcatchers,
a species protected by the Federal Endangered Species Act.
The penalty for harming or killing a protected species
can be a maximum fine of up to $50,000
or imprisonment for one year, or both.

Evidence that permanent fencing and signage has been properly installed shall consist of a signed, stamped statement from a California Registered Engineer or licensed land surveyor and the project biologist certifying that the permanent fence/wall has been placed to protect the WRCB from inadvertent disturbance associated with grading, brushing, or clearing. Photographs and a brief description of design and material used shall be submitted along with the statement from the California Registered Engineer or licensed surveyor and project biologist. A permanent fencing plan shall be submitted to the Wildlife Agencies and WRCB Administrator for review and approval prior to its installation

Typical Fencing Detail – Open Space Fencing

Wire:
- HTSW; 12-gauge; type III galvanized; rated @ 170,000-200,000 psi
- 1,350 lbs breaking strength (minimum)
- Top wire white vinyl coated HTSW
- Tensioned to 250 pounds

Line Posts:- spaced @ 50 feet (maximum, depending on terrain)

Droppers: - spaced at 10 feet

Height: - 60 inches

Braces: - (not shown) one set per 1,320 running feet (maximum separation)

Tensioners: - (not shown) one set of three (one each strand) per brace section

Installation: - experienced, professional ONLY

Fencing Design and Location are shown below: