EXHIBIT C-1

Bank Development Plan

Soquel Canyon Mitigation/Conservation Bank
Chino Hills, San Bernardino & Orange Counties, California

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wra
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1.0 GOALS

This Bank Development Plan has been prepared for the 313 acre Soquel Canyon Mitigation Bank (Bank), located within the city limits of Chino Hills in the southwestern corner of San Bernardino County with one small (7 acre) portion in unincorporated northern Orange County (Figure 1). The purpose of this document is to govern the activities required to be conducted on the Bank to establish Credits. The Bank is a Waters of the U.S., Waters of the State, and Covered Habitat bank that will be able to provide credits for impacts for resources under jurisdiction of the Army Corps of Engineers, the Regional Water Quality Control Board and the California Department of Fish and Wildlife as well impacts under the California Environmental Quality Act.

The goals of the Bank are to:

1) Restore, enhance and maintain ideal habitat conditions to encourage the proliferation of the special status species, currently or historically, on the Bank Property;

2) To preserve and restore stream and riparian habitat;

3) To allow the restoration and enhancement of riparian habitat, and the enhancement of streams and stream buffers; and

4) To allow the sale of Credits as off-site compensatory mitigation for any of the following impacts within the Service Areas:

    a) unavoidable impacts to Waters of the U.S., including wetlands, which result from activities authorized under Section 404 of the Clean Water Act (hereinafter "Section 404");

    b) mitigation for impacts to wetland and wildlife resources, and sensitive natural communities, under the applicable sections of the California Environmental Quality Act, Public Resources Code Section 21000 et seq. in the form of Covered Habitat Credits;

    c) unavoidable impacts to Waters of the State of California which result from activities authorized under Section 1602 et seq. of the California Fish and Game Code (hereinafter "Section 1602"); and

    d) unavoidable impacts which result from activities authorized under Section 401 et seq. of the Clean Water Act and the Porter Cologne Act (hereinafter "Section 401").

There are 79,911 linear feet of streams located throughout the Bank property, of which 41,049 linear feet are Waters of the U.S. and Waters of the State, the remaining 38,862 linear feet of streams are Waters of the State only. These streams include perennial, ephemeral and intermittent streams and their associated riparian habitats. Riparian habitats within the Bank property are generally comprised of mulefat (*Baccharis salicifolia*) scrub, coast live oak (*Quercus agrifolia*) woodlands, California walnut (*Juglans californica)* woodlands, and blue

elderberry (*Sambucus nigra*)/toyon (*Heteromeles arbutifolia*) habitats that are within the floodplains of or adjacent to on-site streams. Some of the riparian habitats have the potential to support least Bell's vireo (*Vireo bellii pusillus)*. In addition, the Bank property contains coastal sage scrub, a sensitive habitat that has the potential to support California coastal gnatcatcher (*Polioptila californica*). While these species have not been observed within the Bank Property, management and improvement of habitat for these species will be a main objective, with the intent of encouraging colonization by California coastal gnatcatcher and least Bell's vireo.

Several types of Credits are proposed to be developed and sold to offset unavoidable impacts to Waters of the .US, Waters of the State, and Covered Habitats. Covered Habitats are those biological communities that are afforded special consideration under CEQA, all vegetation alliances with a State ("S) ranking of S1 through S3, and/or designated with a star (*) in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), and/or jurisdictional under Section 1602 of the California Fish and Game Code. These include stream, riparian, oak woodland, coastal sage scrub, chaparral, and California walnut. It is proposed that restoration and/or enhancement Credits be earned through the implementation of this Development Plan.

1.1 Responsible Parties

The Property Owner is:	Land Veritas I, LLC 1001 Bridgeway #246 Sausalito, CA 94965 Tracey Brownfield	(415) 729-3734
The Bank Sponsor is:	Land Veritas Corp 1001 Bridgeway #246 Sausalito, CA 94965 Tracey Brownfield	(415) 729-3734

2.0 BANK PROPERTY

2.1 Bank Location

The Bank Property is located within the city limits of Chino Hills in the southwestern corner of San Bernardino County with one 7 acre portion in unincorporated northern Orange County. The Bank Property is approximately 313 acres located in the Yorba Linda USGS quadrangle, north of Chino Hills State Park, west of the City of Chino Hills and South of Carbon Canyon Road, in San Bernardino and Orange Counties, California. The Bank Property is shown on the general vicinity map (Figure 1) and the Bank Property Map (Figure 2).

2.2 Ownership Status

The Bank Property is owned outright by Land Veritas I, LLC. It is proposed that the Bank Property will continue to be owned by the existing owners. The holder of the Conservation Easement will be Riverside Land Conservancy, a non-profit entity.

2.3 Existing Conditions of Bank Property

The Bank contains diverse habitats including streams, woodlands, scrubland and herbaceous vegetation. A large portion of the Bank Property supports grazed habitats on slopes with intermixed coastal scrub communities. Soquel Canyon Creek bisects the Bank property at its lowest elevation and supports riparian habitat with black walnut and oak woodlands interspersed with mulefat (Figure 3).

Several biological studies have been conducted within the Bank property, including:

- Biological Resources Inventory (WRA: 2011);
- Wetland Delineation Report (WRA: 2011-updated 2013);
- California Gnatcatcher and Least Bell's Vireo Surveys (Element Ecology Consulting, Inc: 2011); and
- Rare Plant Surveys (WRA: 2011).

Based upon the biological studies performed by WRA, the Bank Property is known to support sensitive habitats including streams, riparian habitat, sensitive natural communities and potential habitat for several special status species (Table 1).

Elevations within the Bank Property range from approximately 900 to 1,600 feet. The site has steep slopes which supported extensive coastal scrub communities before the Freeway Complex Fire in November 2008, which heavily burned the Bank Property as well as the adjacent Chino Hills State Park. The vegetation and habitat are recovering quickly and support a variety of wildlife (Figure 3).

Table 1: Pre-existing Habitats

Biological Community	Hydro-period / Sensitivity	Acreage	Linear feet
Non-wetland waters	Ephemeral streams (R4SB2/R4SB4/R4SB7)	3.89	67,842
	Intermittent streams (R4SB2/R4SB4)	1.45	8,610
	Perennial streams (R3UB2)	2.05	3,459
TOTAL		**7.39**	**79,911**
Woodland	Sensitive	83.08	N/A
	Non-sensitive	0.0	N/A
Scrubland	Sensitive	106.72	N/A
	Non-sensitive	85.49	N/A
Herbaceous	Sensitive	4.27	N/A
	Non-sensitive	33.8	N/A
TOTAL		**313.36**	**N/A**

The Bank Property supports several large canyons with ephemeral and intermittent drainages as well as the perennial stream in Soquel Canyon known as Soquel Canyon Creek (Figure 4). The Bank Property is unique in that it lies within both the Santa Ana River and San Gabriel River watersheds. A downstream diversion operated by the Orange County Flood Control Division at Miller Basin redirects downstream flows into both the Santa Ana and San Gabriel Rivers.

The soils within the Bank Property consist of sandy alluvium and residuum. These friable soils are moderately to severely susceptible to erosion, the effects of which can be observed throughout the site where fire and grazing effects have caused landslides and gullies.

A review of historical aerial photographs indicates that the Bank Property was dominated by chaparral and coastal scrub communities before the Freeway Complex Fire of 2008. The vegetation within the Bank Property is cismontane woodland, chaparral, coastal scrub, riparian scrub, and valley and foothill grasslands typically situated in the Mediterranean climate zone of California. Woody vegetation is comprised predominantly of serrotonous species germinating or stump-sprouting following fire, while herbaceous vegetation is a mix of common chaparral species of all seral stages and non-native invasive species adapted to disturbance. Overall, the vegetation appears to be in an early to mid-seral stage following the disturbance of the most frequent fire, the Freeway Complex Fire, with charred trunks on shrubs and trees, apparent stump-sprouting, the presence of disturbance adapted non-native herbaceous species, and early seral native species (e.g. deer weed [*Acmispon glaber*]), grape soda lupine [*Lupinus*

excubitus], and herbs (e.g. branching phacelia [*Phacelia ramosissima*]). The majority of the Bank Property appears to be recovering well; however, some areas of coastal sage scrub would benefit from restoration activities to promote the re-growth of California sagebrush. Soquel Canyon Creek bisects the Property and this stream along with the tributaries that feed into it support riparian habitat with mulefat, blue elderberry, and black walnut and oak woodlands. Invasive non-native plants occur within the Bank Property, such as tocalote (*Centaurea melitensis*) and Peruvian peppertree (*Schinus molle*). Thirty-seven plant species considered invasive by the California Invasive Plant Council (Cal-IPC; Cal-IPC 2006) were observed within the Bank Property. Locations of these and other non-native plant species are shown on Figure 5 and species with moderate to high threat concern are presented in Table 2. Additionally, several species (black mustard, grasses and Italian and milk thistle) were ubiquitous throughout the Bank Property and/or were characteristic species of defined alliances, and therefore were not mapped.

Table 2. Invasive plant species threats in the Bank Property

Species	**Estimated Acreage/ No. of Individuals**
blue gum	7 individuals
Peruvian peppertree	10 individuals
tree tobacco	146 individuals
tocalote	29.16 acres
fennel	15 individuals
black & Mediterranean mustards	extensive
Italian & milk thistles	extensive
grasses	extensive

Field surveys to date demonstrate that the Bank Property supports a level of wildlife diversity expected of relatively pristine lands in coastal Southern California. A list of species observed during field surveys is available in the *Biological Resources Inventory* (WRA, 2011) provided in Exhibit H of the BEI. Large mammals, including Mule Deer (*Odocoileus hemionus*) and Coyote (*Canis latrans*), are present. While small mammals are generally difficult to observe and/or identify without dedicated survey techniques such as pitfall trapping, the diversity of microhabitats within the Bank suggests that a variety of the small mammal species found in the region are present. Thirty-seven species of native birds have been observed within the Bank Property by WRA (with additional species observed in adjacent lands), and its various habitats provide breeding habitat for most of these species. Many additional bird species are likely to occur within the Bank Property during peak migratory periods. Six reptile and two amphibian species have been observed to date; as is the case with small mammals, diversity of these groups is often underrepresented by limited, opportunistic survey efforts of the type conducted to date. While invertebrate diversity is more challenging to measure, several species each of

large and conspicuous insect groups including butterflies, odonates (dragonflies and damselflies), and beetles have also been observed within the Bank Property.

Forty-seven special-status species of wildlife have been recorded in the greater vicinity of the Bank Property. During the biological studies conducted to date four special-status wildlife species were observed in the Bank Property by WRA: Allen's hummingbird (*Selasphorus sasin*), Nuttall's woodpecker (*Picoides nuttallii*), coast horned lizard (*Phrynosoma blainvillii*), and red diamond rattlesnake (*Crotalus ruber*). In addition, white-tailed kite (*Elanus leucurus*) was observed foraging adjacent to the Bank Property. Other special status wildlife species (including the listed species California gnatcatcher and least Bell's vireo) have the potential to colonize the site once vegetative communities further recover from the Freeway Complex Fire. However, protocol-level surveys conducted by a permitted biologist have not detected any vireos or gnatcatchers within the Bank Property during the 2011 breeding season (Element Ecology, 2011) and none have been observed during site visits by WRA.

3.0 SITE SELECTION

The Bank Property is located in a crucial wildlife corridor between the metropolitan areas of Orange County, the Los Angeles Basin, the San Gabriel Valley and the Inland Empire. This 30,000-acre wildlife corridor, the Puente-Chino Hills Wildlife Corridor, has been recognized locally and nationally as a significant resource. A local joint powers authority titled The Wildlife Corridor Conservation Authority was established in 1994 to study the corridor and determine appropriate actions to conserve open space in this area. In addition, the National Park service has identified the Puente-Chino Hills as a Nationally Significant Resource due to it being a prime and rare example of the native southern California landscape including rare plant communities such as Coastal Sage Scrub and California Walnut Woodlands. Despite the significance and attention that has been placed on this corridor, less than half has been preserved. The Proposed Bank's adjacency to the Chino Hills State Park would add acreage to this critical area and would help reduce the gap between the currently preserved areas (Figure 2).

The Bank Property would service one of the most rapidly growing urban regions in the nation (Los Angeles/Orange Counties). San Bernardino County itself has seen an 18% population increase since 2000 but has remained lightly populated, while adjacent areas have seen natural and migratory increases as high as 30%. Although nearly 75% of San Bernardino County is undeveloped (with over 80% of land within the county boundaries controlled by federal agencies), population density and development growth in adjacent counties is among the highest in the country. The vegetation types present within the Bank Property (scrub and chaparral communities, riparian habitat with black walnut and oak woodlands) are among those with the greatest percentage of land at risk of development or conversion to uses incompatible with habitat conservation. Currently there are no private mitigation bank credits available for sale in the Bank's Service Areas. Given ongoing large-scale public and private development in the region and increased demand on area waterways leading to potentially significant impacts, demand for mitigation bank credits is anticipated.

4.0 HABITAT RESTORATION AND ENHANCEMENT

Many opportunities exist for the Restoration and Enhancement of sensitive communities and the Restoration and Enhancement of streams and stream Buffers within the Bank Property. Soquel Canyon Creek drains a 1,600 acre drainage area and is deeply incised in some reaches within the Bank Property. However, large boulders or exposed bedrock armor the bottom and resist further down cutting. Large trees and shrubs along some reaches indicate that the drainage has not deviated from its current alignment for decades (Appendix B)tThe application of "soft" erosion control techniques, such as willow brush mattresses and fascines, is not an available treatment option in Soquel Canyon Creek due to typically high stream flow velocities during regular storm events. Instead, Soquel Canyon Creek will be maintained in its natural state, and mitigation activities will focus on areas within the floodplain and buffers.

For the purposes of determining Waters of the U.S. Credit categories, definitions of mitigation type from the Mitigation Rule (promulgated at 33 C.F.R. Part 332 and 40 C.F.R. Part 230) have been applied to treatment areas based on the expected functional lift and determined to be Enhancement Credit. Functions of Enhancement sites will be improved through cattle exclusion, planting and invasive species management. In accordance with the Mitigation Rule, Enhancement means "the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area. Proposed planting areas are comprised of areas that historically supported intact stream buffers and sensitive communities, but currently consist of degraded stream buffers, non-native grassland, or ruderal communities dominated by non-native forbs and some invasive species. The Bank will repair and/or augment certain natural/historic functions of these areas to Enhance stream Buffers, existing conditions and future predicted functions are discussed in detail in the California Rapid Assessment Method ("CRAM") report prepared by VCS Environmental (Appendix C). The Bank will generate Waters of the U.S. Enhancement Credits (Appendix D) for stream Buffers by converting non-native vegetative communities to native types, reducing/eliminating invasive seed sources and, enhancing habitats for protected species. These activities will repair habitat for sensitive species, including least Bell's vireo and California coastal gnatcatcher. Enhancement will also be achieved in areas that currently consist of intact natural habitats, including chaparral, coastal sage scrub, native grasslands, oak woodland, and walnut habitats that have been degraded by cattle grazing and invasive species encroachment (Figure 6).

Waters of the State are intended for impacts regulated under Section 1602 of the California Fish and Game Code. Covered Habitat is intended for impacts under CEQA and include restoration and enhancement of Coastal Sage Scrub, Mulefat Scrub, Native Grassland, Oak Woodland, and Walnut Woodland. Restoration and Enhancement within these areas is distinguished by whether or not planting will occur. For Waters of the State and Covered Habitat credits, planting areas are considered Restoration. The planting or Restoration areas include degraded habitats that are either dominated by non-natives or have been heavily impacted by cattle and have

sparse understory vegetation. Enhancement areas (as described in the previous paragraph) within CDFW jurisdiction will be those areas enhanced by removal of cattle and invasive species, but where planting is not necessary due to the presence of native vegetation.

4.1 Waters of the State Credit Categories

4.1.1 Stream Restoration and Enhancement Description (Waters of the State)

Streams within the Bank Property will be improved through protection of intact floodplains, improved nutrient cycling, bank stability, flood-flow augmentation, and wildlife habitat functions of the stream corridors. Restored stream areas are those where planting and soft-engineering techniques, including but not limited to, willow brush mattresses and fascines are occurring below the top of bank. An important component of the stream Enhancement effort throughout the Bank Property will be the permanent removal of cattle. Exclusion of cattle will enhance streams by allowing native groundcover to re-colonize along stream corridors, which will maintain stable stream banks, reduce and prevent erosion, minimize nutrient inputs into the watercourse, and thereby improve overall water quality in the 71,039 linear feet (5.18 acres) of enhanced streams and 6,927 linear feet and 2.22 acres of restored streams.

4.1.2 Riparian Restoration and Enhancement Description (Section 1602)

Riparian habitats throughout the Bank Property will be enhanced through the exclusion of cattle, and management of invasive species as discussed above. In addition, restoration of riparian habitats will occur through the planting of native species in riparian corridors. Riparian plantings will vary according to landscape position, and are described in detail below.

4.1.3 Mulefat Scrub Restoration and Enhancement Description

Buffer planting on floodplain terraces will be focused on improving the coverage of mulefat dominated communities in the restoration areas. These communities are an important component of habitat for least Bell's vireo. Areas designated for mulefat scrub plantings are low elevation areas adjacent to the thalweg of Soquel Canyon Creek and are currently characterized as non-native grasslands that provide little habitat value for the protected species. Characteristic riparian species will be planted in the lower elevations of the mulefat scrub communities. Mulefat scrub restoration activities will repair historic native species diversity and cover, as well as protected species habitat-related functions of 0.95 acres of mulefat scrub habitat.

4.1.4 Oak Woodland Restoration and Enhancement Description

Planting or Restoration oak woodland habitats along upper reaches of Soquel Canyon Creek will be focused on improving the cover and density of native oak trees, understory shrubs and tall herbaceous vegetation. Planting activities will restore historic native species diversity and cover, as well as habitat-related functions of 1.57 acres of oak woodland habitat. Approximately 43.66 acres of Oak woodland habitats will be Enhanced through the exclusion of cattle.

4.1.5 Walnut Woodland Restoration and Enhancement Description

Planting or restoration of walnut woodland habitats will be focused on improving the cover and density of native walnut trees, understory shrubs and tall herbaceous vegetation. Planting activities will repair historic native species' diversity and cover, as well as protected species' habitat-related functions of 6.92 acres of walnut woodland. Areas designated for these community plantings are currently characterized as non-native grasslands that provide little habitat value for protected species. Characteristic riparian species will be planted in the lower elevations of the walnut woodland. 33.81 acres Walnut Woodland habitats will be enhanced through the exclusion of cattle.

4.1.6 Native Grassland Restoration and Enhancement Description

Planting or restoration of native grassland habitats will be focused on improving the diversity of native grasses and forbs. Diversity and cover of native grasses and forbs will be increased in these areas, particularly at transitions between riparian resource and upland habitats. Planting activities will repair historic native species diversity and cover, as well as habitat-related functions of 1.78 acres of native grassland habitat throughout the Bank Property. Native grassland planting will result in deeper rooting depths and an increase in below ground biomass, which also repairs the slope erosion protection function of this habitat type. Enhancement of native grassland will occur on 2.67 acres.

4.1.7 Coastal Sage Scrub Restoration and Enhancement Description

Coastal sage scrub habitats will be planted at appropriate locations throughout the Bank Property, including a road decommissioning site and areas currently dominated by non-native grasses and forbs. Coastal sage scrub planting or restoration actions will include the decommissioning of an existing dirt road located to the north of Soquel Creek, management of non-native plants, and seeding of native coastal sage scrub species within the historical extent of this habitat type. These areas may be rehabilitated through application of hydro-seeding, if deemed practicable. Coastal sage scrub planting activities will repair historic native species diversity and cover, as well as protected species habitat-related functions of 23.67 acres of coastal sage scrub habitat.

Areas dominated by deer weed are also described as coastal sage scrub enhancement areas (Figure 6). Enhancement of coastal sage scrub will occur on 108.3 acres. Existing coastal sage scrub habitats on the Bank are in a transitional state and are still recovering from the Freeway Complex Fire. Deer weed is an early seral species that is a common component of coastal sage scrub habitats. Deer weed dominated habitats will be monitored for relative abundance of California sagebrush as they continue to progress towards their climax community. If, through monitoring after Bank approval, it is determined that these habitats are not satisfactorily transitioning into coastal sage scrub, the Bank Sponsor may, at its own discretion, seed or plant California sagebrush, or other coastal sage scrub species, to convert the habitats into coastal sage scrub. If seeding/planting is conducted, the treated areas will be

considered coastal sage scrub restoration, instead of coastal sage scrub enhancement, and the Credit tables and ledgers will be updated accordingly.

4.2 Waters of the U.S. Credit Categories

4.2.1 Stream and Buffer Enhancement Description

Existing streams and stream Buffers within the Bank Property will be Enhanced through the permanent exclusion of cattle, and removal and management of invasive species. Buffers are defined in the Mitigation Rule as "an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses." Buffer, which include both riparian buffers and upland buffers, have been identified as all areas within 100-feet of an ephemeral stream, 200-feet of an intermittent stream and 300-feet of a perennial stream. These Buffer widths were determined in coordination with the USACE. All of the Buffers within the Bank are essential to maintaining the ecological viability and aquatic resource functions associated with the on-site streams and the Bank Property's watershed. The Enhancement of the Bank Property's streams and Buffers will provide protection of intact floodplains, improved nutrient cycling, bank stability, flood-flow augmentation, wildlife habitat functions, and significant water quality benefits, including increased sediment retention and stability of stream channels. Perimeter exclusion fencing will be installed around the Bank Property to permanently exclude cattle that are attracted to the still green foliage found in riparian corridors within the Bank Property during summer and within 6 months of the Bank Establishment Date. The perimeter fencing will permanently preclude access, reduce grazing, and eliminate all uncontrolled stream crossings. As a result, streams and stream Buffers within the Bank Property will benefit from significant reductions in soil compaction, bank erosion, and nutrient loading. Removal and management of invasive species within stream Buffer areas will eliminate seed sources and increase native species diversity both onsite and within downstream habitats, which further improves least Bell's vireo and California coastal gnatcatcher habitats.

With the implementation of habitat management and cattle exclusion activities, native species diversity and cover, as well as habitat-related functions will be improved within 76.79 acres of chaparral, 108.3 acres of coastal sage scrub, 43.66 acres of oak woodland, and 33.81 acres of walnut woodland habitats. This will result in the Enhancement of 84.11 acres of ephemeral stream/Buffer, 63.23 acres of intermittent stream/Buffer and 41.09 acres of perennial stream/Buffer.

4.3 Predicted Improved California Rapid Assessment Method Results

An assessment of the existing conditions of the Bank Property and expected improved conditions using the CRAM has been conducted by VCS Environmental (Appendix C). The CRAM scores within this report consist of the baseline CRAM scores for the Bank Property and target CRAM scores which will be utilized as one of two methods to measure the success of planting and Enhancement activities.

Implementing the proposed planting and Enhancement activities is expected to increase the Hydrology Attribute, Physical Structure Attribute, and the Biotic Structure Attribute score, which would then increase the overall CRAM score for each assessment area. Enhancement activities will not alter the drainage contours and will focus on the removal of cattle from the Bank Property, planting of native species, and removal of non-native species. Therefore Buffer and Landscape Context metrics, two of the Hydrology metrics, and one of the Physical structure metrics are not expected to change as a result of restoration activities conducted within the Bank Property. The metrics that are expected to change as a result of the proposed planting and Enhancement activities are discussed below:

Ephemeral Drainages

Attribute 1: Buffer and Landscape Context

The Riparian Continuity, Percent of AA with Buffer, and Buffer Width metrics are exhibiting the highest possible scores for Assessment Areas (AAs) within the Bank Property and are not expected to change as a result of Development Plan implementation. The Buffer Condition metric assesses the extent and quality of the vegetation, condition of the soils, and amount of human visitation within the Buffer. The Buffers for the AAs for ephemeral stream types within the Bank Property were characterized by disturbed soils and contained between 25% and 75% non-native vegetation (yielding a metric score of 9). The control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around the perimeter to control trespass and to exclude cattle from the Bank Property is expected to restore the disturbed soils to a natural, undisturbed state and result in a decrease in cover of non-native vegetation to less than 25%. However, restoration of the disturbed soils within the Buffers to a natural, undisturbed state is not expected to be reflected in the metric score within the 5 year monitoring period. Therefore, the Buffer and Landscape Context Attribute is not expected to change as a result of Development Plan implementation.

Attribute 2: Hydrology

The water source metric assesses direct inputs of water into the AA, specifically inputs affecting the dry season, as well as any diversions of water from the AA. Although precipitation, groundwater, and natural runoff are the primary sources of water for ephemeral streams within the Bank Property, urban runoff from residential development located to the northeast is also a contributing source of water (yielding a metric score of 9). The Water Source metric is not expected to change as a result of Development Plan implementation.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, which is assessed by the degree of channel entrenchment. Although the ephemeral drainages on the Bank Property had higher entrenchment ratios (yielding a metric score

of 9), these drainages still exhibit disturbances related to the presence of cattle. Although the exclusion of cattle and planting of native vegetation is expected to provide erosion control and stability of the channel banks, the disturbed soils and channel entrenchment are expected to require a longer period of time to become evident. An increase in the Hydrologic Connectivity metric is not anticipated to be reflected within the 5 year monitoring period. Therefore, Hydrologic Connectivity metric is not expected to change as a result of Development Plan implementation.

Channel stability is assessed as the degree of channel aggradation (i.e. net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e. net loss of sediment from the bed causing it to be lower over time). Due to the disturbance of the ephemeral drainages on the Bank Property by the presence of cattle, the AAs associated with these drainages were characterized by aggraded conditions (yielding a metric score of 6 or 9). The planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around the perimeter to exclude cattle from the Bank Property is expected to restore the disturbed soils and channels to a natural, undisturbed state. The use of plantings for erosion control and stability of the channel banks and the return of regular flows regimes through drainage channels are expected to result in an increase in the Channel Stability metric scores (yielding a metric score of 9 for all AAs). Therefore, the improvement of the score of this metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion control and native cover, as identified in the Development Plan.

Attribute 3: Physical Structure

The Structural Patch Richness metric measures patch richness (the number of different types of physical features that provide habitat for aquatic, wetland, or riparian species) within the AA. Structural patch types within the AAs for the ephemeral stream types on the Bank Property have been impacted by the presence of cattle, with between 4 and 7 structural patch types observed (yielding a metric score of 6 or 9). An increase in the score for this metric is anticipated to result from fencing the site with wildlife friendly three-wire fencing around it's perimeter to exclude cattle from the Bank Property so that disturbed channels beds and banks can return to a natural, undisturbed state, which is expected to, in turn, result in the presence of such patch types as bank slumps or undercut banks, cobbles and boulders, pools or depressions in the channels, riffles or rapids, and secondary channels. In addition, the planting of native vegetation will provide for control of erosion and stability of the banks that will be allowed to form once cattle is removed and the natural flow regime is allowed to return to these areas. The presence of native vegetation and the return to a natural flow regime is expected to result in structural patch types such as abundant wracklines or organic debris in the channels, debris jams, woody debris, and standing snags. It is expected that the successful exclusion of cattle and meeting the success criteria for erosion and native cover will result in the increase of observable structural patch types to a minimum of 6 to 7 for all AAs (yielding a metric score of 9 for all

AAs). Therefore, the improvement in the score of the Structural Patch Richness metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion and native cover, as identified in the Bank Development Plan.

Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical and biotic features and elevation gradients. The AAs for ephemeral stream types within the Bank Property were characterized by either a single bench that lacks abundant micro-topographic complexity or one bench with abundant micro-topographic complexity (yielding a metric score of 6 or 9). Cattle have disturbed the soils within the drainage areas, which has resulted in the flattening of drainage beds, channels, and banks and removal of cobbles, boulders, and native vegetation. Although the exclusion of cattle is expected to restore the disturbed soils to a natural, undisturbed state and planting of native vegetation will provide erosion control and stability of the channel banks, the presence of interrupted flow regimes, disturbed soils, and flattened drainage areas are expected to require longer than the five year monitoring period to return to a natural, undisturbed state. Therefore, the Topographic Complexity metric is not expected to change as a result of Development Plan implementation.

Attribute 4: Biotic Structure

Vegetation within the AAs for the ephemeral stream types on the Bank Property included branching phacelia (*Phacelia ramosissima*), black mustard (*Brassica nigra*), Italian thistle (*Carduus pycnocephalus*), red brome (*Bromus madritensis* ssp. *rubens*), ripgut brome (*B. diandrus*), toyon (*Heteromeles arbutifolia*), and blue elderberry (*Sambucus nigra*).

A plant layer is a stratum of vegetation indicated by a discreet canopy at a specified height that comprises at least 5% of the area of the AA where the layer is expected. All of the AAs for ephemeral stream types within the Bank Property received the highest score possible due to the presence of all but the floating plant layer (yielding a submetric score of 12 for all AAs). The Co-Dominant Species submetric assesses the dominant plant species richness within the AA. The AAs for ephemeral stream types were found to support 5 to 10 co-dominant species (yielding a submetric score of 6 or 9). The Percent Invasion submetric assesses the number of invasive co-dominant species within the AA. The AAs for ephemeral stream types were found to support between 16% and 50% invasive co-dominant species (yielding a submetric score of 3, 6, or 9). An increase in the score for the Co-Dominant Species and Percent Invasion submetrics are anticipated to result from the control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a submetric score of 9 for Co-Dominant Species and a submetric score of 12 for Percent Invasion). Therefore, the improvement in the score of these submetrics will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover and invasive species, as identified in the Bank Development Plan.

The Interspersion/Zonation metric assesses the number of distinct plant zones within the AA and the amount of edge between them. The number of distinct plant zones within the AAs for the ephemeral stream types on the Bank Property were found to have a low degree of plan-view interspersion due to the presence of cattle (yielding a metric score of 6 for all AAs). An increase in the score for this metric is anticipated to result from the planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a metric score of 9 for all AAs). Therefore, the improvement in the score of the Interspersion/Zonation metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

The Vertical Structure metric assesses the degree of overlap among plant layers within the AA. The vertical biotic structure within the AAs for the ephemeral stream types on the Bank Property were found to support between 25% and 75% moderate overlap of 2 plant layers or more (yielding a metric score of 3, 6, or 9). The vertical biotic structure within the AAs for the ephemeral stream types on the Bank Property have been impacted by the presence of cattle. An increase in the score for this metric is anticipated to result from the planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a score of 9 for all AAs). Therefore, the improvement in the score of Vertical Structure metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

Intermittent Drainages

Attribute 1: Buffer and Landscape Context

The Riparian Continuity, Percent of AA with Buffer, and Buffer Width metrics are exhibiting the highest possible scores for AAs within the Bank Property and are not expected to change as a result of Development Plan implementation. The Buffer Condition metric assesses the extent and quality of the vegetation, condition of the soils, and amount of human visitation within the buffer. The buffers for the AAs for intermittent stream types within the Bank Property were characterized by disturbed soils and contained between 25% and 75% non-native vegetation (yielding a metric score of 9). The control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around the perimeter to control trespass and to exclude cattle from the Bank Property is expected to restore the disturbed soils to a natural, undisturbed state and result in a decrease in cover of non-native vegetation to less than 25%. However, restoration of the disturbed soils within the buffers to a natural, undisturbed state is not expected to be reflected in the metric score within the 5 year monitoring period. Therefore, the Buffer and Landscape Context Attribute is not expected to change as a result of Development Plan implementation.

Attribute 2: Hydrology

The water source metric assesses direct inputs of water into the AA, specifically inputs affecting the dry season, as well as any diversions of water from the AA. Although precipitation, groundwater, and natural runoff are the primary sources of water for intermittent streams within the Bank Property, urban runoff from residential development located to the northeast is also a contributing source of water (yielding a metric score of 9). The Water Source metric is not expected to change as a result of Development Plan implementation.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, which is assessed by the degree of channel entrenchment. The intermittent drainages had lower entrenchment ratios due to disturbances related to the presence of cattle (yielding a metric score of 3 or 6). Although the exclusion of cattle and planting of native vegetation is expected to provide erosion control and stability of the channel banks, the disturbed soils and channel entrenchment are expected to require a longer period of time to become evident. An increase in the Hydrologic Connectivity metric is not anticipated to be reflected within the 5 year monitoring period. Therefore, Hydrologic Connectivity metric is not expected to change as a result of Development Plan implementation.

Channel stability is assessed as the degree of channel aggradation (i.e. net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e. net loss of sediment from the bed causing it to be lower over time). Due to the disturbance of the intermittent drainages on the Bank Property by the presence of cattle, the AAs associated with these drainages were characterized by aggraded conditions (yielding a metric score of 6 or 9). The planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around the perimeter to exclude cattle from the Bank Property is expected to restore the disturbed soils and channels to a natural, undisturbed state. The use of plantings for erosion control and stability of the channel banks and the return of regular flows regimes through drainage channels are expected to result in an increase in the Channel Stability metric scores (yielding a metric score of 9 for all AAs). Therefore, the improvement of the score of this metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion control and native cover, as identified in the Development Plan.

Attribute 3: Physical Structure

The Structural Patch Richness metric measures patch richness (the number of different types of physical features that provide habitat for aquatic, wetland, or riparian species) within the AA. Structural patch types within the AAs for the intermittent stream types on the Bank Property have been impacted by the presence of cattle, with between 4 and 7

structural patch types observed (yielding a metric score of 6 or 9). An increase in the score for this metric is anticipated to result from fencing the site with wildlife friendly three-wire fencing around it's perimeter to exclude cattle from the Bank Property so that disturbed channels beds and banks can return to a natural, undisturbed state, which is expected to, in turn, result in the presence of such patch types as bank slumps or undercut banks, cobbles and boulders, pools or depressions in the channels, riffles or rapids, and secondary channels. In addition, the planting of native vegetation will provide for control of erosion and stability of the banks that will be allowed to form once cattle is removed and the natural flow regime is allowed to return to these areas. The presence of native vegetation and the return to a natural flow regime is expected to result in structural patch types such as abundant wracklines or organic debris in the channels, debris jams, woody debris, and standing snags. It is expected that the successful exclusion of cattle and meeting the success criteria for erosion and native cover will result in the increase of observable structural patch types to a minimum of 6 to 7 for all AAs (yielding a metric score of 9 for all AAs). Therefore, the improvement in the score of the Structural Patch Richness metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion and native cover, as identified in the Bank Development Plan.

Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical and biotic features and elevation gradients. The AAs for intermittent stream types within the Bank Property were characterized by either a single bench that lacks abundant micro-topographic complexity or one bench with abundant micro-topographic complexity (yielding a metric score of 6 or 9). Cattle have disturbed the soils within the drainage areas, which has resulted in the flattening of drainage beds, channels, and banks and removal of cobbles, boulders, and native vegetation. Although the exclusion of cattle is expected to restore the disturbed soils to a natural, undisturbed state and planting of native vegetation will provide erosion control and stability of the channel banks, the presence of interrupted flow regimes, disturbed soils, and flattened drainage areas are expected to require longer than the five year monitoring period to return to a natural, undisturbed state. Therefore, the Topographic Complexity metric is not expected to change as a result of Development Plan implementation.

Attribute 4: Biotic Structure

The intermittent streams in the Proposed Bank contain shrub and tree species including California walnut (*Juglans californica*), coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*), and blue elderberry (*Sambucus nigra*).

A plant layer is a stratum of vegetation indicated by a discreet canopy at a specified height that comprises at least 5% of the area of the AA where the layer is expected. All of the AAs for intermittent stream types within the Bank Property received the highest score possible due to the presence of all but the floating plant layer (yielding a submetric score of 12 for all AAs). The Co-Dominant Species submetric assesses the dominant plant species richness within the AA. The AAs for intermittent stream types were found to support 3 to 7 co-

dominant species (yielding a submetric score of 3 or 6). The Percent Invasion submetric assesses the number of invasive co-dominant species within the AA. The AAs for intermittent stream types were found to support between 16% and 30% invasive co-dominant species (yielding a submetric score of 9). An increase in the score for the Co-Dominant Species and Percent Invasion submetrics are anticipated to result from the control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a submetric score of 9 for Co-Dominant Species and a submetric score of 12 for Percent Invasion). Therefore, the improvement in the score of these submetrics will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover and invasive species, as identified in the Bank Development Plan.

The Interspersion/Zonation metric assesses the number of distinct plant zones within the AA and the amount of edge between them. The number of distinct plant zones within the AAs for the intermittent stream types on the Bank Property were found to have a low to moderate degree of plan-view interspersion due to the presence of cattle (yielding a metric score of 6 or 9). An increase in the score for this metric is anticipated to result from the planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a metric score of 12 for all AAs). Therefore, the improvement in the score of the Interspersion/Zonation metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

The Vertical Structure metric assesses the degree of overlap among plant layers within the AA. The vertical biotic structure within the AAs for the intermittent stream types on the Bank Property were found to support between 25% and 75% moderate overlap of 2 plant layers or more (yielding a metric score of 6 or 9). The vertical biotic structure within the AAs for the intermittent stream types on the Bank Property have been impacted by the presence of cattle. An increase in the score for this metric is anticipated to result from the planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a score of 12 for all AAs). Therefore, the improvement in the score of Vertical Structure metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

<u>Perennial Drainages</u>

Attribute 1: Buffer and Landscape Context

The Riparian Continuity, Percent of AA with Buffer, and Buffer Width metrics are exhibiting the highest possible scores for Assessment Areas (AAs) within the Bank Property and are not expected to change as a result of Development Plan

implementation. The Buffer Condition metric assesses the extent and quality of the vegetation, condition of the soils, and amount of human visitation within the buffer. The buffers for the AAs for perennial stream types within the Bank Property were characterized by disturbed soils and contained between 25% and 75% non-native vegetation (yielding a metric score of 9). The control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around the perimeter to control trespass and to exclude cattle from the Bank Property is expected to restore the disturbed soils to a natural, undisturbed state and result in a decrease in cover of non-native vegetation to less than 25%. However, restoration of the disturbed soils within the buffers to a natural, undisturbed state is not expected to be reflected in the metric score within the 5 year monitoring period. Therefore, the Buffer and Landscape Context Attribute is not expected to change as a result of Development Plan implementation.

Attribute 2: Hydrology

The water source metric assesses direct inputs of water into the AA, specifically inputs affecting the dry season, as well as any diversions of water from the AA. Although precipitation, groundwater, and natural runoff are the primary sources of water for perennial streams within the Bank Property, urban runoff from residential development located to the northeast is also a contributing source of water (yielding a metric score of 9). The Water Source metric is not expected to change as a result of Development Plan implementation.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, which is assessed by the degree of channel entrenchment. The perennial drainages had lower entrenchment ratios due to disturbances related to the presence of cattle (yielding a metric score of 3). Although the exclusion of cattle and planting of native vegetation is expected to provide erosion control and stability of the channel banks, the disturbed soils and channel entrenchment are expected to require a longer period of time to become evident. An increase in the Hydrologic Connectivity metric is not anticipated to be reflected within the 5 year monitoring period. Therefore, Hydrologic Connectivity metric is not expected to change as a result of Development Plan implementation.

Channel stability is assessed as the degree of channel aggradation (i.e. net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e. net loss of sediment from the bed causing it to be lower over time). Due to the disturbance of the perennial drainages on the Bank Property by the presence of cattle, the AAs associated with these drainages were characterized by aggraded conditions (yielding a metric score of 6 or 9). The planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around the perimeter to exclude cattle from the Bank Property is expected to restore the disturbed soils and channels to a natural, undisturbed state. The use of plantings for erosion control and stability of the channel banks and the return of regular flows regimes through drainage

channels are expected to result in an increase in the Channel Stability metric scores (yielding a metric score of 9 for all AAs). Therefore, the improvement of the score of this metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion control and native cover, as identified in the Development Plan.

Attribute 3: Physical Structure

The Structural Patch Richness metric measures patch richness (the number of different types of physical features that provide habitat for aquatic, wetland, or riparian species) within the AA. Structural patch types within the AAs for the perennial stream types on the Bank Property have been impacted by the presence of cattle, with between 3 and 8 structural patch types observed (yielding a metric score of 3 or 6). An increase in the score for this metric is anticipated to result from fencing the site with wildlife friendly three-wire fencing around it's perimeter to exclude cattle from the Bank Property so that disturbed channels beds and banks can return to a natural, undisturbed state, which is expected to, in turn, result in the presence of such patch types as bank slumps or undercut banks, cobbles and boulders, pools or depressions in the channels, riffles or rapids, and secondary channels. In addition, the planting of native vegetation will provide for control of erosion and stability of the banks that will be allowed to form once cattle is removed and the natural flow regime is allowed to return to these areas. The presence of native vegetation and the return to a natural flow regime is expected to result in structural patch types such as abundant wracklines or organic debris in the channels, debris jams, woody debris, and standing snags. It is expected that the successful exclusion of cattle and meeting the success criteria for erosion and native cover will result in the increase of observable structural patch types to a minimum of 9 to 11 for all AAs (yielding a metric score of 9 for all AAs). Therefore, the improvement in the score of the Structural Patch Richness metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion and native cover, as identified in the Bank Development Plan.

Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical and biotic features and elevation gradients. The AAs for perennial stream types within the Bank Property were characterized by either a single bench that lacks abundant micro-topographic complexity or one bench with abundant micro-topographic complexity (yielding a metric score of 6 or 9). Cattle have disturbed the soils within the drainage areas, which has resulted in the flattening of drainage beds, channels, and banks and removal of cobbles, boulders, and native vegetation. Although the exclusion of cattle is expected to restore the disturbed soils to a natural, undisturbed state and planting of native vegetation will provide erosion control and stability of the channel banks, the presence of interrupted flow regimes, disturbed soils, and flattened drainage areas are expected to require longer than the five year monitoring period to return to a natural, undisturbed state. Therefore, the Topographic Complexity metric is not expected to change as a result of Development Plan implementation.

Attribute 4: Biotic Structure

Vegetation within the AAs for perennial stream types on the Bank Property includes California walnut (*Juglans californica*), coast live oak (*Quercus agrifolia*), western sycamore (*Platanus racemosa*), Goodding's willow (*Salix gooddingii*), arroyo willow (*S. lasiolepis*), mulefat (*Baccharis salicifolia*), California blackberry (*Rubus ursinus*), stinging nettle (*Urtica dioica*), water cress (*Nasturtium officinale*), mugwort (*Artemisia douglasiana*), rosilla (*Helenium puberulum*), and basket rush (*Juncus textilis*).

A plant layer is a stratum of vegetation indicated by a discreet canopy at a specified height that comprises at least 5% of the area of the AA where the layer is expected. All of the AAs for perennial stream types within the Bank Property received the highest score possible due to the presence of all but the floating plant layer (yielding a submetric score of 12 for all AAs). The Co-Dominant Species submetric assesses the dominant plant species richness within the AA. The AAs for perennial stream types were found to support 6 to 8 co-dominant species (yielding a submetric score of 6). The Percent Invasion submetric assesses the number of invasive co-dominant species within the AA. The AAs for perennial stream types were found to support between 16% and 45% invasive co-dominant species (yielding a submetric score of 6 or 9). An increase in the score for the Co-Dominant Species and Percent Invasion submetrics are anticipated to result from the control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a submetric score of 9 for Co-Dominant Species and a submetric score of 12 for Percent Invasion). Therefore, the improvement in the score of these submetrics will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover and invasive species, as identified in the Bank Development Plan.

The Interspersion/Zonation metric assesses the number of distinct plant zones within the AA and the amount of edge between them. The number of distinct plant zones within the AAs for the perennial stream types on the Bank Property were found to have a moderate degree of plan-view interspersion due to the presence of cattle (yielding a metric score of 9 for all AAs). An increase in the score for this metric is anticipated to result from the planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a metric score of 12 for all AAs). Therefore, the improvement in the score of the Interspersion/Zonation metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

The Vertical Structure metric assesses the degree of overlap among plant layers within the AA. The vertical biotic structure within the AAs for the perennial stream types on the Bank Property were found to support more than 50% moderate overlap of 2 plant layers or more

(yielding a metric score of 9 for all AAs). The vertical biotic structure within the AAs for the perennial stream types on the Bank Property have been impacted by the presence of cattle. An increase in the score for this metric is anticipated to result from the planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a score of 12 for all AAs). Therefore, the improvement in the score of Vertical Structure metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

5.0 DEVELOPMENT PLAN

The habitat restoration and enhancement activities (Development Activities) will be implemented following Bank Establishment. No grading will occur. Planting/seeding will occur in the fall/winter to take advantage of winter rains and increased likelihood of plant survival. Plantings may be irrigated for the first two or three years to facilitate successful establishment.

Personnel familiar with the Bank Development Plan and experienced with native plant establishment and weed removal will monitor the construction.

5.1 Site Preparation and Planting

Proper soil preparation will include measures for providing proper drainage, nutrient content, and erosion control. Plants installed in properly prepared soils will have better conditions for high survival and growth rates. Soils in planted areas will be tested and amended as necessary to provide optimal conditions for plant growth. Typical soil amendments may include compost and fertilizer. In planting areas currently dominated by non-native species, amendments will be tilled into approximately the upper twelve inches of soil. No tilling will occur in habitats dominated by native species. Planting pits will be installed using hand labor or mechanical equipment, depending on the accessibility of the area to equipment, due in part to slope restrictions or the possibility of damaging existing vegetation. The planting areas will be divided into mulefat scrub, native grassland, oak woodland, coastal sage scrub, and walnut woodland (Figures 7, 8 and 9). Cover by native grass species in the understories of planting areas will be increased by seeding. The plant species designated for the planting areas are native species which currently occur within close proximity of the Bank Property's stream corridors.

Control methods for weeds will include the following, as necessary:

- Mechanical cutting of annual grasses and mustards;
- Hand pulling of seedlings and saplings where feasible; and
- Specific herbicide application for target weeds, such as Italian thistle (*Carduus pycnocephalus*), tocalote thistle (*Centaurea melitensis*), and milk thistle (*Silybum marianum*)

Weed thatch removal may be necessary prior to seeding to allow optimal contact between seed and soil. Where feasible, mainly in flat, accessible areas, the decommissioned road corridor and weedy areas will be ripped or tilled following weed removal and may be seeded using imprinting. Ripping or tilling will reduce soil compaction and improve water infiltration, facilitating seed germination and plant establishment.

- Mulefat Scrub Planting Areas

  Mulefat is an obligate phreatophyte, which is defined as relatively shallow rooted plants that use water in the capillary fringe above a permanent groundwater table as their primary water source (Haney et al. 2008, Stromberg 2007). Mulefat has been documented to grow in locations with a mean maximum seasonal ground water depth of 2.1-meters (approximately 6.5 feet) with a standard deviation of 1-meter (Leenhouts et al. 2006). The literature indicates that a maximum seasonal groundwater depth of 2-3 meters (6.5-9.75 feet) is likely required to support mulefat plantings. As such mulefat scrub planting areas are planned for areas with open canopy that are located adjacent to Soquel Canyon Creek between 0-3 meters above the elevation of the thalweg.

  The mulefat scrub planting areas will be dominated by mulefat, but will be intermixed with Gooding's willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), basket rush (*Juncus textilis*), seep monkeyflower (*Mimulus guttatus*), and mugwort (*Artemesia douglasiana*), at lower elevations and California sage (*Artemsia californica*), California buckwheat (*Erigonum fasciculatum var. fasciculatum*), white sage (Salvia apiana), black sage (Salvia mellifera) and native grasses at higher elevations depending on the surrounding community type.

  A biological monitor who is familiar with the optimal growing conditions for each planted species will be present during planting to direct planting site selection and layout. The species and planting densities proposed for these areas are listed in Table 3. The Goodding's willow, basket rush, and seep monkeyflower will be planted mainly along streambanks at lower elevations, whereas the California sage, mugwort, white sage, and black sage will be planted at higher locations within the mulefat scrub planting areas at transition zones with drier habitats.

Table 3: Mulefat Scrub Planting Palette

Botanical Name	Common Name	Container Size / Type	On-center Spacing (feet)
Mulefat Scrub Area			
Artemesia californica	California sage	deepot	6
Artemisia douglasiana	mugwort	deepot	6
Baccharis salicifolia	mulefat	treepot /stake	10
Erigonum fasciculatum var. fasciculatum	California buckwheat	deepot	6
*Juncus textilis**	basket rush	treeband	2
*Mimulus guttatus**	seep monkeyflower	deepot	4
*Salix gooddingii**	Goodding's willow	treepot /stake	10
Salix lasiolepis	arroyo willow	treepot /stake	10
Salvia apiana	white sage	deepot	10
Salvia mellifera	black sage	deepot	6
*These species will be planted only within immediate vicinity of stream banks			

- Native Grassland Planting Areas

  Areas designated for native grassland planting are generally located immediately upslope of riparian areas in the lower half of Soquel Canyon Creek within the Bank Property (Figure 9). These habitats currently consist of non-native grasses, forbs and invasive species. Native grassland planting areas will be dominated by any combination of the following species: foothill needlegrass (*Stipa cernua*), and bluegrass (*Poa secunda*). Common yarrow (*Achillea millefolium*), fiddleneck (*Amsinckia menzeisii*), mugwort (*Artemesia douglasiana*), purple owl's clover (*Castilleha exserta*), California everlasting (*Pseudognaphalium californicum*), and beeplant (*Scophularia californica*) will also be sowed in native grassland planting areas, though at a lower seed application rate than the native grasses. Where feasible, particularly on flat, accessible areas, ripping and/or tilling will be deployed to improve seed germination and seedling survival. The native grassland areas will include a diverse variety of species, which are listed in Table 4.

Table 4: Native Grassland Planting Palette

Botanical Name	Species Name	Application Rate (Lbs/Acre)
Achillea millefolium	common yarrow	1.5
Amsinckia menziesii	fiddleneck	0.5
Artemesia douglasiana	mugwort	1.00
Castilleja exserta	purple owl's-clover	1.00
Pseudognaphalium californicum	California everlasting	1.00
Lupines excubitus	grape soda lupine	2.00
Stipa cernua	foothill needlegrass	4.00
Poa secunda	bluegrass	1.50
Scrophularia californica	beeplant	0.30
Sisyrinchium bellum	blue eyed grass	1.50
Trifolium willdenovii	tomcat clover	2.00
Festuca microstachys	small fescue	4.00

- Oak Woodland Planting Areas

  The oak woodland planting areas will be dominated by coast live oak (*Quercus agrifolia*), and will include a diverse variety of species, including western sycamore (*Platanus racemosa*), coffeeberry (*Frangula californica*), toyon, California rose (*Rosa californicus*), California blackberry (*Rubus ursinus*), blue elderberry, and southern wild grape (*Vitis girdiana*) (Table 5). Plantings will consist of native tree species, particularly of oaks, and supplemental plantings of mulefat and associated riparian species in the understory (Figure 9).

- Walnut Woodland Planting Areas

  The walnut woodland planting areas will be dominated by California walnut (*Juglans californica*), but will otherwise include the same composition of species as the oak riparian planting areas (Table 5, Figure 9).

Table 5: Oak Woodland/Walnut Woodland Palette

Botanical Name	Common Name	Container Size / Type	On-center Spacing (feet)
Baccharis salicifolia	mulefat	deepot	6
Frangula californica	coffeeberry	deepot	10
Heteromeles arbutifolia	toyon	deepot	8
Juglans californica	California walnut	treepot	12
Platanus racemosa	western sycamore	treepot	12
Quercus agrifolia	coast live oak	treepot	12
Rosa californica	California rose	deepot	6
Rubus ursinus	California blackberry	deepot	6
Sambucus nigra	blue elderberry	treepot	10
Stipa cernua	foothill needlegrass	Seed	
Poa secunda	bluegrass	Seed	
Symphoricarpos albus	common snowberry	deepot	8
Vitis girdiana	southern wild grape	deepot	6

Coastal Sage Scrub Planting Areas

Coastal sage scrub planting areas will be composed of coastal sage scrub species appropriate for the site. Species selection will also favor those that provide gnatcatcher nesting and foraging habitat. Coastal sage scrub planting areas will be dominated by a combination of California sagebrush, deer weed (*Lotus scoparius*), foothill needlegrass, purple needlegrass (*Stipa pulchra*), and California buckwheat. Coyote brush (*Baccharis pilularis*), telegraph weed (*Heterotheca grandiflora*), ladies' tobacco (*Pseudognaphalium californicum*), lemonade berry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), white sage, and black sage will also be sowed in coastal sage scrub planting areas, though at a lower seed application rate than the aforementioned species. The coastal sage scrub seed mix is listed in Table 6. Where feasible, the seed mix will be applied using imprinting or sprayed on site with hydroseed techniques followed by the application of a

hydromulch to assist with erosion control and moisture retention. Seeding will occur at the onset of the rainy season following Bank approval. Seeding will occur in areas with vehicular access. In areas where seeding is not feasible, seed will be applied by manual methods.

Table 6: Coastal Sage Scrub Planting Palette

Botanical Name	**Species Name**	**Application Rate (Lbs/Acre)**
Artemisia californica	California sagebrush	2.00
Baccharis pilularis	coyote brush	0.15
Eriogonum fasciculatum var. *fasciculatum*	California buckwheat	1.50
Heterotheca grandiflora	telegraph weed	0.15
Lotus scoparius	deer weed	1.7
Malosma laurina	laurel sumac	0.15
Pseudognaphalium californicum	ladies' tobacco	0.50
Rhus integrifolia	Lemonade berry	0.15
Salvia apiana	white sage	1.00
Salvia mellifera	black sage	1.00
Stipa lepida	foothill needlegrass	2.00
Stipa pulchra	purple needlegrass	2.00

The container stock plantings will be installed at the onset of the rainy season following Bank approval. Small container (younger) trees and shrubs will be planted as they generally establish a greater root to top ratio and become adapted quickly to the site conditions. A natural distribution will be obtained by placement of the trees and shrubs in appropriate microhabitats under the supervision of, and as directed by a Biologist familiar with restoration of vegetation communities.

A temporary drip irrigation system may be installed to provide water to the riparian plantings for the first one to three years following installation. The plants will be irrigated in the dry season to

help with establishment and increase survivorship rates. Irrigation water will be stored in temporary tanks and the tanks will be refilled as required throughout the dry season.

As part of the Bank's adaptive management program, the Bank Sponsor, may at their sole discretion, implement water harvesting techniques utilizing solar solinoids for power to provide automated irrigation to a portion of the planted areas during the grow-in period. Similarly, the Bank Sponsor may implement use of polymers for purposes of providing suitable growing conditions. Polymers may include dry water, Hydro-sorb^{TM}, and similar products to inform future restoration techniques in remote areas.

5.2 Road Decommissioning

The main north-south dirt access road north of Soquel Canyon Creek will be decommissioned and returned to native habitats as depicted in Figure 9. This will involve tilling and reseeding/planting with native species as described in the habitat restoration sections above.

5.3 Fencing, Gates, and Signage

The property will be fenced within 6 months of the Bank Establishment Date with wildlife friendly three-wire fencing around its perimeter to control trespass and to exclude cattle from the Bank Property's sensitive resources (Figure 10). Gates will also be installed at road crossings of other access points. Additionally, signs will be installed notifying the public of the boundaries of the Bank Property to prevent trespass.

5.4 Gully Stabilization

Discrete gully areas located adjacent to road decommissioning areas will be stabilized as appropriate within the Bank Property using soft-engineering techniques, including but not limited to, willow brush mattresses and fascines.

5.5 As-Built Conditions

As-built, post-planting plans and a brief letter report outlining the as-built, post-planting conditions of the Credit development areas within the Bank Property will be prepared and submitted to the Interagency Review Team (IRT) and to the conservation easement holder within one month of habitat restoration and enhancement.

6.0 PERFORMANCE MONITORING AND STANDARDS

Monitoring the restored and enhanced habitats will occur annually throughout the performance monitoring period beginning the first spring following completion of restoration and enhancement. Data will be collected each year during spring-early summer to assess native vegetation. The performance monitoring methods and final Performance Standards are discussed below. Performance monitoring would continue on an annual basis until the site has met all Performance Standards and the IRT has agreed in writing that the site has met all Performance Standards. These Performance Standards must be met in consecutive order and

while it is expected that these Performance Standards will be met over five consecutive years; Performance Standards may be met earlier or later than the corresponding year. The Bank Property will be monitored for a minimum of five years.

Reference sites used for evaluation of performance standards will be monitored using the same sampling methodology that is used for the Bank habitats. The locations, orientations, and number and rational of selected reference sites and photo monitoring locations will be submitted to the IRT at least 2 months in advance of initiating the restoration and enhancement activities and must be approved by the IRT prior to initiation of the restoration and enhancement activities.

6.1 Waters of the U.S. Performance Standards

Purpose: The performance of stream and Buffer Enhancement activities will be monitored using the CRAM Riverine module and the South Pacific Division's Uniform Performance Standard (UPS) to quantitatively assess the habitats' progress towards achieving the target scores identified from baseline data provided in the CRAM report prepared by VCS Environmental (Appendix C).

The attached CRAM report includes the baseline CRAM scores, documented prior to any development action within the Bank Property, and the expected (Target) CRAM scores following successful establishment of the plantings and recolonization of native vegetation. Target scores have been set based on a regional reference site, and generally are within the range of what has been observed in the highest performing AA within the Bank Property. The Target scores will be utilized to measure the success of Enhancement activities. Target scores are provided below in Tables 7-9.

CRAM will be conducted within the same AA in years 3, 4, and 5 following implementation of the Enhancement activities. Due to limitations in the way CRAM is scored, there is the potential for measurable improvements in the Enhanced habitats to not be adequately reflected in the CRAM scores. To ensure changes in Enhanced habitats are captured, and measured, alternate Uniform Performance Standards have been established for each CRAM metric. The Enhanced habitats will be considered as meeting their Performance Standards when they have met both the Uniform Performance Standards and the Target CRAM scores. If the Target CRAM score is not met for any metric during years 3, 4 or 5, the Uniform Performance Standards may be used by the USACE to determine if and to what degree the Enhanced habitats are meeting the Performance Standards. In such an event, the USACE would also make a case-by-case determination if full, partial, or no release of Credits would be warranted. The final Performance Standard will not be met until the Target CRAM score has been achieved.

Alternate Performance Standards have been established using the Uniform Performance Standard in all but one case. For determining performance related to channel stability, there was not a Uniform Performance Standard that measured the expected benefits that would result from the proposed Enhancement activities. An alternative Performance Standard was

established for this metric that tracks the number of field indicators that suggest the stream is in equilibrium.

Methodology: The condition of Bank Property's streams and Buffers will be monitored using the CRAM Riverine module in the AAs identified in Appendix C of this document. CRAM scores will be determined in years 3, 4, and 5 following implementation. These scores will be compared to expected, Target CRAM Scores (Table 7) and used in conjunction with the alternative Performance Standards to demonstrate success of the Enhancement activities.

Monitoring will also be conducted in planting sites and on one or more reference sites for each stream type for use in meeting the alternate Performance Standards. Monitoring will include measurements of absolute native cover, absolute exotic cover, and native species richness in planting areas using permanent transects, and measurements of equilibrium indicators, structural patch types, horizontal interspersion and vertical structure in stream AAs using methods from CRAM.

Performance Standard: The Enhanced habitats will be considered as meeting their Performance Standards when they have met both the Uniform Performance Standards and the Target CRAM scores. If the Target CRAM score is not met for any metric during years 3, 4 or 5, the Uniform Performance Standards may be used by the USACE to determine if and to what degree the Enhanced habitats are meeting the Performance Standards. In such an event, the USACE would also make a case-by-case determination if full, partial, or no release of Credits would be warranted. The final Performance Standard will not be met until the Target CRAM score has been achieved. Performance Standards for each stream type are given in tables 7-9. The final Performance Standard will be met only when no planting and/or irrigation has been used for the last two years.

Table 7: Perennial Stream and Buffer Performance Standards

Metric/ Submetric	Performance Standard	Baseline Score[1]	Year 1	Year 2	Year 3	Year 4	Year 5	Final
Channel Stability/ Equilibrium Indicators	The Bank Sponsor shall ensure either: Channel Stability scores are equal to or greater than 9 by Year 5, and The number of equilibrium indicators observed is equal to or greater than 75% of the number observed at the reference site(s)	7.5	N/A	N/A	9/ 50%	9/ 66%	9/ 75%	9
Structural Patch Richness/ UPS #4	The Bank Sponsor shall ensure the either: Structural Patch Richness scores are equal to or greater than 9 by Year 5, and The Bank Property provides diverse physical features or surfaces contributing to riverine habitat function by containing 75% or more of the structural patch types found at the reference site(s)	4.5	N/A	N/A	6/ 50%	6/ 66%	9/ 75%	9
Number of Co-Dominant Plant Spp./ UPS #31	The Bank Sponsor shall ensure either: Number of Co-dominant Plant Species scores are equal to or greater than 9 by Year 5, and Target native species richness values of tree, shrub, and herb strata are met by year 5. The number of native species will be greater than or equal to 75% of the reference site(s).	6	N/A	N/A	6/ 50%	6/ 66%	9/ 75%	9

Metric/ Submetric	Performance Standard	Baseline Score[1]	Year 1	Year 2	Year 3	Year 4	Year 5	Final
Percent Invasion/ UPS #29	The Bank Sponsor shall ensure either: Percent Invasion scores are equal to or greater than 12 by Year 5, and Target percent absolute cover (for combined strata), are met for exotic species (tree, shrub, and herb strata) by year 5. Cover of exotics will be less than or equal to 100% of the cover observed at reference site(s).	7.5	N/A	N/A	12/ 50%	12/ 75%	12/ 100%	12
Horizontal Interspersion/ UPS #32	The Bank Sponsor shall ensure either: Horizontal Interspersion scores are equal to or greater than 12 by Year 5, and Horizontal target spatial habitat heterogeneity is met by year 5. Target heterogeneity will be equal to or greater than 100% of the reference site(s)	9	N/A	N/A	12/ 50%	12/ 75%	12/ 100%	12
Vertical Biotic Structure/ UPS #32	The Bank Sponsor shall ensure either: Vertical Interspersion scores are equal to or greater than 12 by Year 5, and Vertical target spatial habitat heterogeneity is met by year 5. Target heterogeneity will be equal to or greater than 100% of the reference site(s)	9	N/A	N/A	12/ 50%	12/ 75%	12/ 100%	12

[1]Baseline scores are an average of all assessment areas for a given stream type.

Table 8: Intermittent Stream and Buffer Performance Standards

Metric/ Submetric	Performance Standard	Baseline Score[1]	Year 1	Year 2	Year 3	Year 4	Year 5	Final
Channel Stability/ Equilibrium Indicators	The Bank Sponsor shall ensure either: Channel Stability scores are equal to or greater than 9 by Year 5, and The number of equilibrium indicators observed is equal to or greater than 75% of the number observed at the reference site(s)	8	N/A	N/A	9/ 50%	9/ 66%	9/ 75%	9
Structural Patch Richness/ UPS #4	The Bank Sponsor shall ensure the either: Structural Patch Richness scores are equal to or greater than 9 by Year 5, and The Bank Property provides diverse physical features or surfaces contributing to riverine habitat function by containing 75% or more of the structural patch types found at the reference site(s)	8	N/A	N/A	9/ 50%	9/ 66%	9/ 75%	9
Number of Co-Dominant Plant Spp./ UPS #31	The Bank Sponsor shall ensure either: Number of Co-dominant Plant Species scores are equal to or greater than 9 by Year 5, and Target native species richness values of tree, shrub, and herb strata are met by year 5. The number of native species will be greater than or equal to 75% of the reference site(s).	5	N/A	N/A	6/ 50%	6/ 66%	9/ 75%	9

Metric/ Submetric	Performance Standard	Baseline Score[1]	Year 1	Year 2	Year 3	Year 4	Year 5	Final
Percent Invasion/ UPS #29	The Bank Sponsor shall ensure either: Percent Invasion scores are equal to or greater than 12 by Year 5, and Target percent absolute cover (for combined strata), are met for exotic species (tree, shrub, and herb strata) by year 5. Cover of exotics will be less than or equal to 100% of the cover observed at reference site(s).	9	N/A	N/A	12/ 50%	12/ 75%	12/ 100%	12
Horizontal Interspersion/ UPS #32	The Bank Sponsor shall ensure either: Horizontal Interspersion scores are equal to or greater than 12 by Year 5, and Horizontal target spatial habitat heterogeneity is met by year 5. Target heterogeneity will be equal to or greater than 100% of the reference site(s)	7	N/A	N/A	12/ 50%	12/ 75%	12/ 100%	12
Vertical Biotic Structure/ UPS #32	The Bank Sponsor shall ensure either: Vertical Interspersion scores are equal to or greater than 12 by Year 5, and Vertical target spatial habitat heterogeneity is met by year 5. Target heterogeneity will be equal to or greater than 100% of the reference site(s)	8	N/A	N/A	12/ 50%	12/ 75%	12/ 100%	12

[1]Baseline scores are an average of all assessment areas for a given stream type.

Table 9: Ephemeral Stream and Buffer Performance Standards

Metric/ Submetric	Performance Standard	Baseline Score[1]	Year 1	Year 2	Year 3	Year 4	Year 5	Final
Channel Stability/ Equilibrium Indicators	The Bank Sponsor shall ensure either: Channel Stability scores are equal to or greater than 9 by Year 5, and The number of equilibrium indicators observed is equal to or greater than 75% of the number observed at the reference site(s)	7.5	N/A	N/A	9/ 50%	9/ 66%	12/ 75%	12
Structural Patch Richness/ UPS #4	The Bank Sponsor shall ensure the either: Structural Patch Richness scores are equal to or greater than 9 by Year 5, and The Bank Property provides diverse physical features or surfaces contributing to riverine habitat function by containing 75% or more of the structural patch types found at the reference site(s)	6.75	N/A	N/A	9/ 50%	9/ 66%	12/ 75%	12
Number of Co-Dominant Plant Spp./ UPS #31	The Bank Sponsor shall ensure either: Number of Co-dominant Plant Species scores are equal to or greater than 9 by Year 5, and Target native species richness values of tree, shrub, and herb strata are met by year 5. The number of native species will be greater than or equal to 75% of the reference site(s).	6	N/A	N/A	6/ 50%	6/ 66%	9/ 75%	9

Metric/ Submetric	Performance Standard	Baseline Score[1]	Year 1	Year 2	Year 3	Year 4	Year 5	Final
Percent Invasion/ UPS #29	The Bank Sponsor shall ensure either: Percent Invasion scores are equal to or greater than 12 by Year 5, and Target percent absolute cover (for combined strata), are met for exotic species (tree, shrub, and herb strata) by year 5. Cover of exotics will be less than or equal to 100% of the cover observed at reference site(s).	6.75	N/A	N/A	12/ 50%	12/ 75%	12/ 100%	12
Horizontal Interspersion/ UPS #32	The Bank Sponsor shall ensure either: Horizontal Interspersion scores are equal to or greater than 12 by Year 5, and Horizontal target spatial habitat heterogeneity is met by year 5. Target heterogeneity will be equal to or greater than 100% of the reference site(s)	6	N/A	N/A	9/ 50%	9/ 75%	9/ 100%	9
Vertical Biotic Structure/ UPS #32	The Bank Sponsor shall ensure either: Vertical Interspersion scores are equal to or greater than 12 by Year 5, and Vertical target spatial habitat heterogeneity is met by year 5. Target heterogeneity will be equal to or greater than 100% of the reference site(s)	6.75	N/A	N/A	9/ 50%	9/ 75%	9/ 100%	9

[1]Baseline scores are an average of all assessment areas for a given stream type.

6.2 Waters of the State Performance Standards

Success at meeting Performance Standards for CDFW Restoration and Enhancement areas will be based on whether or not conditions the areas are meeting target ranges around reference site conditions. Reference sites will be evaluated for baseline conditions and each year for comparison with Performance Standards at the Bank using the same vegetation monitoring techniques described below. Reference sites will be provided for each habitat type and submitted to CDFW for approval.

6.2.1 Restoration Performance Standards

6.2.1.1 Native Cover and Survivorship

Purpose: To evaluate the effectiveness of native species planting and invasive species control in planting areas.

Methods: Planting areas will be monitored each year for the cover of native species and survival of plantings. Absolute cover of native species will be monitored for planting areas using permanent transects and living planted container stock will be counted in each planting area. For Restoration areas that are seeded, survivorship will not be assessed, only native cover measurements will be taken.

Performance Standard: Planting areas will be dominated by native species. Native species cover will be at least 75% of the cover observed in reference site(s). In addition, overall 80% survivorship of planted container stock should be maintained for two years without planting and irrigation

Remedial Actions: If survival of planted native species falls below the vegetation Performance Standard during the performance monitoring period, dead individuals shall be replaced. The Bank Sponsor may choose, at its sole discretion, to plant at a replacement ratio greater than 1:1 to ensure that Performance Standards are met.

6.2.1.2 Invasive Species

Purpose: To evaluate the effectiveness of invasive species removal and control in planting areas.

Methods: Planting areas will be monitored each year for the presence and cover of invasive species. Absolute cover of invasive species will be monitored in planting areas using permanent transects.

Performance Standard: Non-native, invasive tree and shrub populations designated as having a severe (A) invasive impact by Cal-IPC will be managed so they do not exceed more than 0% relative cover, and non-native, invasive, annual forbs designated as having a severe (A) invasive impact by Cal-IPC do not exceed 5% absolute cover within oak woodland planting areas (Table 4). Non-native, annual grass species are expected to be present to some degree in oak woodland planting areas due to their prolific nature within reference locations. No cover requirement is proposed for non-native grasses. The first through final Performance Standards

will be met in conjunction with the corresponding native cover Performance Standards so long as invasive annual forbs comprise less than 5% absolute cover and invasive trees and shrubs comprise 0% absolute cover.

Remedial Actions: If in any year a planting area is not meeting the invasive species Performance Standard, Remedial Actions will be implemented as soon as it is feasible to initiate the effective control measures. The Remedial Actions may include planting/seeding of native species, hand removal of invasives, mowing, weeding, or spot spraying of infestation areas as approved by the CDFW, in consultation with the IRT. If the invasive species Performance Standard is not being met by year five, a detailed weed management plan will be prepared in consultation with the IRT to determine the appropriate measures necessary to address any invasive species issues.

6.2.1.3 Species Richness

Purpose: To evaluate species diversity following planting.

Methods: Planting areas will be surveyed each year for the number of different species present. Species richness will be calculated for planting areas using permanent transects.

Performance Standard: Species richness: The Bank Sponsor shall ensure target native species richness values of tree, shrub, and herb strata are met by year 5. The number of native species in planting areas will be greater than or equal to 75% of the reference site by year 5.

Remedial Actions: If in any year a planting area is not meeting the species richness success criterion, Remedial Actions will be implemented as soon as it is feasible to initiate the effective control measures. The Remedial Actions may include planting/seeding of native species and removal of invasives.

Table 10: Planting Performance Standards

Success Criteria	Year 1 Performance Standard	Year 2 Performance Standard	Year 3 Performance Standard	Year 4 Performance Standard	Final Performance Standard
Native Cover/ Survivorship:	Absolute cover of native species will be at least 50% of the cover observed at the reference site or 95% survival.	Absolute cover of native species will be at least 60% of the cover observed at the reference site or 90% survival.	Absolute cover of native species will be at least 70% of the cover observed at the reference site or 85% survival.	Absolute cover of native species will be at least 75% of the cover observed at the reference site or 80% survival.	Absolute cover of native species will be at least 75% of the cover observed at the reference site or 80% survival after five years and no irrigation has been used for the last two years.
Invasive Species	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.
Species Richness	Number of native species in planting areas ≥ 25% of the reference site	Number of native species in planting areas ≥ 33% of the reference site	Number of native species in planting areas ≥ 50% of the reference site	Number of native species in planting areas ≥ 66% of the reference site	Number of native species in planting areas ≥ 75% of the reference site

6.2.2 Enhancement Performance Standards

Purpose: To evaluate the effectiveness of invasive species removal and control in Enhancement areas.

Methods: Enhancement areas will be monitored each year for the presence and cover of invasive species. Absolute cover of invasive species will be monitored in Enhancement areas using the relevé method.

Performance Standard: Non-native, invasive tree and shrub populations designated as having a severe (A) invasive impact by Cal-IPC will be managed so they do not exceed more than 0% relative cover, and non-native, invasive, annual forbs designated as having a severe (A) invasive impact by Cal-IPC do not exceed 5% absolute cover within oak woodland planting areas (Table 4). Non-native, annual grass species are expected to be present to some degree in oak woodland planting areas due to their prolific nature within reference locations. No cover requirement is proposed for non-native grasses. The first through final Performance Standards will be met in conjunction with the corresponding native cover Performance Standards so long as invasive annual forbs comprise less than 5% absolute cover and invasive trees and shrubs comprise 0% absolute cover.

Remedial Actions: If in any year an enhancement area is not meeting the invasive species Performance Standard, Remedial Actions will be implemented as soon as it is feasible to initiate the effective control measures. The Remedial Actions may include planting/seeding of native species, hand removal of invasives, mowing, weeding, or spot spraying of infestation areas as approved by the CDFW, in consultation with the IRT. If the invasive species Performance Standard is not being met by year five, a detailed weed management plan will be prepared in consultation with the IRT to determine the appropriate measures necessary to eradicate the any invasive species issues.

Table 11: Enhancement Performance Standard

Success Criteria	First Performance Standard	Second Performance Standard	Third Performance Standard	Fourth Performance Standard	Final Performance Standard
Invasive Species	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.	Non-native, invasive tree and shrub species are </= 0% Relative Cover Forbs </= 5% Cover.

6.3 Vegetation Monitoring

Plant survivorship estimates will be made by counting the number of living container stock plantings for each species within each planting area. Health and condition of container stock will also be noted.

Vegetation monitoring for native and invasive cover in riparian and scrub communities will be conducted utilizing an appropriate method including either the California Native Plant Society's relevé sampling methodology (CNPS 2011) or permanent transects, as described below. Relevé sampling will be used for monitoring enhancement areas. Permanent transects will be employed for monitoring restoration areas.

Relevé sampling methodology: Plots will be selected for plant sampling, which are representative of each discrete stand of vegetation to be monitored. Multiple plots may be required to fully represent the vegetation stand. An appropriate and representative number of plots will be established for each community. At least one reference site will be monitored for each community (i.e. mulefat scrub, oak woodland, walnut, native grassland, coastal sage scrub, and mixed community). Plot sizes should be consistent, and plot dimensions should not go beyond the community's natural ecological boundaries. Each species in the plot, as well as its cover and native status, will be recorded to generate an absolute cover for each species and an overall absolute cover for native and non-native species.

Permanent transects: This sampling method is based on a 50-meter by 2.5-meter belt plot (assessment occurs at every 0.5 meter, and all species within 2.5 meters of the transect line are identified). The transects will be located within each planting area, and within representative stands of the target vegetation community at each reference site(s).

Transects would be permanently marked in the field and GPS points recorded so that the same transects will be sampled in subsequent years. Additionally, plant health will be assessed along the transect. Each species observed within 2.5 meters of the transect will be qualitatively assessed for general plant health along each of the transect locations. A qualitative health status description would be assigned to each species that includes such indicators as yellowing, leaf drop, limb sacrifice, live/dead, declining, etc. Other relevant general observations of the transect locations would be noted to describe the overall status of the vegetation community (e.g. phenology, etc.). Applicable performance standards, including relative and absolute cover and species richness measurements, will be calculated from the transect data.

6.4 Photo-Documentation

Visual records will be used to document changes in the Bank Property over the five-year monitoring period. Photo-point monitoring will be used to document the project including pre-restoration, post-restoration, and annual monitoring events. Photo-points will be established prior to initiation of restoration and enhancement installation activities and photo documentation will be conducted annually during the five-year monitoring period to create consistent photographic documentation of the Bank Property. Photo station locations will be selected in the field and location and direction will be provided on a map.

7.0 INTERIM MANAGEMENT PLAN

Maintenance and management of the Bank Property during the performance monitoring period falls within the Interim Management Period. The Interim Management Period, as defined in the BEI, begins on the Bank Establishment Date and continues until all Performance Standards have been met and the Endowment Fund has been fully funded for three years. For the length of the Interim Management Period, performance monitoring of the Bank Property's biological resources as outlined in Section 5.0 of this Development Plan will occur in addition to the maintenance and management tasks described in the Long Term Management Plan (Exhibit D-5 of the BEI). Performance monitoring will occur until all Performance Standards have been met. Once all Performance Standards have been met, monitoring efforts for the remainder of the Interim Management Period will follow the monitoring protocol identified in the Long Term Management Plan. Maintenance, management and monitoring tasks during the Interim Management Period will be funded by the Bank Sponsor.

During the performance monitoring period more rigorous maintenance and management activities may be required and will be guided by the results of monitoring efforts. These more intensive management efforts may involve maintenance and repair of irrigation systems, regular weed management, installation and maintenance of planting cages in the case of problematic herbivory, and erosion control efforts until planted vegetation has become established sufficiently to prevent erosion.

Ongoing removal of non-native, invasive plant species will occur within the Bank Property annually. Methods for control of invasive species will be selected based on the best available techniques as informed by practices of Adaptive Management through annual monitoring. Any detrimental erosion in planting areas will be managed as needed to facilitate the establishment of vigorous native vegetation. Maintenance needs for planted areas will be identified through annual monitoring as described in Section 5.0 of this document during the Interim Management Period and in the Long-term Management Plan. Adaptive Management strategies will be implemented for monitoring, management and maintenance activities throughout the entire Interim Management Period. All maintenance and monitoring activities will be amended as needed based on monitoring results and as approved by the IRT.

8.0 REPORTING

Annual reports will discuss monitoring methodology and results will be submitted to the IRT by August 15 of each monitoring year, with the first annual report to be submitted following completion of Development Activities. Each annual report shall cover the period from July 1 of the preceding year (or if earlier, the Bank Establishment Date for the first annual report) through June 30th of the current year (the "Reporting Period"). These reports will assess the progress in meeting Performance Standards, and identify any Remedial Action proposed, approved, or performed. If a Remedial Action has been completed, the annual report will also evaluate the effectiveness of that action. If necessary, recommendations to improve success in achieving Performance Standards will be made. Annual reports will include a detailed description of the Performance Standards, all transect, relevé and CRAM data for the Bank and the reference

sites, copies of the datasheets, Table 2 from the CRAM memo, figures depicting the location and orientation of all sampling areas, transects and photo points, color photos from the photo points, the time period covered by the report, a description of management tasks conducted, dollar amount and effort expended for management tasks, the total cost of interim management during the Reporting Period, a description of proposed management and maintenance activities for the next reporting year, a description of the overall condition of the Bank, an updated Credit Transfer ledger and accounting of remaining Credits Habitat monitoring and reports will be prepared by qualified biologists with experience in habitat monitoring.

8.1 Adaptive Management

The Bank Property will be monitored in accordance with the approved monitoring requirements to determine the level of success and identify problems requiring Remedial Action or Adaptive Management measures. If the Bank cannot be constructed in accordance with this approved Development Plan, the Bank Sponsor must notify the IRT. A modification of the Development Plan requires approval from the IRT in accordance with the BEI. Reference sites will be monitored each year for comparison to performance at the Bank Property. If Performance Standards are not met in Years 1-5, monitoring will continue until Performance Standards are met. CRAM will be conducted within the same AA in years 3, 4, and 5 following implementation of the Enhancement activities. Due to limitations in the way CRAM is scored, there is the potential for measurable improvements in the Enhanced habitats to not be adequately reflected in the CRAM scores. To ensure changes in Enhanced habitats are captured, and measured, alternate Uniform Performance Standards have been established for each CRAM metric. The Enhanced habitats will be considered as meeting their Performance Standards when they have met both the Uniform Performance Standards and the Target CRAM scores. If the Target CRAM score is not met for any metric during years 3, 4 or 5, the Uniform Performance Standards may be used by the USACE to determine if and to what degree the Enhanced habitats are meeting the Performance Standards. In such an event, the USACE would also make a case-by-case determination if full, partial, or no release of Credits would be warranted. The final Performance Standard will not be met until the Target CRAM score has been achieved. If monitoring or reference sites reveals any Performance Standards are unachievable or if existing conditions have changed at the reference site so that Performance Standards for Waters of the U.S. cannot be met, recommendations on Remedial Actions or adjustments to the Performance Standards and monitoring will be submitted to the USACE.

8.2 Remedial Actions

If monitoring indicates that any Remedial Actions are needed to maintain the Bank Property's water resources and Covered Habitats or to help ensure that the Performance Standards will be met, the Bank Sponsor will prepare an analysis of the cause(s) of failure and, propose Remedial Actions for approval. Minor Remedial Actions such as fence repairs or irrigation line repairs will be conducted within 90 days of identification of the issue. If monitoring determines that the habitats are failing to meet the vegetation criteria, or are likely to fail, Remedial Actions such as supplemental planting or seeding of native species, exotic species eradication, or modifications to irrigation system will be conducted at appropriate times of the year with approval from the IRT. The Bank Sponsor will be responsible for reasonably funding the Remedial Actions necessary for successful completion of the habitat Restoration and Enhancement effort.

9.0 COMPLETION OF RESTORATION AND ENHANCEMENT ACTIVITIES

9.1 Site Visits

Members of the IRT may visit the Bank Property at any time to assess compliance with the Development Plan. It is requested that a minimum of 24 hour notice be given to the Property Owner prior to such a site visit by any member of the IRT.

9.2 Notification of Completion

Upon successfully meeting all Performance Standards, a final report will be sent to the IRT and holder of the Conservation Easement detailing the results of the final year of monitoring.

9.3 USACE and CDFW Confirmation

Once the USACE and CDFW have reviewed the final report and/or conducted a site visit, the USACE and CDFW, in consultation with the other members of the IRT, will determine whether Bank development actions have been successfully completed and notify the Bank Sponsor in writing.

10.0 LONG TERM MANAGEMENT

The Bank Property will be held under Conservation Easement into perpetuity. Riverside Land Conservancy will be the holder of the Conservation Easement and will be responsible for ensuring that the terms of the Conservation Easement are being met. Other long-term management tasks will be the responsibility of the Property Owner and are detailed in the Long-term Management Plan (Exhibit D of the BEI).

11.0 REFERENCES

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Appendix A: FIGURES

Figure 1. Location Map

Soquel Canyon
Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

N
W E
S

0 0.5 1 2
Miles

wra
ENVIRONMENTAL CONSULTANTS

Date: August 2011
Map By: Sundaran Gillespie
Basemap: ESRI World Topo Layer

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Prospectus\Fig1_LocationMap.mxd

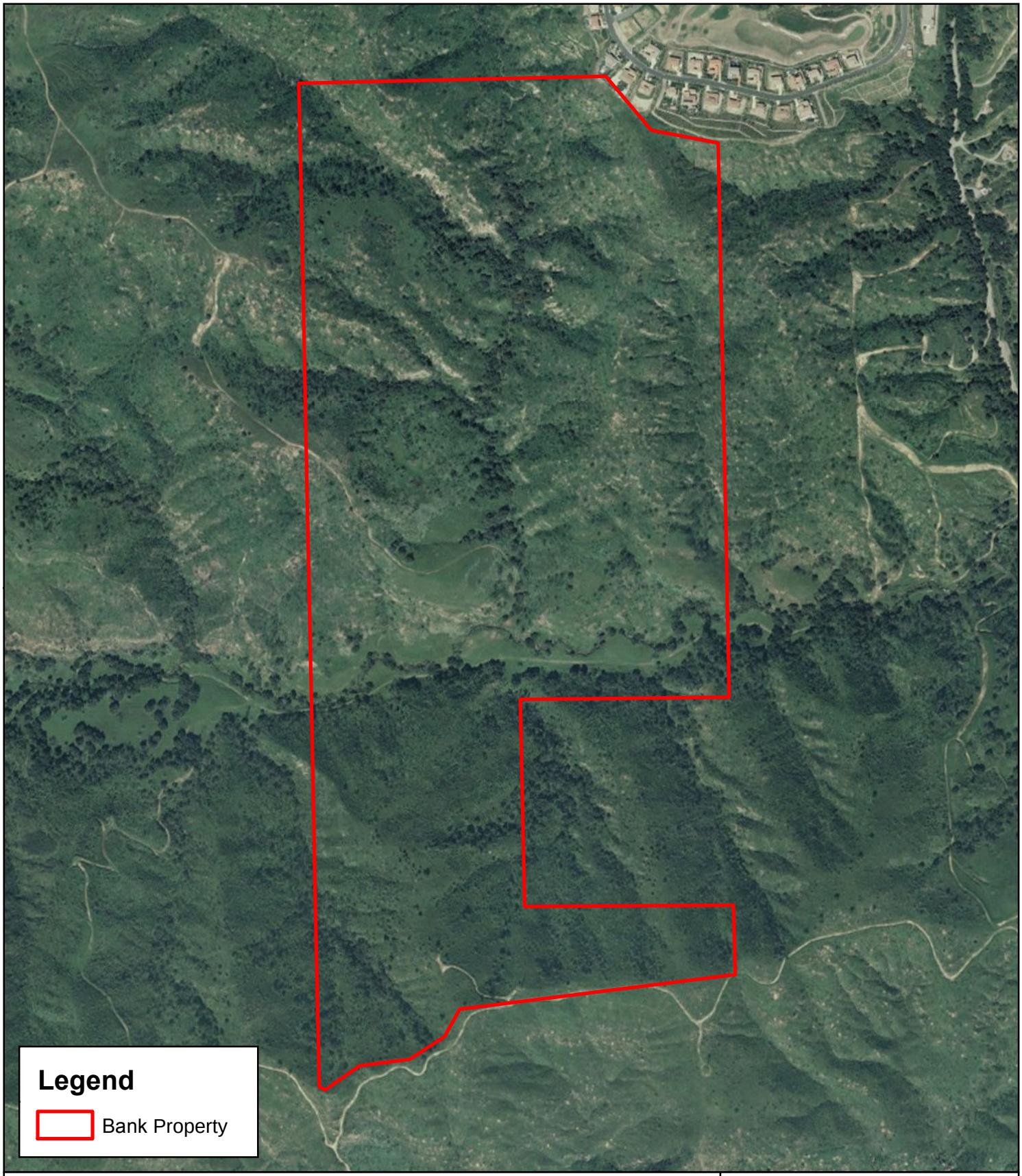

Figure 2. Bank Property Map

Soquel Canyon
Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

N
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0 250 500 1,000
Feet

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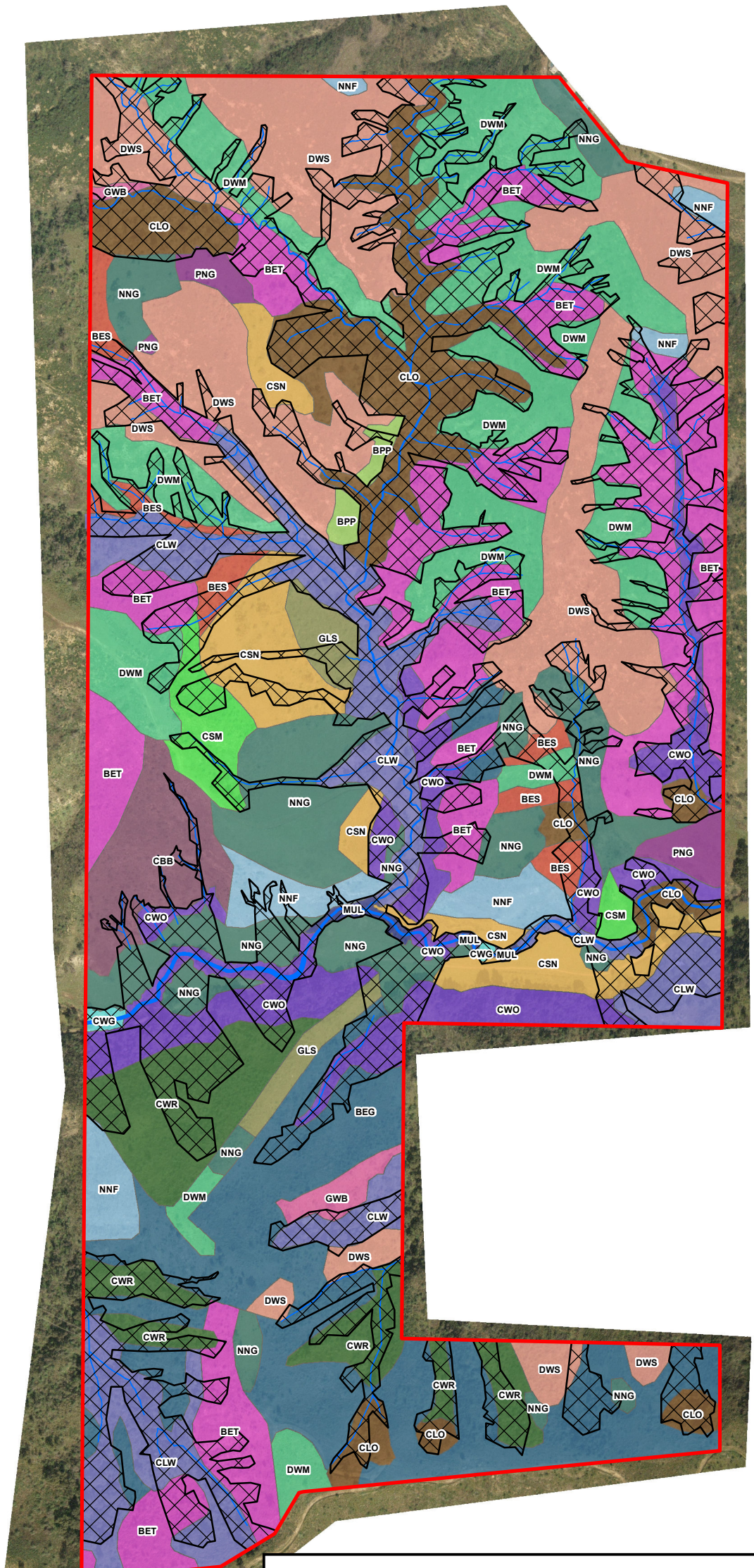
ENVIRONMENTAL CONSULTANTS

Date: August 2011
Map By: Sundaran Gillespie
Basemap: ESRI Imagery

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Prospectus\Fig3_AerialMap.mxd



Legend

- Proposed Bank: (313.35 acres)
- Riparian: (126.42 acres)
- Waters: (2.21 acres)
- CBB - California brittle bush-laural sumac-black sage scrub: (7.10 acres)
- CSM - California sagebrush mixed scrub: (4.27 acres)
- CSN - California sagebrush-non-native grassland scrub: (12.34 acres)
- CWG - California walnut groves: (0.42 acres)
- CWO - California walnut-coast live oak groves: (19.87 acres)
- CWR - California walnut/giant wild rye groves: (15.41 acres)
- BES - blue elderberry stands: (4.62 acres)
- BEG - blue elderberry-giant wild rye stands: (32.54 acres)
- BET - blue elderberry-toyon stands: (41.44 acres)
- BPP - branching phacelia patches: (1.11 acres)
- CLO - coast live oak woodland: (22.36 acres)
- CLW - coast live oak-California walnut woodland: (25.02 acres)
- DWM - deer weed mixed scrub: (38.87 acres)
- DWS - deer weed scrub: (46.62 acres)
- GWB - giant wild rye/blue elderberry-California walnut stands: (1.60 acres)
- GLS - grape soda lupine scrub: (3.56 acres)
- MUL - mulefat thickets: (0.85 acres)
- NNF - non-native forb stands: (7.88 acres)
- NNG - non-native grassland: (24.81 acres)
- PNG - purple needlegrass grasslands: (2.67 acres)

Figure 3. Vegetation Communities within the Proposed Bank

Proposed Soquel Canyon Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

N
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Feet

ENVIRONMENTAL CONSULTANTS

Date: August 2012
Map By: Sundaran Gillespie
Base Source: ESRI

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\LTMP\Dec 2013\FigX_VegComm.mxd

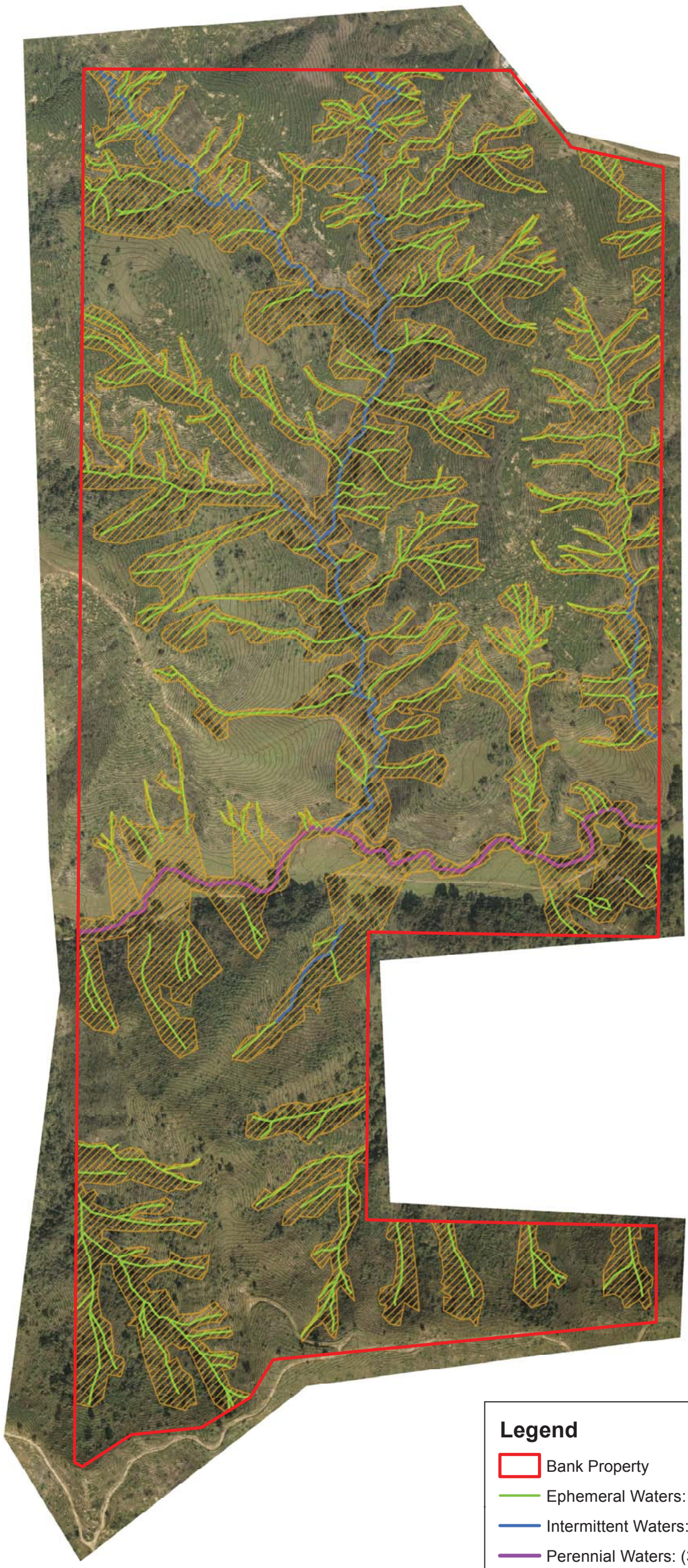

Figure 4a. Section 1602 Jurisdictional Features within the Bank Property

Soquel Canyon
Conservation and Mitigation Bank
San Bernardino and Orange Counties, CA

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Feet
1 inch = 250 feet

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ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Dec 2013
Base Source: DRC

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Delineation\CDFG Map Dec2013.mxd

Waters ID	Width (Feet)	Length (Feet)	Acres
SC1	12.0	876	0.239
SC2	18.0	247	0.107
SC3	8.0	2336	0.427
W001	2.5	875	0.050
W002	1.0	140	0.003
W003	1.0	236	0.005
W004	0.5	244	0.003
W005	2.0	368	0.017
W006	2.0	517	0.024
W007	3.0	525	0.036
W008	0.5	144	0.002
W009	0.5	155	0.002
W010	5.0	804	0.092
W011	1.5	255	0.009
W012	3.0	1751	0.120
W013	1.0	230	0.005
W014	0.5	207	0.002
W015	0.5	176	0.002
W016	1.0	621	0.014
W017	0.5	93	0.001
W018	1.0	867	0.020
W019	1.0	222	0.005
W020	0.5	93	0.001
W021	1.0	247	0.006
W022	1.0	392	0.009
W023	1.0	185	0.004
W024	1.0	318	0.007
W025	1.0	455	0.010
W026	1.0	243	0.006
W027	1.0	201	0.005
W028	1.0	391	0.009
W029	1.5	379	0.013
W030	0.5	217	0.002
W031	0.5	122	0.001
W032	5.0	1770	0.203
W033	1.0	421	0.010
W034	0.5	56	0.001
W035	0.5	71	0.001
W036	1.5	539	0.018
W037	1.0	126	0.003
W038	1.0	328	0.008
W039	1.0	559	0.013
W040	1.0	167	0.004
W041	1.5	395	0.013
W042	1.5	772	0.027
W043	1.0	168	0.004
W044	1.0	71	0.002
W045	1.0	82	0.002
W046	2.0	482	0.022
W047	1.0	584	0.013
W048	1.0	127	0.003
W049	1.0	423	0.010
W050	1.0	160	0.004
W051	1.0	289	0.007
W052	1.0	122	0.003
W053	1.5	317	0.011
W054	3.0	166	0.011
W055	4.0	138	0.013
W056	0.5	151	0.002
W057	0.5	165	0.002
W058	0.5	184	0.002
W059	1.0	582	0.013
W060	1.0	333	0.008
W061	1.0	191	0.004
W062	0.5	459	0.005
W063	1.0	776	0.018
W064	4.0	1134	0.103
W065	1.0	602	0.014
W066	1.5	335	0.011
W067	1.0	272	0.006
W068	1.5	530	0.018
W069	1.0	113	0.003
W070	1.0	277	0.006
W071	1.0	262	0.006
W072	1.0	1110	0.025
W073	1.0	61	0.001
W074	1.0	428	0.010
W075	1.0	86	0.002
W076	1.0	65	0.001
W077	1.0	353	0.008
W078	1.0	203	0.005
W079	2.0	518	0.024
W080	1.0	201	0.005
W081	1.0	196	0.004
W082	1.0	456	0.010
W083	1.0	355	0.008
W084	1.0	151	0.003
W085	3.0	885	0.061
W086	1.0	309	0.007
W087	1.0	128	0.003
W088	1.0	571	0.013
W089	1.0	365	0.008
W090	1.0	177	0.004
W091	1.0	566	0.013
W092	1.0	584	0.013
W093	1.0	561	0.026
W094	1.0	260	0.006
W095	1.0	272	0.006
W096	1.5	197	0.007
W097	1.0	132	0.003
W098	1.0	133	0.003
W099	1.0	296	0.007
W100	1.0	223	0.005
W101	1.0	243	0.006
W102	1.0	66	0.002
W103	1.0	77	0.002
W104	1.0	644	0.015
W105	1.0	345	0.008
	Total	41049	2.211

Figure 4b. Section 404 Jurisdictional Features within the Bank Property

Soquel Canyon
Conservation and Mitigation Bank
San Bernardino and Orange Counties, CA

N
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0 500 1,000
Feet
1 inch = 250 feet

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ENVIRONMENTAL CONSULTANTS

Date: May 2011
Map By: Sundaran Gillespie
Base Source: ESRI

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Delineation\Delin Map Dec2013.mxd

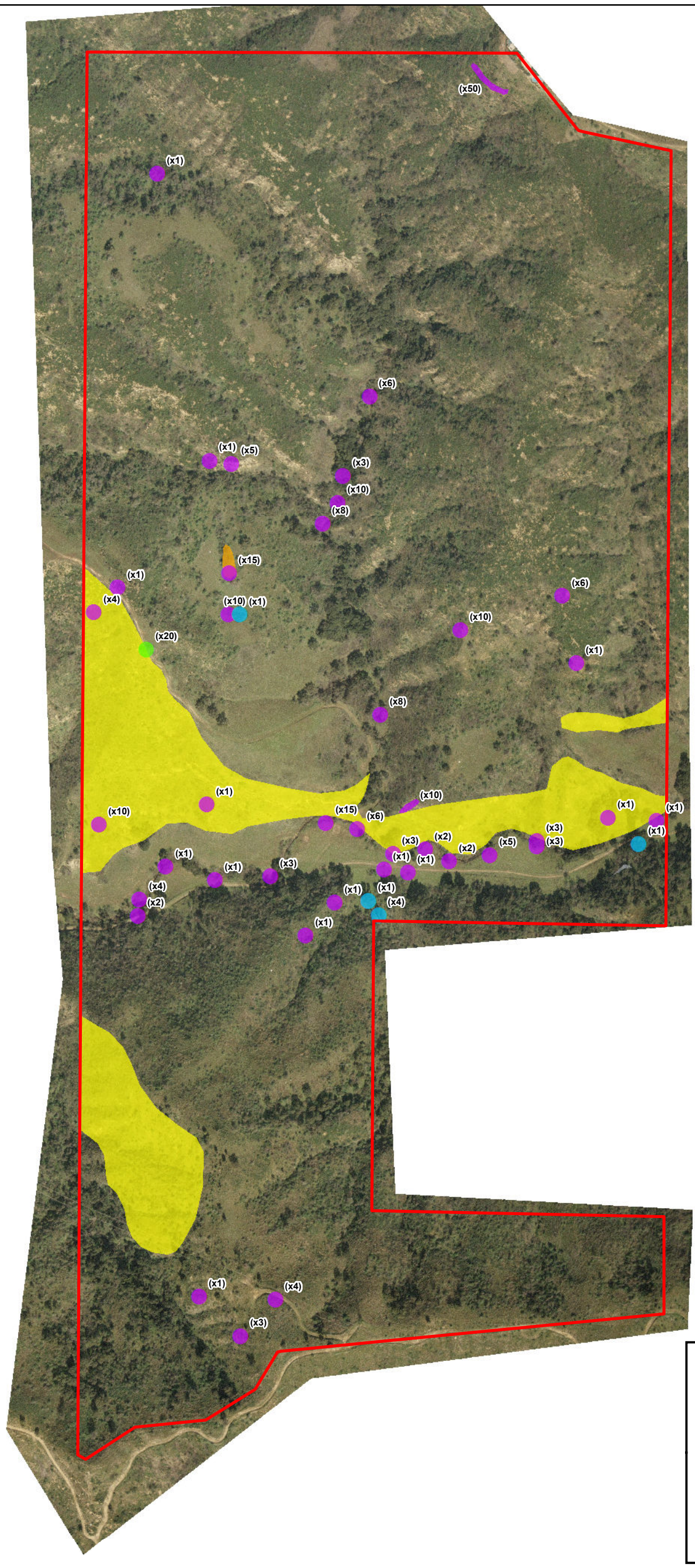

Figure 5. Invasive Weeds Observed within the Bank Property

Soquel Canyon
Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

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Feet

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ENVIRONMENTAL CONSULTANTS

Date: August 2011
Map By: Sundaran Gillespie
Base Source: ESRI

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\LTMP\Fig10_Weeds.mxd

Legend

Streams

Enhancement Areas

- Chaparral Enhancement: (76.79 acres)
- Coastal Sage Scrub Enhancement: (108.53 acres)
- Native Grassland Enhancement: (2.67 acres)
- Oak Woodland Enhancement: (43.66 acres)
- Walnut Enhancement: (33.81 acres)

Figure 6. Enhancement Areas

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Feet

Soquel Canyon
Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

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ENVIRONMENTAL CONSULTANTS

Date: Dec 2013
Map By: SG
Base Source: DRC

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Development Plan\2013\Dec\Fig6_EnhancementAreas.mxd

LEGEND

SYMBOL	DESCRIPTION
	MULEFAT SCRUB PLANTING (0.95 ACRES*)
	NATIVE GRASSLAND PLANTING (1.78 ACRES*)
	OAK WOODLAND PLANTING (1.57 ACRES*)
	COASTAL SAGE SCRUB PLANTING (23.47 ACRES*)
	WALNUT WOODLAND PLANTING (6.93 ACRES*)
	BANK PROPERTY BOUNDARY
	EXISTING CONTOUR
	BAT BOX
	OWL BOX
	BOULDER PILE

NOTE: Cattle will be excluded and invasive species removal/ management will be conducted throughout the entire Bank Property

* Acreage amount represents total acres within the entire Bank Property, not exclusively the acres shown in this figure.

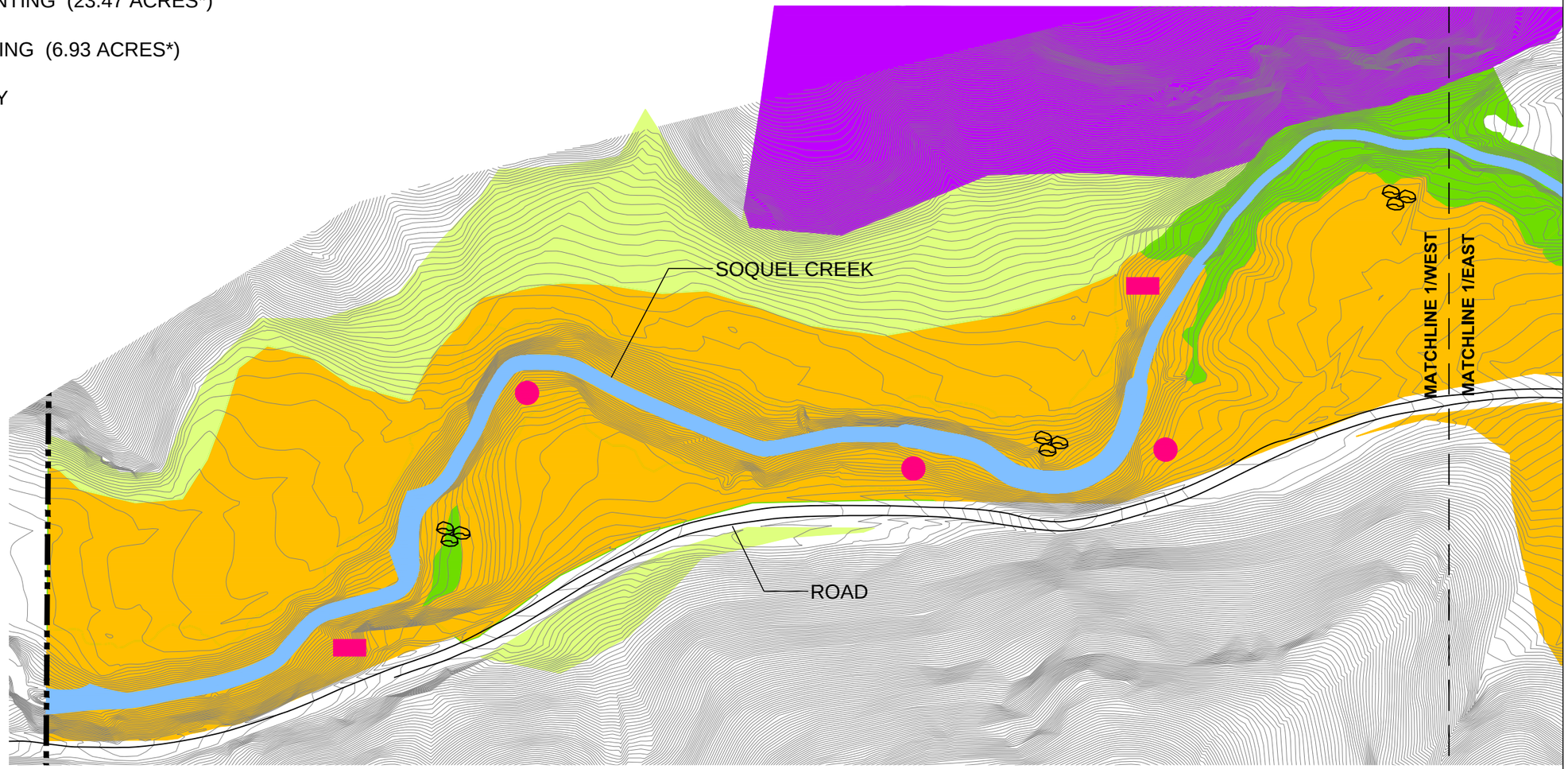


Figure 7. Stream Corridor Planting Plan - West

Soquel Canyon Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

0 50 100 200

wra
ENVIRONMENTAL CONSULTANTS

May 2014

LEGEND

SYMBOL	DESCRIPTION
	MULEFAT SCRUB PLANTING (0.95 ACRES*)
	NATIVE GRASSLAND PLANTING (1.78 ACRES*)
	OAK WOODLAND PLANTING (1.57 ACRES*)
	COASTAL SAGE SCRUB PLANTING (23.47 ACRES*)
	WALNUT WOODLAND PLANTING (6.93 ACRES*)
	BANK PROPERTY BOUNDARY
	EXISTING CONTOUR
	BAT BOX
	OWL BOX
	BOULDER PILE

NOTE: Cattle will be excluded and invasive species removal/ management will be conducted throughout the entire Bank Property

* Acreage amount represents total acres within the entire Bank Property, not exclusively the acres shown in this figure.

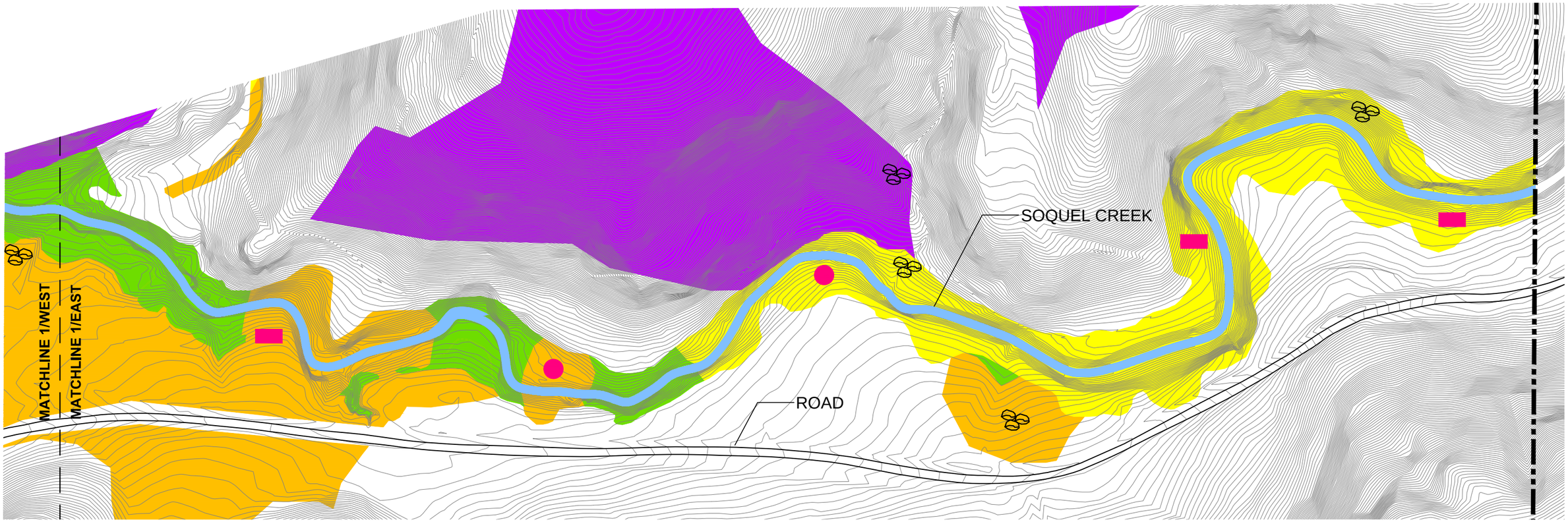


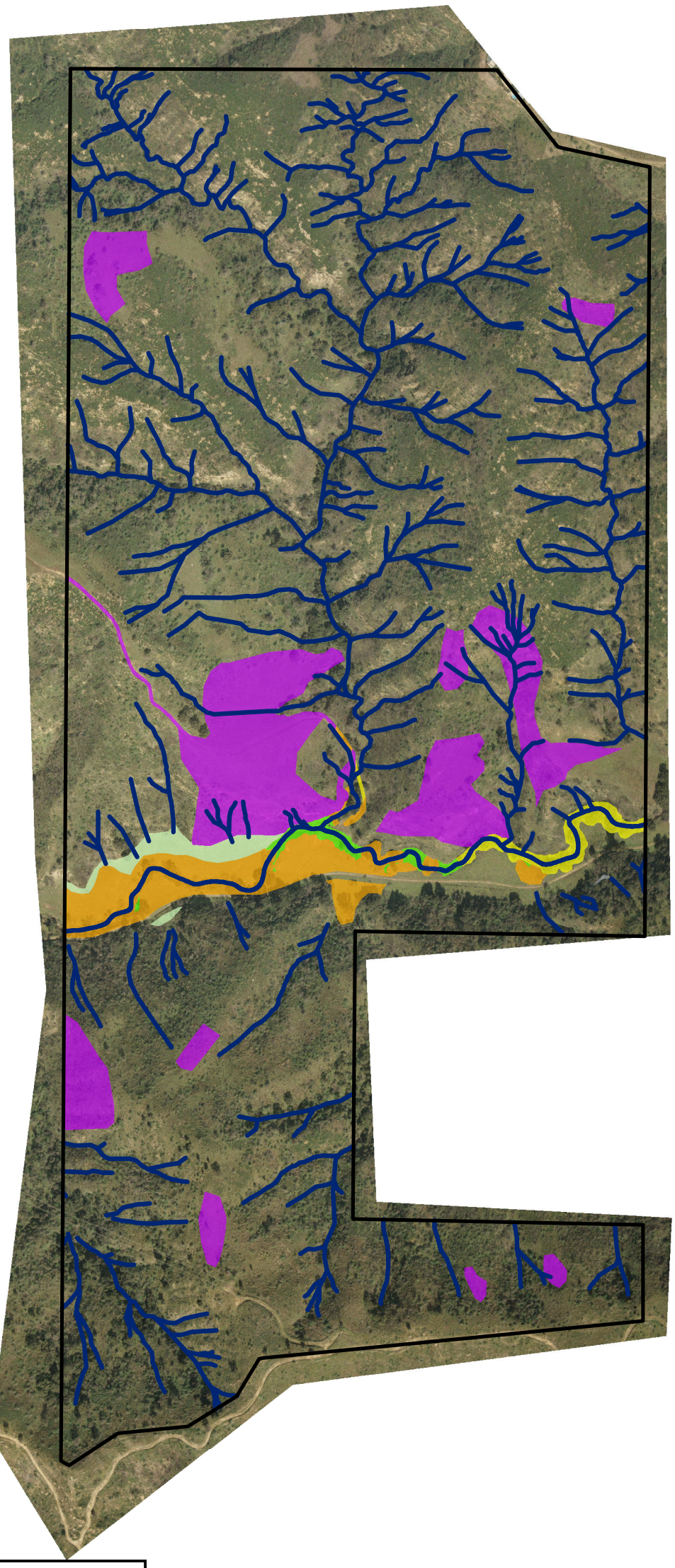
Figure 8. Stream Corridor Planting Plan - East

Soquel Canyon Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

0 50 100 200

wra
ENVIRONMENTAL CONSULTANTS

May 2014



Legend

Streams

Planting Areas

- Coastal Sage Scrub Planting Area: (23.47 acres)
- Mulefat Scrub Planting Area: (0.95 acre)
- Native Grassland Planting Area: (1.78 acres)
- Oak Woodland Planting Area: (1.57 acres)
- Walnut Planting Area: (6.92 acres)

Figure 9. Planting Areas

Soquel Canyon
Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

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ENVIRONMENTAL CONSULTANTS

Date: Dec 2013
Map By: SG
Base Source: DRC

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Development Plan\2014\may\FigX_PlantingAreas.mxd

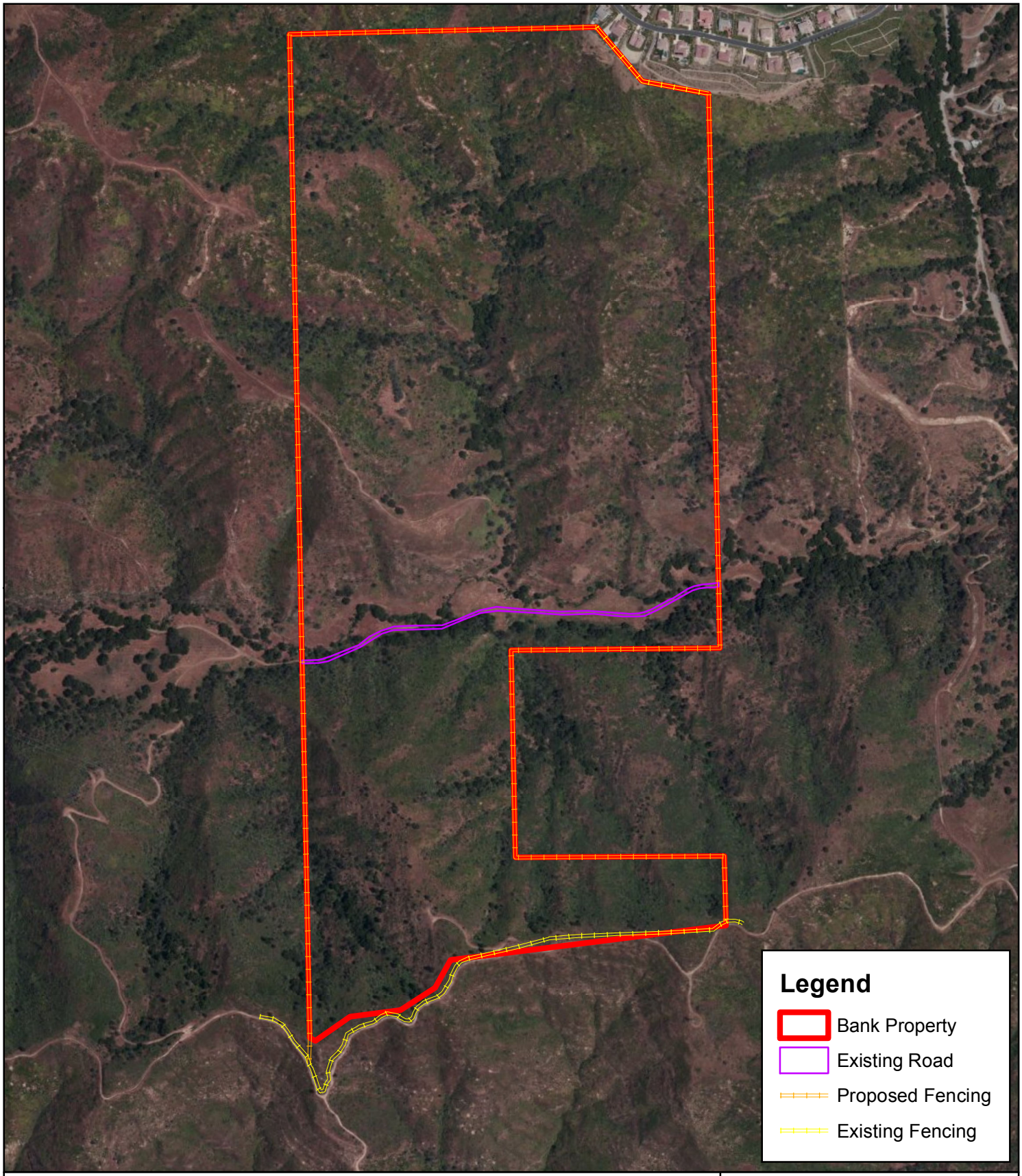

Figure 10. Proposed Fencing within the Bank Property

Soquel Canyon
Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

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Feet

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ENVIRONMENTAL CONSULTANTS

Date: April 2014
Map By: SG
Basemap: ESRI Imagery

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Development Plan\2014\april\Fencing.mxd

APPENDIX B: MEMORANDUM FROM MARK ANDERSON, MSA LAND SOLUTIONS, INC.

MSA
Land Solutions, Inc.

M E M O R A N D U M

To: Tracey Brownfield, Land Veritas

From: Mark Anderson, RCE 26821

Date: 4/23/2014

Subject: Soquel Canyon Mitigation Bank, City of Chino Hills

I am pleased to share my professional observations of Soquel Canyon drainage for the reach within the subject property based on my field visits in July 2013. The drainage flows from east to west through the subject property within a valley bottom surrounded by hills to the north and south. The drainage is well incised and has a sinuous alignment. The banks of the drainage include mature vegetation for much of the reach within the property. In contrast there are significant reaches where just beyond the banks of the creek there are no trees or large shrubs. This is a strong indication that the drainage has not deviated from its current alignment for decades.

Inspection of the drainage bottom reveals numerous locations where large boulders or bedrock have been exposed thereby armoring the bottom that resists further down cutting. Lateral bank erosion is inhibited by the mature bank vegetation. Isolated locations show disturbance, many which are the direct result of cattle trails and crossings. On the date of the site visit there was relatively young growth visible near the bottom of the banks indicating that there had not been significant storm flows in the past year or two.

In general, I would characterize the Soquel Canyon drainage through the length of the property as having obtained stability through natural armoring by exposing bedrock and boulders in combination with mature vegetation that is supported by low flows.

Credentials
I am a professional civil engineer with 40 years of experience in a broad range of technical disciplines with emphasis on grading and drainage matters. Past projects have included the protection and enhancement of natural drainage courses, creation of wetland systems, protection of downstream properties utilizing retention and detention systems as well the more traditional flood control improvements such as storm drains, open channels and reinforced concrete boxes. My grading design experience often involves hillside terrain and the associated valley bottoms and natural drainage courses. These types of projects require collaboration and understanding experts in the areas of biology and geology.

APPENDIX C: CRAM REPORT

Evaluation of Ephemeral, Intermittent, and Perennial Streams using the California Rapid Assessment Method (CRAM) for the Soquel Canyon Mitigation Bank Site

Prepared for:

Land Veritas Corp
1505 Bridgeway, #209
Sausalito, CA 94965

Prepared by:

VCS Environmental
EXPERT SOLUTIONS | CEQA-NEPA . Biology . Regulatory

30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675

June 2014

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TABLE OF CONTENTS

APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

AA	Assessment Area
CRAM	California Rapid Assessment Method
USGS	United States Geological Survey
VCS	VCS Environmental

1.0 Introduction

The proposed Soquel Canyon Mitigation Bank is an approximately 320-acre property located between the cities of Chino Hills and Yorba Linda, California. The property consists of eight contiguous parcels totaling approximately 320 acres. The property is owned by Land Veritas, LLC, the proposed bank proponent.

CRAM enables two or more trained practitioners working together in the field to assess the overall health of a wetland by choosing the best-fit set of narrative descriptions of observable conditions ranging from the worst commonly observed to the best achievable for the type of wetland being assessed (CWMW 2013). CRAM also assesses the stressors that affect the wetland. The purpose of this assessment is to evaluate the existing conditions of the riverine resources at the Soquel Canyon Mitigation Bank. CRAM attributes were evaluated based on field and/or office assessments and scored using the CRAM, quantifying the site conditions with respect to the four CRAM attributes of the following listed below.

- Buffer and Landscape Context
- Hydrology
- Physical Structure
- Biotic Structure

Attributes are categories of metrics used to assess the condition of the wetland as well as its buffer and landscape context (CWMW 2013).

Project Location

The proposed bank site is an approximately 320-acre property located between the cities of Chino Hills and Yorba Linda, California. The majority of the site is within San Bernardino County, although a small (7-acre) parcel of the site is located in Orange County. Chino Hills State Park is located adjacent to the property's southern boundary (Figures 1 and 2).

The proposed bank site ranges from approximately 900 to 1,600 feet in elevation, and is dominated by relatively steep hill slopes. The site is undeveloped and contains mostly native vegetative communities, although dense stands of invasive plants can be found in many areas. The distribution of species and communities is strongly influenced by the slope, aspect, and topographic position with regard to the many hills and ridges on the property.

The stream that drains the Soquel Canyon Mitigation Bank site, known as Soquel Creek, bisects the property at its lowest elevation. Downstream from the proposed bank, Soquel Creek drains into a man-made retention basin approximately 7 miles southwest of the site. Water in this basin, known as Miller Basin, is diverted into both the Santa Ana and the Los Angeles Rivers. Thus, Soquel Creek is tributary to both of these rivers.

2.0 Study Methods

Desktop Study

To identify the existing conditions within the Soquel Canyon Mitigation Bank site, biologists performed a desktop study prior to the field surveys to identify potential biological and hydrological issues. The study began with a review of maps, databases, and relevant available literature on the biological and hydrological resources within the mitigation sites vicinity.

Prior to conducting the field work, USGS topo maps and aerial imagery of Soquel Canyon Creek and the ephemeral and intermittent drainages within the Soquel Canyon Mitigation Bank site were reviewed in the office to help determine the appropriate boundary and division of each assessment area (AA) and to analyze metrics for the Buffer and Landscape Context Attribute, the Water Source metric of the Hydrology Attribute, and possible stressors.

Field Survey Methods using CRAM

After assembling the background information about the drainages within the Soquel Canyon Creek Mitigation Bank site, VCS Environmental (VCS) biologists conducted a CRAM assessment on October 9, 10, and 13, 2013. CRAM requires two trained practitioners. Erin Hayes, Amanda Beck, and Shawn Gatchel-Hernandez of VCS are U.C. Davis trained practitioners. VCS followed the methods described in the *California Rapid Assessment Method for Wetlands, Riverine Wetlands Field Book ver. 6.1* (CWMW 2013) to evaluate the current wetland conditions on the proposed mitigation bank site. CRAM, field observations, relevant literature/databases, USGS topo maps, and aerial imagery were utilized to assess the current baseline conditions. To quantify site conditions, VCS conducted a CRAM assessment as described in the sections below.

2.1.1 Establishing the Assessment Areas (AA)

The AA is the portion of a wetland that is the subject of a CRAM assessment (CWMW 2013). Fieldwork for CRAM began with finding and confirming the boundaries of the AA. The location of each AA follows all recommended guidelines set forth in the CRAM User's Manual (e.g.

recommended length, observing hydrobreaks, etc.). Aerial imagery, topo maps, and field conditions were used to assist in the delineation of each AA. The following AAs were selected based upon the type of drainage feature being assessed:

Perennial Drainage (Soquel Creek)

- AA #2
- AA #4

Intermittent Drainages

- AA #1
- AA #3
- AA #9

Ephemeral Drainages

- AA #5
- AA #6
- AA #7
- AA #8

Figures 3 and 4 shows the location of each AA.

2.1.2 Current Conditions of the Mitigation Sites

During the field surveys, the biologists walked along and within each drainage and assessed and recorded the field indicators, existing habitat, vegetation, and hydrologic field conditions within each AA and its buffer. Indicators are visible clues or evidence about field conditions used to select the best-fit narrative description of alternative states for CRAM metrics (CWMW 2013). Photographs were taken at each AA. Representative photographs of the current conditions within the AAs are attached in Appendix B.

Pursuant to the CRAM, each mitigation site AA (AA #1 - AA #9) was evaluated in the field and/or office for the following main attributes:

- Buffer and Landscape Context
- Hydrology
- Physical Structure
- Biotic Structure

Each of these attributes is comprised of multiple metrics/submetrics. A metric is a measureable component of an attribute (CWMW 2013). Overall scoring was conducted following the CRAM scoring methodology for non-confined riverine systems (see Tables 1A-1C: Score Summary Tables and Appendix B - CRAM Data Sheets).

3.0 Results and Discussion

Riverine wetlands are classified as confined or non-confined, based on the ratio of valley width to channel width. The drainage wetland sub-type for the intermittent and ephemeral drainage AAs was confined. The drainage wetland sub-type for the perennial drainage was non-confined. Except for AA #2, all the AAs were dry (no flowing water) during the site visits. Only the upstream portion of AA #2 had flowing water during the site visit, but a majority of AA #2 was dry/damp.

CRAM Scores

After the field visit, VCS analyzed each metric and developed a score. The score for a CRAM metric is the numerical value associated with the narrative description of an alternative state that is chosen because it best-fits the condition observed at the time of the assessment (CWMW 2013). The attribute score was then calculated based on its associated metric scores, as defined by CRAM. An attribute score is the percent of the maximum possible combination of the metric scores for the attribute (CWMW 2013). CRAM yields an overall score for each AA based on the component scores for the attributes and their metrics. The CRAM overall score or AA score is calculated by averaging the four final attribute scores for an AA. This score indicates the overall condition of an AA. Tables 1A through 1C outline the raw and final scores for each attribute as well as the overall CRAM score for the current mitigation site conditions. Raw data sheets including applicable worksheets and calculations are attached as Appendix B.

Table 1A
Ephemeral Drainages

Assessment Area	AA #1	AA #5	AA #6	AA #8
Wetland Subclass (conf/nonconf)	confined	confined	confined	confined
Buffer and Landscape Context				
Riparian Continuity	12	12	12	12
% of AA with Buffer	C	12	12	12
Average Buffer Width	0	12	12	12
Buffer Condition	9	9	9	9
Raw	22.39	22.39	22.39	22.39
Final	93	93	93	93
Hydrology				
Water Source	9	9	9	9
Channel Stability	9	6	6	9
Hydrologic Connectivity	9	9	9	9
Raw	27	24	24	27
Final	75	67	67	75
Physical Structure				
Structural Patch Richness	9	6	6	6
Topographic Complexity	6	6	6	9
Raw	15	12	12	15
Final	63	50	50	63
Biotic Structure				
PC: No. of plant layers	12	12	12	12
PC: No. of codominants	B	6	6	6
PC: Percent codominant invasive	3	9	6	9
Horizontal Interspersion	6	6	6	6
Vertical Biotic Structure	9	6	3	9
Raw	36	21	17	24
Final	61	58	47	67
Overall AA Score	73	67	64	75

Table 1B
Intermittent Drainages

Assessment Area	AA #3	AA #7	AA #9
Wetland Subclass (conf/nonconf)	confined	confined	confined
Buffer and Landscape Context			
Riparian Continuity	12	12	12
% of AA with Buffer	12	12	12
Average Buffer Width	12	12	12
Buffer Condition	9	9	9
Raw	22.39	22.39	22.39
Final	93	93	93
Hydrology			
Water Source	9	9	9
Channel Stability	6	9	9
Hydrologic Connectivity	3	6	6
Raw	18	24	24
Final	50	67	67
Physical Structure			
Structural Patch Richness	6	9	9
Topographic Complexity	9	6	6
Raw	15	15	15
Final	63	63	63
Biotic Structure			
PC: No. of plant layers	12	12	12
PC: No. of codominants	6	3	6
PC: Percent codominant invasive	9	9	9
Horizontal Interspersion	9	6	6
Vertical Biotic Structure	9	6	9
Raw	26	20	24
Final	72	56	67
Overall AA Score	**74**	**70**	**72**

Table 1C
Perennial Drainages

Assessment Area	AA #2	AA #4
Wetland Subclass (conf/nonconf)	non-confined	non-confined
Buffer and Landscape Context		
Riparian Continuity	12	12
% of AA with Buffer	12	12
Average Buffer Width	12	12
Buffer Condition	9	9
Raw	22.39	22.39
Final	93	93
Hydrology		
Water Source	9	9
Channel Stability	9	6
Hydrologic Connectivity	3	3
Raw	21	18
Final	58	50
Physical Structure		
Structural Patch Richness	3	6
Topographic Complexity	6	9
Raw	9	15
Final	38	63
Biotic Structure		
PC: No. of plant layers	12	12
PC: No. of codominants	6	6
PC: Percent codominant invasive	6	9
Horizontal Interspersion	9	9
Vertical Biotic Structure	9	9
Raw	26	26
Final	72	72
Overall AA Score	**65**	**74**

Based on the CRAM evaluation and calculations summarized above, conditions within the bank site varies by an 11 point margin. The overall CRAM score ranges from 64 to 75 for AA #1 - AA #9.

Attribute 1: Buffer and Landscape Context

The Buffer and Landscape Context Attribute contain two metrics and three submetrics:

- Riparian Continuity (Aquatic Area Abundance) metric
- Buffer metric
    - Percent of AA with Buffer submetric
    - Average Buffer Width submetric
    - Buffer Condition submetric

The buffer is the area outside the AA, including adjoining uplands and other wetland areas that can reduce the effects of stressors on the wetland's condition (CWMW 2013). The landscape context of a wetland consists of the lands, waters, and associated natural processes and human uses that directly affect the condition of the wetland or its buffer (CWMW 2013).

All of the AAs are located within an open space (natural upland habitats) area with no development or other land covers that would be excluded from the buffer (250 meters on either side of the AA). The existing site conditions within each of the AA buffers are generally the same. The buffer for each AA contains natural upland habitats with native and non-native plant species. Because each AA buffer contained natural upland habitats and no land covers that would be excluded from the buffer, each AA received the highest score possible (A) for the Percent of AA with Buffer submetric and the Average Buffer Width submetric. The Riparian Continuity (Aquatic Area Abundance) metric for each AA also received an A since there were no interruptions of "non-buffer land cover" 500 meters up- or down-stream of each AA. The Buffer Condition submetric scored a B for each AA due to the presence of non-native grasses and herbs within each AA buffer.

Attribute 2: Hydrology

The Hydrology Attribute contains three metrics:

- Water Source metric
- Channel Stability metric

- Hydrologic Connectivity (Entrenchment Ratio) metric

Water sources directly affect the extent, duration, and frequency of the hydrological dynamics within an AA (CWMW 2013). Water sources include direct inputs of water into the AA as well as any diversions of water from the AA (CWMW 2013). Although precipitation, groundwater, and natural runoff are the primary sources of water for the AAs, urban runoff from residential development located northeast of the bank property is also a contributing source of water. Therefore, each AA received a B for the Water Source metric.

Channel stability is assessed as the degree of channel aggradation (i.e. net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e. net loss of sediment from the bed causing it to be lower over time) (CWMW 2013). Due to the disturbance of the ephemeral and perennial drainages on the bank site by the presence of cattle, the AAs associated with these drainages were characterized by aggraded conditions and received a B or C for the Channel Stability metric. The AAs associated with the intermittent drainage showed less evidence of aggradation and received the highest score possible (A) for the Channel Stability metric.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, or to accommodate rising floodwaters without persistent changes in water level that can result in stress to wetland plants and animals (CWMW 2013). This metric is assessed on the degree of channel entrenchment (CWMW 2013). Scores for the Hydrologic Connectivity metric varied throughout the AAs. Higher scores (A or B) correspond to a less entrenched drainage; while lower scores (C or D) correspond to a more entrenched drainage. Generally, the ephemeral and intermittent drainages had a higher entrenchment ratio than the perennial drainage due to disturbances related to the presence of cattle.

Attribute 3: Physical Structure

The Physical Structure Attribute contains two metrics:

- Structural Patch Richness metric
- Topographic Complexity metric

Patch richness is the number of different obvious types of physical surfaces or features (patches) that may provide habitat for aquatic, wetland, or riparian species (CWMW 2013). Patches may be natural or man-made. This metric is different from topographic complexity in that it addresses the number of different patch types, whereas topographic complexity

evaluates the spatial arrangements and interspersion of the types (CWMW 2013). Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical and abiotic features and elevation gradients (CWMW 2013).

The Structural Patch Richness metric and the Topographic Complexity metric scored Bs and Cs for each of the AAs because of the disturbance from cattle. Cattle have disturbed the soils within the drainage areas, which has resulted in the flattening of drainage beds, channels, and banks and removal of cobbles, boulders, and native vegetation. An increase in the score for these metrics is anticipated to result from fencing the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the bank site so that disturbed drainage areas can return to a natural, undisturbed state.

Attribute 4: Biotic Structure

The Biotic Structure Attribute contains three metrics and three submetrics:

- Plant Community metric
    - Number of Plant Layers submetric
    - Number of Co-Dominant Plant Species submetric
    - Percent Invasion submetric
- Horizontal Interspersion metric
- Vertical Biotic Structure metric

Vegetation within the within the ephemeral streams includes branching phacelia (*Phacelia ramosissima*), black mustard (*Brassica nigra*), Italian thistle (*Carduus pycnocephalus*), red brome (*Bromus madritensis* ssp. *rubens*), ripgut brome (*B. diandrus*), toyon (*Heteromeles arbutifolia*), and blue elderberry (*Sambucus nigra*). The intermittent streams in the Proposed Bank contain shrub and tree species including California walnut (*Juglans californica*), coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*), and blue elderberry (*Sambucus nigra*). Vegetation within Soquel Canyon Creek includes California walnut (*Juglans californica*), coast live oak (*Quercus agrifolia*), western sycamore (*Platanus racemosa*), Goodding's willow (*Salix gooddingii*), arroyo willow (*S. lasiolepis*), mulefat (*Baccharis salicifolia*), California blackberry (*Rubus ursinus*), stinging nettle (*Urtica dioica*), water cress (*Nasturtium officinale*), mugwort (*Artemisia douglasiana*), rosilla (*Helenium puberulum*), and basket rush (*Juncus textilis*).

A majority of the AAs supported several different plant layers (short, medium, tall, and very tall) and scored high (As and Bs) for this submetric. A plant layer is a stratum of vegetation indicated by a discreet canopy at a specified height that comprises at least 5% of the area of the AA

where the layer is expected (CWMW 2013). All of the AAs received the highest score possible (A) due to the presence of all but the floating plant layer.

A majority of the AAs were found to support a low number of co-dominant species and scored low for this submetric (Cs and Bs). Scores for the Percent Invasion submetric varied (Bs - Ds) throughout the AAs due to the high amount of non-native co-dominant plant species found within some of the AAs. The number of invasive co-dominant species for all plant layers combined is assessed as a percentage of the total number of co-dominants.

Horizontal interspersion refers to the variety of interspersion of plant "zones" (CWMW 2013). Plant zones are obvious multi-species associations (in some cases zones may be plant monocultures) that remain relatively constant in makeup throughout the AA and which are arrayed along gradients of elevation, moisture, or other environmental factors that seem to affect the plant community organization in a two-dimensional plan view (CWMW 2013). The Horizontal Interspersion metric scored medium to low (Bs and Cs) for all of the AAs.

The vertical component of biotic structure assesses the degree of overlap among plant layers. The score of the Vertical Biotic Structure metric varied (Bs and Cs) due to disturbance from cattle and wildfire, which have limited the number of plant layers with overlap.

Stressors

A stressor is an anthropogenic perturbation within a wetland or its environmental setting that is likely to negatively impact the condition and function of the CRAM AA (CWMW 2013). The biologists did not identify any stressors within 50 meters of each AA for the Hydrology and Physical Structure Attributes. Three stressors were identified within 50 meters of each AA for the Biotic Structure Attribute. They include:

- Mowing, grazing, excessive herbivory (within AA)
- Lack of vegetation management to conserve natural resources
- Lack of treatment of invasive plants adjacent to AA or buffer

The presence of cattle grazing within all of the AAs contributes a negative effect on all of the Attribute scores. In addition, the lack of treatment of invasive plants within the AAs, adjacent to the AAs and within the buffer likely contributes a significant negative effect on the AAs and the Buffer and Landscape Context Attribute final score.

In addition to these stressors, in 2008, the Freeway Complex fire burned the Soquel Canyon Mitigation Bank site. This fire had a dramatic affect on vegetation and wildlife found in the bank site. After the fire, many non-native exotic plants encroached into the burned areas, however it appears the site is starting to recover and many of the native plants/trees are starting to resprout.

4.0 CRAM Recommendations

The condition of onsite drainages will be monitored using the CRAM Riverine module to assess various functions related to changes observed. The CRAM scores within this report consist of the baseline CRAM scores for the bank site and will be utilized to measure the success of restoration and enhancement activities. CRAM will be conducted within the same assessment areas in years 3, 4, and 5 following implementation of the enhancement activities. Improvements in existing stream function are anticipated as a result of stream buffer restoration and enhancement activities. Changes in CRAM scores will be evaluated for consecutive monitoring events to demonstrate lift in the stream's ecological function(s). Evidence of bank erosion attributable to stream buffer enhancement activities will be documented, and recommendations regarding adjustments to the planting areas will be provided, if deemed necessary. Restoration activities will not alter the drainage contours and will focus on the removal of cattle from the bank site, planting of native species, and removal of non-native species.

Following is a discussion of the anticipated effects of the proposed enhancement activities on the CRAM scores for each drainage type.

4.1 Ephemeral Drainages

4.1.1 Attribute 1: Buffer and Landscape Context

The Riparian Continuity, Percent of AA with Buffer, and Buffer Width metrics are exhibiting the highest possible scores for Assessment Areas (AAs) within the Bank Property and are not expected to change as a result of Development Plan implementation. The Buffer Condition metric assesses the extent and quality of the vegetation, condition of the soils, and amount of human visitation within the buffer. The buffers for the AAs for ephemeral stream types within the Bank Property were characterized by disturbed soils and contained between 25% and 75% non-native vegetation (yielding a metric score of 9). The control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around the perimeter to control trespass and to exclude cattle from the Bank Property is expected to restore the disturbed soils to a natural, undisturbed state and

result in a decrease in cover of non-native vegetation to less than 25%. However, restoration of the disturbed soils within the buffers to a natural, undisturbed state is not expected to be reflected in the metric score within the 5 year monitoring period. Therefore, the Buffer and Landscape Context Attribute is not expected to change as a result of Development Plan implementation.

4.1.2 *Attribute 2: Hydrology*

The water source metric assesses direct inputs of water into the AA, specifically inputs affecting the dry season, as well as any diversions of water from the AA. Although precipitation, groundwater, and natural runoff are the primary sources of water for ephemeral streams within the Bank Property, urban runoff from residential development located to the northeast is also a contributing source of water (yielding a metric score of 9). The Water Source metric is not expected to change as a result of Development Plan implementation.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, which is assessed by the degree of channel entrenchment. Although the ephemeral drainages on the Bank Property had higher entrenchment ratios (yielding a metric score of 9), these drainages still exhibit disturbances related to the presence of cattle. Although the exclusion of cattle and planting of native vegetation is expected to provide erosion control and stability of the channel banks, the disturbed soils and channel entrenchment are expected to require a longer period of time to become evident. An increase in the Hydrologic Connectivity metric is not anticipated to be reflected within the 5 year monitoring period. Therefore, Hydrologic Connectivity metric is not expected to change as a result of Development Plan implementation.

Channel stability is assessed as the degree of channel aggradation (i.e. net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e. net loss of sediment from the bed causing it to be lower over time). Due to the disturbance of the ephemeral drainages on the Bank Property by the presence of cattle, the AAs associated with these drainages were characterized by aggraded conditions (yielding a metric score of 6 or 9). The planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around the perimeter to exclude cattle from the Bank Property is expected to restore the disturbed soils and channels to a natural, undisturbed state. The use of plantings for erosion control and stability of the channel banks and the return of regular flows regimes through drainage channels are expected to result in an increase in the Channel Stability metric scores (yielding a metric score of 9 for all AAs). Therefore, the improvement of the score of this metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion control and native cover, as identified in the Development Plan.

4.1.3 *Attribute 3: Physical Structure*

The Structural Patch Richness metric measures patch richness (the number of different types of physical features that provide habitat for aquatic, wetland, or riparian species) within the AA.

Structural patch types within the AAs for the ephemeral stream types on the Bank Property have been impacted by the presence of cattle, with between 4 and 7 structural patch types observed (yielding a metric score of 6 or 9). An increase in the score for this metric is anticipated to result from fencing the site with wildlife friendly three-wire fencing around it's perimeter to exclude cattle from the Bank Property so that disturbed channels beds and banks can return to a natural, undisturbed state, which is expected to, in turn, result in the presence of such patch types as bank slumps or undercut banks, cobbles and boulders, pools or depressions in the channels, riffles or rapids, and secondary channels. In addition, the planting of native vegetation will provide for control of erosion and stability of the banks that will be allowed to form once cattle is removed and the natural flow regime is allowed to return to these areas. The presence of native vegetation and the return to a natural flow regime is expected to result in structural patch types such as abundant wracklines or organic debris in the channels, debris jams, woody debris, and standing snags. It is expected that the successful exclusion of cattle and meeting the success criteria for erosion and native cover will result in the increase of observable structural patch types to a minimum of 6 to 7 for all AAs (yielding a metric score of 9 for all AAs). Therefore, the improvement in the score of the Structural Patch Richness metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion and native cover, as identified in the Bank Development Plan.

Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical and biotic features and elevation gradients. The AAs for ephemeral stream types within the Bank Property were characterized by either a single bench that lacks abundant micro-topographic complexity or one bench with abundant micro-topographic complexity (yielding a metric score of 6 or 9). Cattle have disturbed the soils within the drainage areas, which has resulted in the flattening of drainage beds, channels, and banks and removal of cobbles, boulders, and native vegetation. Although the exclusion of cattle is expected to restore the disturbed soils to a natural, undisturbed state and planting of native vegetation will provide erosion control and stability of the channel banks, the presence of interrupted flow regimes, disturbed soils, and flattened drainage areas are expected to require longer than the five year monitoring period to return to a natural, undisturbed state. Therefore, the Topographic Complexity metric is not expected to change as a result of Development Plan implementation.

4.1.4 *Attribute 4: Biotic Structure*

Vegetation within the AAs for the ephemeral stream types on the Bank Property included branching phacelia (Phacelia ramosissima), black mustard (Brassica nigra), Italian thistle (Carduus pycnocephalus), red brome (Bromus madritensis ssp. rubens), ripgut brome (B. diandrus), toyon (Heteromeles arbutifolia), and blue elderberry (Sambucus nigra).

A plant layer is a stratum of vegetation indicated by a discreet canopy at a specified height that comprises at least 5% of the area of the AA where the layer is expected. All of the AAs for ephemeral stream types within the Bank Property received the highest score possible due to

the presence of all but the floating plant layer (yielding a submetric score of 12 for all AAs). The Co-Dominant Species submetric assesses the dominant plant species richness within the AA. The AAs for ephemeral stream types were found to support 5 to 10 co-dominant species (yielding a submetric score of 6 or 9). The Percent Invasion submetric assesses the number of invasive co-dominant species within the AA. The AAs for ephemeral stream types were found to support between 16% and 50% invasive co-dominant species (yielding a submetric score of 3, 6, or 9). An increase in the score for the Co-Dominant Species and Percent Invasion submetrics are anticipated to result from the control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a submetric score of 9 for Co-Dominant Species and a submetric score of 12 for Percent Invasion). Therefore, the improvement in the score of these submetrics will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover and invasive species, as identified in the Bank Development Plan.

The Interspersion/Zonation metric assesses the number of distinct plant zones within the AA and the amount of edge between them. The number of distinct plant zones within the AAs for the ephemeral stream types on the Bank Property were found to have a low degree of plan-view interspersion due to the presence of cattle (yielding a metric score of 6 for all AAs). An increase in the score for this metric is anticipated to result from the planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a metric score of 9 for all AAs). Therefore, the improvement in the score of the Interspersion/Zonation metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

The Vertical Structure metric assesses the degree of overlap among plant layers within the AA. The vertical biotic structure within the AAs for the ephemeral stream types on the Bank Property were found to support between 25% and 75% moderate overlap of 2 plant layers or more (yielding a metric score of 3, 6, or 9). The vertical biotic structure within the AAs for the ephemeral stream types on the Bank Property have been impacted by the presence of cattle. An increase in the score for this metric is anticipated to result from the planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a score of 9 for all AAs). Therefore, the improvement in the score of Vertical Structure metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

4.2 Intermittent Drainages

4.2.1 Attribute 1: Buffer and Landscape Context

The Riparian Continuity, Percent of AA with Buffer, and Buffer Width metrics are exhibiting the highest possible scores for AAs within the Bank Property and are not expected to change as a result of Development Plan implementation. The Buffer Condition metric assesses the extent and quality of the vegetation, condition of the soils, and amount of human visitation within the buffer. The buffers for the AAs for intermittent stream types within the Bank Property were characterized by disturbed soils and contained between 25% and 75% non-native vegetation (yielding a metric score of 9). The control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around the perimeter to control trespass and to exclude cattle from the Bank Property is expected to restore the disturbed soils to a natural, undisturbed state and result in a decrease in cover of non-native vegetation to less than 25%. However, restoration of the disturbed soils within the buffers to a natural, undisturbed state is not expected to be reflected in the metric score within the 5 year monitoring period. Therefore, the Buffer and Landscape Context Attribute is not expected to change as a result of Development Plan implementation.

4.2.2 Attribute 2: Hydrology

The water source metric assesses direct inputs of water into the AA, specifically inputs affecting the dry season, as well as any diversions of water from the AA. Although precipitation, groundwater, and natural runoff are the primary sources of water for intermittent streams within the Bank Property, urban runoff from residential development located to the northeast is also a contributing source of water (yielding a metric score of 9). The Water Source metric is not expected to change as a result of Development Plan implementation.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, which is assessed by the degree of channel entrenchment. The intermittent drainages had lower entrenchment ratios due to disturbances related to the presence of cattle (yielding a metric score of 3 or 6). Although the exclusion of cattle and planting of native vegetation is expected to provide erosion control and stability of the channel banks, the disturbed soils and channel entrenchment are expected to require a longer period of time to become evident. An increase in the Hydrologic Connectivity metric is not anticipated to be reflected within the 5 year monitoring period. Therefore, Hydrologic Connectivity metric is not expected to change as a result of Development Plan implementation.

Channel stability is assessed as the degree of channel aggradation (i.e. net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e. net loss of sediment from the bed causing it to be lower over time). Due to the disturbance of the intermittent drainages on the Bank Property by the presence of cattle, the AAs associated with these drainages were characterized by aggraded conditions (yielding a metric score of 6 or 9).

The planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around the perimeter to exclude cattle from the Bank Property is expected to restore the disturbed soils and channels to a natural, undisturbed state. The use of plantings for erosion control and stability of the channel banks and the return of regular flows regimes through drainage channels are expected to result in an increase in the Channel Stability metric scores (yielding a metric score of 9 for all AAs). Therefore, the improvement of the score of this metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion control and native cover, as identified in the Development Plan.

4.2.3 Attribute 3: Physical Structure

The Structural Patch Richness metric measures patch richness (the number of different types of physical features that provide habitat for aquatic, wetland, or riparian species) within the AA. Structural patch types within the AAs for the intermittent stream types on the Bank Property have been impacted by the presence of cattle, with between 4 and 7 structural patch types observed (yielding a metric score of 6 or 9). An increase in the score for this metric is anticipated to result from fencing the site with wildlife friendly three-wire fencing around it's perimeter to exclude cattle from the Bank Property so that disturbed channels beds and banks can return to a natural, undisturbed state, which is expected to, in turn, result in the presence of such patch types as bank slumps or undercut banks, cobbles and boulders, pools or depressions in the channels, riffles or rapids, and secondary channels. In addition, the planting of native vegetation will provide for control of erosion and stability of the banks that will be allowed to form once cattle is removed and the natural flow regime is allowed to return to these areas. The presence of native vegetation and the return to a natural flow regime is expected to result in structural patch types such as abundant wracklines or organic debris in the channels, debris jams, woody debris, and standing snags. It is expected that the successful exclusion of cattle and meeting the success criteria for erosion and native cover will result in the increase of observable structural patch types to a minimum of 6 to 7 for all AAs (yielding a metric score of 9 for all AAs). Therefore, the improvement in the score of the Structural Patch Richness metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion and native cover, as identified in the Bank Development Plan.

Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical and biotic features and elevation gradients. The AAs for intermittent stream types within the Bank Property were characterized by either a single bench that lacks abundant micro-topographic complexity or one bench with abundant micro-topographic complexity (yielding a metric score of 6 or 9). Cattle have disturbed the soils within the drainage areas, which has resulted in the flattening of drainage beds, channels, and banks and removal of cobbles, boulders, and native vegetation. Although the exclusion of cattle is expected to restore the disturbed soils to a natural, undisturbed state and planting of native vegetation will provide erosion control and stability of the channel banks, the presence of interrupted flow regimes, disturbed soils, and flattened drainage areas are expected to require longer than the five year monitoring period to return to a natural, undisturbed state.

Therefore, the Topographic Complexity metric is not expected to change as a result of Development Plan implementation.

4.2.4 Attribute 4: Biotic Structure

The intermittent streams in the Proposed Bank contain shrub and tree species including California walnut (Juglans californica), coast live oak (Quercus agrifolia), toyon (Heteromeles arbutifolia), and blue elderberry (Sambucus nigra).

A plant layer is a stratum of vegetation indicated by a discreet canopy at a specified height that comprises at least 5% of the area of the AA where the layer is expected. All of the AAs for intermittent stream types within the Bank Property received the highest score possible due to the presence of all but the floating plant layer (yielding a submetric score of 12 for all AAs). The Co-Dominant Species submetric assesses the dominant plant species richness within the AA. The AAs for intermittent stream types were found to support 3 to 7 co-dominant species (yielding a submetric score of 3 or 6). The Percent Invasion submetric assesses the number of invasive co-dominant species within the AA. The AAs for intermittent stream types were found to support between 16% and 30% invasive co-dominant species (yielding a submetric score of 9). An increase in the score for the Co-Dominant Species and Percent Invasion submetrics are anticipated to result from the control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a submetric score of 9 for Co-Dominant Species and a submetric score of 12 for Percent Invasion). Therefore, the improvement in the score of these submetrics will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover and invasive species, as identified in the Bank Development Plan.

The Interspersion/Zonation metric assesses the number of distinct plant zones within the AA and the amount of edge between them. The number of distinct plant zones within the AAs for the intermittent stream types on the Bank Property were found to have a low to moderate degree of plan-view interspersion due to the presence of cattle (yielding a metric score of 6 or 9). An increase in the score for this metric is anticipated to result from the planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a metric score of 12 for all AAs). Therefore, the improvement in the score of the Interspersion/Zonation metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

The Vertical Structure metric assesses the degree of overlap among plant layers within the AA. The vertical biotic structure within the AAs for the intermittent stream types on the Bank Property were found to support between 25% and 75% moderate overlap of 2 plant layers or more (yielding a metric score of 6 or 9). The vertical biotic structure within the AAs for the intermittent stream types on the Bank Property have been impacted by the presence of cattle. An increase in the score for this metric is anticipated to result from the planting of native

vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a score of 12 for all AAs). Therefore, the improvement in the score of Vertical Structure metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

4.3 Perennial Drainages

4.3.1 Attribute 1: Buffer and Landscape Context

The Riparian Continuity, Percent of AA with Buffer, and Buffer Width metrics are exhibiting the highest possible scores for Assessment Areas (AAs) within the Bank Property and are not expected to change as a result of Development Plan implementation. The Buffer Condition metric assesses the extent and quality of the vegetation, condition of the soils, and amount of human visitation within the buffer. The buffers for the AAs for perennial stream types within the Bank Property were characterized by disturbed soils and contained between 25% and 75% non-native vegetation (yielding a metric score of 9). The control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around the perimeter to control trespass and to exclude cattle from the Bank Property is expected to restore the disturbed soils to a natural, undisturbed state and result in a decrease in cover of non-native vegetation to less than 25%. However, restoration of the disturbed soils within the buffers to a natural, undisturbed state is not expected to be reflected in the metric score within the 5 year monitoring period. Therefore, the Buffer and Landscape Context Attribute is not expected to change as a result of Development Plan implementation.

4.3.2 Attribute 2: Hydrology

The water source metric assesses direct inputs of water into the AA, specifically inputs affecting the dry season, as well as any diversions of water from the AA. Although precipitation, groundwater, and natural runoff are the primary sources of water for perennial streams within the Bank Property, urban runoff from residential development located to the northeast is also a contributing source of water (yielding a metric score of 9). The Water Source metric is not expected to change as a result of Development Plan implementation.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, which is assessed by the degree of channel entrenchment. The perennial drainages had lower entrenchment ratios due to disturbances related to the presence of cattle (yielding a metric score of 3). Although the exclusion of cattle and planting of native vegetation is expected to provide erosion control and stability of the channel banks, the disturbed soils and channel entrenchment are expected to require a longer period of time to become evident. An increase in the Hydrologic Connectivity metric is not anticipated to be reflected within the 5 year

monitoring period. Therefore, Hydrologic Connectivity metric is not expected to change as a result of Development Plan implementation.

Channel stability is assessed as the degree of channel aggradation (i.e. net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e. net loss of sediment from the bed causing it to be lower over time). Due to the disturbance of the perennial drainages on the Bank Property by the presence of cattle, the AAs associated with these drainages were characterized by aggraded conditions (yielding a metric score of 6 or 9). The planting of native vegetation and fencing of the site with wildlife friendly three-wire fencing around the perimeter to exclude cattle from the Bank Property is expected to restore the disturbed soils and channels to a natural, undisturbed state. The use of plantings for erosion control and stability of the channel banks and the return of regular flows regimes through drainage channels are expected to result in an increase in the Channel Stability metric scores (yielding a metric score of 9 for all AAs). Therefore, the improvement of the score of this metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion control and native cover, as identified in the Development Plan.

4.3.3 Attribute 3: Physical Structure

The Structural Patch Richness metric measures patch richness (the number of different types of physical features that provide habitat for aquatic, wetland, or riparian species) within the AA. Structural patch types within the AAs for the perennial stream types on the Bank Property have been impacted by the presence of cattle, with between 3 and 8 structural patch types observed (yielding a metric score of 3 or 6). An increase in the score for this metric is anticipated to result from fencing the site with wildlife friendly three-wire fencing around it's perimeter to exclude cattle from the Bank Property so that disturbed channels beds and banks can return to a natural, undisturbed state, which is expected to, in turn, result in the presence of such patch types as bank slumps or undercut banks, cobbles and boulders, pools or depressions in the channels, riffles or rapids, and secondary channels. In addition, the planting of native vegetation will provide for control of erosion and stability of the banks that will be allowed to form once cattle is removed and the natural flow regime is allowed to return to these areas. The presence of native vegetation and the return to a natural flow regime is expected to result in structural patch types such as abundant wracklines or organic debris in the channels, debris jams, woody debris, and standing snags. It is expected that the successful exclusion of cattle and meeting the success criteria for erosion and native cover will result in the increase of observable structural patch types to a minimum of 9 to 11 for all AAs (yielding a metric score of 9 for all AAs). Therefore, the improvement in the score of the Structural Patch Richness metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for erosion and native cover, as identified in the Bank Development Plan.

Topographic complexity refers to the micro- and macro-topographic relief and variety of elevations within a wetland due to physical and biotic features and elevation gradients. The AAs for perennial stream types within the Bank Property were characterized by either a single

bench that lacks abundant micro-topographic complexity or one bench with abundant micro-topographic complexity (yielding a metric score of 6 or 9). Cattle have disturbed the soils within the drainage areas, which has resulted in the flattening of drainage beds, channels, and banks and removal of cobbles, boulders, and native vegetation. Although the exclusion of cattle is expected to restore the disturbed soils to a natural, undisturbed state and planting of native vegetation will provide erosion control and stability of the channel banks, the presence of interrupted flow regimes, disturbed soils, and flattened drainage areas are expected to require longer than the five year monitoring period to return to a natural, undisturbed state. Therefore, the Topographic Complexity metric is not expected to change as a result of Development Plan implementation.

4.3.4 Attribute 4: Biotic Structure

Vegetation within the AAs for perennial stream types on the Bank Property includes California walnut (Juglans californica), coast live oak (Quercus agrifolia), western sycamore (Platanus racemosa), Goodding's willow (Salix gooddingii), arroyo willow (S. lasiolepis), mulefat (Baccharis salicifolia), California blackberry (Rubus ursinus), stinging nettle (Urtica dioica), water cress (Nasturtium officinale), mugwort (Artemisia douglasiana), rosilla (Helenium puberulum), and basket rush (Juncus textilis).

A plant layer is a stratum of vegetation indicated by a discreet canopy at a specified height that comprises at least 5% of the area of the AA where the layer is expected. All of the AAs for perennial stream types within the Bank Property received the highest score possible due to the presence of all but the floating plant layer (yielding a submetric score of 12 for all AAs). The Co-Dominant Species submetric assesses the dominant plant species richness within the AA. The AAs for perennial stream types were found to support 6 to 8 co-dominant species (yielding a submetric score of 6). The Percent Invasion submetric assesses the number of invasive co-dominant species within the AA. The AAs for perennial stream types were found to support between 16% and 45% invasive co-dominant species (yielding a submetric score of 6 or 9). An increase in the score for the Co-Dominant Species and Percent Invasion submetrics are anticipated to result from the control and removal of invasive and non-native plant species, planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a submetric score of 9 for Co-Dominant Species and a submetric score of 12 for Percent Invasion). Therefore, the improvement in the score of these submetrics will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover and invasive species, as identified in the Bank Development Plan.

The Interspersion/Zonation metric assesses the number of distinct plant zones within the AA and the amount of edge between them. The number of distinct plant zones within the AAs for the perennial stream types on the Bank Property were found to have a moderate degree of plan-view interspersion due to the presence of cattle (yielding a metric score of 9 for all AAs). An increase in the score for this metric is anticipated to result from the planting of native

vegetation and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a metric score of 12 for all AAs). Therefore, the improvement in the score of the Interspersion/Zonation metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

The Vertical Structure metric assesses the degree of overlap among plant layers within the AA. The vertical biotic structure within the AAs for the perennial stream types on the Bank Property were found to support more than 50% moderate overlap of 2 plant layers or more (yielding a metric score of 9 for all AAs). The vertical biotic structure within the AAs for the perennial stream types on the Bank Property have been impacted by the presence of cattle. An increase in the score for this metric is anticipated to result from the planting of native vegetation, and fencing of the site with wildlife friendly three-wire fencing around its perimeter to exclude cattle from the Bank Property so that native vegetation is allowed to grow (yielding a score of 12 for all AAs). Therefore, the improvement in the score of Vertical Structure metric will directly correlate with the successful exclusion of cattle and meeting the success criteria for native cover, as identified in the Bank Development Plan.

5.0 References

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. *The Jepson Manual: Vascular Plants of California,* second edition. University California Press, Berkeley.

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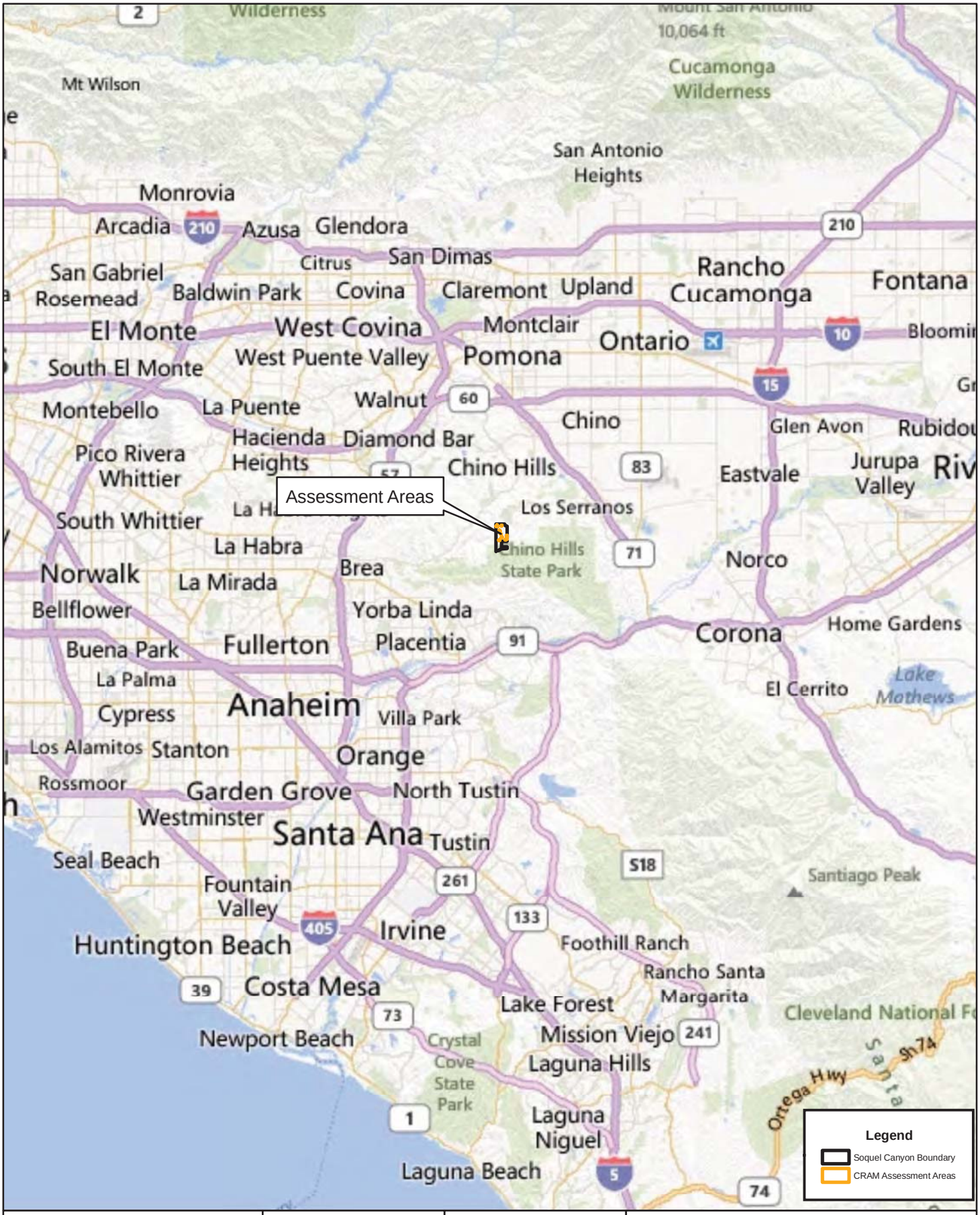
APPENDIX A

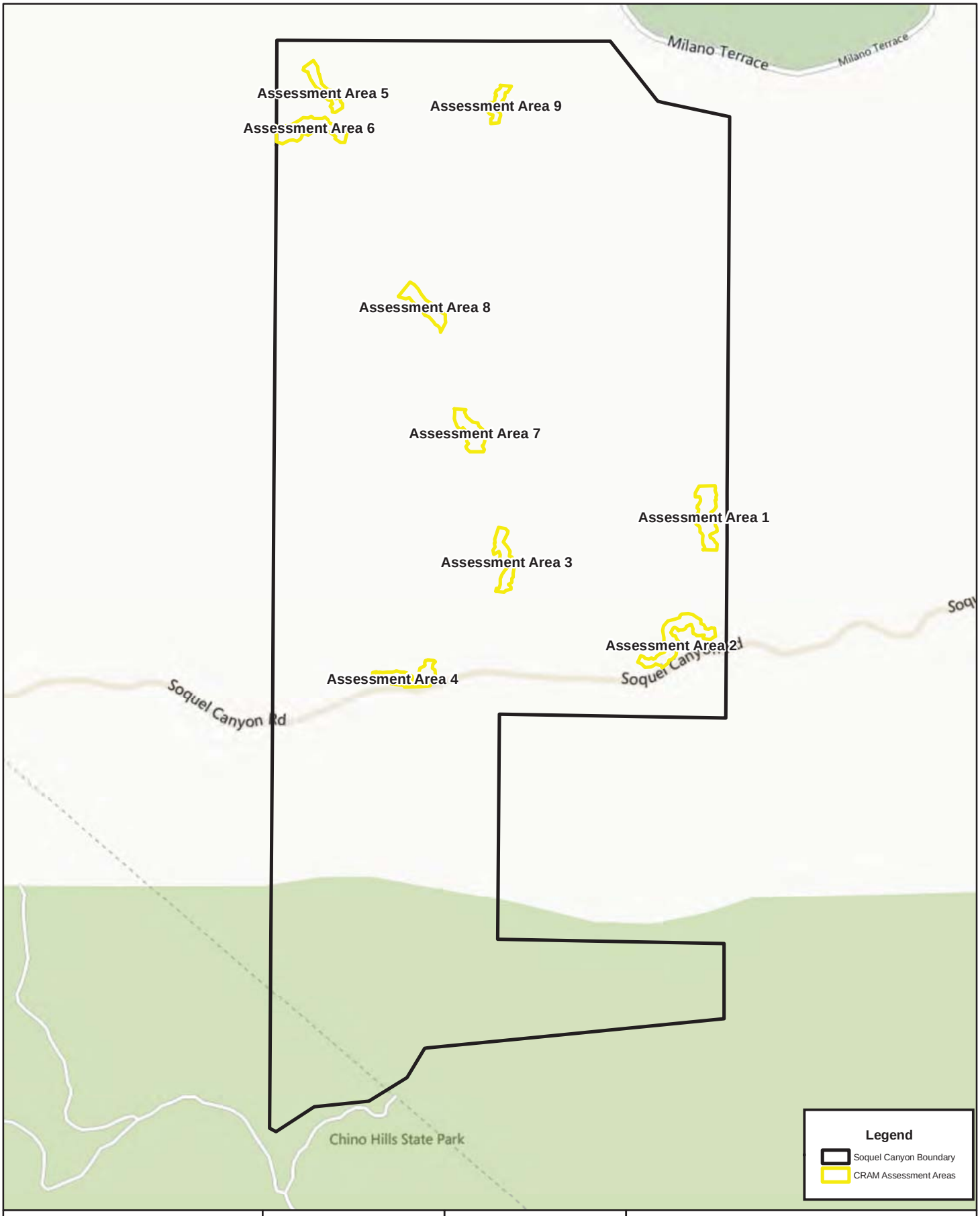
Figures



Prepared By: VCS Environmental	Map Created: 1/3/2014	1 inch = 30,000 feet	Data Source: WRA, Inc

Soquel Canyon CRAM Assessment
Regional Map

FIGURE 1



Prepared By:
VCS Environmental

Map Created: 1/3/2014

0 187.5 375 750 Feet
1 inch = 750 feet

Data Source: WRA, Inc

Soquel Canyon CRAM Assessment
Vicinity Map

FIGURE 2

Prepared By:
VCS Environmental

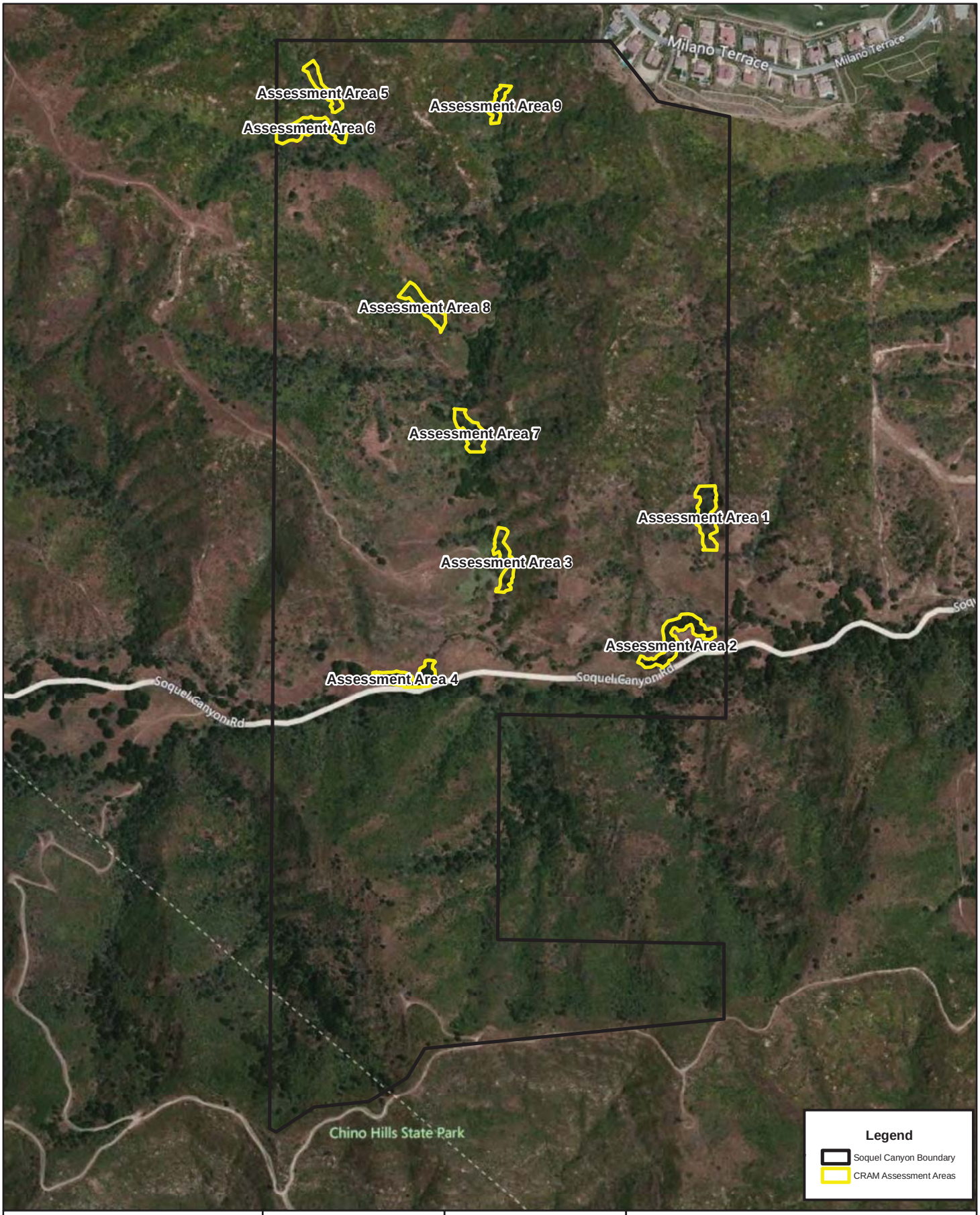
Map Created: 1/3/2014

0 187.5 375 750 Feet
1 inch = 750 feet

Data Source: WRA, Inc

Soquel Canyon CRAM Assessment
Topographic Map

FIGURE 3



Prepared By:
VCS Environmental

Map Created: 1/3/2014

0 187.5 375 750 Feet
1 inch = 750 feet

Data Source: WRA, Inc

Soquel Canyon CRAM Assessment
Aerial Overview Map

FIGURE 4

APPENDIX B

CRAM Data Sheets, AA Figures, and
Representative Photographs of
Assessment Area Current Conditions

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #1

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/09/2013

Assessment Team Members for This AA:

Erin Hayes

Shawn Gatchel-Hernandez

Average Bankfull Width: 3 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100 m

Upstream Point Latitude: 33°56'20.97" **Longitude:** 117°45'14.07"

Downstream Point Latitude: 33°56'17.82" **Longitude:** 117°45'14.00"

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other: Baseline

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☐ intermittent ☑ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	144, 145	Upstream	33°56'23.88"	117°45'08.31"	
2	139-143	Middle Left	33°56'19.71"	117°45'09.04"	
3	139-143	Middle Right	33°56'19.71"	117°45'8.91"	
4	137, 138	Downstream	33°56'16.33"	117°45'10.80"	
5					
6					
7					
8					
9					
10					

Site Location Description:

moderately steep ephemeral drainage; soil generally loose; large coast live oaks, oak woodland along most of AA; herbaceous vegetation along slopes mostly trampled.

Comments:

-buffered by adjacent open space of similar habitat
-CLO, CSS, NN grasses included in buffer
-determine %'s based on aerial

Scoring Sheet: Riverine Wetlands

AA Name:					**Date:**	
Attribute 1: Buffer and Landscape Context (pp. 11-19)					**Comments**	
Stream Corridor Continuity (D)			Alpha. A	Numeric 12		
Buffer:						
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12				
Buffer submetric B: Average Buffer Width	A	12				
Buffer submetric C: Buffer Condition	B	9				
Raw Attribute Score = D+[C x (A x B)½]½				22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)						
			Alpha.	Numeric		
Water Source			A	9		
Channel Stability			B	9		
Hydrologic Connectivity			B	9		
Raw Attribute Score = sum of numeric scores				27	**Final Attribute Score = (Raw Score/36) x 100**	75
Attribute 3: Physical Structure (pp. 27-33)						
			Alpha.	Numeric		
Structural Patch Richness			B	9		
Topographic Complexity			C	6		
Raw Attribute Score = sum of numeric scores				15	**Final Attribute Score = (Raw Score/24) x 100**	63
Attribute 4: Biotic Structure (pp. 34-41)						
Plant Community Composition (based on sub-metrics A-C)						
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12				
Plant Community submetric B: Number of Co-dominant species	C	6				
Plant Community submetric C: Percent Invasion	D	3				
Plant Community Composition Metric *(numeric average of submetrics A-C)*				7		
Horizontal Interspersion			C	6		
Vertical Biotic Structure			B	9		
Raw Attribute Score = sum of numeric scores				36	**Final Attribute Score = (Raw Score/36) x 100**	61
Overall AA Score (average of four final Attribute Scores)					73	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☐ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☑ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☐ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☑ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☑ **Equilibrium** ☐ **Degradation** ☐ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	3.15	2.7	2.6
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.45	0.75	0.7
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	0.90	1.5	1.4
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	4.7	4.9	5.1
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.49	1.8	1.96
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.75

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

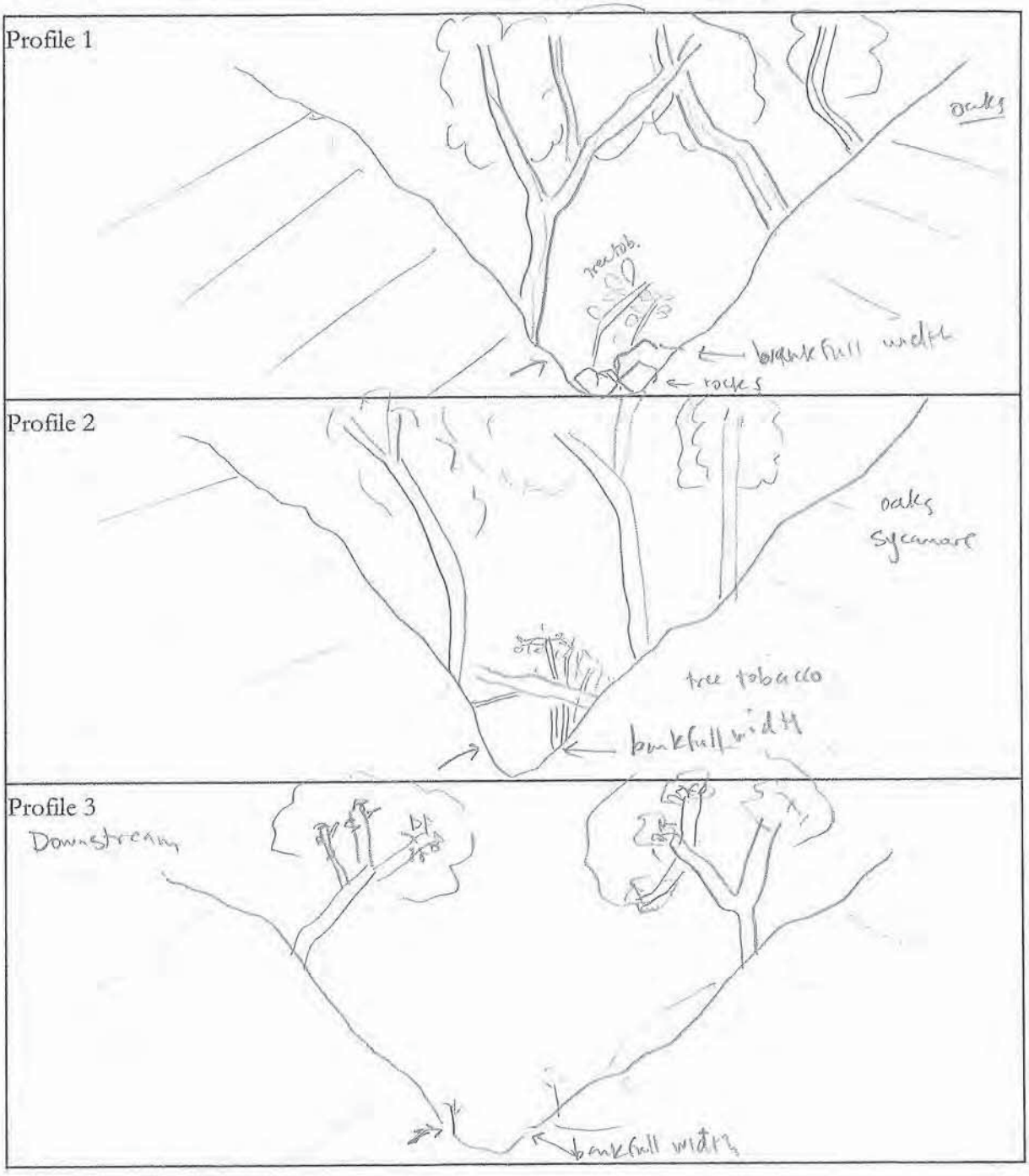
**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	Riverine (Non-confined)	Riverine (Confined)
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	1	1
Bank slumps or undercut banks in channels or along shoreline	1	1
Cobbles and/or Boulders	1	1
Debris jams	1	1
Filamentous macroalgae or algal mats	1	1
Large woody debris	1	1
Pannes or pools on floodplain	1	N/A
Plant hummocks and/or sediment mounds	1	1
Point bars and in-channel bars	1	1
Pools or depressions in channels (wet or dry channels)	1	1
Riffles or rapids (wet or dry channels)	1	1
Secondary channels on floodplains or along shorelines	1	N/A
Standing snags (at least 3 m tall)	1	1
Submerged vegetation	1	N/A
Swales on floodplain or along shoreline	1	N/A
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	1	1
Vegetated islands (mostly above high-water)	1	N/A
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		6

Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Viewing in direction of water flow



C

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

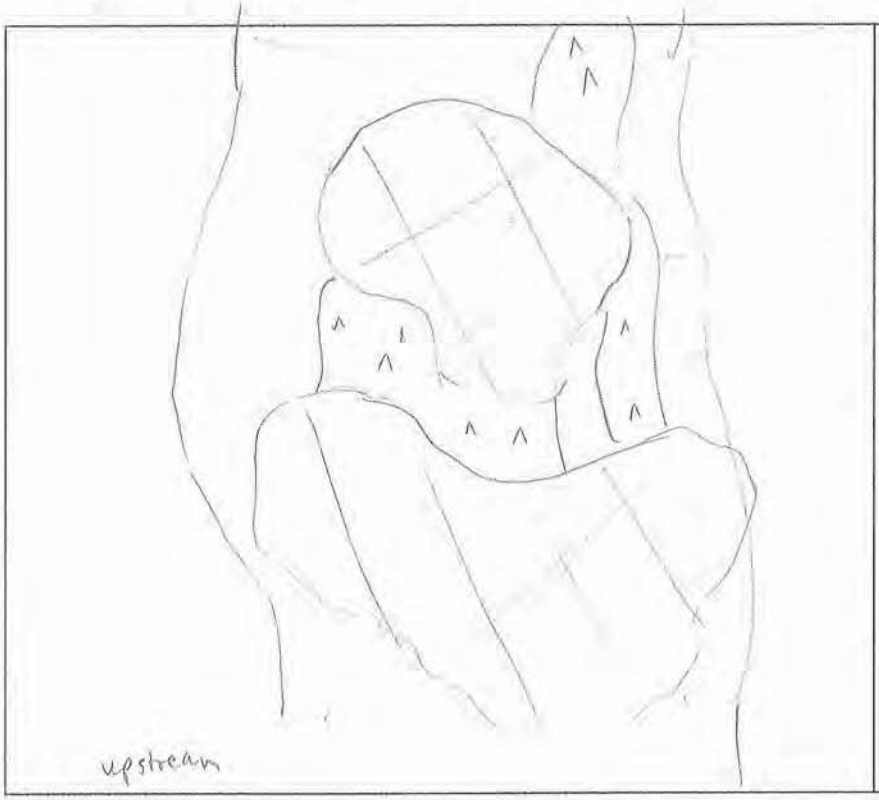
Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grass (not able to ID)	Y
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
scrub oak	N	tree tabacco	Y
sagebrush	N	toyon	N
mustard	Y		
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	6
coast live oak	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	50%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1) = HN grasses & mustard

2) CLO / cyc.

3) shrubby adj (Toyon, poison oak etc.)

4)

5)

6)

C

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

vertical broke

B

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)	✓	
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)	✓	✓
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #2

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/09/2013

Assessment Team Members for This AA:

Erin Hayes

Shawn Gatchel-Hernandez

Average Bankfull Width: 4 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100

Upstream Point Latitude: 33°56'12.69" **Longitude:** 117°45'14.13"

Downstream Point Latitude: 33°56'11.25" **Longitude:** 117°45'18.22"

Wetland Sub-type:

☐ Confined ☑ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other: Baseline

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☑ perennial ☐ intermittent ☐ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	146, 147	Upstream	33°56'12.69"	117°45'14.13"	
2	148-151	Middle Left	33°56'13.04"	117°45'16.50	
3	148-151	Middle Right			
4	152, 153	Downstream	33°56'11.25"	117°45'18.22"	
5					
6					
7					
8					
9					
10					

Site Location Description:

main perennial drainage on site; surrounded by nature oak/walnut woodland habit; banks are generally somewhat steep/vertical to a wide valley floor; riparian vegetation including stinging nettle, mugwort, mulefat, poison oak, and other species found on edges of banks; typically not within the center of channel

Comments:

area is buffered by adjacent open space consisting of CSS intermixed with NN grasses, as well as adjacent oak/walnut woodland

Scoring Sheet: Riverine Wetlands

AA Name:					**Date:**	
Attribute 1: Buffer and Landscape Context (pp. 11-19)					**Comments**	
Stream Corridor Continuity (D)			Alpha. A	Numeric 12		
Buffer:						
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12				
Buffer submetric B: Average Buffer Width	A	12				
Buffer submetric C: Buffer Condition	B	9				
Raw Attribute Score = D+[C x (A x B)^{½}]^{½}				22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)						
			Alpha.	Numeric		
Water Source			B	9		
Channel Stability			B	9		
Hydrologic Connectivity			D	3		
Raw Attribute Score = sum of numeric scores				21	**Final Attribute Score = (Raw Score/36) x 100**	58
Attribute 3: Physical Structure (pp. 27-33)						
			Alpha.	Numeric		
Structural Patch Richness			D	3		
Topographic Complexity			C	6		
Raw Attribute Score = sum of numeric scores				9	**Final Attribute Score = (Raw Score/24) x 100**	38
Attribute 4: Biotic Structure (pp. 34-41)						
Plant Community Composition (based on sub-metrics A-C)						
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12				
Plant Community submetric B: Number of Co-dominant species	C	6				
Plant Community submetric C: Percent Invasion	C	6				
Plant Community Composition Metric *(numeric average of submetrics A-C)*				8		
Horizontal Interspersion			9			
Vertical Biotic Structure			9			
Raw Attribute Score = sum of numeric scores				26	**Final Attribute Score = (Raw Score/36) x 100**	72
Overall AA Score (average of four final Attribute Scores)					65	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA.
	☑ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it.
	☐ There is leaf litter, thatch, or wrack in most pools (if pools are present).
	☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area.
	☐ There is little or no active undercutting or burial of riparian vegetation.
	☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation.
	☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar).
	☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA
	☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☑ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs.
	☐ There are abundant bank slides or slumps.
	☐ The lower banks are uniformly scoured and not vegetated.
	☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel.
	☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation.
	☐ The channel bed appears scoured to bedrock or dense clay.
	☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided).
	☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year.
	☐ There are partially buried living tree trunks or shrubs along the banks.
	☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced.
	☐ There are partially buried, or sediment-choked, culverts.
	☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour.
	☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☑ **Equilibrium** ☐ **Degradation** ☐ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	4.3	3.4	3.8
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.5	0.4	0.5
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	1.0	0.8	1.0
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	5.0	4.4	4.4
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.16	1.29	1.16
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.2

Structural Patch Type Worksheet for Riverine wetlands

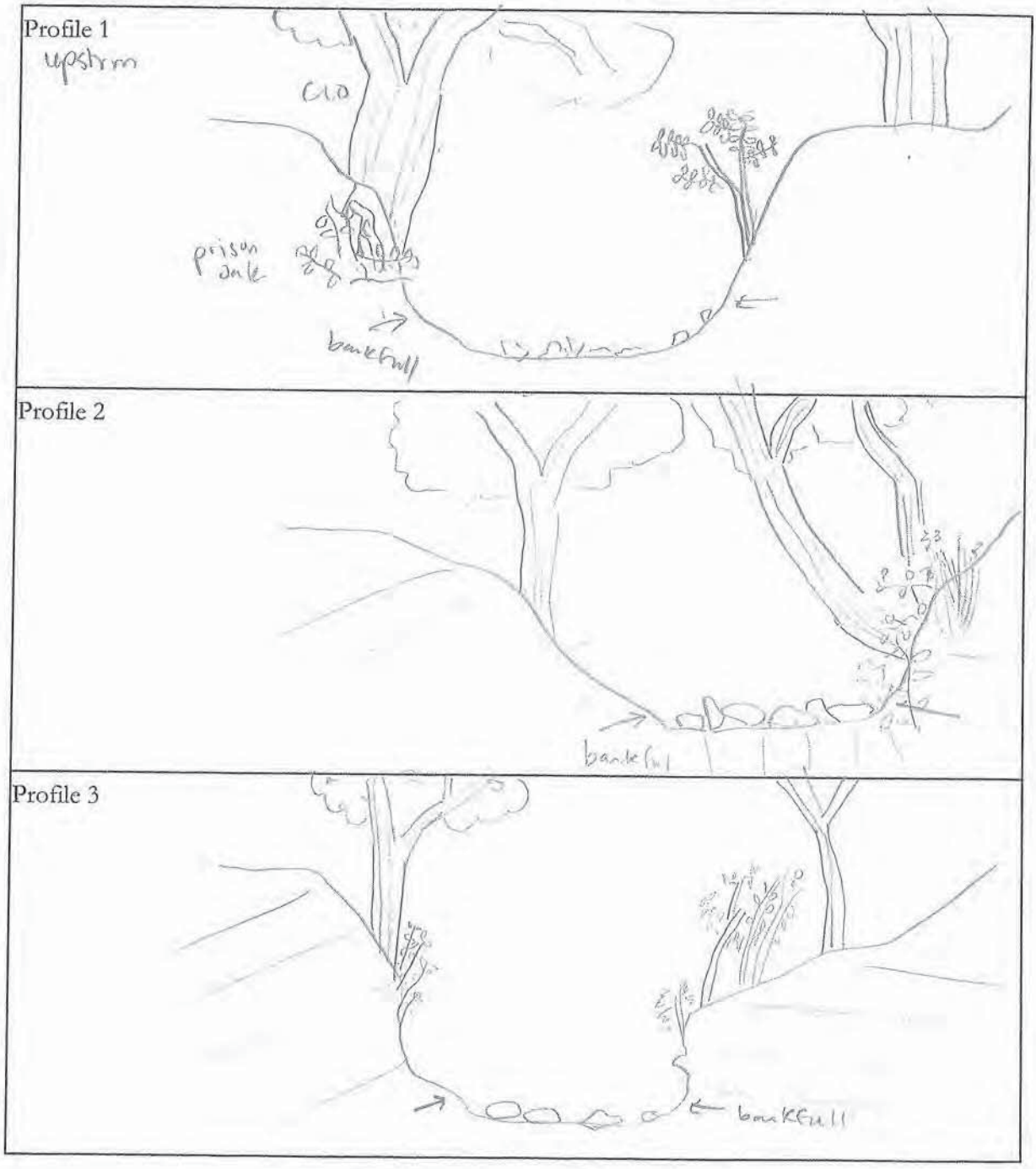
Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)	3	

Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.



C

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

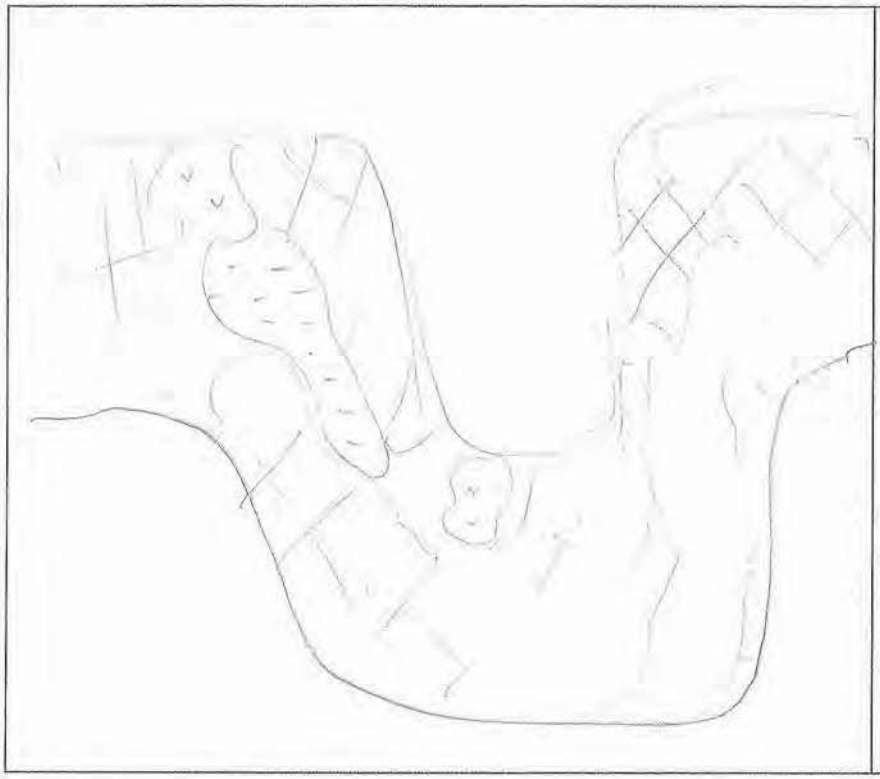
Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grass	Y
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
poison oak	N	mulefat	N
		tree tobacco	Y
		walnut	N
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	6
walnut	N		
coast live oak	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	33%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1)

2)

3)

4)

5)

6)

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

vertical structure

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #3

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/10/2013

Assessment Team Members for This AA:

Amanda Beck

Shawn Gatchel-Hernandez

Average Bankfull Width: 2 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100

Upstream Point Latitude: 33°56'17.75" **Longitude:** 117°45'28.21"

Downstream Point Latitude: 33°56'15.54" **Longitude:** 117°45'28.01"

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☑ intermittent ☐ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	168, 169	Upstream	33°56'17.75"	117°45'28.21"	
2	166, 167	Middle Left	33°56'16.81"	117°45'27.76"	
3	164, 165	Middle Right			
4	162, 163	Downstream	33°56'15.54"	117°45'28.01"	
5					
6					
7					
8					
9					
10					

Site Location Description:

Comments:

Scoring Sheet: Riverine Wetlands

AA Name:				Date:	
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**	
Stream Corridor Continuity (D)		Alpha. A	Numeric 12		
Buffer:					
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12			
Buffer submetric B: Average Buffer Width	A	12			
Buffer submetric C: Buffer Condition	B	9			
Raw Attribute Score = D+[C x (A x B)½]½			22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)					
		Alpha.	Numeric		
Water Source		B	9		
Channel Stability		B	9		
Hydrologic Connectivity		C	6		
Raw Attribute Score = sum of numeric scores			24	**Final Attribute Score = (Raw Score/36) x 100**	67
Attribute 3: Physical Structure (pp. 27-33)					
		Alpha.	Numeric		
Structural Patch Richness		C	6		
Topographic Complexity		C	6		
Raw Attribute Score = sum of numeric scores			12	**Final Attribute Score = (Raw Score/24) x 100**	50
Attribute 4: Biotic Structure (pp. 34-41)					
Plant Community Composition (based on sub-metrics A-C)					
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12			
Plant Community submetric B: Number of Co-dominant species	C	6			
Plant Community submetric C: Percent Invasion	B	9			
Plant Community Composition Metric *(numeric average of submetrics A-C)*			9		
Horizontal Interspersion		C	6		
Vertical Biotic Structure		B	9		
Raw Attribute Score = sum of numeric scores			24	**Final Attribute Score = (Raw Score/36) x 100**	67
Overall AA Score (average of four final Attribute Scores)				70	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☐ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ ~~T~~There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☑ **Equilibrium** ☐ **Degradation** ☐ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	1.3	1.1	1.8
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.3	0.2	0.3
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	0.6	0.4	0.6
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	1.9	1.7	2.3
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.46	1.55	1.28
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.43

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

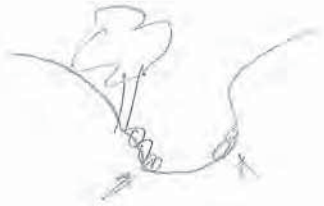
**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		4

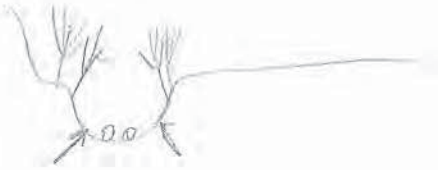
Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1



Profile 2



Profile 3

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

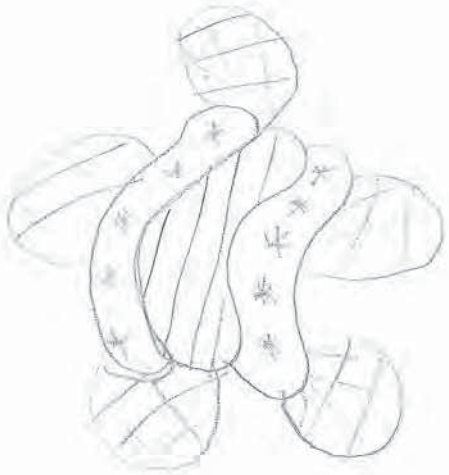
Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grasses	Y
		poison oak	N
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
poison oak	N	mulefat	N
California sage brush	N		
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	6.0
oak	N		
mulefat	N		
walnut	N	**Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)**	16%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1) #
2) * * - mulch
3) /// - non-native grass
4)
5)
6)

C

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #4

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/10/2013

Assessment Team Members for This AA:

Amanda Beck

Shawn Gatchel-Hernandez

Average Bankfull Width: 3 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:**

Upstream Point Latitude: 33°56'09.81" **Longitude:** 117°45'33.52"

Downstream Point Latitude: 33°56'10.04" **Longitude:** 117°45'35.79"

Wetland Sub-type:

☐ Confined ☑ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☑ perennial ☐ intermittent ☐ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	160, 161	Upstream	33°56'09.81"	117°45'33.52"	
2	156, 157	Middle Left	33°56'09.52"	117°45'33.66"	
3	158, 159	Middle Right			
4	154, 155	Downstream	33°56'10.04"	117°45'35.79"	
5					
6					
7					
8					
9					
10					

Site Location Description:

open space surrounded by open space in all directions

Comments:

perennial channel
-impacted by cattle grazing
-oak/walnut woodland

Scoring Sheet: Riverine Wetlands

AA Name:				Date:	
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**	
Stream Corridor Continuity (D)		Alpha. A	Numeric 12		
Buffer:					
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12			
Buffer submetric B: Average Buffer Width	A	12			
Buffer submetric C: Buffer Condition	B	9			
Raw Attribute Score = D+[C x (A x B)½]½			22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)					
		Alpha.	Numeric		
Water Source		B	9		
Channel Stability		C	6		
Hydrologic Connectivity		D	3		
Raw Attribute Score = sum of numeric scores			18	**Final Attribute Score = (Raw Score/36) x 100**	50
Attribute 3: Physical Structure (pp. 27-33)					
		Alpha.	Numeric		
Structural Patch Richness		C	6		
Topographic Complexity		B	9		
Raw Attribute Score = sum of numeric scores			15	**Final Attribute Score = (Raw Score/24) x 100**	63
Attribute 4: Biotic Structure (pp. 34-41)					
Plant Community Composition (based on sub-metrics A-C)					
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12			
Plant Community submetric B: Number of Co-dominant species	C	6			
Plant Community submetric C: Percent Invasion	B	9			
Plant Community Composition Metric *(numeric average of submetrics A-C)*			9		
Horizontal Interspersion		B	9		
Vertical Biotic Structure		B	9		
Raw Attribute Score = sum of numeric scores			26	**Final Attribute Score = (Raw Score/36) x 100**	72
Overall AA Score (average of four final Attribute Scores)				74	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☑ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☑ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☑ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☑ **Equilibrium** ☐ **Degradation** ☐ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	2.8	2.1	2.4
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.2	.15	.15
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	0.4	0.3	0.3
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	3.6	2.75	3.1
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.29	1.07	1.33
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.23

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

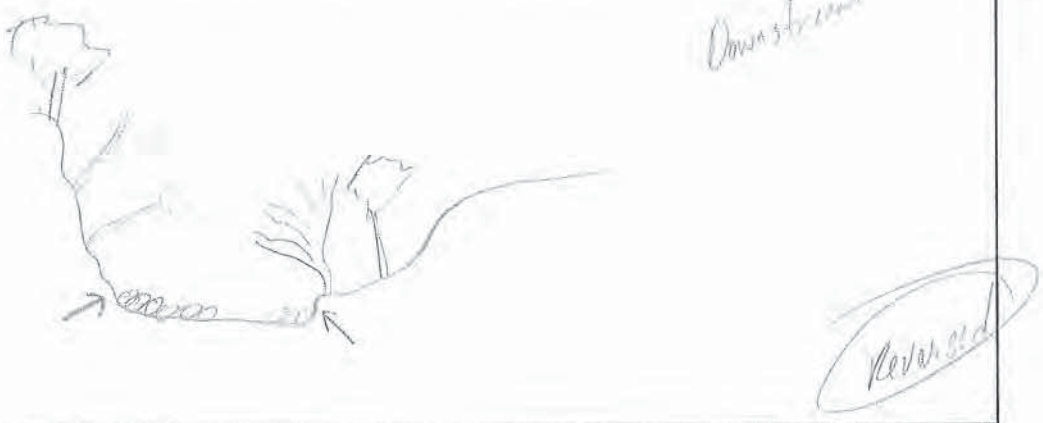
**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)	7	

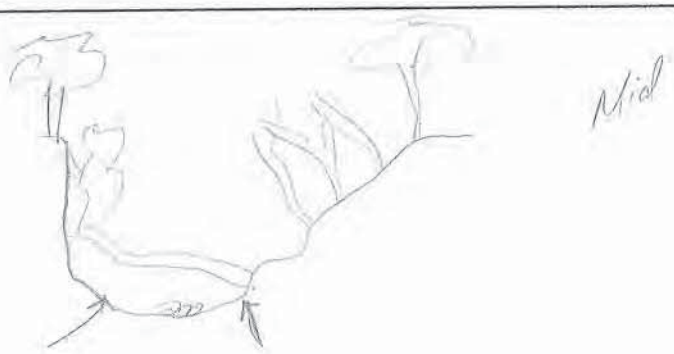
Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1



Profile 2



Profile 3

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

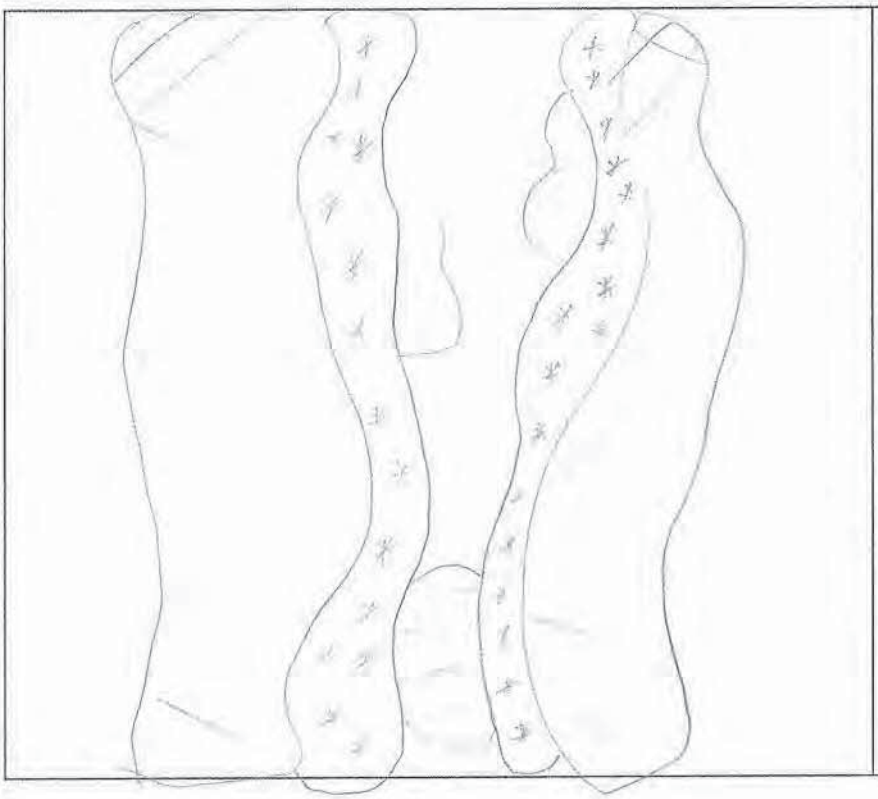
Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grasses	Y
		Italian thistle	Y
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
California rose	N	mulefate	N
poison oak	N		
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	7.0
oak	N		
walnut	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	29%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1) oak/walnut

2)

3) willow/mallow rose

4)

5)

6)

B

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)	✓	
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #5

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/13/13

Assessment Team Members for This AA:

Amanda Beck

Shawn Gatchel-Hernandez

Average Bankfull Width: 1 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100

Upstream Point Latitude: 33°56'45.32" **Longitude:** 117°45'41.36"

Downstream Point Latitude: 33°56'43.13" **Longitude:** 117°45'39.14"

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☐ intermittent ☑ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	67, 68	Upstream	33°56'45.32"	117°45'41.36"	
2	69, 70	Middle Left	33°56'43.93"	117°45'40.25"	
3	71, 72	Middle Right			
4	73, 74	Downstream	33°56'43.13"	117°45'39.14"	
5					
6					
7					
8					
9					
10					

Site Location Description:

moderately steep ephemeral drainage; soil generally loose; large coast live oaks, oak woodland along most of AA; herbaceous vegetation along slopes mostly trampled.

Comments:

ephemeral channel
-impacted by cattle grazing
-oak/walnut woodland

Scoring Sheet: Riverine Wetlands

AA Name:				Date:	
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**	
Stream Corridor Continuity (D)		Alpha. A	Numeric 12		
Buffer:					
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12			
Buffer submetric B: Average Buffer Width	A	12			
Buffer submetric C: Buffer Condition	B	9			
Raw Attribute Score = D+[C x (A x B)½]½			22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)					
		Alpha.	Numeric		
Water Source		B	9		
Channel Stability		C	6		
Hydrologic Connectivity		B	9		
Raw Attribute Score = sum of numeric scores			24	**Final Attribute Score = (Raw Score/36) x 100**	67
Attribute 3: Physical Structure (pp. 27-33)					
		Alpha.	Numeric		
Structural Patch Richness		C	6		
Topographic Complexity		C	6		
Raw Attribute Score = sum of numeric scores			12	**Final Attribute Score = (Raw Score/24) x 100**	50
Attribute 4: Biotic Structure (pp. 34-41)					
Plant Community Composition (based on sub-metrics A-C)					
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12			
Plant Community submetric B: Number of Co-dominant species	C	6			
Plant Community submetric C: Percent Invasion	B	9			
Plant Community Composition Metric *(numeric average of submetrics A-C)*			9		
Horizontal Interspersion		C	6		
Vertical Biotic Structure		C	6		
Raw Attribute Score = sum of numeric scores			21	**Final Attribute Score = (Raw Score/36) x 100**	58
Overall AA Score (average of four final Attribute Scores)				67	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☑ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☐ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☑ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☐ **Equilibrium** ☐ **Degradation** ☑ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	.76	.64	.67
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.1	0.1	0.1
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	0.2	0.2	0.2
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	1.44	0.9	1.33
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.8	1.41	1.99
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.73

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		5

Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1

Profile 2

Profile 3

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grasses	Y
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
giant rye	N	scrub oak	N
scrub oak	N	toyon	N
black sage	N		
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	6
oak	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	16%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.

Assigned zones:

1) ~~II~~ scrub oak; Sage; grass style

2) * * * - non-native grasses

3) III - toyon/oak

4)

5)

6)

C

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)	✓	
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #6

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/13/2013

Assessment Team Members for This AA:

Amanda Beck

Shawn Gatchel-Hernandez

Average Bankfull Width: 1 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100 m

Upstream Point Latitude: 33°56'41.62" **Longitude:** 117°45'43.61"

Downstream Point Latitude: 33°56'41.48" **Longitude:** 117°45'38.81"

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☐ intermittent ☑ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	4717, 4718	Upstream	33°56'41.67"	117°45'43.72"	
2	4719, 20, 21, 22	Middle Left	33°56'42.05"	117°45'41.72"	
3	4719, 20, 21, 22	Middle Right			
4	4723, 24	Downstream	33°56'41.48"	117°45'39.00"	
5					
6					
7					
8					
9					
10					

Site Location Description:

soil generally loose; large coast live oaks, oak woodland along most of AA; herbaceous vegetation along slopes mostly trampled.

Comments:

ephemeral channel
-impacted by cattle grazing
-oak woodland buffer

Scoring Sheet: Riverine Wetlands

AA Name:				Date:	
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**	
Stream Corridor Continuity (D)		Alpha. A	Numeric 12		
Buffer:					
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12			
Buffer submetric B: Average Buffer Width	A	12			
Buffer submetric C: Buffer Condition	B	9			
Raw Attribute Score = D+[C x (A x B)½]½			22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)					
		Alpha.	Numeric		
Water Source		B	9		
Channel Stability		C	6		
Hydrologic Connectivity		B	9		
Raw Attribute Score = sum of numeric scores			24	**Final Attribute Score = (Raw Score/36) x 100**	67
Attribute 3: Physical Structure (pp. 27-33)					
		Alpha.	Numeric		
Structural Patch Richness		C	6		
Topographic Complexity		C	6		
Raw Attribute Score = sum of numeric scores			12	**Final Attribute Score = (Raw Score/24) x 100**	50
Attribute 4: Biotic Structure (pp. 34-41)					
Plant Community Composition (based on sub-metrics A-C)					
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12			
Plant Community submetric B: Number of Co-dominant species	C	6			
Plant Community submetric C: Percent Invasion	C	6			
Plant Community Composition Metric *(numeric average of submetrics A-C)*			8		
Horizontal Interspersion		C	6		
Vertical Biotic Structure		D	3		
Raw Attribute Score = sum of numeric scores			17	**Final Attribute Score = (Raw Score/36) x 100**	47
Overall AA Score (average of four final Attribute Scores)				64	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☐ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☐ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☑ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☑ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☐ **Equilibrium** ☐ **Degradation** ☑ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections →	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	1.25	1.36	.89
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.3	.25	0.2
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	0.6	0.5	0.4
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	2.0	2.37	1.3
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.6	1.74	1.46
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.6

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

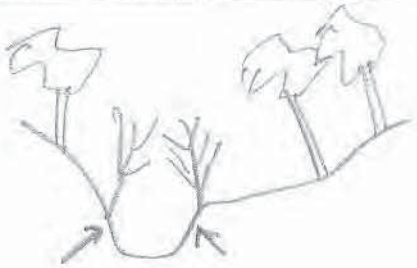
STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		4

Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1

Profile 2



Profile 3

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grasses	Y
		russian thistle	Y
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
poison oak	N	toyon	N
russian thistle	Y	skunkbrush	N
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	6
oak	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	33%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.

Assigned zones:

1) [illegible]

2) * * * = non-native grass/[illegible]

3) # = oak

4)

5)

6)

C

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)	✓	
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #7

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/10/2013

Assessment Team Members for This AA:

Amanda Beck

Shawn Gatchel-Hernandez

Average Bankfull Width: 3 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100 m

Upstream Point Latitude: 33°56'25.75" **Longitude:** 117°45'31.15"

Downstream Point Latitude: 33°56'23.33" **Longitude:** 117°45'29.84"

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☑ intermittent ☐ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	176, 177	Upstream	33°56'25.75"	117°45'31.15"	
2	174, 175	Middle Left	33°56'24.52"	117°45'30.16"	
3	172, 173	Middle Right			
4	170, 171	Downstream	33°56'23.33"	117°45'29.84"	
5					
6					
7					
8					
9					
10					

Site Location Description:

moderately steep intermittent drainage; soil generally loose; large coast live oaks, oak woodland along most of AA; herbaceous vegetation along slopes mostly trampled.

Comments:

intermittent channel
-impacted by cattle grazing
-oak/walnut woodland

Scoring Sheet: Riverine Wetlands

AA Name:					**Date:**	
Attribute 1: Buffer and Landscape Context (pp. 11-19)					**Comments**	
Stream Corridor Continuity (D)			Alpha. A	Numeric 12		
Buffer:						
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12				
Buffer submetric B: Average Buffer Width	A	12				
Buffer submetric C: Buffer Condition	B	9				
Raw Attribute Score = D+[C x (A x B)½]½				22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)						
			Alpha.	Numeric		
Water Source			B	9		
Channel Stability			B	9		
Hydrologic Connectivity			C	6		
Raw Attribute Score = sum of numeric scores				24	**Final Attribute Score = (Raw Score/36) x 100**	67
Attribute 3: Physical Structure (pp. 27-33)						
			Alpha.	Numeric		
Structural Patch Richness			B	9		
Topographic Complexity			C	6		
Raw Attribute Score = sum of numeric scores				15	**Final Attribute Score = (Raw Score/24) x 100**	63
Attribute 4: Biotic Structure (pp. 34-41)						
Plant Community Composition (based on sub-metrics A-C)						
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12				
Plant Community submetric B: Number of Co-dominant species	D	3				
Plant Community submetric C: Percent Invasion	B	9				
Plant Community Composition Metric *(numeric average of submetrics A-C)*				8		
Horizontal Interspersion			C	6		
Vertical Biotic Structure			C	6		
Raw Attribute Score = sum of numeric scores				20	**Final Attribute Score = (Raw Score/36) x 100**	56
Overall AA Score (average of four final Attribute Scores)					70	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☑ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☐ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ There is little or no active undercutting or burial of riparian vegetation. ☑ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☑ **Equilibrium** ☐ **Degradation** ☐ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	2.2	1.8	2.9
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.4	.35	.35
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	0.8	.7	.7
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	2.9	3.1	3.7
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.32	1.72	1.28
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.44

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

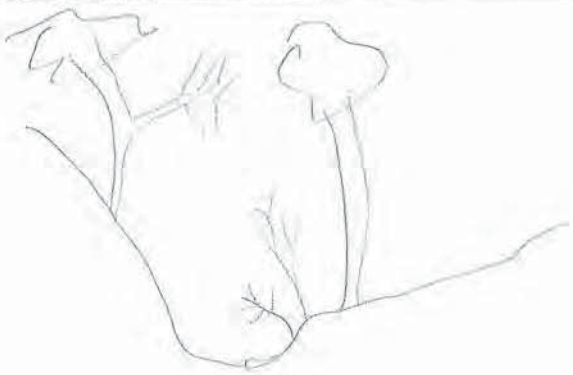
**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		6

Worksheet for AA Topographic Complexity

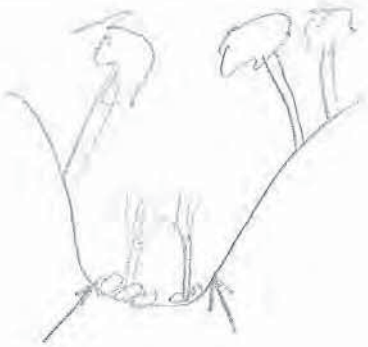
At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1



Profile 2

Profile 3



Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

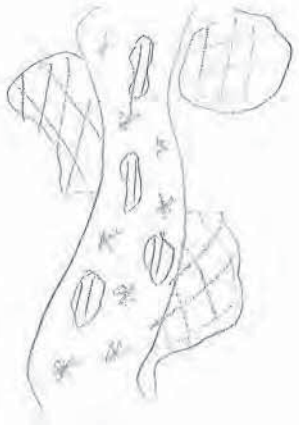
Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grasses	Y
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
poison oak	N	mulefat	N
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	4
oak	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	25%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1) H - not functional

2) [illegible]

3) H - nonfunctional/tree tobacco

4)

5)

6)

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #8

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/13/2013

Assessment Team Members for This AA:

Amanda Beck

Shawn Gatchel-Hernandez

Average Bankfull Width: 1 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100

Upstream Point Latitude: 33°56'32.74" **Longitude:** 117°45'34.73"

Downstream Point Latitude: 33°56'31.93" **Longitude:** 117°45'33.53"

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☑ intermittent ☐ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1	57, 58	Upstream	33°56'32.74"	117°45'34.73"	
2	48, 49	Middle Left	33°56'31.99"	117°45'34.20"	
3	50, 51	Middle Right			
4	4746, 47	Downstream	33°56'31.93"	117°45'33.53"	
5					
6					
7					
8					
9					
10					

Site Location Description:

soil generally loose; large coast live oaks, oak woodland along most of AA; herbaceous vegetation along slopes mostly trampled.

Comments:

ephemeral channel
-impacted by cattle grazing
-oak/walnut woodland

Scoring Sheet: Riverine Wetlands

AA Name:					**Date:**	
Attribute 1: Buffer and Landscape Context (pp. 11-19)					**Comments**	
Stream Corridor Continuity (D)			Alpha. A	Numeric 12		
Buffer:						
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12				
Buffer submetric B: Average Buffer Width	A	12				
Buffer submetric C: Buffer Condition	B	9				
Raw Attribute Score = D+[C x (A x B)½]½				22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)						
			Alpha.	Numeric		
Water Source			B	9		
Channel Stability			B	9		
Hydrologic Connectivity			B	9		
Raw Attribute Score = sum of numeric scores				27	**Final Attribute Score = (Raw Score/36) x 100**	75
Attribute 3: Physical Structure (pp. 27-33)						
			Alpha.	Numeric		
Structural Patch Richness			C	6		
Topographic Complexity			B	9		
Raw Attribute Score = sum of numeric scores				15	**Final Attribute Score = (Raw Score/24) x 100**	63
Attribute 4: Biotic Structure (pp. 34-41)						
Plant Community Composition (based on sub-metrics A-C)						
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12				
Plant Community submetric B: Number of Co-dominant species	C	6				
Plant Community submetric C: Percent Invasion	B	9				
Plant Community Composition Metric *(numeric average of submetrics A-C)*				9		
Horizontal Interspersion			C	6		
Vertical Biotic Structure			B	9		
Raw Attribute Score = sum of numeric scores				24	**Final Attribute Score = (Raw Score/36) x 100**	67
Overall AA Score (average of four final Attribute Scores)					75	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☐ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☐ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ ~~T~~There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☐ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☑ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☐ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☑ **Equilibrium** ☐ **Degradation** ☐ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections →	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	1.119	1.14	1.0
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	0.2	.25	0.2
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	0.4	0.5	0.4
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	1.89	2.0	1.47
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.59	1.75	1.47
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.6

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		4

Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1

Profile 2

Profile 3

Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

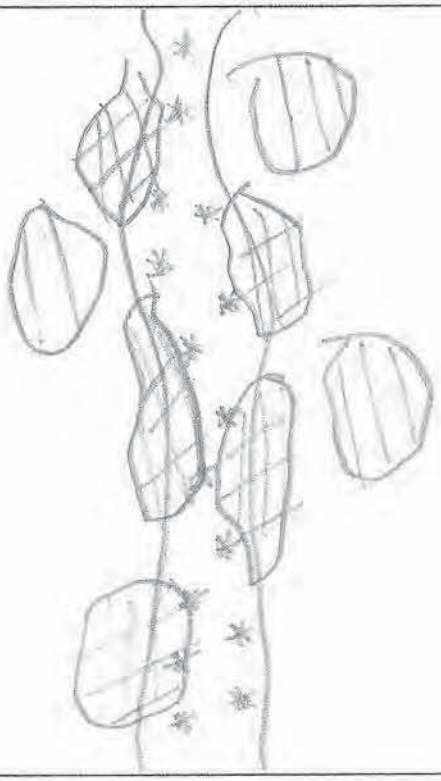
Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		NN grasses	Y
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
scrub oak	N	toyon	N
skunk brush	N		
chamise	N		
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	6
oak	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	16%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.



Assigned zones:

1) ~~H~~ - planted / layer? scrub oak / shrub

2) * * * - non-native grasses

3) ||| - bare

4)

5)

6)

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)	✓	
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Basic Information Sheet: Riverine Wetlands

Assessment Area Name: AA #9

Project Name: Soquel Canyon Mitigation Bank

Assessment Area ID #:

Project ID #: **Date:** 10/13/13

Assessment Team Members for This AA:

Amanda Beck

Shawn Gatchel-Hernandez

Average Bankfull Width: 1 m

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m)**:** 100

Upstream Point Latitude: 33°56'44.35" **Longitude:** 117°45'27.79"

Downstream Point Latitude: 33°56'42.20" **Longitude:** 117°45'28.45"

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☑ Mitigation ☐ Impacted ☐ Ambient ☐ Reference ☐ Training

☐ Other:

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☑ intermittent ☐ ephemeral

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		Upstream	33°56'44.53"	117°45'28.12"	
2		Middle Left	33°56'43.41"	117°45'28.32"	
3		Middle Right			
4		Downstream	33°56'42.53"	117°45'28.35"	
5					
6					
7					
8					
9					
10					

Site Location Description:

moderately steep intermittent drainage; soil generally loose; large coast live oaks, oak woodland along most of AA; herbaceous vegetation along slopes mostly trampled.

Comments:

intermittent channel
-impacted by cattle grazing
-oak woodland buffer

Scoring Sheet: Riverine Wetlands

AA Name:				**Date:**	
Attribute 1: Buffer and Landscape Context (pp. 11-19)				**Comments**	
Stream Corridor Continuity (D)		Alpha. A	Numeric 12		
Buffer:					
Buffer submetric A: Percent of AA with Buffer	Alpha. A	Numeric 12			
Buffer submetric B: Average Buffer Width	A	12			
Buffer submetric C: Buffer Condition	B	9			
Raw Attribute Score = D+[C x (A x B)½]½			22.39	**Final Attribute Score = (Raw Score/24) x 100**	93
Attribute 2: Hydrology (pp. 20-26)					
		Alpha.	Numeric		
Water Source		B	9		
Channel Stability		B	9		
Hydrologic Connectivity		C	6		
Raw Attribute Score = sum of numeric scores			24	**Final Attribute Score = (Raw Score/36) x 100**	67
Attribute 3: Physical Structure (pp. 27-33)					
		Alpha.	Numeric		
Structural Patch Richness		B	9		
Topographic Complexity		C	6		
Raw Attribute Score = sum of numeric scores			15	**Final Attribute Score = (Raw Score/24) x 100**	63
Attribute 4: Biotic Structure (pp. 34-41)					
Plant Community Composition (based on sub-metrics A-C)					
Plant Community submetric A: Number of plant layers	Alpha. A	Numeric 12			
Plant Community submetric B: Number of Co-dominant species	C	6			
Plant Community submetric C: Percent Invasion	B	9			
Plant Community Composition Metric *(numeric average of submetrics A-C)*			9		
Horizontal Interspersion		C	6		
Vertical Biotic Structure		B	9		
Raw Attribute Score = sum of numeric scores			24	**Final Attribute Score = (Raw Score/36) x 100**	67
Overall AA Score (average of four final Attribute Scores)				72	

Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
Upstream Total Length	0	Downstream Total Length	0

Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.

Percent of AA with Buffer: 100 **%**

Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width ***Round to the nearest integer***	250

Worksheet for Assessing Channel Stability for Riverine Wetlands

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☐ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☑ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☑ There is leaf litter, thatch, or wrack in most pools (if pools are present). ☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☐ There is little or no active undercutting or burial of riparian vegetation. ☐ If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. ☐ Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). ☑ There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps. ☐ The lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☑ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. ☐ There are partially buried living tree trunks or shrubs along the banks. ☐ The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☑ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.
Overall	☑ **Equilibrium** ☐ **Degradation** ☐ **Aggradation**

Riverine Wetland Entrenchment Ratio Calculation Worksheet

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections ⟶	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	1.3	1.1	1.8
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	.3	.2	.3
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	.6	.4	.6
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	1.9	1.7	2.3
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	1.46	1.55	1.28
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			1.43

Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

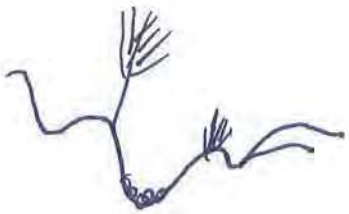
**Please refer to the CRAM Photo Dictionary at www.cramwetlands.org for photos of each of the following patch types.*

STRUCTURAL PATCH TYPE (circle for presence)	**Riverine (Non-confined)**	**Riverine (Confined)**
Minimum Patch Size	**3 m^2**	**3 m^2**
Abundant wrackline or organic debris in channel, on floodplain	**1**	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**	**1**
Cobbles and/or Boulders	**1**	**1**
Debris jams	**1**	**1**
Filamentous macroalgae or algal mats	**1**	**1**
Large woody debris	**1**	**1**
Pannes or pools on floodplain	**1**	**N/A**
Plant hummocks and/or sediment mounds	**1**	**1**
Point bars and in-channel bars	**1**	**1**
Pools or depressions in channels (wet or dry channels)	**1**	**1**
Riffles or rapids (wet or dry channels)	**1**	**1**
Secondary channels on floodplains or along shorelines	**1**	**N/A**
Standing snags (at least 3 m tall)	**1**	**1**
Submerged vegetation	**1**	**N/A**
Swales on floodplain or along shoreline	**1**	**N/A**
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	**1**	**1**
Vegetated islands (mostly above high-water)	**1**	**N/A**
Total Possible	**17**	**12**
No. Observed Patch Types (enter here and use in Table 14 below)		6

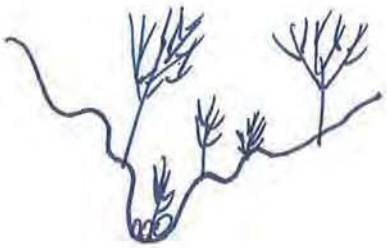
Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

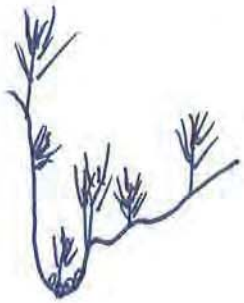
Profile 1



Profile 2



Profile 3



Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands
(A dominant species represents ≥10% *relative* cover)

Special Note:

** Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.*

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		Non-Native Grasses	Y
		Poison Oak	N
		Skunk Brush	N
Medium (0.5-1.5 m)	**Invasive?**	**Tall (1.5-3.0 m)**	**Invasive?**
Skunk Brush	N	Mulefat	N
Poison Oak	N		
Mulefat	N		
Very Tall (>3.0 m)	**Invasive?**	**Total number of co-dominant species for all layers combined (enter here and use in Table 18)**	6
Oak	N		
Walnut	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	16%

Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.

Assigned zones:

1) // - poison oak skunk bush mulefat

2) # - oak / walnut

3) * * - non-native grasses / coastal sage / [illegible]

4)

5)

6)

C

Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

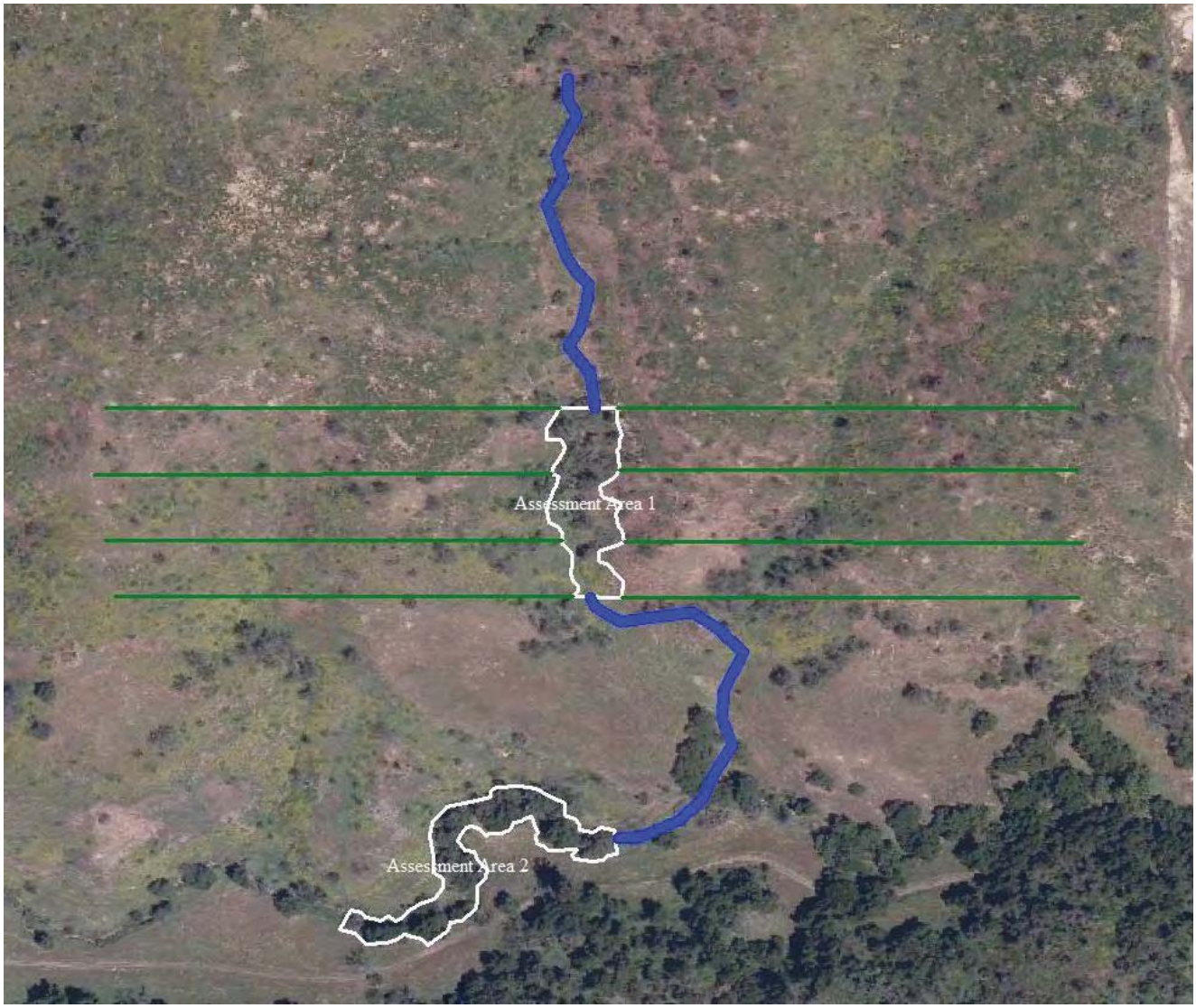
Stressor Checklist Worksheet

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)	✓	✓
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources	✓	
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

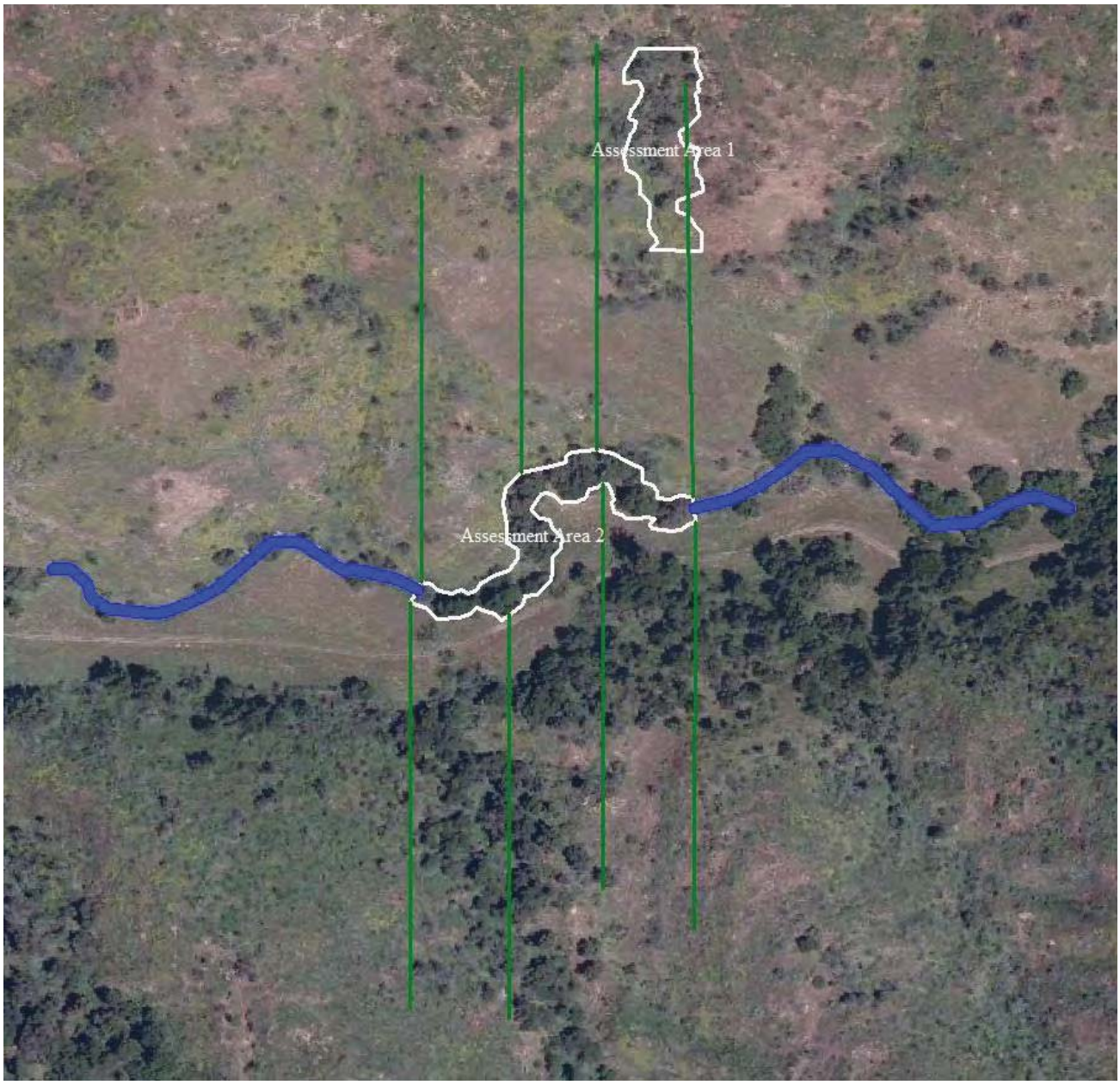


LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections

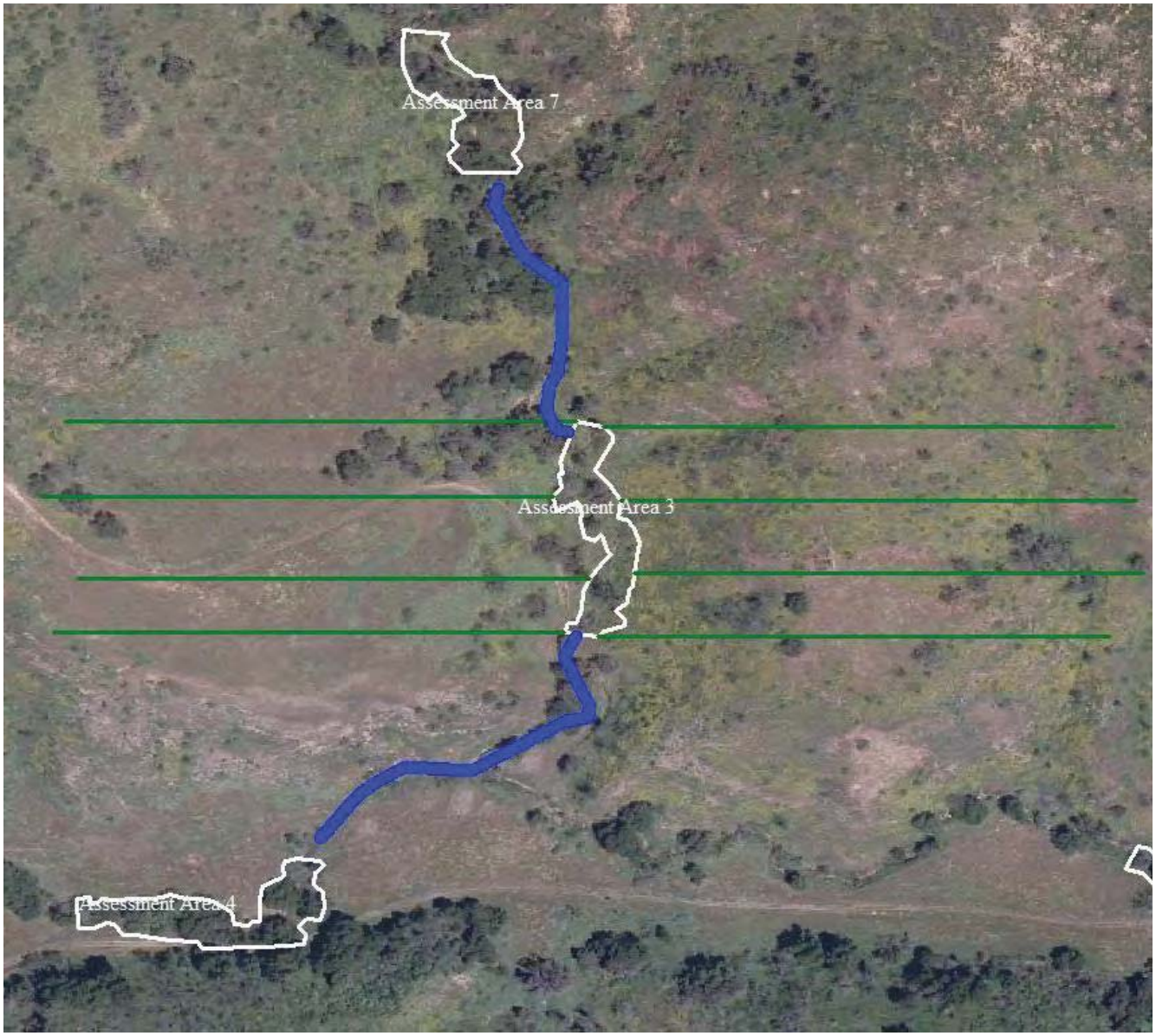


LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections

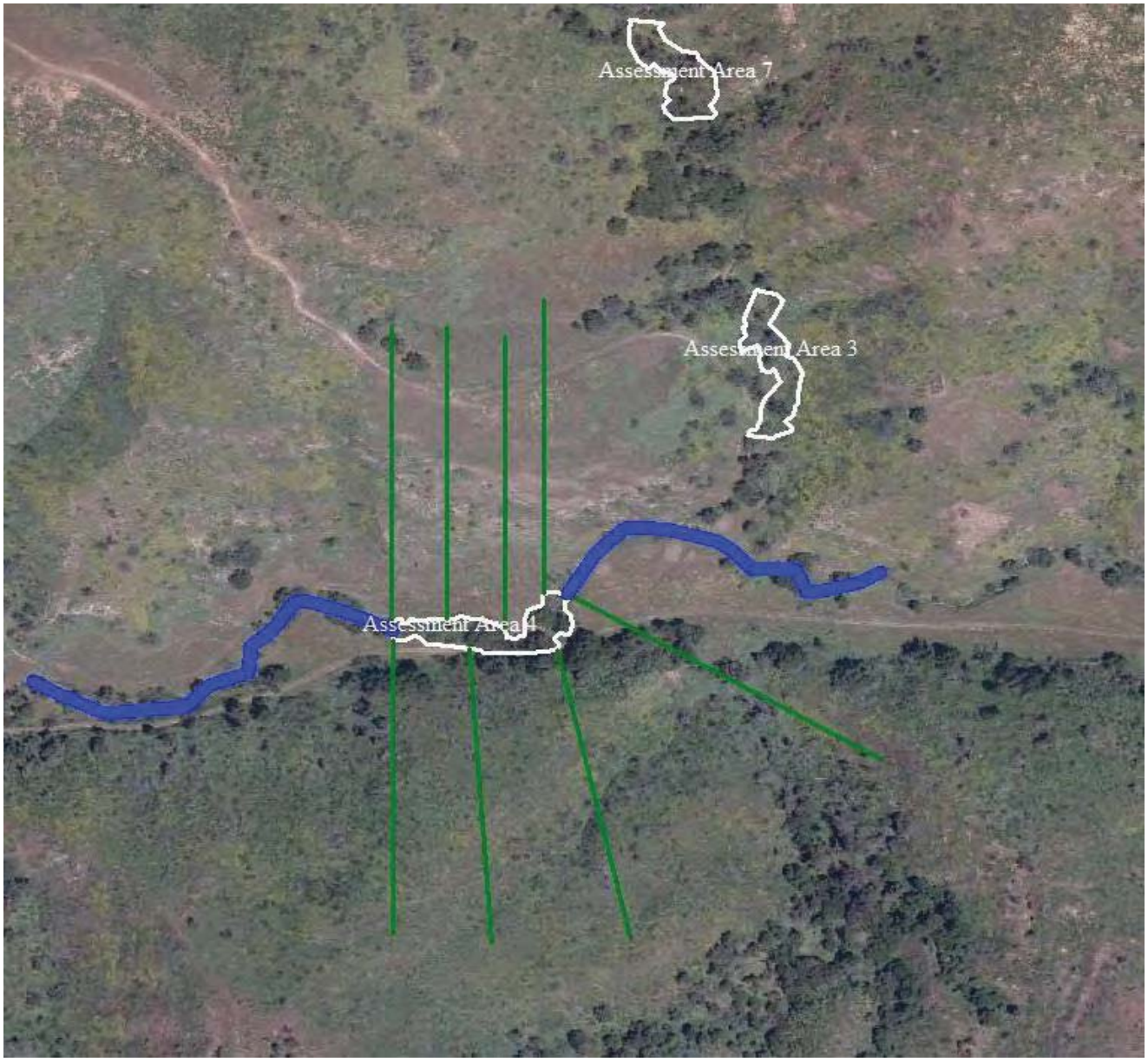


LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections

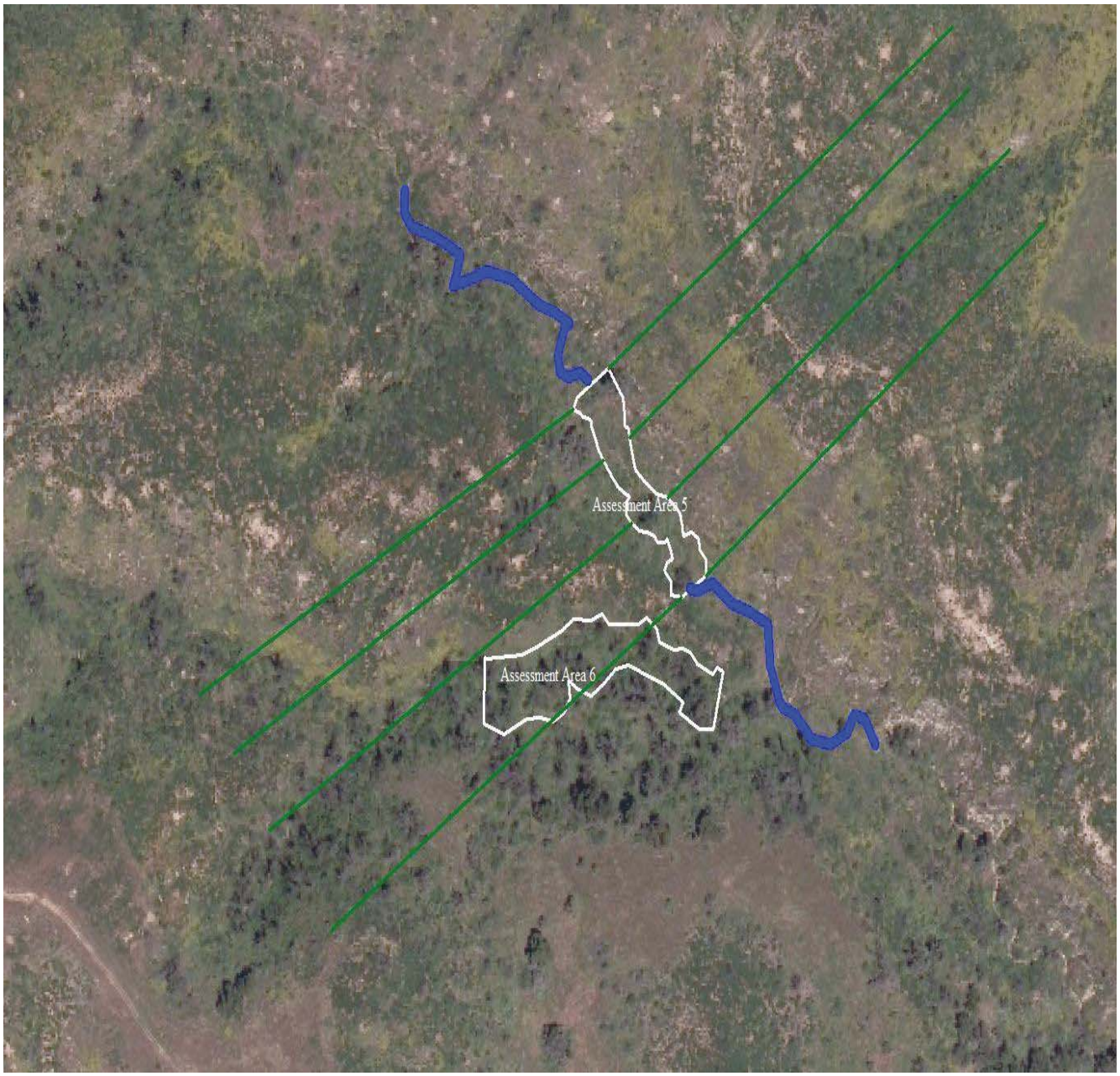


LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections

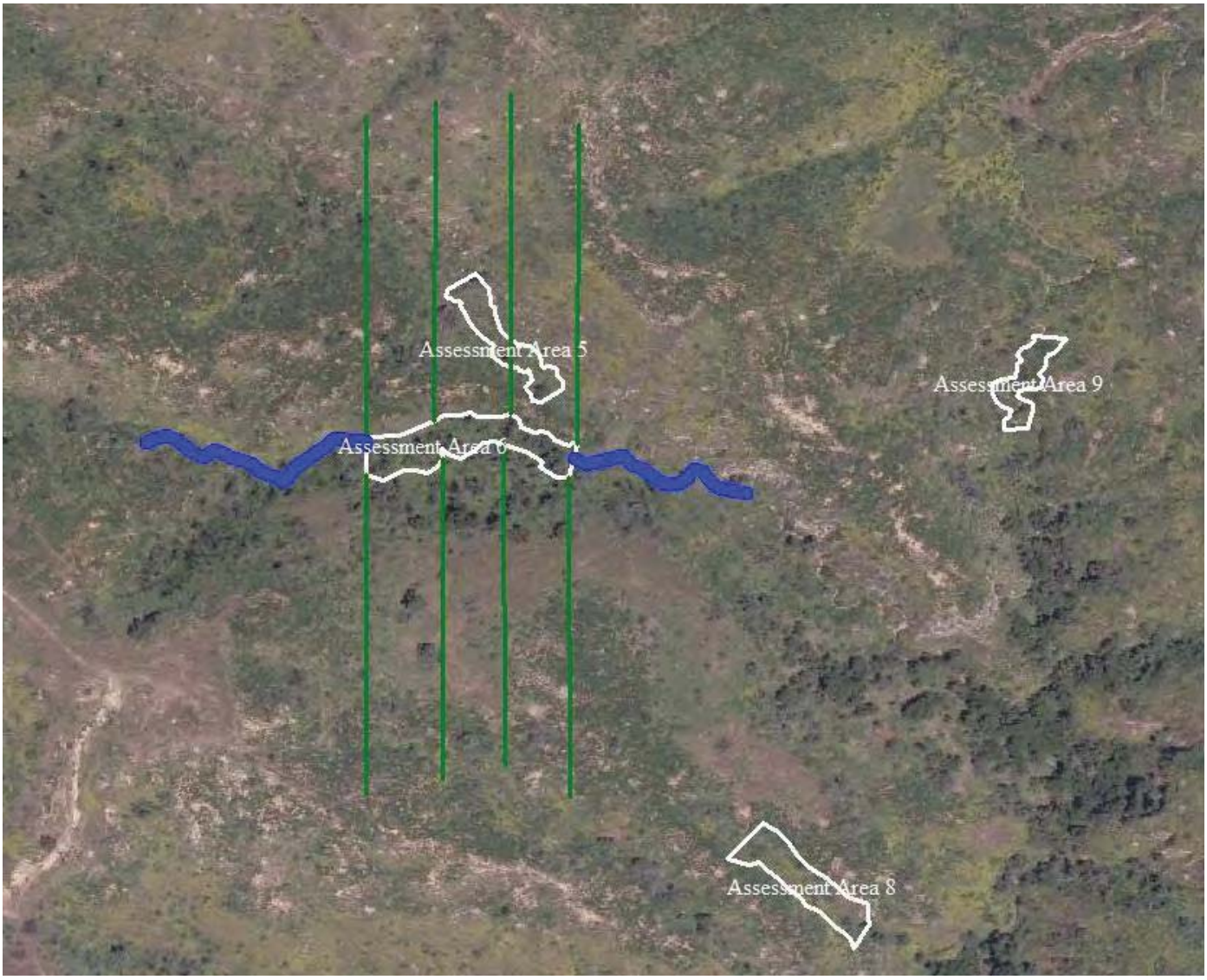


LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections

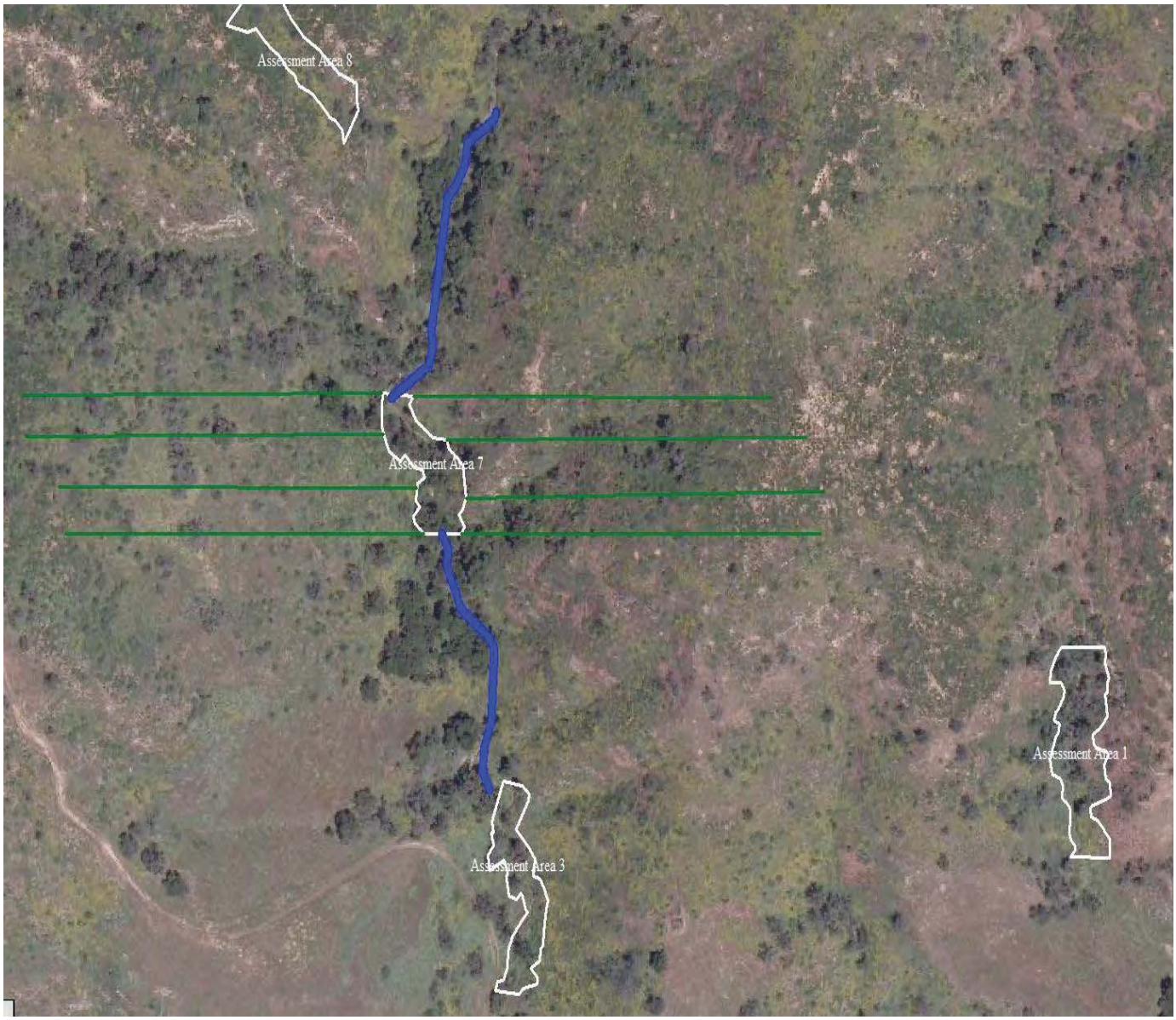


LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections



LEGEND

Assessment Area

Buffer widths

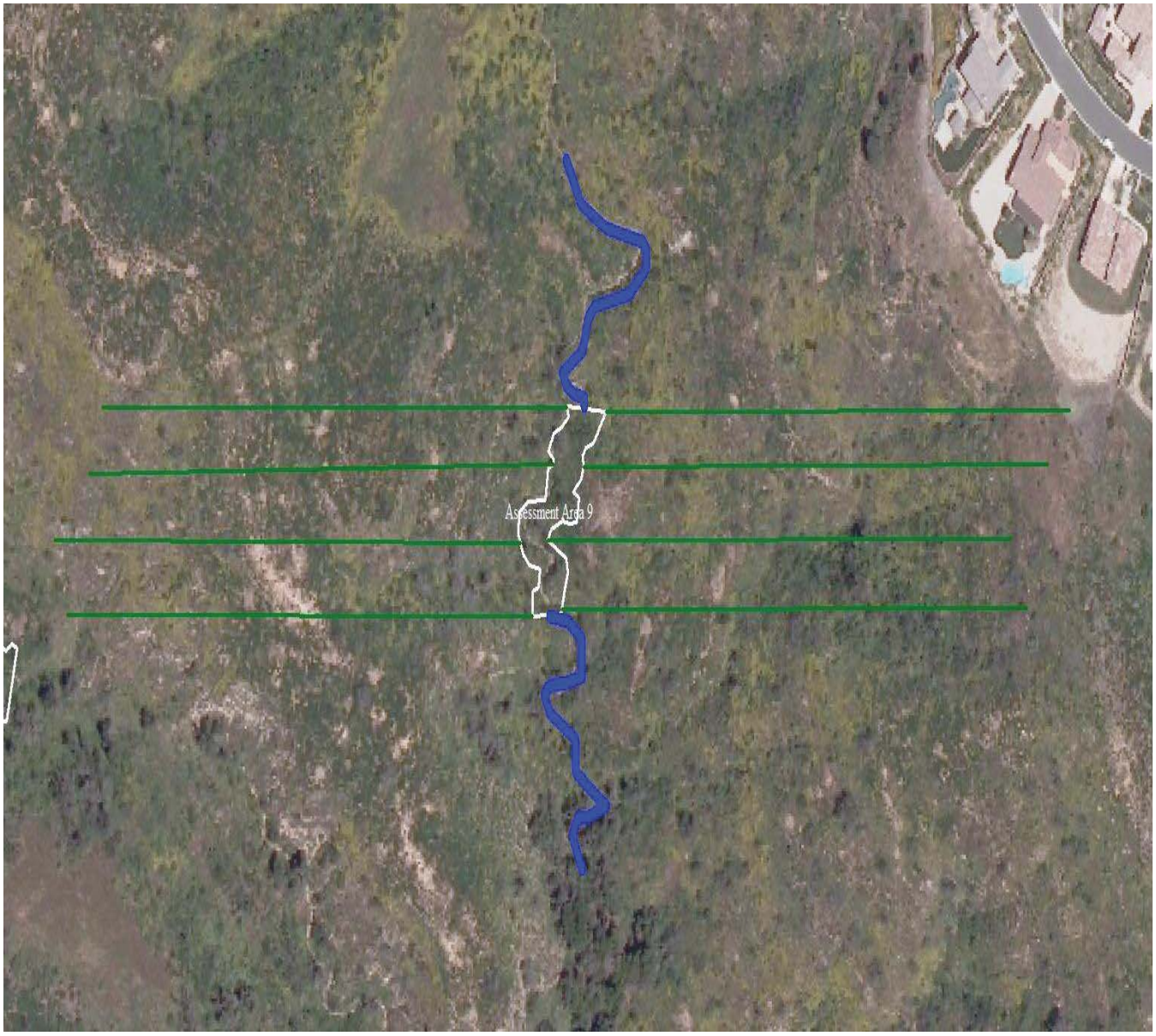
Down-stream drainage connections

LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections

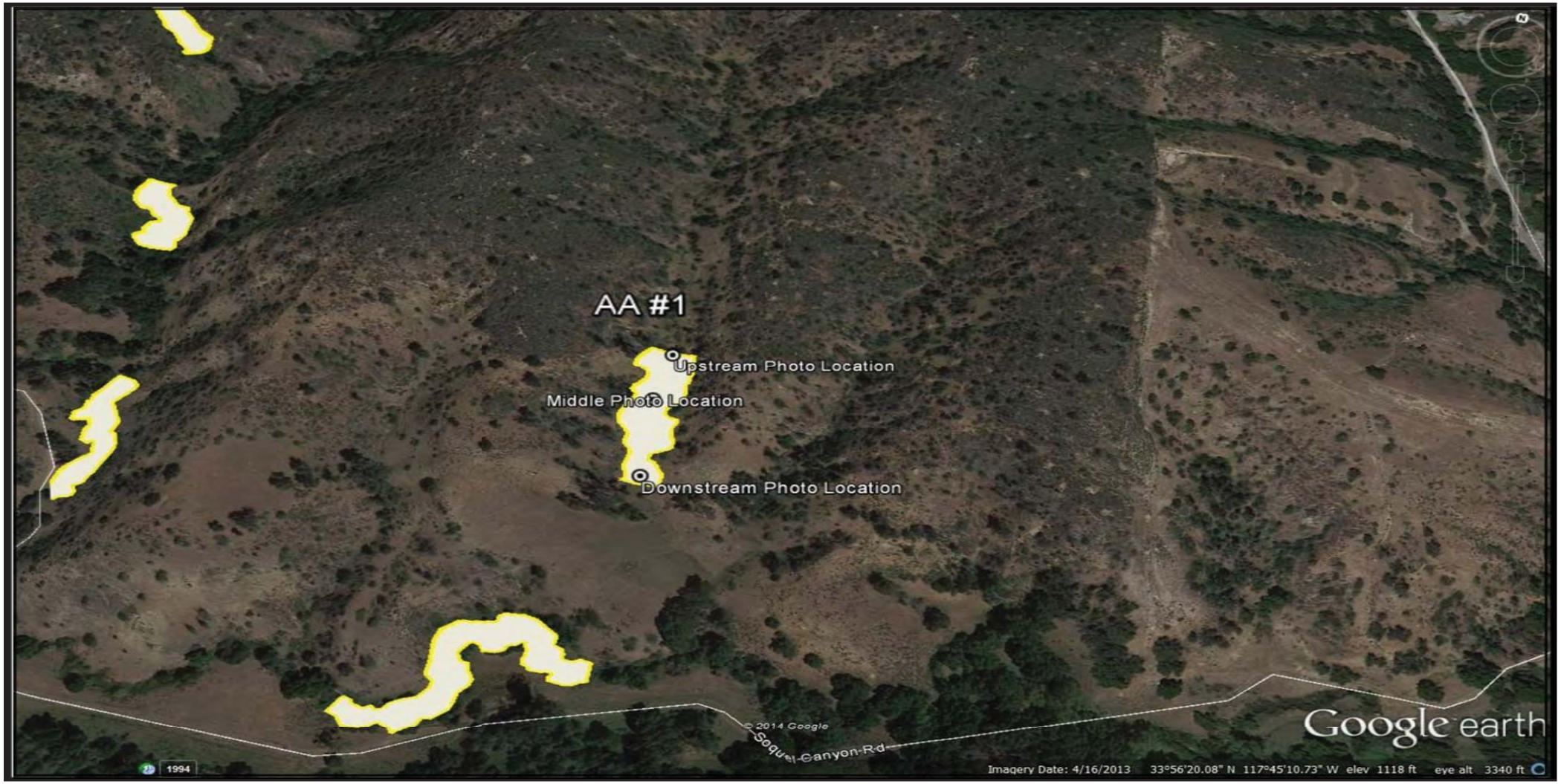


LEGEND

Assessment Area

Buffer widths

Down-stream drainage connections



AA #1 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

AA #2 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #3 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #4 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #5 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #6 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #7 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #8 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #9 - Photo Location Map

VCS ENVIRONMENTAL
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675
(949) 489-2700
fax (949) 489-0309

N

AA #1 – Buffer adjacent to upstream point

AA #1 – Streambed within upstream portion of AA

AA #1 – Streambed within middle portion of the AA

AA #1 – Streambed within downstream end of the AA

AA #2 – Buffer adjacent to upstream point

AA #2 – Streambed within upstream portion of AA

AA #2 – Streambed within middle portion of the AA

AA #2 – Streambed within downstream end of the AA

AA #3 – Buffer adjacent to upstream point

AA #3 – Streambed within upstream portion of AA

AA #3 – Streambed within middle portion of the AA

AA #3 – Streambed within downstream end of the AA

AA #4 – Buffer adjacent to upstream point

AA #4 – Streambed within upstream portion of AA

AA #4 – Streambed within middle portion of the AA

AA #4 – Streambed within downstream end of the AA

AA #5 – Buffer adjacent to upstream point

AA #5 – Streambed within upstream portion of AA

AA #5 – Streambed within middle portion of the AA

AA #5 – Streambed within downstream end of the AA

AA #6 – Buffer adjacent to upstream point

AA #6 – Streambed within upstream portion of AA

AA #6 – Streambed within middle portion of the AA

AA #6 – Streambed within downstream end of the AA

AA #7 – Buffer adjacent to upstream point

AA #7 – Streambed within upstream portion of AA

AA #7 – Streambed within middle portion of the AA

AA #7 – Streambed within downstream end of the AA

AA #8 – Buffer adjacent to upstream point

AA #8 – Streambed within upstream portion of AA

AA #8 – Streambed within middle portion of the AA

AA #8 – Streambed within downstream end of the AA

AA #9 – Buffer adjacent to upstream point

AA #9 – Streambed within upstream portion of AA

AA #9 – Streambed within middle portion of the AA

AA #9 – Streambed within downstream end of the AA

APPENDIX D: CREDITING FIGURES

Bank Property

Ephemeral Credits (Buffer Width: 100 feet)

- Waters Enhancement: (28,300 feet, 0.71 acre)
- Riparian Buffer Enhancement: (14.30 acres)
- Upland Buffer Enhancement: (68.39 acres)

Intermittent Credits (Buffer Width: 200 feet)

- Waters Enhancement: (8,610 feet, 0.72 acre)
- Riparian Buffer Enhancement: (25.61 acres)
- Upland Buffer Enhancement: (37.53 acres)

Perennial Credits (Buffer Width: 300 feet)

- Waters Enhancement: (3,459 feet, 0.77 acre)
- Riparian Buffer Enhancement: (23.10 acres)
- Upland Buffer Enhancement: (17.96 acres)

Figure F-1.3.1 Waters of the U.S. and Buffers Credit Analysis

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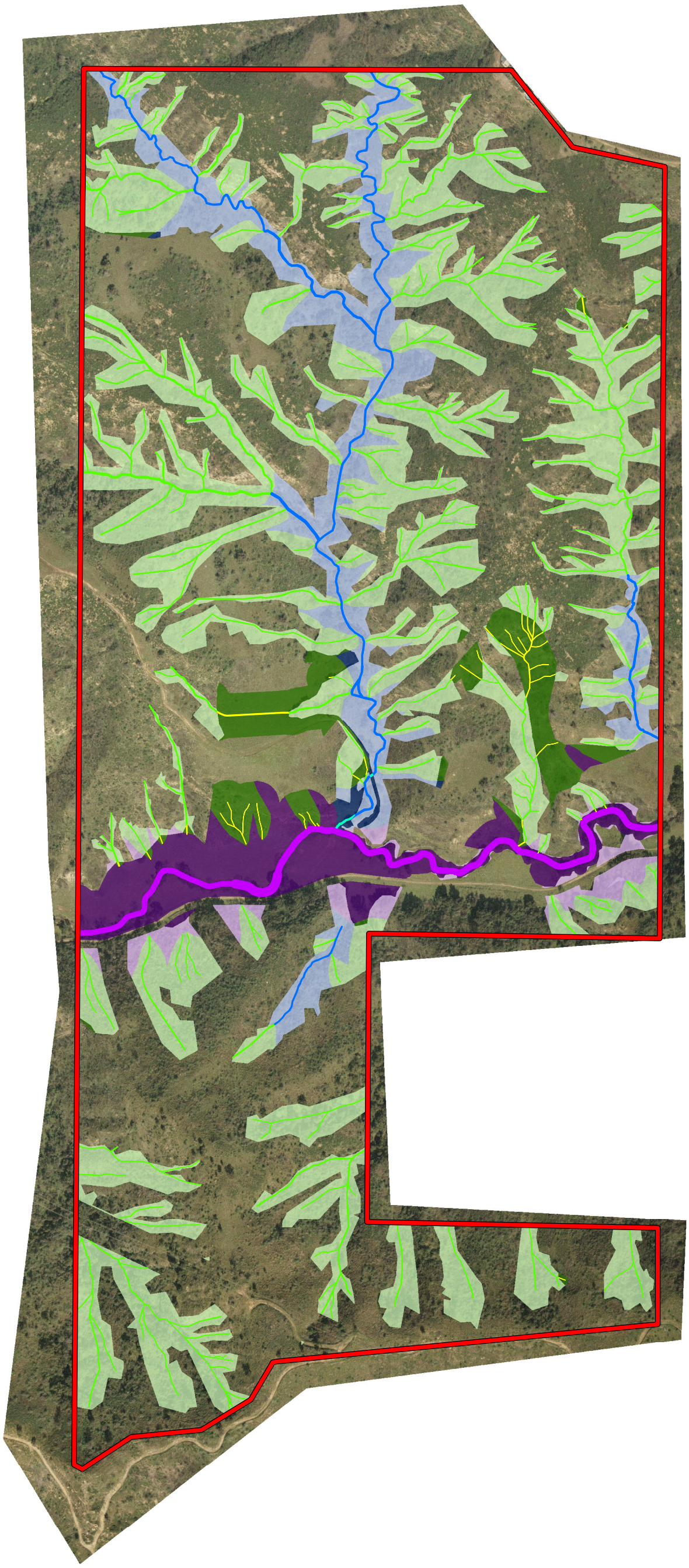
Feet

wra
ENVIRONMENTAL CONSULTANTS

Soquel Canyon
Conservation and Mitigation Bank
San Bernardino and Orange Counties, CA

Map By: SG
Date: Nov. 2014
Base Source: DRC

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Development Plan\2014\June\FigX_CorpsCreditAnalysis.mxd



Bank Property

Ephemeral Credits

- Waters Enhancement: (3.75 acres)
- Waters Restoration: (0.14 acre)
- Riparian Enhancement: (83.60 acres)
- Riparian Restoration: (8.14 acres)

Intermittent Credits

- Waters Enhancement: (1.44 acres)
- Waters Restoration: (0.02 acre)
- Riparian Enhancement: (18.48 acres)
- Riparian Restoration: (0.56 acre)

Perennial Credits

- Waters Restoration: (2.06 acres)
- Riparian Enhancement: (3.46 acres)
- Riparian Restoration: (11.46 acres)

Figure F-1.3.2 Waters of the State Credit Analysis

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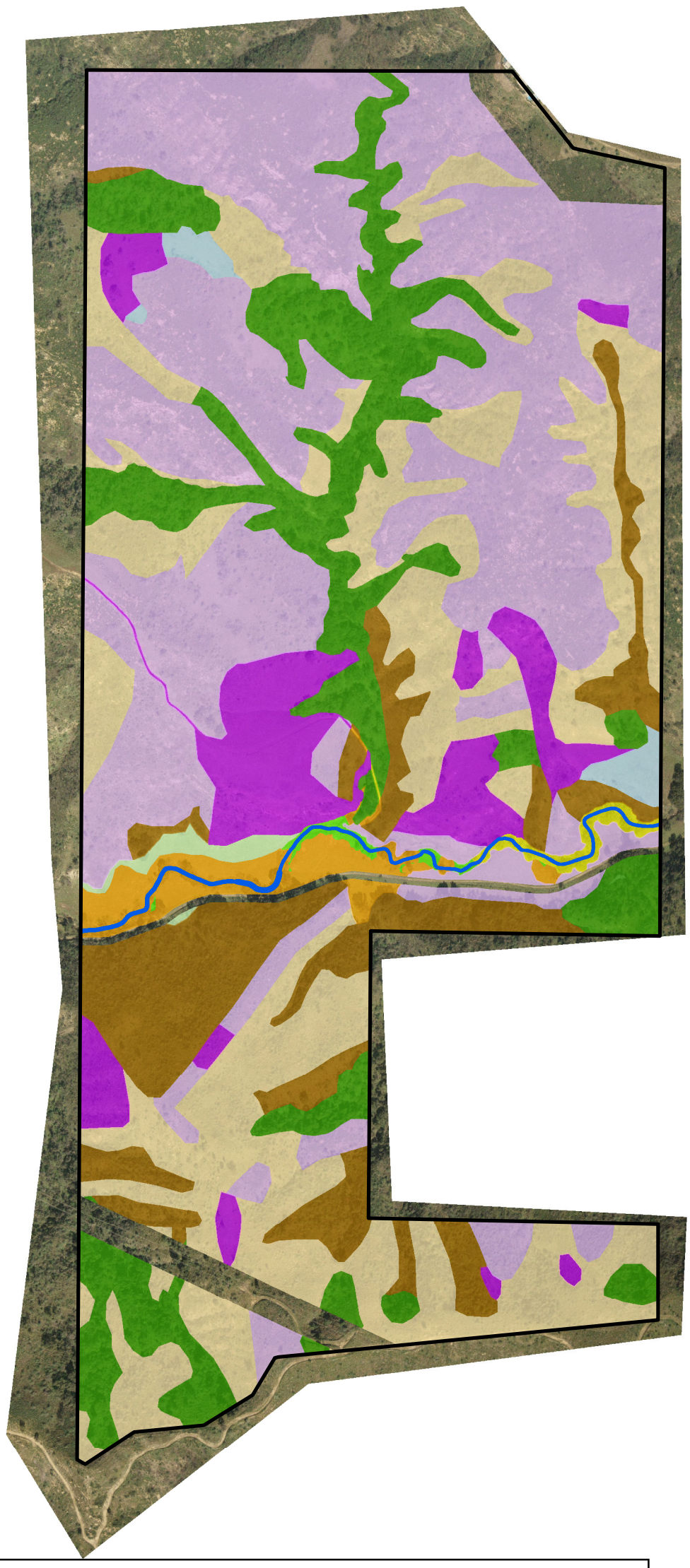
Feet

ENVIRONMENTAL CONSULTANTS

Soquel Canyon
Conservation and Mitigation Bank
San Bernardino and Orange Counties, CA

Map By: SG
Date: Nov. 2014
Base Source: DRC

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Development Plan\2014\June\FigX_CDFW1600CreditAnalysis.mxd



Legend

Enhancement Areas

- Chaparral Enhancement: (76.58 acres)
- Coastal Sage Scrub Enhancement: (108.54 acres)
- Native Grassland Enhancement: (2.67 acres)
- Oak Woodland Enhancement: (43.87 acres)
- Walnut Enhancement: (33.81 acres)

Restoration Areas

- Perennial Stream Restoration: (0.77 acre)
- Coastal Sage Scrub Restoration: (23.47 acres)
- Mulefat Scrub Restoration: (0.95 acre)
- Native Grassland Restoration: (1.78 acres)
- Oak Woodland Restoration: (1.57 acres)
- Walnut Restoration: (6.93 acres)

Figure F-1.3.3 Covered Habitat Credits

N
W E
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Feet

Soquel Canyon
Mitigation/Conservation Bank
San Bernardino and Orange Counties, CA

wra
ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Nov. 2014
Base Source: DRC

Path: L:\Acad 2000 Files\20000\20114\gis\ArcMap\Development Plan\2014\June\FigX_CDFWCEQACredits.mxd

EXHIBIT C-2

EXHIBIT C-2

CONSTRUCTION SECURITY ANALYSIS AND SCHEDULE

The Bank Sponsor will provide a Construction Security to the USACE to provide financial assurance as outlined in section VI.A of the BEI for the tasks to be completed following Bank establishment. The Construction Security will guarantee the completion of construction and planting to Restore and/or Enhance Waters of the U.S. and Buffers, Waters of the State, and Covered Habitat on the Bank Property in accordance with the Development Plan (Exhibit C-1 of the BEI). The Construction Security will be in the form of two Irrevocable Letters of Credit in an amount equal to 100% of the construction cost estimates provided below. The USACE will have the right to draw on this security in accordance with section VIII.E.1.a of the BEI.

Construction Cost Estimate

Third party cost estimates have been obtained from a restoration firm with experience in habitats similar to and in the vicinity of the Bank Property. Except as noted for gully stabilization, the following costs were obtained from the third party bid package. Actions associated with gaining site access (installation of steel plates), treatment/removal of invasive trees as shown on Figure 5 of the Development Plan, installation of fencing, gates and signs, site preparation including discing and road decommissioning in the oak and walnut planting areas, and installation of irrigation will be covered under one letter of credit (LOC-1), and herbicide treatment of invasives, site preparation in non-irrigated areas, gully stabilization, seeding and planting will be covered under a second letter of credit (LOC-2).

Activity	LOC-1	LOC-2
Mobilization	$6,407	$0
Weed Removal (Invasive Trees)	$33,416	$0
Weed Removal (Herbicide Treatment)	$0	$25,151
Fencing, Gates and Signs	$56,768	$0
Site Preparation (Installation of steel plates, road decommissioning, and discing in oak-walnut planting areas)	$2,748	$0
Site Preparation (Soil Preparation in seeded areas, discing etc.)	$0	$5,562
Gully Stabilization (estimate provided by WRA)	$0	$12,000
Seeds & Seeding	$0	$95,716
Planting	$0	$73,725
Irrigation	$91,625	$0
Subtotal	$190,964	$212,154
Contingency (10%)	*$19,097*	*$21,216*
Total Security	**$210,061**	**$233,370**

Security Funding Schedule

As outlined in section VI.A of the BEI, the Bank Sponsor will furnish to the USACE the entire Construction Security equal to $443,431 prior to the first Credit Release. If at any time during the life of the security, the USACE draws upon the Construction Security, the Bank Sponsor will replenish the Construction Security as outlined section VIII.E.1.a.2 of the BEI. Each letter of credit will be released upon completion of the activities covered by that letter of credit pursuant to the relevant requirements outlined in section VIII.E.1.a.3 of the BEI.

EXHIBIT C-3

EXHIBIT C-3

PERFORMANCE SECURITY ANALYSIS AND SCHEDULE

The Bank Sponsor will provide a Performance Security to the USACE to provide financial assurance as outlined in section VI.B of the BEI. The Performance Security will guarantee that the constructed habitats meet all of their Performance Standards as outlined in the Development Plan (Exhibit C-1 of the BEI) and that any Remedial Actions required under section VIII.F of the BEI are completed through Bank Closure. The Performance Security will be in the form of an Irrevocable Standby Letter of Credit in an amount equal to either 20% of the Construction Security (Exhibit C-2 of the BEI) or 20% of the Endowment Amount, whichever is greater.

Construction Security and Endowment Costs

The following cost estimates have been prepared by WRA, Inc. and cost estimates obtained from restoration firms with experience in habitats similar to and in the vicinity of the Bank Property. The estimates come from Exhibit C-2 and Exhibit D-2 of the BEI.

Construction and Security Costs	
Construction Security	$443,431
Endowment Amount	$465,945
Performance Security	**$93,189**

Security Funding Schedule

As outlined in section VI.B of the BEI, the Bank Sponsor will furnish to the USACE the Performance Security equal to **$93,189** concurrent with the first Credit Transfer. If at any time during the life of the Bank, the USACE draws upon the Performance Security, the Bank Sponsor will replenish the Performance Security as outlined section VIII.E.1.b. The Performance Security shall be cancelled upon completion of the requirements outlined in Section VIII.E.1.b.3 of the BEI.