October 14, 2020

Mr. Sundeep Amin
Burns & McDonnell
4225 Executive Square, Suite 500
La Jolla, CA 92037

Re: 2020 Updated Vegetation Communities of the Proposed Moosa Creek Riparian Restoration Project, Bonsall, San Diego County, California

Dear Mr. Amin:

Blackhawk Environmental Inc. (Blackhawk) was contracted through Burns & McDonnell, Inc. to update previously performed vegetation community mapping occurring within the proposed Moosa Creek Riparian Restoration Project (Project). The regulatory agencies include the United States Army Corps of Engineers (USACE; Corps), Environmental Protection Agency (EPA), United States Fish & Wildlife Service (USFWS), San Diego Regional Water Quality Control Board (SDRWQCB; RWQCB) and the California Department of Fish & Wildlife (CDFW).

The Project site is located in unincorporated San Diego County, near the rural community of Bonsall on a portion of an abandoned golf course. Specifically, the Project site is bounded by Camino Del Rey to the north-northeast, Calle De Las Estrellas and Old River Road to the west, and Golf Club Drive to the south. The overall Project area is approximately 67 acres and is adjacent to Bonsall Elementary School and a newly developing residential neighborhood to the west, existing residential neighborhoods to the south, east and southeast, a residential condominium complex to the north, and San Luis Rey Training Center to the east. The Project site is located approximately 0.4-mile east of State Route-76 (Mission Road) intersection with Camino Del Rey/Olive Mill Road. The Project site contains facilities from the abandoned golf course and heavily disturbed habitats. The topography of the Project site is generally level with isolated pockets of steep slopes around the perimeter. The surrounding development occurs above grade of the Project site. The 100-year floodplain is mapped by the Federal Emergency Management Agency (FEMA) across the Project site along Moosa Creek.

Biological studies were initially conducted in February of 2013. The results of those studies are provided in detail in the *Biological Resources Report for the Moosa Creek Mitigation Bank Project* prepared by Wetland Research Associates (WRA; 2013). At the time of the initial studies, which covered a larger footprint than the current Project, the proposed Project supported nine distinct vegetation communities. Detailed project descriptions, previously mapped vegetation communities, jurisdictional delineations and proposed designs can be referenced in the aforementioned reports.

PURPOSE AND NEED

The applicant is proposing a Grading Permit for the restoration of riparian and upland habitats on 67 acres of land within the Bonsall Community Plan area that contains the former Moosa Creek Golf Course. The site is designated for Open Space (Recreation) and zoned for Open Space Use (S80). The proposed habitat restoration work is consistent with the existing zoning for the site. The Project site is located between State Route-76 and Interstate-15, south of Camino Del Rey, and is bisected by Moosa Creek. The on-site reach of the creek flows from the eastern end of the Project site westward

where it exits the Project site at the western end of Old River Road. From the property, Moosa Creek continues another half mile off site to the southwest before ultimately joining the San Luis Rey River.

The Moosa Creek Riparian Restoration Project (Project) would remove existing infrastructure and recontour portions of the property to be planted with native riparian and upland species. Approximately 10 acres of the Project site contains existing riparian habitat along Moosa Creek, with the remainder featuring ornamental and developed areas consistent with the previous use as a golf course. Planned restoration activities would consist of regrading the area adjacent to but outside the creek and removing 4.5 acres of existing infrastructure (tennis courts, parking lots, golf course features, etc.) to establish and/or enhance approximately 39 acres of riparian habitat and approximately 28 acres of native riparian-upland transitional buffers and other site improvements.

Proposed earthwork would be conducted to extend the top of the Moosa Creek bank to create a high flow terrace/floodplain. Restoration strategies planned for the site include riparian re-establishment (consisting of a mulefat-willow dominated riparian habitat that may also include wetlands depending on conditions), floodplain re-establishment (floodplain transitional species that include riparian and upland species), coast live oak savannah re-establishment (coast live oak savannah with associated species), and riparian enhancement (control of non-native species and light seeding or planting). The Project would re-establish and rehabilitate riparian habitat to benefit federally and state-listed wildlife species (e.g., least Bell's vireo and southwestern willow flycatcher). The restoration effort is being designed under the guidance of the United States Fish and Wildlife Service (USFWS) to offset corresponding riparian habitat and endangered species impacts at the Marine Corps Air Station (MCAS) at Camp Pendleton.

Project implementation is anticipated to commence in the winter of 2021 but may need to be adjusted to account for weather or to avoid sensitive bird breeding and nesting seasons. While one construction stage is anticipated, the overall work may be broken into two distinct phases: demolition/earthwork and planting. After construction, the restoration areas would be monitored for up to five years in accordance with the proposed restoration plan, and, as necessary, invasive species removal and other vegetation management activities would be performed during the monitoring period.

Golf course operations within the proposed Project were discontinued in August, 2014. Over the last several years, in the absence of routine maintenance, vegetation communities have transitioned and as such, the previously mapped vegetation communities no longer accurately reflect the current site conditions. The purpose of this memo report is to summarize changes in existing site conditions within the Project site that have occurred since golf course operations and maintenance were discontinued.

METHODS

A vegetation mapping effort was conducted in the field to document and map all vegetation communities that exist within the Project. Vegetation classification was determined following the Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland, 1986) and in some cases, additional classifications, following Obenbauer 1996, were included when necessary to refine unique vegetation components. The naming convention generally followed the previous effort.

Biologists slowly walked the entirety of the site and evaluated vegetation community characteristics, dominant and subdominant species, density and structure in order to carefully classify distinct vegetation communities. Each vegetation community was documented in the field using ESRI ArcGIS Collector software. Utilizing GPS streaming, biologists mapped vegetation communities by walking the limits of vegetation polygon, or drew polygons around distinct areas as appropriate. Additionally, recent satellite imagery was cross-referenced during the mapping effort to accurately depict the mapped polygons. Blackhawk biologists Ian Maunsell and Kris Alberts conducted vegetation mapping and plant surveys on May 19 and 28, 2020.

RESULTS

A total of 21 distinct vegetation communities were documented during the vegetation mapping effort (Figure 1 & Table 1). Descriptions and Holland classification codes of each vegetation communities are outlined below. Non-native grassland and ruderal weeds were the two most abundant vegetation types and accounted for approximately one third of the Project.

Non-native grassland (42200) (16.957 acres)

Non-native, annual grasses of Mediterranean origin typically characterize non-native grasslands. This vegetation community typically occurs in areas of both natural and anthropogenic disturbance and is dominated by various non-native annual grasses with varying relative ground cover. Non-native grassland within the Project was most prevalent along flat upland areas previously maintained as part of golf course operations and accounted for almost one third of the Project. Absolute vegetative cover within this vegetation community ranged from 70-120%. Dominant species included rattail fescue (*Festuca myuros*), slender oat (*Avena barbata*), rescue brome (*Bromus catharticus*), ripgut brome (*Bromus diandrus*), Bermuda grass (*Cynadon dactylon*), shortpod mustard (*Hirschfeldia incana*), foxtail barley (*Hordeum murinum*) with other less dominant non-native species such as western ragweed (*Ambrosia psilostachya*), fat-hen (*Atriplex prostrata*), Italian thistle (*Carduus pycnocephalus*), poision hemlock (*Conium maculatum*), Canadian horseweed (*Erigeron canadensis*), prickly ox-tongue (*Helminotheca echioides*), prickly lettuce (*Lactuca serriola*) and small wire lettuce (*Stephenomeria exigua*).

Ruderal weeds (42200) (16.742 acres)

Ruderal weeds occur where there are few native plant species and generally contribute a low habitat value. Ruderal weeds are most prevalent particularly in areas disturbed by human activities. This community is dominated by non-native herbaceous species adapted to disturbance (Holland 1986; Sawyer et al. 2009). Within the Project, this community was dominated by shortpod mustard, Perennial pepperweed (*Lepidium latifolium*), wild radish (*Raphanus sativa*), ripgut brome, rattail fescue, Bermuda grass, foxtail barley and rabbitsfoot grass (*Polypogon monspeliensis*). Other secondary species documented within this community include bull thistle (*Cirsium vulgare*), Canadian horseweed, common Mediterranean grass (*Schismus barbatus*), prickly ox-tongue, western ragweed, prickly lettuce, Bermuda grass, annual beardgrass (*Polypogon monspeliensis*) and cocklebur (*Xanthium strumarium*). Ruderal weeds were observed to integrate with other vegetation communities, particularly on the margins of arroyo willow association, mulefat-arroyo willow association, Fremont cottonwood association and non-native grasslands (Figure 1).

Arroyo willow association (63320) (6.031 acres)

This structurally diverse community is characterized by a seasonally wet shrubland that is cold-decidous. A dense, shrub layer dominated by arroyo willow (*Salix lasiolepis*) comprises the main understory and lower tree canopy. Other species that contributed to the multi-tiered canopy, but were not dominant, included western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii*). The lower shrub layer also contained a high percentage of native shrubs, including mulefat (*Baccharis salicifolia*). Various native and non-native annuals and forbs were observed to occur in the understory of this community, such as stinging nettle (*Urtica dioica*), western ragweed (*Ambrosia psilostachya*), wild radish, and perennial pepperweed.

Non-native herbaceous wetland (52410) (3.816 acres)

This community exhibited a dominance of non-native hydrophytic vegetation characterized by low growing non-woody vegetation providing relative ground cover near or in excess of 100-percent. Common plant species observed within this habitat included a mix of native and non-native species such as sea spurry (*Spergularia arvensis*), Bermuda grass, rabbitsfoot grass, salt grass (*Distichilis spicata*), cocklebur, curly dock (*Rumex crispus*), fivehook bassia (*Bassia hyssopifolia*), prickly lettuce, poison hemlock, and Australian saltbush (*Atriplex semibaccata*). Low microtopographic depressions and swales within these habitats were observed to support patchy occurrences of hydrophytes such as toad rush (*Juncus bufonius*), threesquare bulrush (*Schoenoplectus pungens*), pale rush (*Eleocharis macrostachya*) and pickleweed (*Salicornia depressa*).

Ornamental landscaping (12000) (3.421 acres):

This vegetation community is composed of a variety of non-native, horticultural plant species that are commonly planted throughout Southern California. Some native species were also identified within this community, but in low numbers. Dominant species within this community include ash trees (*Fraxinus ssp.*), olive (*Olea europarea*), California fan palm (*Washingtonia filifera*), Mexican fan palm (*Washingtonia robusta*) with less abundant oleander (*Nerium oleander*), weeping willow (*Salix babylonica*) and Queen palm (*Syagrus romanzoffiana*). Understory species included various non-native annual grasses and annual forbs.

Developed (12000) (3.191 acres)

Developed lands generally include areas that have been physically altered to such an extent that conditions no longer exist to support native vegetation. These areas generally do not have the capacity to revegetate. Within the Project, this community was composed of primarily paved surfaces including concrete parking lots, paved golf cart paths and paved roadways that lacked vegetation.

Irrigated ornamental plants (12000) (3.019 acres)

This community consists of various non-native and native plant species often planted as ornamental shrubs and trees around developed areas. The majority of species within this community require irrigation in order to persist in a southern California climate. Species observed within this community include slender myoporum (*Myoporum parviflorum*), rosemary (*Rosmarinus officinalis*), aleppo pine (*Pinus halepensis*), crimson bottlebrush (*Callistemon citrinus*), ash trees and oleander with scarce native trees such as western sycamore. The understory of this community was generally dominated

by nonnative grasses and annuals such as shortpod mustard, wild radish, ripgut brome and rescue brome with very few native species.

Mulefat-arroyo willow association (63320) (2.655 acres)
This community was generally characterized as a dense shrubland dominated by mulefat, interspersed with arroyo willows and contained greater than 50 percent relative cover of mulefat and arroyo willow in the shrub and lower tree canopy. This association is similar to arroyo willow association except that it had a lower-growing tree canopy and a higher relative proportion of mulefat. Associated species in the understory included stinging nettle, watercress (*Nasturtium officinale*), poison hemlock and tall flatsedge (*Cyperus eragrostris*). This community occurred along stream channels and seasonally wet areas of the Project that are subject to frequent winter flooding that may limit the conversion of this community into an arroyo willow forest.

Disturbed Fremont cottonwood-arroyo willow association (61320) (2.252 acres)
This community occurs in seasonally wet or persistently wet portions of the Project and is very similar to Fremont cottonwood-arroyo willow association except that it contains a higher proportion of non-native species within the tree, shrub and understory layers, including salt cedar (*Tamarix ramosissima*), giant reed (*Arundo donax*), various non-native grasses and ruderal weeds. This community consists of tall, open, broad-leaved, winter-deciduous riparian species and is dominated by Fremont cottonwood in the upper canopy and arroyo willow dominating the main understory along with scattered mulefat. This vegetation community is dense and structurally diverse.

Fremont cottonwood association (61330) (2.107 acres)
This community occurs in seasonally wet portions of the Project. This community is characterized by a dense, broadleaved, winter deciduous riparian vegetation community dominated by riparian species, namely Fremont cottonwood with less dominant arroyo willow and western sycamore trees. Associated plant species included Douglas mugwort (*Artemisia douglasiana*), dwarf nettle, stinging nettle, and non-native annual grasses. The largest Fremont cottonwood trees, mapped in the central portion of the Project west of Moosa Creek, may be relics from pre-development conditions or may be planted specimens.

Fremont cottonwood-arroyo willow association (61320) (2.094 acres)
This community occurs in seasonally wet or persistently wet portions of the Project and is very similar to disturbed Fremont cottonwood-arroyo willow association except that it contains a higher proportion of native species within the tree, shrub and understory. This community consists of tall, open, broad-leaved, winter-deciduous riparian species and is dominated by Fremont cottonwood and arroyo willow in the upper canopy and mulefat dominating the main understory with scattered, generally low-growing, arroyo willows. This vegetation community is fairly dense and structurally diverse.

Riverine channel (64100) (1.874 acres)
This community was composed of unvegetated open water channels that convey permanent water flows and/or seasonal runoff from surrounding areas. Most of these channels were three to nine feet wide and likely convey mostly urban/agricultural runoff associated with surrounding developed areas and irrigation. Freshwater marsh inclusions were present within many areas of the riverine channels.

Coast live oak woodland (71160) (0.540 acres)
This community was restricted to occurrence in the far south of the Project and is characterized by dominant stands of coast live oak (*Quercus agrifolia*), most of which appear to have been planted, but some may be relics from pre-development conditions. A minimal shrub layer was documented in this community, likely as a result of landscaped maintenance. Sparse shrub and annual species occurring within the understory include ripgut brome, Italian thistle, poison hemlock, Canadian horseweed and foxtail brome.

Freshwater marsh (52410) (0.501 acres)
Freshwater marsh is characterized by persistent inundated or saturated soils capable of supporting freshwater wetland emergent plant species. This vegetation community was largely dominated by southern cattail (*Typha domingensis*) with sub-dominant hardstem bulrush (*Schoenoplectus acutus*) and threesquare bulrush occurring along margins of open water riverine and ponded areas and along shallow, ponded portions of riverine channel of the Project.

Disturbed mulefat association (63310) (0.426 acres)
This community was characterized as a moderately dense shrubland dominated by mulefat, containing some small arroyo willows, but exhibiting greater than 50 percent relative cover of mulefat in the shrub layer. This association was similar to the mulefat association, except that it had a higher relative proportion of non-native vegetation, including salt cedar, and a slightly lower relative percent cover with more recent signs of anthropogenic disturbance. Associated species included poison hemlock, wild radish and tall flatsedge.

Disturbed habitat (11300) (0.414 acres)
This vegetation community primarily identifies areas where severe anthropogenic impacts to natural communities has occurred to the extent that it is no longer functioning as a natural community. Within the Project, this community occurred where man-made dirt trails and road shoulders have been maintained in the past. These trails are predominantly bare ground with very scarce non-native grasses and ruderal weeds. This community does not provide any substantial ecological value.

Open water (64100) (0.305 acres)
This community was dominated by open, ponded waters with freshwater emergent species occurring along the periphery, including Gooding's black willow (*Salix gooddinggii*), arroyo willow, salt cedar, Fremont cottonwood, southern cattail, and common threesquare within shallow portions of the open water and along the margins.

Rip-rap (12000) (0.144 acres)
This community was composed of rock piles installed around the periphery of retention basins and channels associated with the adjacent residential development to the west leading into these channels and bains. Very sparse non-native species were observed growing along riprap areas, including slender oat, ripgut brome, prickly ox-tongue, common sowthistle (*Sonchus oleraceus*), rattail fescue and bur clover (*Medicago polymorpha*).

Annual bluegrass turf (12000) (0.140 acres)
This vegetation community was characterized as a mowed and maintained turf, dominated by annual blue grass (*Poa annua*) with lesser abundant Bermuda grass, crete weed (*Hedypnois cretica*) and ripgut brome. Various non-dominant planted trees were documented within this community, primarily along the northern margin of the golf course and included olive and crimson bottlebrush.

Disturbed arroyo willow association (63320) (0.037 acres)
This structurally diverse community was characterized by a seasonally wet riparian woodland that is winter-deciduous. This association is very similar to arroyo willow association with a dense, shrub layer dominated by arroyo willow that comprises the main understory and lower tree canopy; however, it generally had a lower percent relative vegetation cover and a high proportion of non-native species such as salt cedar and perennial pepper weed.

Fremont cottonwood-Goodding's willow association (61320) (0.028 acres)
This community occurs in seasonally wet portions of the Project and is very similar to Fremont cottonwood association, except that a higher proportion of Gooding's black willow was documented in this community. This community consists of tall, open, broad-leaved, winter-deciduous riparian species and is dominated by Fremont cottonwood and Gooding's black willow in the upper canopy and non-native herbaceous species in the understory such as ripgut brome, poison hemlock and perennial pepperweed. Within the Project, this vegetation community is fairly open with a single tiered canopy.

Table 1 summarizes the acreages of vegetation communities within the Project.

Table 1. Vegetation Communities & Acreages

Vegetation Community	Acres
Non-native grassland	16.957
Ruderal weeds	16.742
Arroyo willow association	6.031
Non-native herbaceous wetland	3.816
Ornamental landscaping	3.421
Developed	3.191
Irrigated ornamental plants	3.019
Mulefat-arroyo willow association	2.655
Disturbed Fremont cottonwood-arroyo willow association	2.252
Fremont cottonwood association	2.107
Fremont cottonwood-arroyo willow association	2.094
Riverine channel	1.874
Coast live oak woodland	0.540
Freshwater marsh	0.501
Disturbed mulefat association	0.426
Disturbed habitat	0.414

Open water	0.305
Rip-rap	0.144
Annual bluegrass turf	0.140
Disturbed arroyo willow association	0.037
Fremont cottonwood-Goodding's willow association	0.028
TOTAL	66.693

DISCUSSION

Vegetation community maps created during the 2020 field surveys were compared to vegetation community mapping presented in the *Biological Resources Report, Moosa Creek Mitigation Bank Project, February 2013* (Revised November 2015 (WRA 2013). The updated vegetation community mapping shows a gradual reversion of the previously maintained golf course grounds to more natural vegetation communities and habitat function. Previously identified native communities were observed to have gradually expanded in the absence of human disturbance. In general, the site is characterized by a mosaic of riparian and wetland vegetation communities that dominate the Moosa Creek channel and associated floodplain and have a higher dominance of native species (Figure 1). Various non-native communities generally become more dominant as distance to Moosa Creek increases.

The most notable changes to the site since 2013 include the expansion of arroyo willow association and disturbed Fremont cottonwood – arroyo willow association vegetation communities into areas that were previously mapped as open water in 2013 as well as the general expansion of native riparian communities along the margins of Moosa Creek. Additionally, since the vacated golf course grounds are no longer being irrigated, northern areas of the Project that were previously mapped as irrigated woodlands have been reclassified to Fremont cottonwood association.

A significant portion of the previously mapped annual bluegrass turf has converted into non-native grassland, ruderal weeds or non-native herbaceous wetland, depending on local topography, hydrology and seed banks. This alteration in grassland communities is likely a result of limited maintenance and irrigation that tends to favor dominance of drought tolerant, non-native grasses. Within the non-native herbaceous wetland, persistent saturated soils have favored primarily non-native herbaceous species; however, low microtopgraphic depressions and swales within these areas supported some native hydrophytes that may indicate portions of this vegetation community transitioning into freshwater marsh or herbaceous wetlands dominated by annual plant species.

The observed hydrologic conditions have resulted in the natural recruitment of both native and non-native hydrophytic plant species within the Moosa Creek channel and the adjacent flood plain. The updated vegetation mapping indicates the presence of 20.117 acres of vegetation communities exhibiting a dominance of hydrophytic vegetation communities: arroyo willow association, disturbed arroyo willow association, mulefat-arroyo willow association, Fremont cottonwood-arroyo willow association, disturbed Fremont cottonwood-arroyo willow association, freshwater marsh and disturbed herbaceous wetland habitats.

SURVEYOR CERTIFICATION

I certify that the information in this survey report and attached exhibits fully and accurately represents my work. If you have any questions regarding this report, please feel free to call me at 610-804-8916 or e-mail me at ryanq@blackhawkenv.com, and I will address all questions and concerns.

Sincerely,

Ryan Quilley
Staff Biologist

ATTACHMENTS

A: Figure - Vegetation Communities

REFERENCES

Baldwin, BG, DH Goldman, DJ Keil, TH Rosatti, (eds.). 2012. The Jepson Manual of Higher Plants of California second edition. University of California Press. Berkeley.

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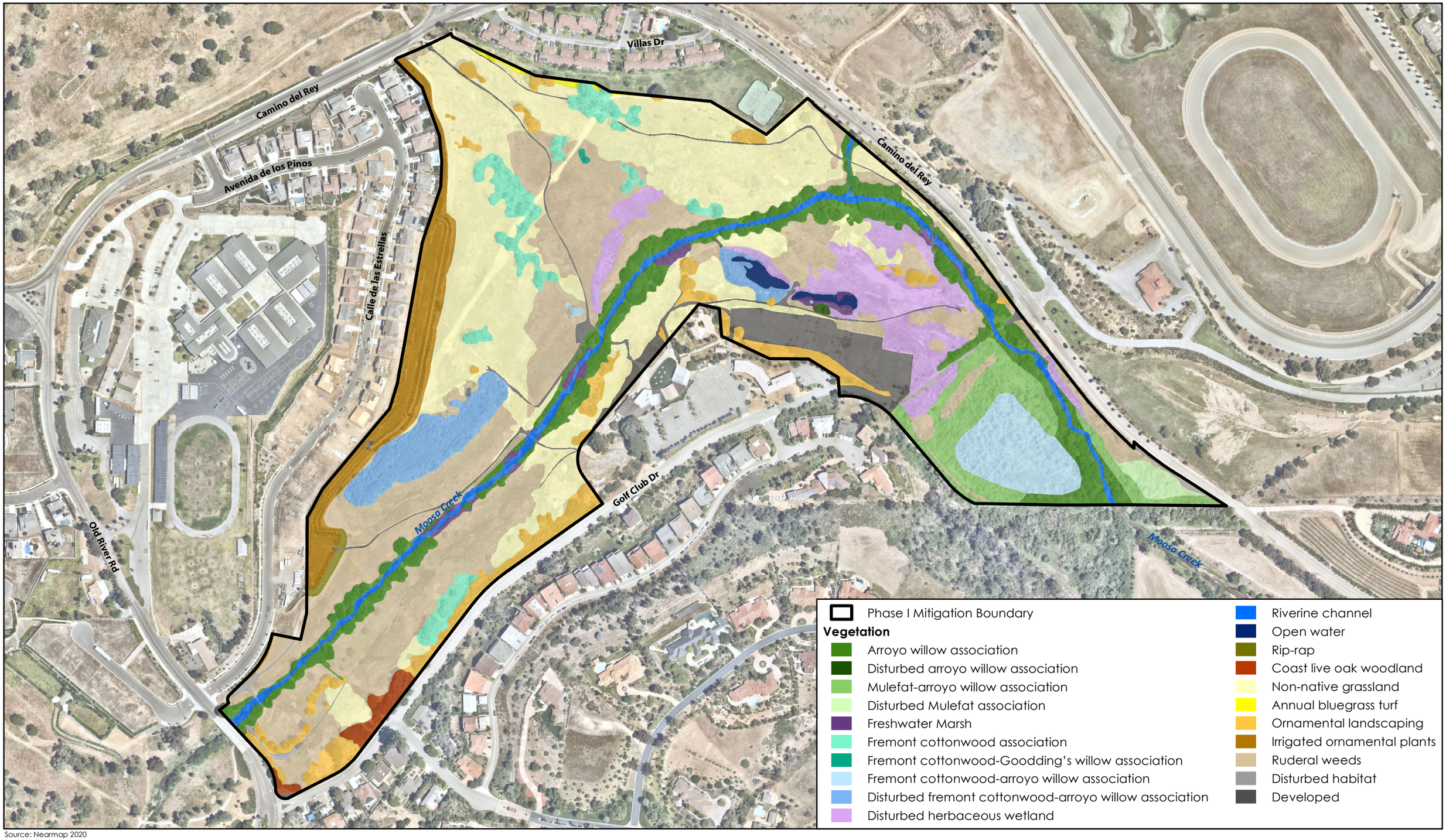
Tan, SS. 2000, Geologic map of the Bonsall 7.5-minute quadrangle, San Diego County, California: A digital database.: California Geological Survey, Preliminary Geologic Maps, scale 1:24,000. Accessed online at http://ngmdb.usgs.gov/Prodesc/proddesc_78458.htm on June 23, 2020.

WRA, Inc. 2014a. Biological Resources Report Moosa Creek Mitigation Bank Project, San Luis Rey River Watershed, San Diego County, California. 22-34 pp.

ATTACHMENT A

Figure

Blackhawk Environmental



Source: Nearmap 2020

BLACKHAWK Environmental

N

0 300 Feet

Vegetation

Moosa Creek Restoration

BLACKHAWK Environmental

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July 20, 2020

Mr. Sundeep Amin
Burns & McDonnell
4225 Executive Square, Suite 500
La Jolla, CA 92037

Focused Rare Plant Survey Report

Moosa Creek Riparian Restoration Project

Bonsall, San Diego County, CA

Dear Mr. Amin:

Blackhawk Environmental, Inc. (Blackhawk) was contracted by Burns & McDonnell, Inc. to conduct several tasks in support of a proposed Grading Permit for the restoration of riparian and upland habitats on approximately 67 acres of land occurring within the proposed Moosa Creek Riparian Restoration Project (Project) that contains the former Moosa Creek Golf Course, located near the rural community of Bonsall in unincorporated San Diego County, California. The tasks included: 1) literature review for special-status plant species occurrences within five miles of the Project site; 2) focused rare plant survey, and; 3) focused rare plant survey report. This document is the focused rare plant survey report that was based on the results of the literature review and includes the results of the survey conducted on May 12, 2020, as well as incidental sightings that were recorded during subsequent site visits between May 12 and July 7, 2020. No special-status plant species were observed on the Project site at the time of the focused rare plant survey or during subsequent site visits.

INTRODUCTION

The Moosa Creek Riparian Restoration Project (Project) consists of approximately 67 acres of land on a portion of an abandoned golf course, as shown in Figure 1. The focused rare plant survey took place over the entire 67-acre Project site. Elevations on the Project are roughly 150 to 185 feet (45 to 56 meters) above mean sea level (amsl). A total of 21 distinct vegetation communities were documented within the Project site (Figure 2); descriptions of each of these vegetation communities are outlined in the *Moosa Creek Riparian Project Vegetation Communities and Mapping Update Memo Report* (Blackhawk 2020). Non-native grassland and ruderal weeds were the two most abundant vegetation types and accounted for approximately one third of the Project.

A primary objective of the Project is to remove some of the existing infrastructure and recontour portions of the property before planting with native riparian and upland species. Before the Project commenced, a focused rare plant survey was conducted to update previous survey results (Cummings and Associates 2013) to ascertain the presence/absence of State and/or federally threatened and/or endangered or otherwise sensitive plant species possibly occurring on the Project site.

PROJECT DESCRIPTION

The applicant is proposing a Grading Permit for the restoration of riparian and upland habitats on 67 acres of land within the Bonsall Community Plan area that contains the former Moosa Creek Golf Course. The site is designated for Open Space (Recreation) and zoned for Open Space Use (S80). The proposed habitat restoration work is consistent with the existing zoning for the site. The Project site is located between State Route-76 and Interstate-15, south of Camino Del Rey, and is bisected by Moosa Creek. The on-site reach of the creek flows from the eastern end of the Project site westward where it exits the Project site at the western end of Old River Road. From the property, Moosa Creek continues another half mile off site to the southwest before ultimately joining the San Luis Rey River.

The Moosa Creek Riparian Restoration Project (Project) would remove existing infrastructure and recontour portions of the property to be planted with native riparian and upland species. Approximately 10 acres of the Project site contains existing riparian habitat along Moosa Creek, with the remainder featuring ornamental and developed areas consistent with the previous use as a golf course. Planned restoration activities would consist of regrading the area adjacent to but outside the creek and removing 4.5 acres of existing infrastructure (tennis courts, parking lots, golf course features, etc.) to establish and/or enhance approximately 39 acres of riparian habitat and approximately 28 acres of native riparian-upland transitional buffers and other site improvements.

Proposed earthwork would be conducted to extend the top of the Moosa Creek bank to create a high flow terrace/floodplain. Restoration strategies planned for the site include riparian re-establishment (consisting of a mulefat-willow dominated riparian habitat that may also include wetlands depending on conditions), floodplain re-establishment (floodplain transitional species that include riparian and upland species), coast live oak savannah re-establishment (coast live oak savannah with associated species), and riparian enhancement (control of non-native species and light seeding or planting). The Project would re-establish and rehabilitate riparian habitat to benefit federally and state-listed wildlife species (e.g., least Bell's vireo and southwestern willow flycatcher). The restoration effort is being designed under the guidance of the United States Fish and Wildlife Service (USFWS) to offset corresponding riparian habitat and endangered species impacts at the Marine Corps Air Station (MCAS) at Camp Pendleton.

Project implementation is anticipated to commence in the winter of 2021 but may need to be adjusted to account for weather or to avoid sensitive bird breeding and nesting seasons. While one construction stage is anticipated, the overall work may be broken into two distinct phases: demolition/earthwork and planting. After construction, the restoration areas would be monitored for up to five years in accordance with the proposed restoration plan, and, as necessary, invasive species removal and other vegetation management activities would be performed during the monitoring period.

SURROUNDING LAND USES AND SETTING

The Project site is located in unincorporated San Diego County, near the rural community of Bonsall on a portion of an abandoned golf course. Specifically, the Project site is bounded by Camino Del Rey to

the north-northeast, Calle De Las Estrellas and Old River Road to the west, and Golf Club Drive to the south. The overall Project area is approximately 67 acres and is adjacent to Bonsall Elementary School and a newly developing residential neighborhood to the west, existing residential neighborhoods to the south, east and southeast, a residential condominium complex to the north, and San Luis Rey Training Center to the east. The Project site is located approximately 0.4-mile east of State Route-76 (Mission Road) intersection with Camino Del Rey/Olive Mill Road. The Project site contains facilities from the abandoned golf course and heavily disturbed habitats. The topography of the Project site is generally level with isolated pockets of steep slopes around the perimeter. The surrounding development occurs above grade of the Project site. The 100-year floodplain is mapped by the Federal Emergency Management Agency (FEMA) across the Project site along Moosa Creek.

METHODS

A literature review for known occurrences of special-status plant species was conducted within five miles of the Project site via searches of the California Natural Diversity Database (CNDDB) and United States Fish & Wildlife Service (USFWS) Critical Habitat designations. The literature review also incorporated the findings presented in *A Rare Plant Assessment Over the Proposed Moosa Creek Mitigation Bank Property, County of San Diego, California* (Cummings and Associates 2013). Following the literature review, a preliminary potential for occurrence (PFO) was assigned to each species as cross-reference by existing conditions on the Project site and hypothesized suitability. Based on the results of the literature review, a focused rare plant survey was conducted for the two plant species with a low PFO within the Project site. Although nine of the 11 targeted rare plant species were considered absent within the Project site, it is important to note that the nature of this survey included cataloging all plant species observed within the Project site, including those presumed to be absent and possibly other rare species that may not yet be known within five miles of the Project site. The survey was conducted by a team of four Blackhawk botanists (Kris Alberts, Seth Reimers, Ryan Quilley and Ian Maunsell) walking in slightly meandering transects approximately 20 to 60 feet apart from one another along the entire 67-acre Project site in order to achieve 100% visual coverage. In general, the distance between transects increased or decreased as necessary in order to ensure full coverage and varied with factors such as habitat type, topography, vegetative density and height, access restrictions and target species morphological traits. Since some of the target species could be identified from non-floral characteristics outside of bloom periods, and many other special-status plant species known in the region have generally overlapping bloom periods, a single survey pass along the Project site was deemed sufficient to capture any potentially occurring sensitive plant species for this Project. In addition, follow-up incidental observations were made during other surveys for this Project through July 7, 2020.

Each surveyor recorded every plant species encountered along the way in his field notes. In order to make specific or sub-specific determinations, digital photographs and/or small samples were collected for some species that required further analysis. The botanists worked collaboratively as a team to ensure that all observed plants were documented correctly for proper presentation in the findings of this report.

Botanical taxonomy follows *The Jepson Manual: Vascular Plants of California, second edition* and the *Jepson eFlora* except where local experts Rebman and Simpson used alternate nomenclature in

accordance with the *Checklist of Vascular Plants of San Diego County, 5th edition* (in press). Invasive plants were identified utilizing California Invasive Plant Council's (Cal-IPC) Inventory Database (http://www.cal-ipc.org/paf/). The list of plant species observed is presented in Attachment B.

RESULTS

The literature review resulted in a total of 11 special-status plant species that were reported to historically or presently occur within five miles of the Project, including San Diego thorn-mint (*Acanthomintha ilicifolia*, County List A species), San Diego ambrosia (*Ambrosia pumila*, County List A species), thread-leaved brodiaea (*Brodiaea filifolia*, County List A species), wart-stemmed ceanothus (*Ceanothus verrucosus*, County List B species), smooth tarplant (*Centromadia pungens ssp. laevis*, County List A species), summer holly (*Comarostaphylis diversifolia ssp. diversifolia*, County List A species), Blochman's dudleya (*Dudleya blochmaniae ssp. blochmaniae*, County List A species), cliff spurge (*Euphorbia misera*, County List B species), decumbent goldenbush (*Isocoma menziesii var. decumbens*, County List A species), felt-leaved monardella (*Monardella hypoleuca ssp. lanata*, County List A species), and Parry's tetracoccus (*Tetracoccus dioicus*, County List A species) (Figure 3).

San Diego thorn-mint, San Diego ambrosia and thread-leaved brodiaea are the only State or federally listed plant species within the five-mile buffer; San Diego thorn-mint and thread-leaved brodiaea are listed as State Endangered and federally Threatened, and San Diego ambrosia is listed as federally Endangered. USFWS-designated Critical Habitat for San Diego ambrosia and thread-leaved brodiaea occurs within five miles of the Project site, but not on the Project site itself (Figure 4). The rest of the species fall into three different California Rare Plant Ranks (CRPR). Generally, rarity increases with a higher CRPR listing status; that is, plant species listed at 1B.1 are considered rarer than plants listed as 1B.2, plants listed as 1B.2 are rarer than 1B.3, and so on. The CRPR ranks for plant species with the potential to occur in this Project are as follows:

- **CRPR List 1B.1**: Smooth tarplant and Blochman's dudleya
- **CRPR List 1B.2**: Summer holly, decumbent goldenbush, felt-leaved monardella and Parry's tetracoccus
- **CRPR List 2B.2**: wart-stemmed ceanothus and cliff spurge

Prior to conducting the focused rare plant survey, and in order to accurately gauge PFOs for all 11 of these plant species, several variables were weighed, including the numbers of, distances to, dates and qualities of the reported occurrences, habitat and/or elevation restrictions, onsite soil types, connectivity to source populations and seed dispersal mechanisms of the target species, regional rarity and firsthand experience. None of the 11 rare plant species were known to be present within the Project site prior to the focused rare plant survey; likewise, none were found to have a high PFO. Nine species were considered absent from the Project site, primarily due to a lack of suitable habitat and/or a lack of recolonization potential following the closure of the golf course in August 2014; these include San Diego thorn-mint, thread-leaved brodiaea, wart-stemmed ceanothus, summer holly, Blochman's dudleya, cliff spurge, decumbent goldenbush, felt-leaved monardella and Parry's tetracoccus.

The remaining two plant species had a low PFO associated with their potential presence within the Project site. This finding was primarily due to the fact that potentially suitable habitat within the Project site is now present for these species; however, the appropriate seed stock would have had to become

established between previous surveys in 2013 and the current survey in 2020, which was hypothesized as unlikely. The two plant species with a low PFO were San Diego ambrosia and smooth tarplant.

- **Low PFO**: San Diego ambrosia and smooth tarplant
- **Absent PFO**: San Diego thorn-mint, thread-leaved brodiaea, wart-stemmed ceanothus, summer holly, Blochman's dudleya, cliff spurge, decumbent goldenbush, felt-leaved monardella and Parry's tetracoccus

A total of 175 plant species belonging to 53 families were documented within the Project site and the survey areas of this Project; 110 were non-native, 52 of which are considered invasive (Attachment B). No special-status plant species were observed on the Project site.

CONCLUSION

No special-status plant species were observed on the Project site. Therefore, no impacts to special-status plant species are anticipated to occur as a result of this Project.

If you have any questions regarding this report, please feel free to call me at 619-972-8714 or e-mail me at kris@blackhawkenv.com.

Sincerely,

Kris Alberts

Kris Alberts
Principal Biologist – Vice President

ATTACHMENTS

A Figures
B Observed Plant Species List

REFERENCES

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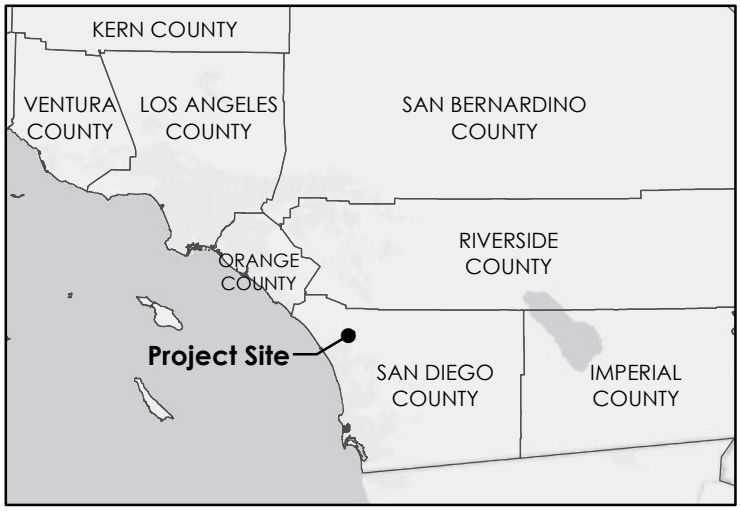
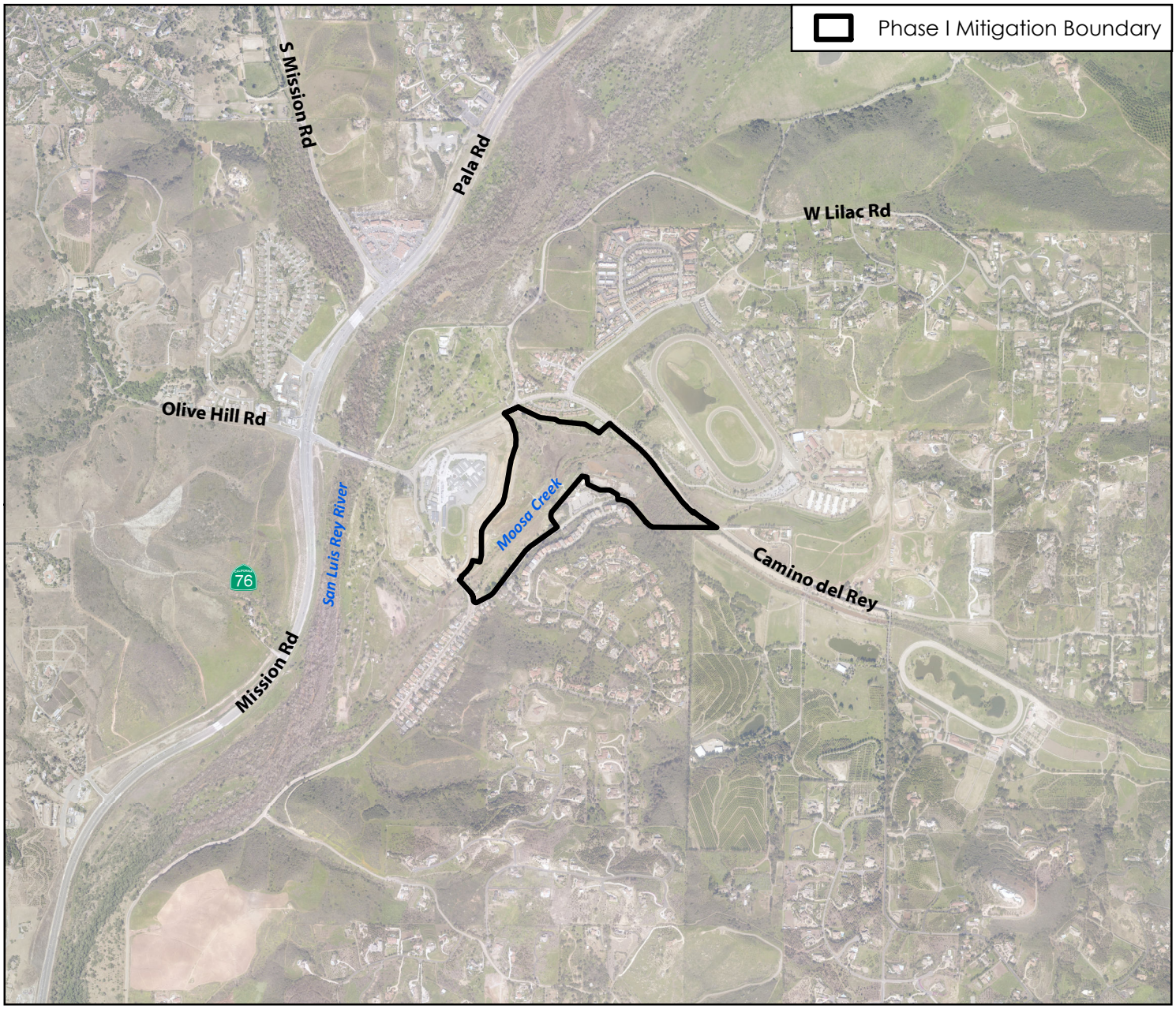
ATTACHMENT A

Figures





Source: SANDAG & SanGIS 2017; Esri

Figure 1

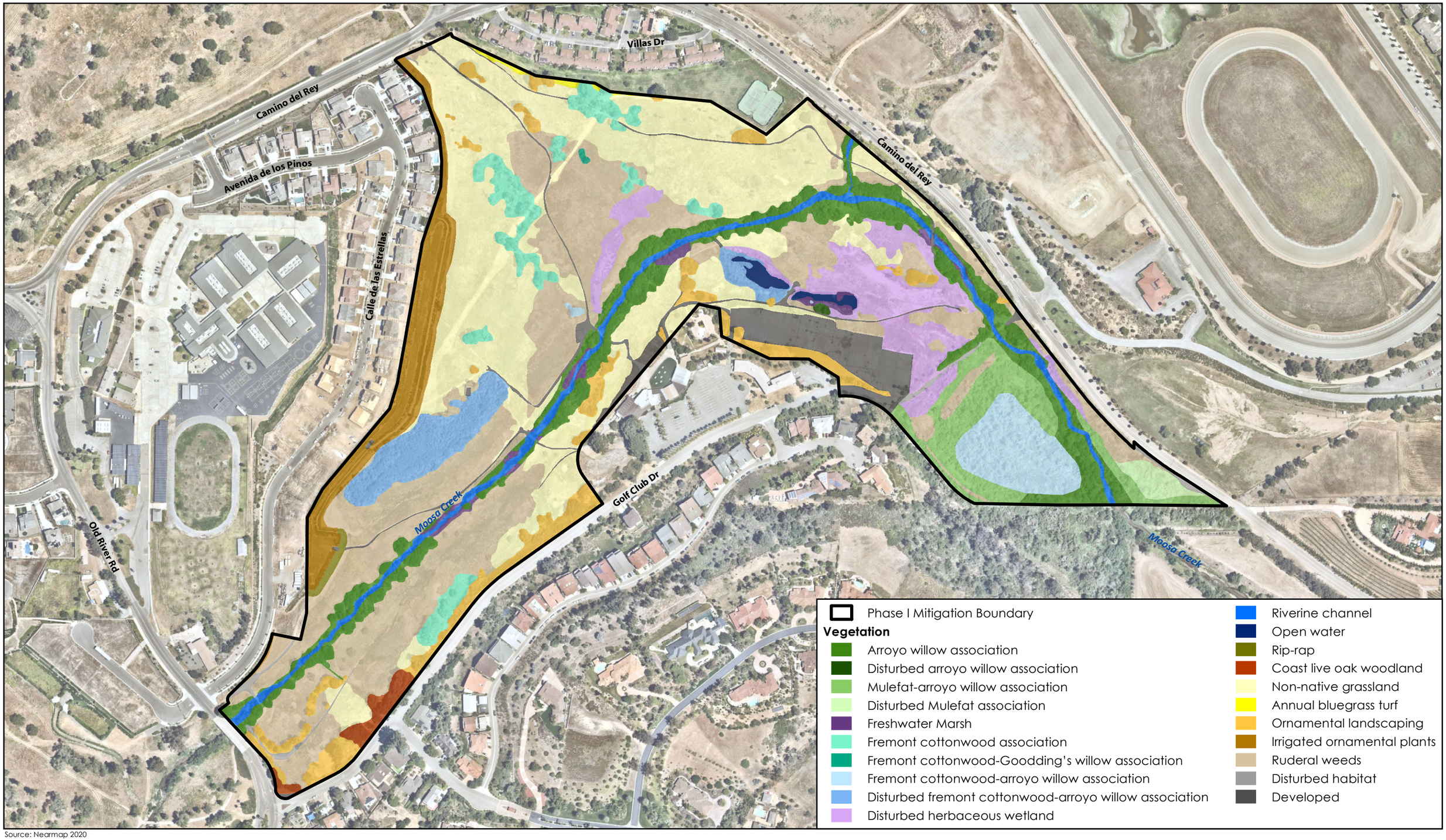
Project Vicinity and Location

Moosa Creek Restoration

BLACKHAWK Environmental

N

0 2,000 Feet



Source: Nearmap 2020

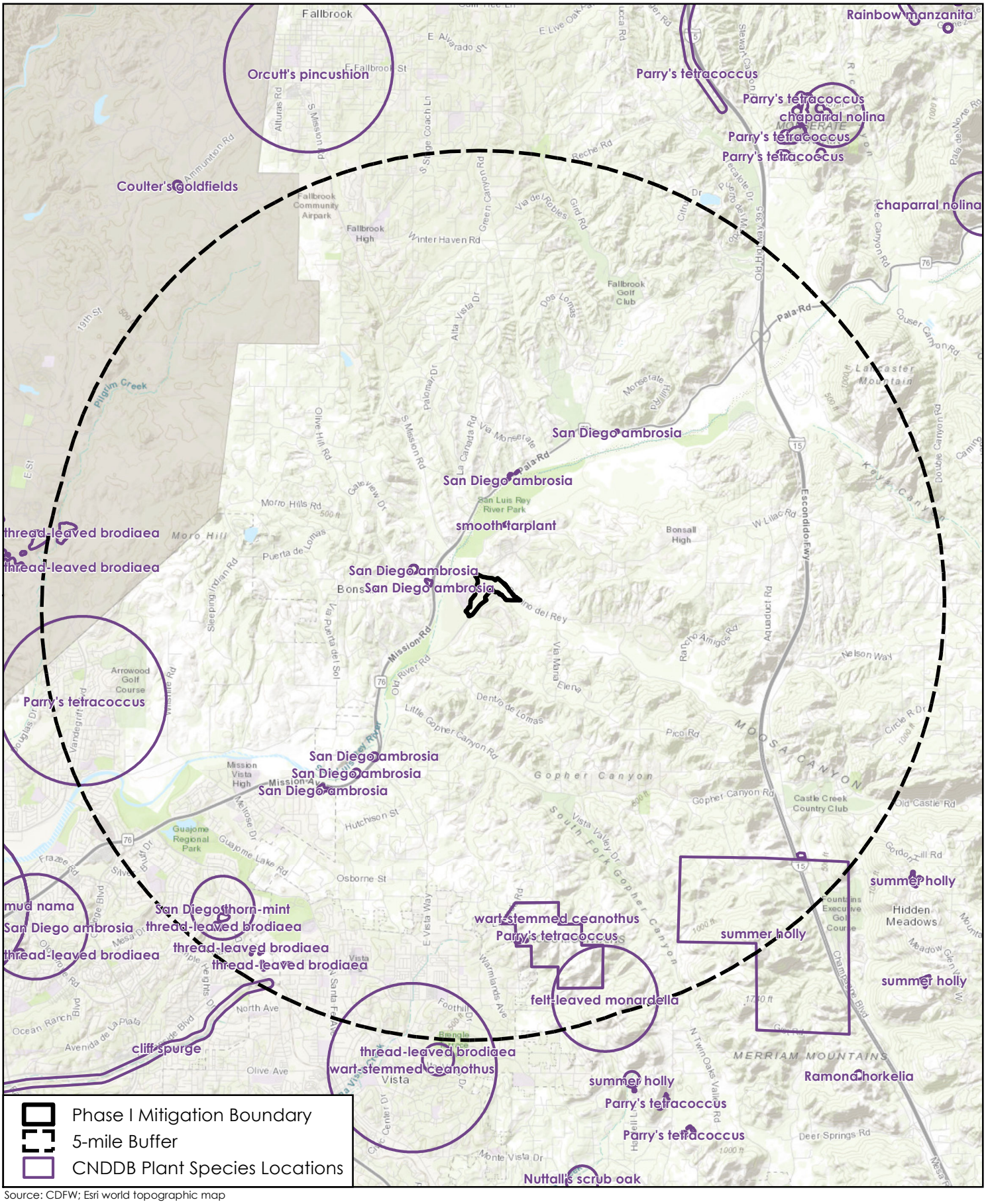
BLACKHAWK Environmental

N

0 300 Feet

Figure 2 - Vegetation

Moosa Creek Restoration



Source: CDFW; Esri world topographic map

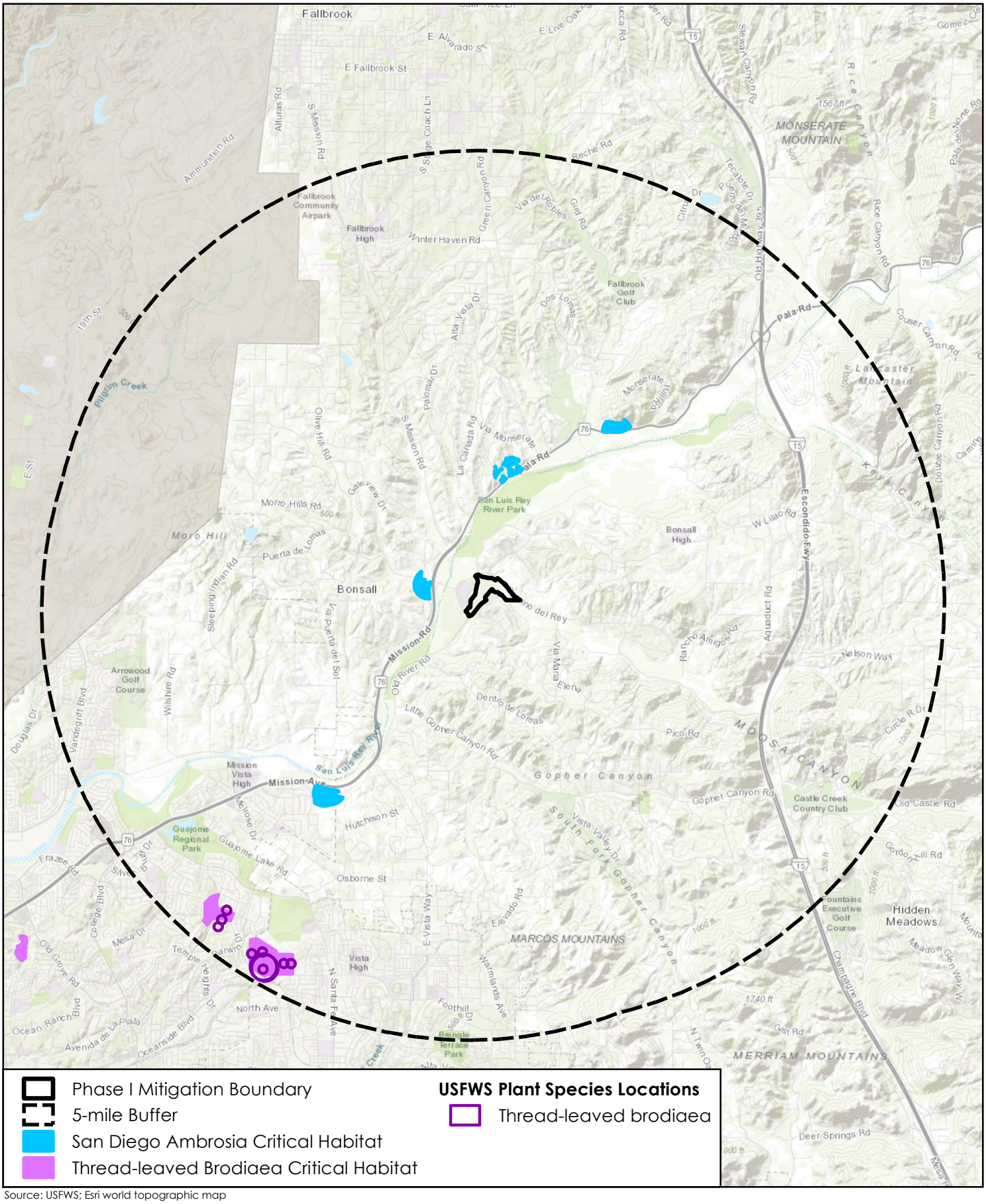
BLACKHAWK Environmental

N

0 1.5 Miles

Figure 3 - CNDDB Results

Moosa Creek Restoration



Source: USFWS; Esri world topographic map

BLACKHAWK Environmental

N

0 1.5 Miles

Figure 4 - USFWS Results

Moosa Creek Restoration

ATTACHMENT B

Observed Plant Species List

Blackhawk Environmental

OBSERVED PLANT SPECIES LIST

GYMNOSPERMS

PINACEAE	**Pine Family**
**Pinus halepensis*	Aleppo pine

ANGIOSPERMS

MONOCOTS

ARACEAE	**Arum Family**
Lemna minor	Smaller duckweed
ARECACEAE	**Palm Family**
***Phoenix canariensis*	Canary island date palm
**Phoenix dactylifera*	Date palm
**Syagrus romanzoffiana*	Queen palm
**Washingtonia filifera*	Washington fan palm
***Washingtonia robusta*	Mexican fan palm
CYPERACAEA	**Sedge Family**
Cyperus eragrostis	Tall flatsedge
**Cyperus esculentus*	Yellow nutsedge
**Cyperus involucratus*	Umbrella plant
Eleocharis macrostachya	Pale spike-rush
Schoenoplectus acutus	Common tule
Schoenoplectus americanus	Alkali bulrush
Schoenoplectus pungens	Common threesquare
JUNCACEAE	**Rush Family**
Juncus balticus	Wire rush
Juncus bufonius	Toad rush
Juncus mexicanus	Mexican rush
POACEAE	**Grass Family**
***Arundo donax*	Giant reed
***Avena barbata*	Slender wild oat
***Avena fatua*	Wild oat
**Bromus catharticus*	Rescue grass
***Bromus diandrus*	Ripgut grass
***Bromus hordeaceus*	Soft chess
***Bromus madritensis* ssp. *rubens*	Compact brome
***Cortaderia selloana*	Pampas grass
***Cynodon dactylon*	Bermuda grass
**Digitaria sanguinalis*	Hairy crabgrass

Distichlis spicata	Saltgrass
***Festuca myuros*	Rattail fescue
***Festuca perennis*	Perennial ryegrass
***Hordeum murinum* ssp. *glaucum*	Glaucous barley
Leptochloa fusca	Sprangletop
**Paspalum dilatatum*	Dallis grass
**Poa annua*	Annual bluegrass
***Pennisetum clandestinum*	Kikuyu grass
***Polypogon monspeliensis*	Annual beard grass
***Schismus barbatus*	Mediterranean schismus
**Stenotaphrum secundatum*	St. Augustine grass
***Stipa miliacea*	Smilo grass
TYPHACEAE	**Cattail Family**
Typha domingensis	Southern cattail
Typha latifolia	Broad-leaf cattail

DICOTS

ADOXACEAE	**Adoxa Family**
Sambucus nigra ssp. caerulea	Blue elderberry
AIZOACEAE	**Fig-Marigold Family**
**Carpobrotus edulis*	Hottentot-fig
ANACARDIACEAE	**Sumac Family**
***Schinus molle*	Peruvian pepper tree
***Schinus terebinthifolius*	Brazilian pepper tree
**Searsia lancea*	African sumac
Toxicodendron diversilobum	Poison oak
APIACEAE	**Carrot Family (Umbelliferae)**
**Apium graveolens*	Common celery
***Conium maculatum*	Poison hemlock
Daucus pusillus	Rattlesnake weed
***Foeniculum vulgare*	Sweet fennel
***Torilis arvensis*	Field hedge parsley
APOCYNACEAE	**Dogbane Family**
**Nerium oleander*	Oleander
ARALIACEAE	**Ginseng Family**
***Hedera helix*	English ivy
ASTERACEAE	**Aster - Daisy - Composite Family**
Ambrosia acanthicarpa	Annual bursage
Ambrosia psilostachya	Western ragweed
Artemisia douglasiana	Douglas mugwort

Artemisia dracunculus	Tarragon
Baccharis pilularis ssp. consanguinea	Coyote brush
**Baccharis pilularis ssp. pilularis*	Coyote brush (creeping varietal)
Baccharis salicifolia	Mule fat
***Carduus pycnocephalus*	Italian thistle
***Centaurea melitensis*	Tocalote
***Cirsium vulgare*	Bull thistle
***Cotula coronopifolia*	African brass-buttons
**Erigeron bonariensis*	Flax-leaf fleabane
Erigeron canadensis	Horseweed
***Glebionis coronaria*	Crown daisy
**Hedypnois cretica*	Crete weed
***Helminthotheca echioides*	Bristly ox-tongue
Heterotheca grandiflora	Telegraph weed
***Hypochaeris glabra*	Smooth cat's ear
Isocoma menziesii var. vernonioides	Menzies' goldenbush
**Lactuca serriola*	Bitter lettuce
**Logfia gallica*	Narrow-leaf cottonrose
Matricaria discoidea	Pineappleweed
Pseudognaphalium californicum	California everlasting
**Pseudognaphalium luteoalbum*	Fragrant everlasting cudweed
**Sonchus asper*	Prickly sowthistle
**Sonchus oleraceus*	Common sowthistle
Stephanomeria exigua	Small wirelettuce
Stephanomeria virgata ssp. *pleurocarpa*	Tall wreath-plant
**Taraxacum officinale*	Common dandelion
Xanthium strumarium	Cocklebur
BORAGINACEAE	**Borage Family**
Heliotropium curassavicum	Salt heliotrope
Phacelia ramosissima var. *latifolia*	Branching phacelia
BRASSICACEAE	**Mustard Family**
***Brassica nigra*	Black mustard
***Hirschfeldia incana*	Short-pod mustard
**Lepidium didymum*	Lesser wart-cress
***Lepidium latifolium*	Perennial pepperweed
Lepidium nitidum	Shining peppergrass
Lepidium virginicum ssp. menziesii	Robinson's pepper grass
Nasturtium officinale	Watercress
***Raphanus sativus*	Wild radish
***Sisymbrium irio*	London rocket

CAMPANULACEAE	**Bellflower Family**
Triodanis biflora	Venus' looking glass
CAPRIFOLIACEAE	**Honeysuckle Family**
**Linnea x grandiflora*	Glossy abelia
CARYOPHYLLACEAE	**Pink Family**
**Spergularia bocconi*	Boccone's sand-spurrey
CHENOPODIACEAE	**Goosefoot Family**
**Atriplex prostrata*	Spearscale
***Atriplex semibaccata*	Australian saltbush
***Bassia hyssopifolia*	Five horn bassia
**Chenopodium album*	Lamb's quarters
Chenopodium berlandieri	Pit seed goosefoot
**Dysphania ambrosioides*	Mexican tea
Salicornia depressa	Virginia glasswort
***Salsola tragus*	Russian thistle
CONVOLVULACEAE	**Morning-Glory Family**
Convulvulus arvensis	Field bindweed
EUPHORBIACEAE	**Spurge Family**
Croton setiger	Doveweed
**Euphorbia maculata*	Spotted spurge
**Euphorbia peplus*	Petty spurge
***Ricinus communis*	Castor bean
FABACEAE	**Pea Family**
**Ceratonia siliqua*	Carob tree
***Medicago polymorpha*	Bur medic
**Melilotus albus*	White sweetclover
**Melilotus indicus*	Indian sweetclover
**Trifolium fragiferum*	Strawberry clover
FAGACEAE	**Oak Family**
Quercus agrifolia	Coast live oak
GERANIACEAE	**Geranium Family**
***Erodium cicutarium*	Red-stem filarre/storksbill
**Erodium moschatum*	White-stem filaree/storksbill
***Geranium dissectum*	Cut-leaf geranium
HAMAMELIDACEAE	**Witch-Hazel Family**
**Liquidambar styraciflua*	Sweetgum
LAMIACEAE	**Mint Family**
**Salvia rosmarinus*	Creeping rosemary
Stachys ajugoides	Hedge nettle
LYTHRACEAE	**Loosestrife Family**

***Lythrum hyssopifolia*	Grass poly
MALVACEAE	**Mallow Family**
**Malva parviflora*	Cheeseweed mallow
Malvella leprosa	Alkali mallow
MORACEAE	**Mulberry Family**
***Ficus carica*	Edible fig
**Morus alba*	White mulberry
MYRSINACEAE	**Myrsine Family**
**Lysimachia arvensis*	Scarlet pimpernel
MYRTACEAE	**Myrtle Family**
**Callistemon citrinus*	Crimson bottlebrush
OLEACEAE	**Olive Family**
Fraxinus velutina	Velvet ash
**Ligustrum sp.*	Privet tree
***Olea europea*	Olive
ONAGRACEAE	**Evening-primrose Family**
Epilobium brachycarpum	Annual fireweed
Epilobium ciliatum	Slender willow herb
Oenothera elata ssp. *hookeri*	Hooker's evening-primrose
**Oenothera speciosa*	Mexican evening primrose
OXALIDACEAE	**Oxalis Family**
***Oxalis pes-capre*	Bermuda-buttercup
PHYTOLACCACEAE	**Pokeweed Family**
***Phytolacca americana*	American pokeweed
PLANTAGINACEAE	**Plantain Family**
Nuttallanthus texanus	Blue toadflax
***Plantago lanceolata*	English plantain
**Plantago major*	Common plantain
**Veronica anagallis-aquatica*	Water speedwell
PLATANACEAE	**Sycamore Family**
Platanus racemosa	Western sycamore
PLUMBAGINACEAE	**Leadwort Family**
**Limonium sinuatum*	Notch-leaf marsh-rosemary
POLYGONACEAE	**Buckwheat Family**
Eriogonum fasciculatum	California buckwheat
Persicaria lapathifolia	Common knotweed
**Polygonum aviculare*	Prostrate knotweed
***Rumex crispus*	Curly dock
**Rumex pulcher*	Fiddle dock
PORTULACACEAE	**Puslane Family**

**Portulaca oleracea*	Common purslane
ROSACEAE	**Rose Family**
Heteromeles arbutifolia	Toyon
Prunus ilicifolia	Holly leaf cherry
RUBIACEAE	**Coffee Family**
Galium aparine	Common bedstraw
SALICACEAE	**Willow Family**
Populus fremontii	Fremont cottonwood
**Salix babylonica*	Weeping willow
Salix exigua	Sand bar willow
Salix gooddingii	Goodding's black willow
Salix laevigata	Red willow
Salix lasiolepis	Arroyo willow
SAPINDACEAE	**Family**
**Cupaniopsis anacardioides*	Carrotwood
SAURURACEAE	**Lizard-Tail Family**
Anemopsis californica	Yerba mansa
SCROPHULARIACEAE	**Figwort Family**
***Myoporum laetum*	Lollypop tree
**Myoporum parvifolium*	Slender myoporum
SOLANACEAE	**Nightshade Family**
Datura wrightii	Western jimson weed
***Nicotiana glauca*	Tree tobacco
**Solanum americanum*	White nightshade
Solanum douglasii	Douglas's nightshade
TAMARICACEAE	**Tamarisk Family**
***Tamarix ramosissima*	Tamarisk
ULMACEAE	**Elm Family**
**Ulmus parviflora*	Chinese elm
**Ulmus pumila*	Siberian elm
URTICACEAE	**Nettle Family**
Urtica dioica	Stinging nettle
**Urtica urens*	Dwarf nettle
VISCACEAE	**Mistletoe Family**
Phoradendron serotinum ssp. macrophyllum	American mistletoe
VITACEAE	**Grape Family**
Vitis girdiniana	Southern California wild grape

Key to Symbols: * Non-native, ** Non-native and Invasive according to Cal-IPC, † Special status plant, CNPS Rare Plant Rank

October 14, 2020

Mr. Sundeep Amin
Burns & McDonnell
4225 Executive Square, Suite 500
La Jolla, CA 92037

Re: 2020 Least Bell's Vireo & Southwestern Willow Flycatcher Survey Results, Moosa Creek Riparian Restoration Project, Bonsall, San Diego County, California

Dear Mr. Amin:

Blackhawk Environmental Inc. (Blackhawk) was contracted through Burns & McDonnell Engineering Company, Inc. to complete protocol least Bell's vireo (*Vireo bellii pusillus*; LBVI) and southwestern willow flycatcher (*Empidonax traillii extimus*; SWFL) surveys for the proposed Moosa Creek Riparian Restoration Project (Project) in Bonsall, San Diego County, California. All LBVI and SWFL surveys were conducted by Blackhawk Principal Biologist Kris Alberts (USFWS permit TE-039640-5.1) from April 20, 2020 through July 7, 2020, according to United States Fish & Wildlife Service (USFWS) and United States Geological Service (USGS) protocols (Sogge, Ahlers and Sferra, 2010, USFWS 2001).

INTRODUCTION

The Moosa Creek Riparian Restoration Project (Project) is located in unincorporated San Diego County, near the rural community of Bonsall on a portion of an abandoned golf course. Specifically, the Project site is bounded by Camino Del Rey to the north-northeast, Calle De Las Estrellas and Old River Road to the west, and Golf Club Drive to the south (Figure 1). The overall Project area is approximately 67 acres and is adjacent to Bonsall Elementary School and a newly developing residential neighborhood to the west, existing residential neighborhoods to the south, east and southeast, a residential condominium complex to the north, and San Luis Rey Training Center to the east. The Project site is located approximately 0.4-mile east of State Route-76 (Mission Road) intersection with Camino Del Rey/Olive Mill Road. The Project site contains facilities from the abandoned golf course and heavily disturbed habitats. The topography of the Project site is generally level with isolated pockets of steep slopes around the perimeter. The surrounding development occurs above grade of the Project site. The 100-year floodplain is mapped by the Federal Emergency Management Agency (FEMA) across the Project site along Moosa Creek.

The Project site is bisected by Moosa Creek which flows from the eastern end of the project site westward where it exits the project site at the western end of Old River Road. From the property, Moosa Creek continues another half mile off site to the southwest before ultimately joining the San Luis Rey River. The Project area is shown on the U.S. Geological Survey (USGS) *Bonsall* quadrangle in Sections 20, 21, and 28; Township10 South; Range 03 West (USGS 2012) (Figure 2).

The Moosa Creek Riparian Restoration Project would remove existing infrastructure and recontour portions of the property to be planted with native riparian and upland species. Approximately 10 acres of the Project site contains existing riparian habitat along Moosa Creek, with the remainder featuring ornamental and developed areas consistent with the previous use as a golf course. Planned restoration

activities would consist of regrading the area adjacent to but outside the creek and removing 4.5 acres of existing infrastructure (tennis courts, parking lots, golf course features, etc.) to establish and/or enhance approximately 39 acres of riparian habitat and approximately 28 acres of native riparian-upland transitional buffers and other site improvements. Proposed earthwork would be conducted to extend the top of the Moosa Creek bank to create a high flow terrace/floodplain. Restoration strategies planned for the site include riparian re-establishment (consisting of a mulefat-willow dominated riparian habitat that may also include wetlands depending on conditions), floodplain re-establishment (floodplain transitional species that include riparian and upland species), coast live oak savannah re-establishment (coast live oak savannah with associated species), and riparian enhancement (control of non-native species and light seeding or planting).

The Project would re-establish and rehabilitate riparian habitat to benefit federally and state-listed wildlife species (e.g., least Bell's vireo and southwestern willow flycatcher). The restoration effort is being designed under the guidance of the United States Fish and Wildlife Service (USFWS) to offset corresponding riparian habitat and endangered species impacts at the Marine Corps Air Station (MCAS) at Camp Pendleton.

Project implementation is anticipated to commence in the winter of 2021, but may need to be adjusted to account for weather or to avoid sensitive bird breeding and nesting seasons. While one construction stage is anticipated, the overall work may be broken into two distinct phases: demolition/earthwork and planting. After construction, the restoration areas would be monitored for up to five years in accordance with the proposed restoration plan, and, as necessary, invasive species removal and other vegetation management activities would be performed during the monitoring period.

All LBVI/SWFL surveys were conducted in one continuous stretch of riparian habitat of Moosa Creek just south of Camino del Rey (Figures 2 and 3). The LBVI/SWFL survey area included all suitable riparian habitats within the Project site, at elevations from 158 to 178 feet above mean sea level (amsl).

This report includes species accounts, survey methods, survey results, discussion, recommendations and conclusion sections. Attachments include Project vicinity, location and survey results maps (Attachment A) and an observed/detected wildlife species list (Attachment B).

LEAST BELL'S VIREO SPECIES ACCOUNT

The least Bell's vireo is a State and Federal-endangered subspecies of Bell's vireo (*Vireo belli*; BEVI) that breeds along the coastal slope of southern California and winters in southern Baja California, Mexico. Its breeding range extends north to the Sacramento area and south into northern Baja California, Mexico. On its breeding grounds, it typically associates with willow-dominated riparian environments characterized by well-developed canopies of large shrubs and trees, lush green foliage and dense understories, but may also occur in dense weedy or shrubby habitats adjacent or near riparian habitats, such as those dominated by tall black mustard (*Brassica nigra*), lemonade berry (*Rhus integrifolia*) and/or laurel sumac (*Malosma laurina*). Its preferred breeding habitats are typically southern willow scrub composed of arroyo willow (*Salix lasiolepis*), mulefat (*Baccharis salicifolia*), sandbar willow (*S. exigua*), red willow (*S. laevigata*), Fremont's cottonwood (*Populus fremontii*), and/or Goodding's black willow (*S. goodingii*). A substantial forbaceous understory may also be present that may include stinging nettle (*Urtica dioica*), California blackberry (*Rubus ursinus*), wild grape (*Vitis girdiniana*), poison oak (*Toxicodendron diversilobum*), California wild rose (*Rosa californica*) and/or California mugwort (*Artemisia douglasiana*), among other native and non-native plant species.

Prior to its listing in 1986, LBVI were extirpated from most of their historic range, with an estimated 300 pairs statewide (Kus 2002); all those locations were south of Santa Barbara County, with most occurring along the Santa Margarita River on Marine Corps Base Camp Pendleton in San Diego County. Upon protection and implementation of widespread brown-headed cowbird (*Molothrus ater*; BHCO) control programs, the LBVI population began to exponentially increase, numbering approximately 2,000 pairs by 1998. By 2006, there were 3,000 estimated LBVI territories in California (USFWS 2006). Today, the population is likely marginally above 3,000 estimated territories, but the species has yet to recolonize the northern portion of its former range. Causes of decline included BHCO nest parasitism, habitat loss and degradation, and the spread of invasive plant species such as giant reed (*Arundo donax*) and tamarisk (*Tamarix ramosissima*) into breeding grounds.

LBVI are typically 4.75 to five inches long with a wingspan of about seven inches and weight of less than 0.5 ounce. The general appearance of LBVI includes a grayish/olive back with faint wing bars, faint eye ring, and an unmarked, whitish underside. Its emphatic, persistent and diagnostic male song is a repetitive "question and answer" call type, phonetically written as "chee-cheedle-chee-cheedle-chee-chee? Chee-cheedle-chee-cheedle-chee-chew!" Both the males and females, as well as juveniles, will also scold and call.

Breeding locations are of monogamous pairs. Males typically arrive at breeding locations by mid-April, a week or two ahead of the females, to begin defending their preferred breeding territory from other LBVI males. The nest is built by both the male and the female, usually within a week or two of pair formation. Nest locations are usually in dense areas of vegetation and about three to four feet above ground level. The nest form is woven as a suspended cup of plant down and fibers supported by two twigs on the outer edges. Nest substrates may include a number of native and non-native shrub, forb, vine, and tree species, provided that the selected site has adequate cover and twig structure. Three to five white, sparsely marked eggs are laid in the nest; one egg is laid per day. Once a full clutch is laid, the male and female share incubating duties for 14 days until hatching. Once hatched and before fledging, the young remain in the nest for approximately 10-12 days while they are fed by both adults. Fledglings then stay with the parents for at least two weeks while being fed by both adults. Eventually, the young are driven out of their natal territories by the territorial adults but will remain in the

general vicinity until the fall migration.

Egg-laying occurs primarily from late April through early July, followed by nestling presence through August. Most breeding territories will attempt one brood per season; however, double brooding can occur if sufficient time remains in the breeding season. Adults and juveniles remain in and/or near their nesting territories until they begin to migrate south in late summer/early fall to Baja California.

SOUTHWESTERN WILLOW FLYCATCHER SPECIES ACCOUNT

The southwestern willow flycatcher is a state and federally endangered subspecies of willow flycatcher (*Empidonax traillii*; WIFL) that breeds in the southwestern United States and winters in Central America. On its breeding and wintering grounds, it almost invariably associates with dense, riparian environments characterized by multi-tiered canopies, lush green foliage, dense understories, surface water and/or saturated soils, open areas for foraging on a variety of insects, and a mosaic habitat pattern. In migration, it can occur in a variety of habitats, but tends to prefer wooded and/or shrubby riparian habitats where food sources are more abundant (Finch and others, 2000). Successful migration requires high energy intake while foraging in unfamiliar areas, all while exposed to an array of predators and other threats. Therefore, migration is the period of highest mortality within the annual cycle of the flycatcher (Paxton and others, 2007). In 2007, the SWFL population was estimated at approximately 1,300 territories distributed among approximately 280 breeding sites (Durst and others, 2008).

SWFL can be distinguished from other WIFL subspecies only by their breeding territory locations, diagnostic "fitz-bew" calls, and timings of detection. They are part of the *Empidonax* complex of flycatchers, notoriously difficult to separate from one another during typical field observations. SWFL are typically 5.75 inches long with a wingspan of eight to nine inches and weigh about 0.5 ounce. The general appearance of SWFL includes a dark olive/brownish-back with two faint whitish wing bars, pale, unmarked, olive/yellowish underside, slightly crested head, whitish throat, yellow lower mandible, faint to absent eye rings, brown eyes and black legs. Songs and calls consist primarily of "fitz-bew", "britt" and "whit" variations.

Most breeding locations are of monogamous pairs; however, polygyny is also not uncommon. Males typically arrive at breeding locations in mid-May, a week or two ahead of the females, to begin defending their preferred breeding territory from other SWFL males. The nest is built almost exclusively by the female, usually within a week or two of pair formation. Nest locations are usually in dense areas of vegetation, supported by several smaller twigs in conjunction with larger stems, from two to 20 feet above ground level, though most are placed no more than 10 feet above ground level. Nest substrates may include a number of native and non-native shrub, forb, vine, and tree species, provided that the selected site has adequate cover and twig structure. Two to four buffy eggs, lightly marked with brown toward the blunt end, are laid in a cup nest made of plant down and fibers. Once a full clutch is laid, the female incubates the eggs for 12-13 days. Egg-laying occurs primarily from late May through early July, followed by nestling presence until early August. Nestlings remain in the nest for 12-15 days before fledging and then stay with the parents post-fledging for approximately two weeks while being fed by both adults. Most breeding pairs will attempt one brood per season; however, double brooding does occur on occasion if sufficient time remains in the breeding season. Adults and juveniles remain in and/or near their nesting territories until they begin their southward migration in late summer/early fall back to Central America.

SURVEY METHODS

Blackhawk Principal Biologist Kris Alberts (KA) conducted all SWFL/LBVI assessments and surveys for this Project (Table 1). A total of eight LBVI surveys were conducted at least 10 days apart from one another, and a total of five SWFL surveys were completed at least five days apart from one another within three survey windows for project-related surveys. When possible, LBVI and SWFL surveys were conducted on the same day but not concurrently. Therefore, a combined total of eight LBVI and/or SWFL survey passes were completed for the Project.

Least Bell's Vireo Survey Methods

LBVI survey methods followed the latest accepted protocols of the USFWS (2001). The LBVI methodology stipulates that eight surveys are to occur between April 10 and July 31 in suitable habitats at least ten days apart. Surveys are to be conducted between 6:00 AM and 11:00 AM, though several surveys were extended for this Project when avian activity remained high and weather conditions remained favorable. Surveys were conducted without using recorded vocalization playbacks, with the biologist actively looking and listening for LBVI. The surveying biologist was familiar with the songs, calls and scolds of adult and juvenile LBVI, as well as plumage characteristics in relation to other vireo species. When LBVI were detected, detailed notation was collected that included: the number of individuals; specific locations using Global Positioning System (GPS) coordinates and/or territory mapping; sex; age; pairing status; nesting status; presence/absence of leg bands and if present, color combinations; the presence of other sensitive bird species; and BHCO presence.

LBVI territories were mapped directly onto the ESRI ArcGIS Collector software application on the biologist's smartphone. Territories or locations were mapped by observing where LBVI were directly observed and/or aurally detected, in conjunction with neighboring territories that were also frequently and simultaneously vocal. Polygons encompassing occupied areas were then drawn to include all areas of detection throughout the surveys. At the end of the surveys, all polygons were interlaid to form comprehensive observed LBVI territories for each pair or location during the 2020 season (Figures 2 and 3).

LBVI surveys were conducted during favorable weather conditions between dawn and 12:00 PM on April 20 and 29; May 9 and 19; June 2, 17 and 27; July 7, 2020. The surveys were done by walking slowly through and/or adjacent to LBVI-suitable habitats, looking and listening for LBVI presence throughout the survey durations, using binoculars and/or the naked eye, as appropriate. The biologist listened for any and all LBVI calls, as well as all other bird species. All LBVI-relevant data and wildlife species were recorded in the field notes of the biologist for inclusion in this report. The complete list of wildlife species detected during the surveys is provided as Attachment B. Survey conditions are presented in Table 1.

Southwestern Willow Flycatcher Survey Methods

SWFL survey methods followed the latest accepted protocols of the United States Geological Service (USGS) (Sogge, Ahlers and Sferra, 2010). The SWFL methodology stipulates that for project-related surveys, a minimum of one survey must occur within survey period 1 (May 15-31), a minimum of two surveys must occur within survey period 2 (June 1-24) and a minimum of two surveys must occur within survey period 3 (June 25-July 17); all surveys must be at least five days apart. Five SWFL surveys were conducted accordingly in the three survey periods (May 19 in survey period 1; June 2 and 17 in survey

period 2; and June 27 and July 7 in survey period 3) within the 2020 SWFL breeding season.

The first SWFL survey on April 20 included a habitat assessment of the entire study area and 500 feet from its boundaries to identify SWFL-suitable habitats. SWFL-suitable habitats identified from the assessment were immediately surveyed for WIFL/SWFL presence/absence on April 20. An aerial map of the study area was used to demarcate SWFL-suitable habitats from non-suitable habitats. After the initial survey, it was determined that SWFL-suitable habitat was primarily present along the eastern end of the surveyed area, adjacent to and south of Camino Del Rey, east of Golf Club Drive, consisting of a large riparian patch plainly visible from aerial imagery. However, the remainder of Moosa Creek, though narrower than the large riparian patch at the eastern end and more ribbon-like, also contained SWFL-suitable habitat, so it was also surveyed. Therefore, SWFL surveys were conducted in all the same areas as LBVI surveys.

SWFL surveys were conducted during favorable weather conditions in the morning hours of May 19; June 2, 17 and 27; and July 7, 2020. The surveys were done by walking slowly through and adjacent to SWFL-suitable habitats while playing back recorded "fitz-bew" calls on an Apple iPhone 11 Pro at full volume. The surveying biologist looked and listened for WIFL and/or SWFL presence throughout the survey durations, using binoculars and/or the naked eye, as appropriate. The biologist listened for any and all WIFL/SWFL calls, as well as all other bird species. All WIFL/SWFL-relevant data and wildlife species were recorded in the field notes of the biologist for inclusion in this report. As mentioned above, the complete list of wildlife species detected during the surveys is provided as Attachment B. Survey conditions are presented in Table 1.

Table 1. Survey Conditions

Date	Type/#	Time	Temperature F°	Wind (mph)	Cloud Cover %	Precipitation
4-20-20	LBVI 1	0700-1130	59-66	0-5	0-50	None
4-29-20	LBVI 2	0710-1120	66-70	0-1	100	None
5-9-20	LBVI 3	0625-1135	65-79	1-4	100-50	None
5-19-20	LBVI 4/SWFL 1	0605-1115	55-65	0-6	10-20	None
6-2-20	LBVI 5/SWFL 2	0600-1115	57-83	0-2	80-85	None
6-17-20	LBVI 6/SWFL 3	0635-1115	67-71	0-2	100	None
6-27-20	LBVI 7/SWFL 4	0715-1110	64-77	0-3	100-0	None
7-7-20	LBVI 8/SWFL 5	0635-1105	64-78	0-3	100-0	None

SURVEY RESULTS

Blackhawk observed six LBVI locations, four of which represented breeding territories (Figures 2 and 3). Table 2 lists the approximate GPS center points of each territory and provides brief comments about the territories, nests, and other pertinent observations. All LBVI observed were unbanded. No WIFL or SWFL were detected during any of the surveys. The BHCO, a brood parasite of LBVI, SWFL, and many other passerines, was detected flying over or perched in the survey area on every survey, generally utilizing the entire Moosa Creek corridor. Approximately two to six individual BHCO were detected on each survey, utilizing the entire survey area, but with a greater concentration detected within the riparian habitat at the east end of the survey area.

Two observed LBVI pair territories (LBVI 1 and LBVI 2) occurred in the large riparian patch at the eastern end of the Project site just south of Camino del Rey, including almost all of the riparian vegetation that abuts the roadway. The other two LBVI pair territories (LBVI 3 and LBVI 6) occurred in the narrower, ribbon-like stretch of Moosa Creek that bisects the former golf course. An additional two LBVI locations were of single transient males that did not establish paired territories on the Project site; one of the single male locations (LBVI 5) was toward the southern end of the Project site within Moosa Creek, and the other location (LBVI 4) was at the north end of the old golf course pond hydrologically disconnected from Moosa Creek toward the southwest edge of the Project site. The LBVI-occupied riparian habitat within the Project site is best described as a combination of Arroyo Willow Association, Disturbed Arroyo Willow Association, Mulefat-Arroyo Willow Association, Fremont Cottonwood-Arroyo Willow Association, and Disturbed Fremont Cottonwood-Arroyo Willow Association. In addition, other assessed/surveyed habitats included adjacent areas of Disturbed Habitat (non-native grassland, ruderal vegetation and ornamental plants), Non-Native Herbaceous Wetland and Fremont Cottonwood Association.

The LBVI-occupied riparian habitats within Moosa Creek were variously dominated or co-dominated by arroyo willow, Goodding's black willow, red willow and/or sandbar willow, along with mulefat. Other native tree and large shrub species included western sycamore (*Platanus racemosa*), blue elderberry (*Sambucus nigra* ssp. *caerulea*) and Fremont cottonwood. Large non-native species interspersed within Moosa Creek included giant reed (*Arundo donax*), salt cedar (*Tamarix ramosissima*) and Washington fan palm (*Washingtonia filifera*). Understories were generally dense collections of low hanging twigs and branches of the native species mentioned in this paragraph, but also included California mugwort, short-pod mustard (*Hirschfeldia incana*), poison hemlock (*Conium maculatum*), ragweed (*Ambrosia psilostachya*), evening primrose (*Oenethera elata*), yerba mansa (*Anemopsis californica*), cocklebur (*Xanthium strumarium*), cattail (*Typha* sp.) and tule (*Scirpus* sp.)

Four LBVI territories (LBVI 1, 2, 3, and 6) included a paired male and female, with definitive evidence of successful nesting observed for two territories (LBVI 2 and LBVI 3) in the form of at least two fledged young per pair. See Table 2 for a summary of the LBVI observations.

Table 2. LBVI Observations

Territory	Date(s)	Observations / Comments	Territory GPS Coordinates
1	4/20/2020	Male heard singing regularly, but not frequently.; based on this, a pair was assumed. Singing detected from the east end of the large riparian patch south of the stream, along the fence, and up to the power line crossing.	33.285718, -117.209166
	5/19/2020	Unbanded male heard singing constantly, high up in red willow.	
	6/2/2020	Male heard singing, but also hyper-singing.	
	6/17/2020	Male rarely heard singing. Singing was detected on both sides of the creek, from an old access road to mid-interior.	
	6/27/2020	Male initially heard singing and overlapping with singing from the male associated with LBVI 2. Singing from LBVI 1 male was heard farther east after 20 minutes where it scolded and hyper-sang. A second LBVI was heard scolding, followed by scolding from LBVI 1 male. This male resumed singing shortly afterwards.	
	7/7/2020	Solitary male heard singing occasionally in the interior of this territory.	
2	All survey dates	LBVI pair 2 was observed on every survey. Both the male and female were unbanded. Two nests were found. The first nest fledged, and the outcome of the second nest is unknown, as it was discovered on the final survey. Nest 1 was found on 5/19/20 in an arroyo willow, two feet above ground level (AGL), at 33. 28688, -117.209988. By 6/2/20, Nest 1 had fledged two young, and the male was heard singing. Juveniles were heard vocalizing and observed being fed by both parents. The male was seen moving all the way to the southwest edge of the large riparian area at the east end of the survey area. Nest 2 was found on 7/7/20 in a	33.286746, -117.210210

		red willow, 4.5 feet above ground level, by the river bank at 33.28685, -117.20980 with one LBVI egg and two BHCO eggs. The male sang occasionally and scolded when the nest was approached. No further observations were made as Nest 2 was found on the last day of surveys.	
3	4/20/2020	Unbanded pair seen foraging by the bridge crossing, south of small creek confluence from the north. Singing and occasional scolding was heard.	
	4/29/2020	Nest 1 found in red willow, two feet AGL, at 33.288351, -117. 212247 with no eggs. Male was heard singing often and low in vegetation. Female not seen or heard.	33.288399, -117.212231
	5/9/2020	Incubating.	
	5/19/2020	Incubating/brooding.	
	6/2/2020	Nest fledged. Male heard singing and infrequently hyper-singing.	
	7/7/2020	Male observed singing from the bridge in Nest 1 area. Nest 1 fledged at least two young.	
4	4/20/2020	Unbanded male singing regularly, low in vegetation, and, at times, ceased singing; based on this, a pair was initially assumed. However, this male was not seen during any other survey dates.	33.286674, -117.215816
5	4/20/2020	Unbanded male singing infrequently and low in vegetation; based on this, a pair was assumed. Male was located at the far south end of the survey area, between the south end of the old pond and Old River Road. This male was not seen during any other survey dates.	33.285006, -117.217036
6	4/29/2020	Unbanded male singing regularly and high up in vegetation, within a large riparian patch between LBVI 3 and LBVI 5. No female seen or heard.	33.287688, -117.214332
	6/27/2020	Male heard singing occasionally, but mostly quiet.	
	7/7/2020	Male heard singing occasionally in territory and from an ornamental patch just south and east of the creek bridge.	

Several County of San Diego-sensitive Group 1 bird species were also observed on, overhead and/or adjacent to the Project site, including: Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), turkey vulture (*Cathartes aura*), yellow-breasted chat (*Icteria virens*), white-faced ibis (*Plegadis chihi*), vermilion flycatcher (*Pyrocephalus rubinus flammeus*),

In addition, several County of San Diego-sensitive Group 2 bird species were also observed on, overhead or adjacent to the Project site, including: great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), yellow warbler (*Setophagia coronata*) and western bluebird (*Sialia mexicana*).

All of the above species, with the exception of great blue heron and turkey vulture, are known to or are highly likely to nest in and/or adjacent to the Project site, based on observed nesting behaviors, suitable habitat, paired presence during the nesting season and/or ample suitable nesting and foraging habitat.

The relative locations of where these species were observed are presented on Figure 3.

CONCLUSION

I certify this report to be a complete and accurate account of the findings and conclusions of surveys for LBVI and SWFL conducted for the Project during the 2020 breeding season. If you have any questions regarding this report, please feel free to call me at 619-972-8714 or e-mail me at kris@blackhawkenv.com, and I will address all questions and concerns.

Sincerely,

Kris Alberts
Principal Biologist
USFWS Permit TE-039640-5.1

BLACKHAWK Environmental

ATTACHMENTS:

A Figures
B Observed/Detected Wildlife Species List

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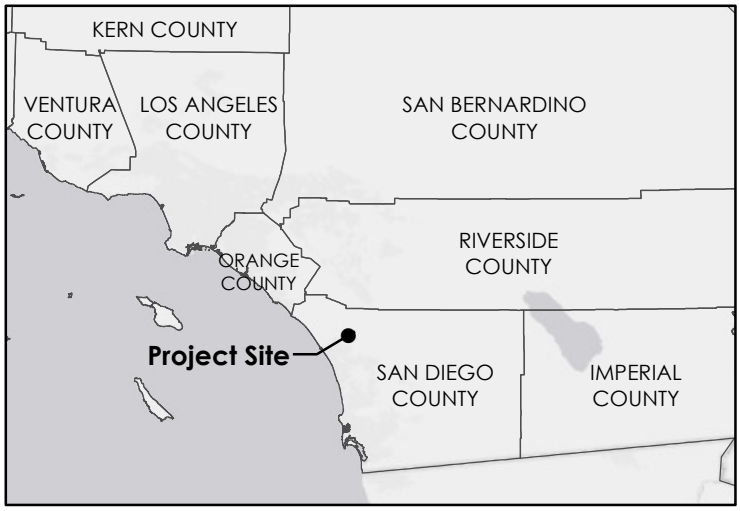
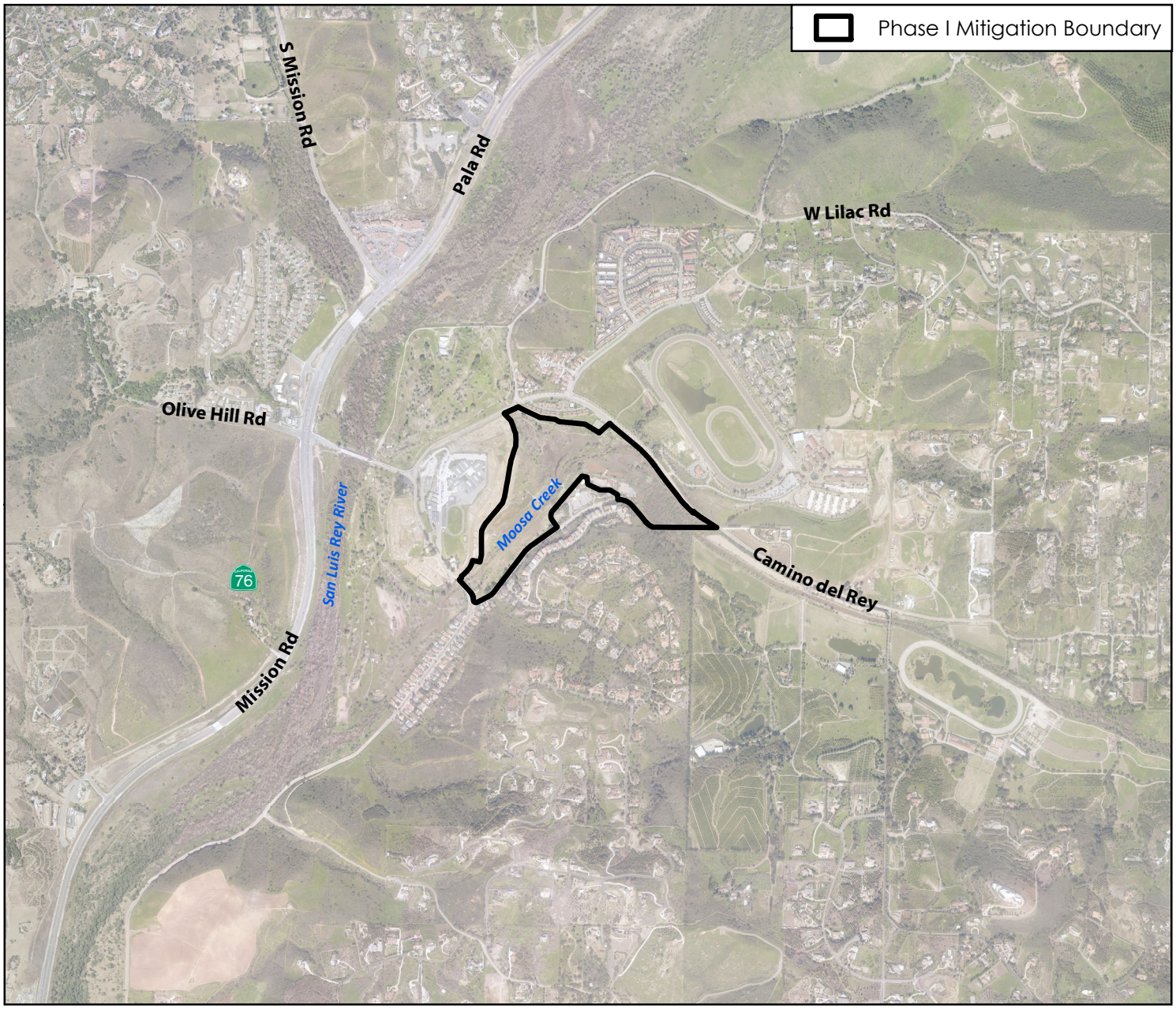
ATTACHMENT A

Figures





Source: SANDAG & SanGIS 2017; Esri

Figure 1

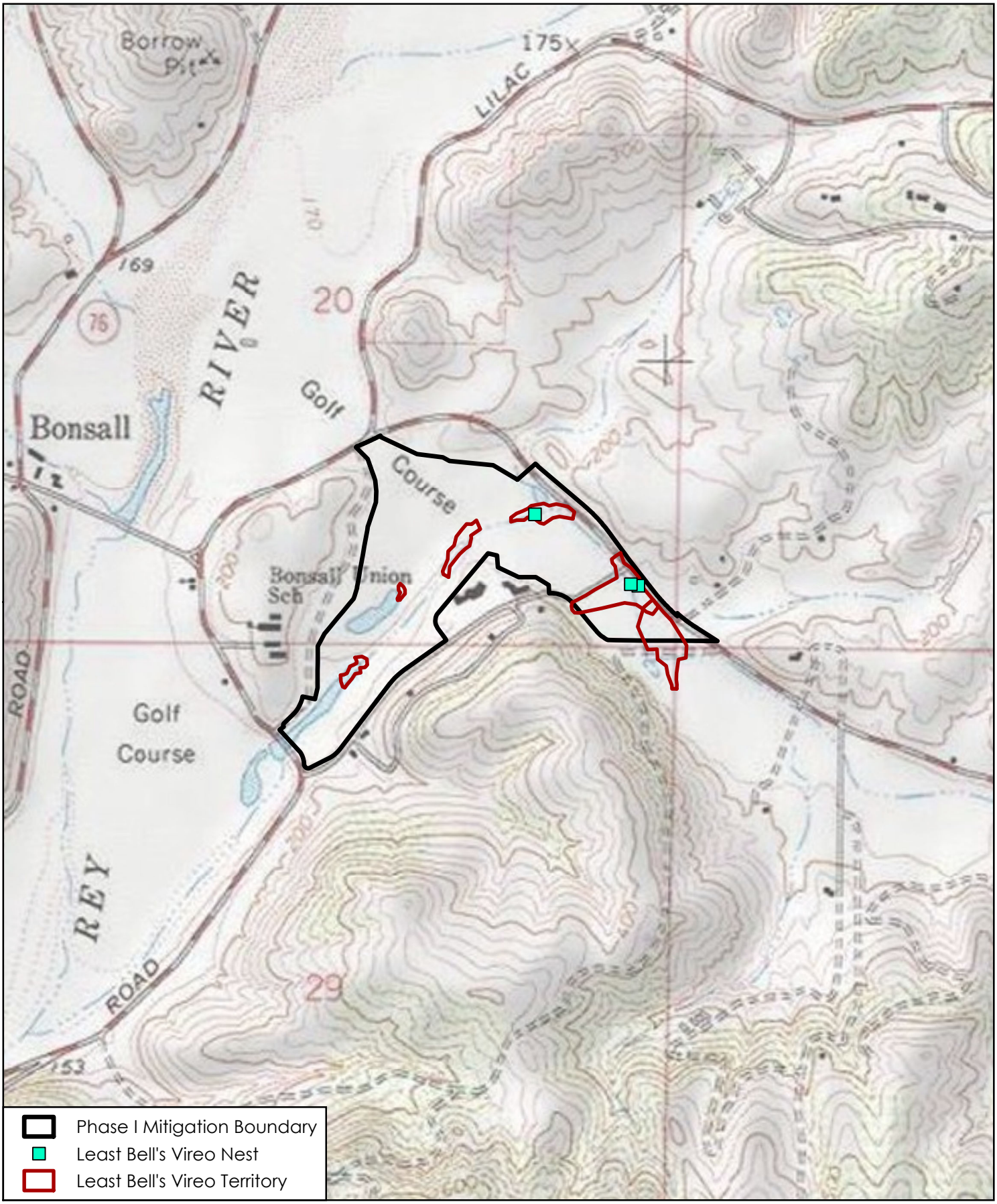
Project Vicinity and Location

Moosa Creek Restoration

BLACKHAWK Environmental

N

0 2,000 Feet



Source: USGS 7.5' Quadrangles (Bonsall), Esri

Figure 2

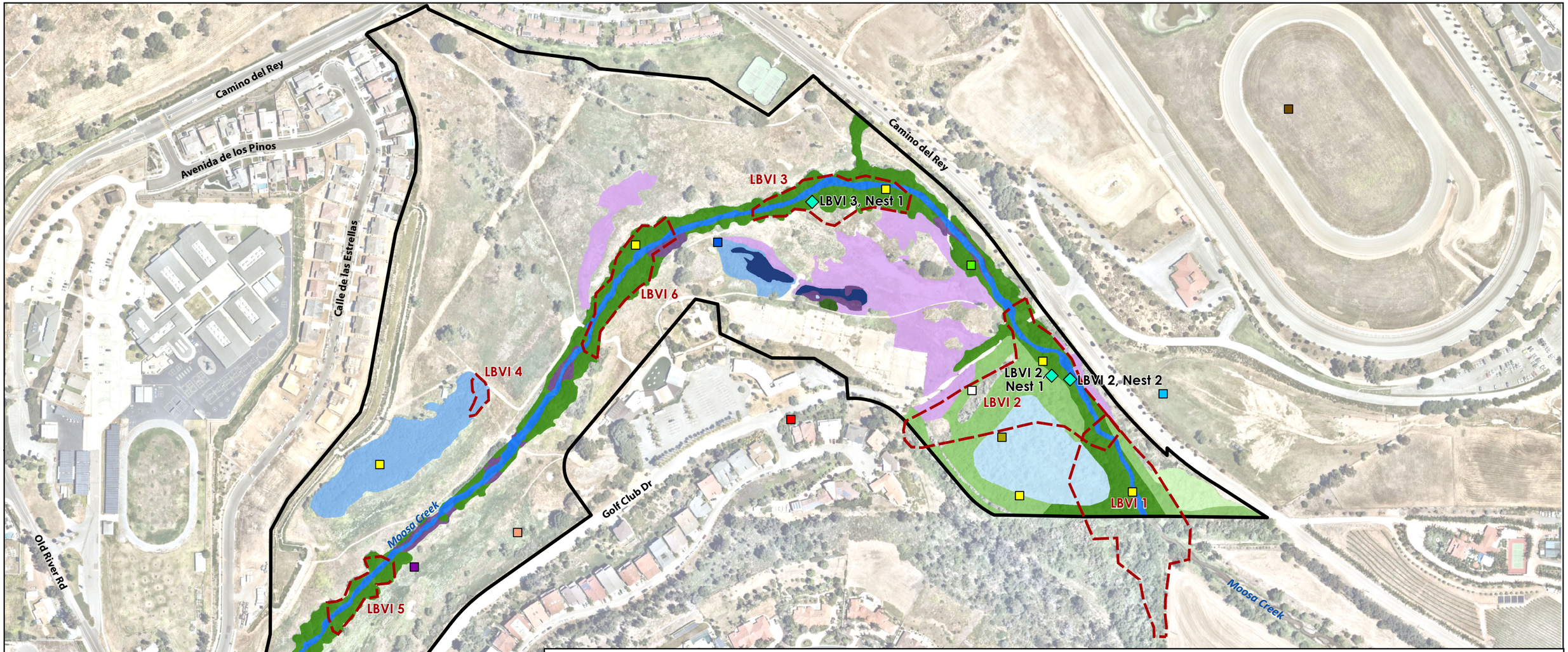
USGS Topo

BLACKHAWK Environmental

N

0 1,000 Feet

Moosa Creek Restoration



Source: Nearmap 2020

BLACKHAWK Environmental

N

0 300 Feet

Figure 3

Least Bell's Vireo Survey Results

Moosa Creek Restoration

ATTACHMENT B

Observed/Detected Wildlife Species List

Blackhawk Environmental

OBSERVED/DETECTED WILDLIFE SPECIES LIST

Moosa Creek Riparian Restoration Project

AVES	BIRDS
ACCIPITRIDAE	**Hawks & Eagles**
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
AEGITHALIDAE	**Long-tailed Tits**
Psaltriparus minimus	bushtit
ANATIDAE	**Ducks, Geese & Waterfowl**
Anas platyrhynchos	mallard
ARDEIDAE	**Herons & Egrets**
Ardea alba	great egret
Ardea herodias	great blue heron
Butorides virescens	green heron
CARDINALIDAE	**Cardinals & Allies**
Passerina caerulea	blue grosbeak
Pheucticus melanocephalus	black-headed grosbeak
Piranga ludoviciana	western tanager
CATHARTIDAE	**New World Vultures**
Cathartes aura	turkey vulture
CHARADRIIDAE	**Plovers, Dotterels & Lapwings**
Charadrius vociferus	killdeer
COLUMBIDAE	**Pigeons & Doves**
* *Columba livia*	rock pigeon
* *Streptopelia decaocto*	Eurasian collared-dove
Zenaida macroura	mourning dove
CORVIDAE	**Crows & Jays**
Aphelocoma californica obscura	California scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
EMBERIZIDAE	**Sparrows & Allies**
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Pipilo maculatus	spotted towhee
ESTRILDIDAE	**Old World Sparrows**
* *Lonchura punctulata*	scaly-breasted munia
FALCONIDAE	**Falcons**
Falco sparverius	American kestrel
HIRUNDINIDAE	**Swallows**
Hirundo rustica	barn swallow
Petrochelidon pyrrhonota	cliff swallow
Stelgidopteryx serripennis	northern rough-winged swallow
Tachycineta bicolor	tree swallow
FRINGILLIDAE	**Finches & Allies**
Haemorhous mexicanus	house finch

Spinus psaltria	lesser goldfinch
ICTERIDAE	**New World Blackbirds, Orioles & Allies**
Agelaius phoeniceus	red-winged blackbird
Euphagus cyanocephalus	Brewer's blackbird
Icterus cucullatus	hooded oriole
Molothrus ater	brown-headed cowbird
Quiscalus mexicanus	great-tailed grackle
MIMIDAE	**Mockingbirds & Thrashers**
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
PARIDAE	**Tits, chickadees & Titmice**
Baelophus inornatus	oak titmouse
PARULIDAE	**Wood warblers & Relatives**
Cardellina pusilla	Wilson's warbler
Geothlypis trichas	common yellowthroat
Icteria virens	yellow-breasted chat
Oreothlypis celata	orange-crowned warbler
Setophaga coronata	yellow-rumped warbler
Setophaga nigrescens	black-throated gray warbler
Setophaga petechia	yellow warbler
PICIDAE	**Woodpeckers & Allies**
Colaptes auratus	northern flicker
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
PTILIOGONATIDAE	**Silky Flycatchers**
Phainopepla nitens	phainopepla
SITTIDAE	**Nuthatches**
Sitta carolinensis	white-breasted nuthatch
STURNIDAE	**Starlings & Allies**
* *Sturnus vulgaris*	European starling
THRESKIORNITHIDAE	**Ibises & Spoonbills**
Plegadis chihi	white-faced ibis
TROCHILIDAE	**Hummingbirds**
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
TROGLODYTIDAE	**Wrens**
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
TURDIDAE	**Thrushes & Allies**
Sialia mexicana	western bluebird
Turdus migratorius	American robin
TYRANNIDAE	**Tyrant Flycatchers**
Empidonax difficilis	Pacific-slope flycatcher
Myiarchus cinerascens	ash-throated flycatcher
Pyrocephalus rubinus	vermilion flycatcher
Sayornis nigricans	black phoebe
Sayornia saya	Say's phoebe
Tyrannus verticalis	western kingbird

Tyrannus vociferans	Cassin's kingbird
VIREONIDAE	**Vireos**
◆ *Vireo bellii pusillus*	least Bell's vireo
Vireo gilvus	warbling vireo
Vireo huttoni	Hutton's vireo

ACTINOPTERYGII	RAY-FINNED FISHES
CENTRARCHIDAE	**Sunfish**
**Lepomis cyanellus*	green sunfish
**Lepomis macrochirus*	bluegill
**Micropterus salmoides*	largemouth bass
CYPRINIDAE	**Carps, Minnows, and Allies**
**Cyprinus carpio*	common carp
POECILIIDAE	**Tooth Carps**
**Gambusia affinis*	mosquitofish

AMPHIBIA	AMPHIBIANS
BUFONIDAE	**True Toads**
Anaxyrus boreas	western toad
HYLIDAE	**Treefrogs**
Pseudacris hypochondriaca hypochondriaca	Baja California treefrog
RANIDAE	**True Frogs**
**Lithobates catesbeianus*	bullfrog

REPTILIA	REPTILES
PHRYNOSOMATIDAE	**Zebra-tailed, Earless, Fringe-toed, Spiny, Tree, Side-blotched & Horned Lizards**
Sceloporus occidentalis	western fence lizard

MAMMALIA	MAMMALS
CANIDAE	**Foxes, Wolves & Allies**
**Canis lupus familiaris*	domestic dog
Canis latrans	coyote
DIDELPHIDAE	**American Opossums**
**Didelphis virginiana*	opossum
FELIDAE	**Cats**
Lynx rufus	bobcat
MEPHITIDAE	**Skunks & Allies**
Mephitis mephitis	striped skunk
MUSTELIDAE	**Weasels, badgers & Allies**
Mustela frenata	long-tailed weasel
LEPORIDAE	**Rabbits & Hares**
Sylvilagus audobonii	desert cottontail
PROCYONIDAE	**Raccoons & Allies**
Procyon lotor	raccoon

SCIURIDAE	Squirrels
Otospermophilus beecheyi	California ground squirrel

* *Non-native species*

Federally and State-endangered species

July 20, 2020

Mr. Sundeep Amin
Burns & McDonnell
4225 Executive Square, Suite 500
La Jolla, CA 92037

Re: Update to Delineation of Potentially Jurisdictional Wetland and Non-wetland Waters for the Proposed Moosa Creek Riparian Restoration Project

Dear Mr. Amin:

Blackhawk Environmental Inc. (Blackhawk) was contracted through Burns & McDonnell, Inc. to complete an update to previously performed delineations of wetlands and non-wetland waters occurring within the proposed Moosa Creek Riparian Restoration Project (Project). The regulatory agencies include the United States Army Corps of Engineers (USACE; Corps), Environmental Protection Agency (EPA), United States Fish & Wildlife Service (USFWS), San Diego Regional Water Quality Control Board (SDRWQCB; RWQCB), the County of San Diego and the California Department of Fish & Wildlife (CDFW).

The Project site is located in unincorporated San Diego County, near the rural community of Bonsall on a portion of an abandoned golf course. Specifically, the Project site is bounded by Camino Del Rey to the north-northeast, Calle De Las Estrellas and Old River Road to the west, and Golf Club Drive to the south. The overall Project area is approximately 67 acres and is adjacent to Bonsall Elementary School and a newly developing residential neighborhood to the west, existing residential neighborhoods to the south, east and southeast, a residential condominium complex to the north, and San Luis Rey Training Center to the east. The Project site is located approximately 0.4-mile east of State Route-76 (Mission Road) intersection with Camino Del Rey/Olive Mill Road. The Project site contains facilities from the abandoned golf course and heavily disturbed habitats. The topography of the Project site is generally level with isolated pockets of steep slopes around the perimeter. The surrounding development occurs above grade of the Project site. The 100-year floodplain is mapped by the Federal Emergency Management Agency (FEMA) across the Project site along Moosa Creek.

Biological studies and delineation of potentially jurisdictional wetlands were initially conducted in February and June of 2013, respectively. The results of these studies are provided in detail in the *Biological Resources Report* and *Delineation of Potential Jurisdictional Wetlands and Non-Wetland Waters Under Section 404 of the Clean Water Act* prepared by Wetland Research Associates (WRA; 2013). At the time of the initial studies, which covered a larger footprint than the current Project, a total of approximately 37.96 acres of wetlands, 3.59 acres of natural waters, and 2.14 acres of man-made waters were documented predominantly within a portion of the former San Luis Rey Downs Resort golf course (golf course). Detailed project descriptions and proposed designs can be referenced in the aforementioned reports.

PURPOSE AND NEED

The applicant is proposing a Grading Permit for the restoration of riparian and upland habitats on 67 acres of land within the Bonsall Community Plan area that contains the former Moosa Creek Golf Course. The site is designated for Open Space (Recreation) and zoned for Open Space Use (S80). The proposed habitat restoration work is consistent with the existing zoning for the site. The Project site is located between State Route-76 and Interstate-15, south of Camino Del Rey, and is bisected by Moosa Creek. The on-site reach of the creek flows from the eastern end of the Project site westward where it exits the Project site at the western end of Old River Road. From the property, Moosa Creek continues another half mile off site to the southwest before ultimately joining the San Luis Rey River.

The Moosa Creek Riparian Restoration Project (Project) would remove existing infrastructure and recontour portions of the property to be planted with native riparian and upland species. Approximately 10 acres of the Project site contains existing riparian habitat along Moosa Creek, with the remainder featuring ornamental and developed areas consistent with the previous use as a golf course. Planned restoration activities would consist of regrading the area adjacent to but outside the creek and removing 4.5 acres of existing infrastructure (tennis courts, parking lots, golf course features, etc.) to establish and/or enhance approximately 39 acres of riparian habitat and approximately 28 acres of native riparian-upland transitional buffers and other site improvements.

Proposed earthwork would be conducted to extend the top of the Moosa Creek bank to create a high flow terrace/floodplain. Restoration strategies planned for the site include riparian re-establishment (consisting of a mulefat-willow dominated riparian habitat that may also include wetlands depending on conditions), floodplain re-establishment (floodplain transitional species that include riparian and upland species), coast live oak savannah re-establishment (coast live oak savannah with associated species), and riparian enhancement (control of non-native species and light seeding or planting). The Project would re-establish and rehabilitate riparian habitat to benefit federally and state-listed wildlife species (e.g., least Bell's vireo and southwestern willow flycatcher). The restoration effort is being designed under the guidance of the United States Fish and Wildlife Service (USFWS) to offset corresponding riparian habitat and endangered species impacts at the Marine Corps Air Station (MCAS) at Camp Pendleton.

Project implementation is anticipated to commence in the winter of 2021 but may need to be adjusted to account for weather or to avoid sensitive bird breeding and nesting seasons. While one construction stage is anticipated, the overall work may be broken into two distinct phases: demolition/earthwork and planting. After construction, the restoration areas would be monitored for up to five years in accordance with the proposed restoration plan, and, as necessary, invasive species removal and other vegetation management activities would be performed during the monitoring period.

Golf course operations within the proposed Project were discontinued in August, 2014. Over the last several years since the previous WRA evaluation, in the absence of routine maintenance, conditions at the Project site, including areas potentially regulated by State and Federal agencies have changed. The purpose of this memo report is to summarize changes in existing site conditions within the Project that have occurred since golf course operations and maintenance were discontinued.

METHODS

A jurisdictional delineation, following the guidelines set forth by USACE (1987, 2008), was performed to gather field data at potentially jurisdictional Waters of the U.S. and Waters of the State within the proposed Project site. Figures depicting the Project vicinity, topographic maps, soil mapping, historic aerials and phasing plan are provided in the *Biological Resources Report* (WRA 2013). Potential wetlands were then delineated within the Project site based on commonality among vegetation community characteristics and three-parameter testing methodology. Vegetation mapping for the Project was updated as part of a concurrent effort performed by Blackhawk. The results of this vegetation mapping effort are summarized in *2020 Updated Vegetation Communities of the Proposed Moosa Creek Riparian Restoration Project* memo report (Blackhawk 2020) and results are included in Figure 1. Blackhawk wetland specialists Ian Maunsell and Kris Alberts performed an evaluation of wetland and waters indicators on May 28 and June 3, 2020.

Prior to conducting the field delineation, the following sources were consulted to identify land use history and provide additional context to potentially atypical and problematic jurisdictional wetlands within the Survey Area, including:

- USGS *Bonsall, California* quadrangle topographic map (USGS 2011)
- Current and historical aerial photographs (Google 2020, WRA 2013)
- National Wetland Inventory (USFWS 2020)
- *Biological Resources Report* (WRA 2013)
- *Delineation of Potential Jurisdictional Wetlands and Non-Wetland Waters Under Section 404 of the Clean Water Act* (WRA 2013)

Once on site, the potential wetland locations were examined to determine the presence of any of the three wetland parameters or drainage channels. Soil type and classification data used in the delineation were provided by the Natural Resource Conservation Service's (NRCS) web soil survey (United States Department of Agriculture [USDA] 2010) (WRA 2013).

Potential waters and wetland locations observed within the Project site were evaluated using the methodology set forth in the USACE Wetland Delineation Manual (USACE 1987) and the Arid West Supplement (USACE 2008). The three parameters used to determine the presence of wetland areas include presence of 1) a dominance of hydrophytic vegetation, 2) wetland hydrology and 3) hydric soils. Criteria for determining presence of wetland hydrology indicators may include evidence of inundation, saturation, water marks, drainage patterns, soil cracks, drift lines, sediment deposits, presence of aquatic invertebrates and other variables. Vegetation was analyzed using dominant species wetland indicator status (USDA 2018). Soil samples were collected and described according to the methodology provided in the Arid West Supplement. Soil chroma and values were determined by utilizing a standard Munsell soil color chart (GretagMacbeth 2000). These parameters and the methods for evaluating them are provided in detail in Section 3.0 of the *Delineation of Potential Jurisdictional Wetlands and Non-Wetland Waters Under Section 404 of the Clean Water Act* (WRA 2013).

Suspected non-wetland jurisdictional areas were evaluated for the presence of definable channels, ordinary high water marks (OHWM), and connectivity to a traditionally navigable water (TNW) or relatively permanent water (RPW). Identification of the OHWM followed the Corps Regulatory Guidance Letter No. 05-05, *Ordinary High Water Mark Identification* (USACE 2005).

Locations of soil sampling performed during the 2020 survey are shown as "2020 Sample Point" on Figures 2-4. Complete USACE Wetland Determination Data Forms are provided for each 2020 Sample Point in Attachment C. Where indicators of hydric soils were observed at Sample Points, "test pits" were excavated to serve as additional soil samples to determine the extent of hydric soil indicators where wetland hydrology and vegetation remained constant surrounding the initial Sample Point location. These locations are shown as "2020 Test Pit" on Figures 2-4. Excavation of test pits were discontinued once one or more of the three wetland parameters were no longer present along sampling zones.

The 2020 delineation update did not reduce or eliminate any areas previously deemed likely to fall under the jurisdiction of any State of Federal agencies. Instead, the update was intended to capture either 1) the expansion of potentially jurisdictional areas as a result of "new normal" conditions (e.g. the formation of three parameter wetlands in previously maintained golf course areas), 2) the conversion of jurisdictional areas to other types of jurisdictional features within the same agency purview (e.g. non-wetland waters of the U.S. now meeting criteria as wetland areas) and/or 3) the addition of regulatory agencies which may assert jurisdiction over a given feature (e.g. previously isolated RWQCB wetland features now observed to have adjacency to waters of the U.S.). No previously delineated features were eliminated as part of the update.

RESULTS

Overall conditions within the Project site indicate the development of "new normal" conditions as a result of discontinuation of golf course maintenance over several years combined with the periodic seasonal flooding of the Project and reestablishment of natural flow within the floodplain contours adjacent to Moosa Creek. Hydrology within the Project site generally flows from east to west along Moosa Creek, as described in Section 4.2 of the *Delineation of Potential Jurisdictional Wetlands and Non-Wetland Waters Under Section 404 of the Clean Water Act* (WRA 2013). The 2013 findings described evidence of flooding combined with impoundment of surface waters within the maintained golf course as a result of irrigation runoff to low areas and microtopographic depressions. However, differing from the 2013 findings, and in the absence of irrigation, the previously described low areas in the Project now receive hydrological input from natural flooding. Evidence of hydrology in these flood zones of Moosa Creek included sediment deposits, drift deposits, wrack lines, water staining and soil cracks throughout the floodplain area. These signs were generally observed at the east end of the Project north of two man-made ponds and south of Moosa Creek, as well as north and west of Moosa Creek near the central portion of the Project. As a result, the flood zone wetlands and the two linked ponds just north of the old tennis courts have direct hydrological connectivity to Moosa Creek both through input from the floodplain, and outflow via a man-made channel connecting back into Moosa Creek. At the time of the survey, flooding had resulted in the complete inundation of both man-made ponds south of Moosa Creek, which supported open water habitat and a surrounding fringe of riparian and wetland vegetation.

A third man-made pond north and west of Moosa Creek was observed to have strong hydrological indicators (sediment deposits, drift deposits, inundation visible on aerial imaging, aquatic invertebrates and reduced iron), although no surface water was present at the time of the survey. This pond appears to receive inconsistent hydrological input from Moosa Creek flooding, but does not have an outflow connecting back into the creek or nearby San Luis Rey River. This pond was man-made with water levels formerly maintained by a pump system that is no longer operational.

The observed hydrologic conditions have resulted in the natural recruitment of both native and non-native hydrophytic plant species within the Moosa Creek channel and the adjacent flood plain. Vegetation mapping updates included in *2020 Updated Vegetation Communities of the Proposed Moosa Creek Riparian Restoration Project* (Blackhawk 2020) indicate the presence of seven vegetation communities exhibiting a dominance of hydrophytic vegetation communities; arroyo willow association, disturbed arroyo willow association, mulefat-arroyo willow association, Fremont cottonwood-arroyo willow association, disturbed Fremont cottonwood-arroyo willow association, freshwater marsh habitats, and disturbed herbaceous wetland. Complete vegetation descriptions are provided in *2020 Updated Vegetation Communities of the Proposed Moosa Creek Riparian Restoration Project* (Blackhawk 2020).

Of particular relevance to potentially jurisdictional features was the expansion/establishment of woody riparian vegetation communities along the banks of Moosa Creek and fringes of the man-made ponds. In general, arroyo willow association, disturbed arroyo willow association, mulefat-arroyo willow association, Fremont cottonwood-arroyo willow association, disturbed Fremont cottonwood-arroyo willow association, and freshwater marsh habitats have established along banks of Moosa Creek for the entirety of its length within the Project, as well as within and adjacent to man-made ponds. These communities are dominated by hydrophytic plant species. Where wetland hydrology and hydric soils also occur within these communities, these areas are likely considered wetland waters of the U.S. under the jurisdiction of USACE, wetland waters of the State under the jurisdiction of RWQCB, and wetland/riparian habitat under the jurisdiction of CDFW.

A newly identified vegetation community, disturbed herbaceous wetland, was noted within the Project site during the 2020 study. This habitat is best described as low growing non-woody vegetation providing relative ground cover near or in excess of 100-percent. Common plant species observed within this habitat included a mix of native and non-native species such as sea spurry (*Spergularia bocconi*; FACW), Bermuda grass (*Cynodon dactylon*; FACU), annual beardgrass (*Polypogon monspeliensis*; FACW), salt grass (*Distichilis spicata*; FAC), cocklebur (*Xanthium strumarium*; FAC), curly dock (*Rumex crispus*; FAC), fivehook bassia (*Bassia hyssopifolia*; FACU), prickly lettuce (*Lactuca serriola*; FACU), poison hemlock (*Conium maculatum*; FACW), and Australian saltbush (*Atriplex semibaccata*; FAC). Low microtopographic depressions and swales within these habitats were observed to support patchy occurrences of more obligate hydrophytes such as toad rush (*Juncus bufonius*; OBL), threesquare bulrush (*Schoenoplectus pungens*), pale rush (*Eleocharis macrostachya*; FACW), and pickleweed (*Salicornia depressa;* OBL). These areas were generally observed to occur within the central and eastern portions of the Project within the floodplain of Moosa Creek. Where this community occurs adjacent to Moosa Creek in combination with hydrology and hydric soils, it is likely considered a wetland Waters of the U.S. under the jurisdiction of USACE,

wetland Waters of the State under the jurisdiction of RWQCB, and a wetland/riparian habitat under the jurisdiction of CDFW.

Indicators of hydric soils conditions were observed throughout the Project site and included sandy redox, depleted under dark surfaces, and redox depressions.

USACE Jurisdiction

A total of 11.772 acres of likely USACE wetland water of the U.S. were observed within the Project site. Of note, 3.969 acres of disturbed herbaceous wetland were observed occurring adjacent to Moosa Creek within the previously maintained golf course. An additional 2.137 acres of non-wetland waters of the U.S. occur within the channel of Moosa Creek, man-made channel and open water habitats of two man-made ponds south of Moosa Creek. Although the previous study determined that these man-made features are not likely regulated by USACE, the establishment of adjacent three parameter wetlands within the floodplain between Moosa Creek and these ponds has established adjacency under new normal conditions. Furthermore, natural and direct hydrological connectivity has been established from Moosa Creek, to the ponds, and returning to Moosa Creek via a man-made channel. Project-related impacts to Moosa Creek and associated wetlands are likely subject to regulation under the Clean Water Act.

Table 1 summarizes the acreages of potentially USACE jurisdictional waters within the Project.

Table 1. Potential Jurisdictional USACE Waters

Jurisdictional Waters	Acres (Linear Feet)
Likely USACE Jurisdiction	
Wetland Waters of the U.S.	11.772
Arroyo willow association	*2.900*
Disturbed arroyo willow association	*0.037*
Disturbed Fremont cottonwood-arroyo willow association	*0.346*
Disturbed herbaceous wetland	*3.969*
Fremont cottonwood-arroyo willow association	*2.057*
Freshwater marsh	*0.335*
Mulefat-arroyo willow association	*2.128*
Non-Wetland Waters of the U.S.	2.137
Developed Channel	*0.003*
Open Water	*0.305*
Riverine channel	*1.829*
Likely USACE Total Jurisdiction	**13.909**

RWQCB Jurisdiction

Likely RWQCB jurisdictional waters within the Project site include all areas discussed above as likely USACE wetland and non-wetland Waters of the U.S. An additional 1.375 RWQCB-jurisdictional isolated wetland waters likely of the State were observed occurring within a previously constructed man-made pond north and west of Moosa Creek. Although this area exhibited all three wetland indicators, the area is isolated from Moosa Creek and only receives irregular hydrological input during periods of extreme flooding. Furthermore, there is no outflow or downstream connectivity from this feature to Moosa Creek. Project-related impacts to Moosa Creek, associated wetlands and isolated wetland features are likely subject to regulation by RWQCB under the Porter-Cologne Water Quality Control Act.

Table 2 summarizes the acreages of potentially RWQCB jurisdictional waters within the Project.

Table 2. Potential Jurisdictional RWQCB Waters

Jurisdictional Waters	Acres (Linear Feet)
Likely RWQCB Jurisdiction	
Isolated Wetland Waters of the State	1.375
Disturbed Fremont cottonwood-arroyo willow association	*1.375*
Wetland Waters of the State	11.772
Arroyo willow association	*2.900*
Disturbed arroyo willow association	*0.037*
Disturbed Fremont cottonwood-arroyo willow association	*0.346*
Disturbed herbaceous wetland	*3.969*
Fremont cottonwood-arroyo willow association	*2.057*
Freshwater marsh	*0.335*
Mulefat-arroyo willow association	*2.128*
Non-Wetland Waters of the State	2.137
Developed Channel	*0.003*
Open Water	*0.305*
Riverine channel	*1.829*
Likely RWQCB Total Jurisdiction	**15.284**

CDFW Jurisdiction

Likely CDFW jurisdictional waters within the Project site include all areas discussed above as likely RWQCB wetland and non-wetland waters of the State. An additional ~~4.833~~ 4.395 acres of CDFW wetland/riparian areas were observed occurring along the fringes of wetland and riparian areas adjacent to Moosa Creek. These areas generally encompass the full extent of riparian vegetation, including canopy drip lines, extending beyond the limits of observed hydrology or hydric soil indicators. Project-related impacts to Moosa Creek and associated wetland/riparian habitats are

likely subject to regulation by CDFW under section 1600 of the Lake and Streambed Alteration Program.

Table 3 summarizes the acreages of potentially CDFW-jurisdictional waters within the Project.

Table 3. Potential Jurisdictional CDFW Waters

Jurisdictional Waters	Acres (Linear Feet)
Likely CDFW Jurisdiction	
Wetland/Riparian	~~17.971~~ 17.545
Arroyo willow association	*6.072*
Disturbed arroyo willow association	*0.037*
Disturbed Fremont cottonwood-arroyo willow association	*2.252*
Disturbed herbaceous wetland	*3.969*
Fremont cottonwood-arroyo willow association	*2.057*
Freshwater marsh	*0.503*
Mulefat-arroyo willow association	*2.655*
Lake/Streambed	~~2.136~~ 2.134
Open Water	*0.305*
Riverine channel	*1.829*
Likely CDFW Total Jurisdiction	**~~20.117~~ 19.679**

CONCLUSION

Since the conclusion of golf course maintenance, potentially jurisdictional features have expanded from those areas previously documented as part of the 2013 survey effort. These areas occur primarily as a result of reestablished hydrologic regime within a flood plain, resulting in the formation of three-parameter wetland areas adjacent to Moosa Creek, in combination with a well-developed riparian corridor along the creek channel. Wetland and riparian areas within the Project are likely subject to USACE, RWQCB and CDFW jurisdiction.

SURVEYOR CERTIFICATION

I certify that the information in this survey report and attached exhibits fully and accurately represents my work. If you have any questions regarding this report, please feel free to call me at 206-920-3266 or e-mail me at ian@blackhawkenv.com, and I will address all questions and concerns.

Sincerely,

Ian Maunsell
Senior Biologist

ATTACHMENTS

A: Figures

B: Site Photographs

C: Jurisdictional Delineation Data Forms

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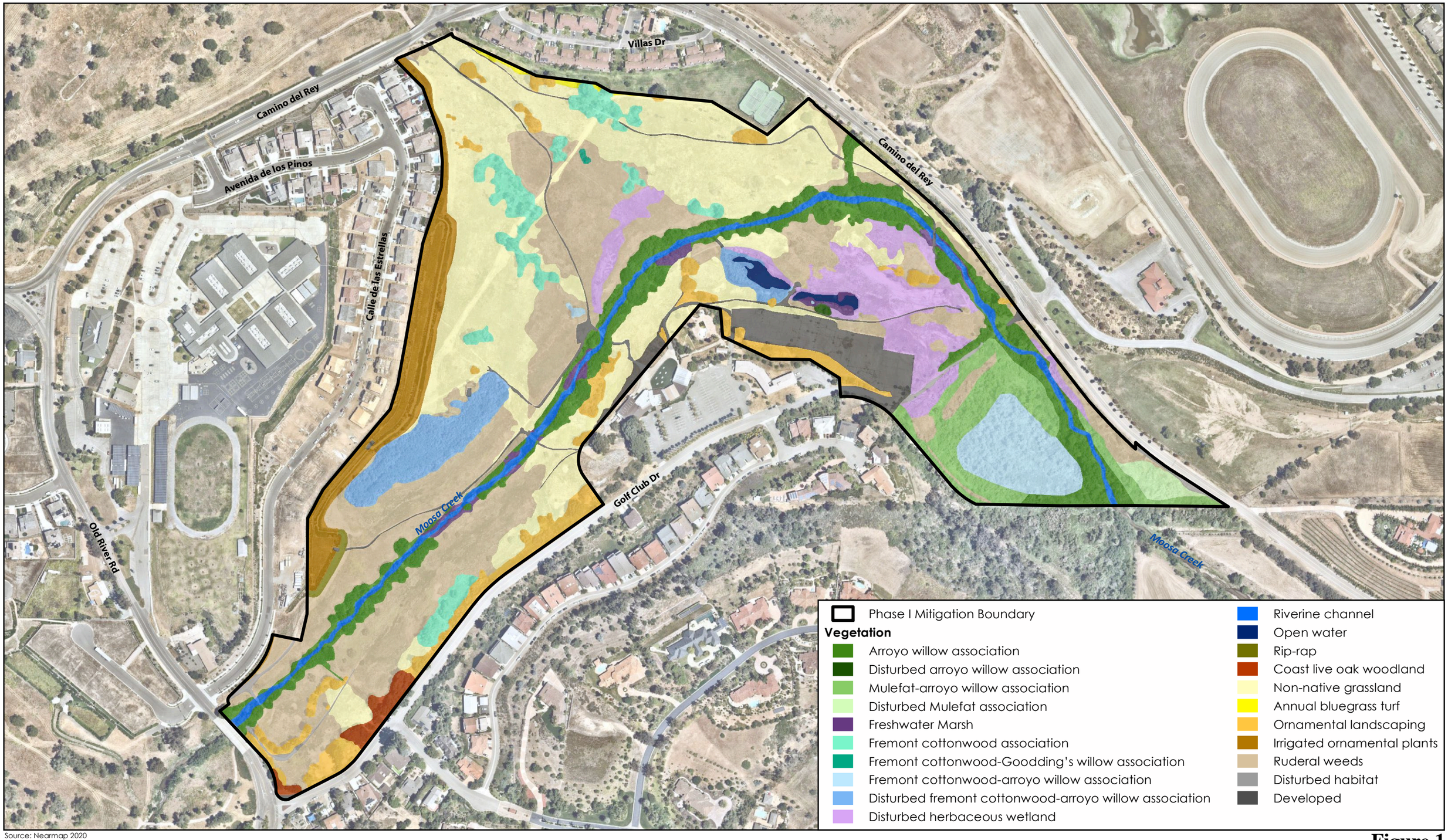
ATTACHMENT A

Figures

Blackhawk Environmental



Source: Nearmap 2020

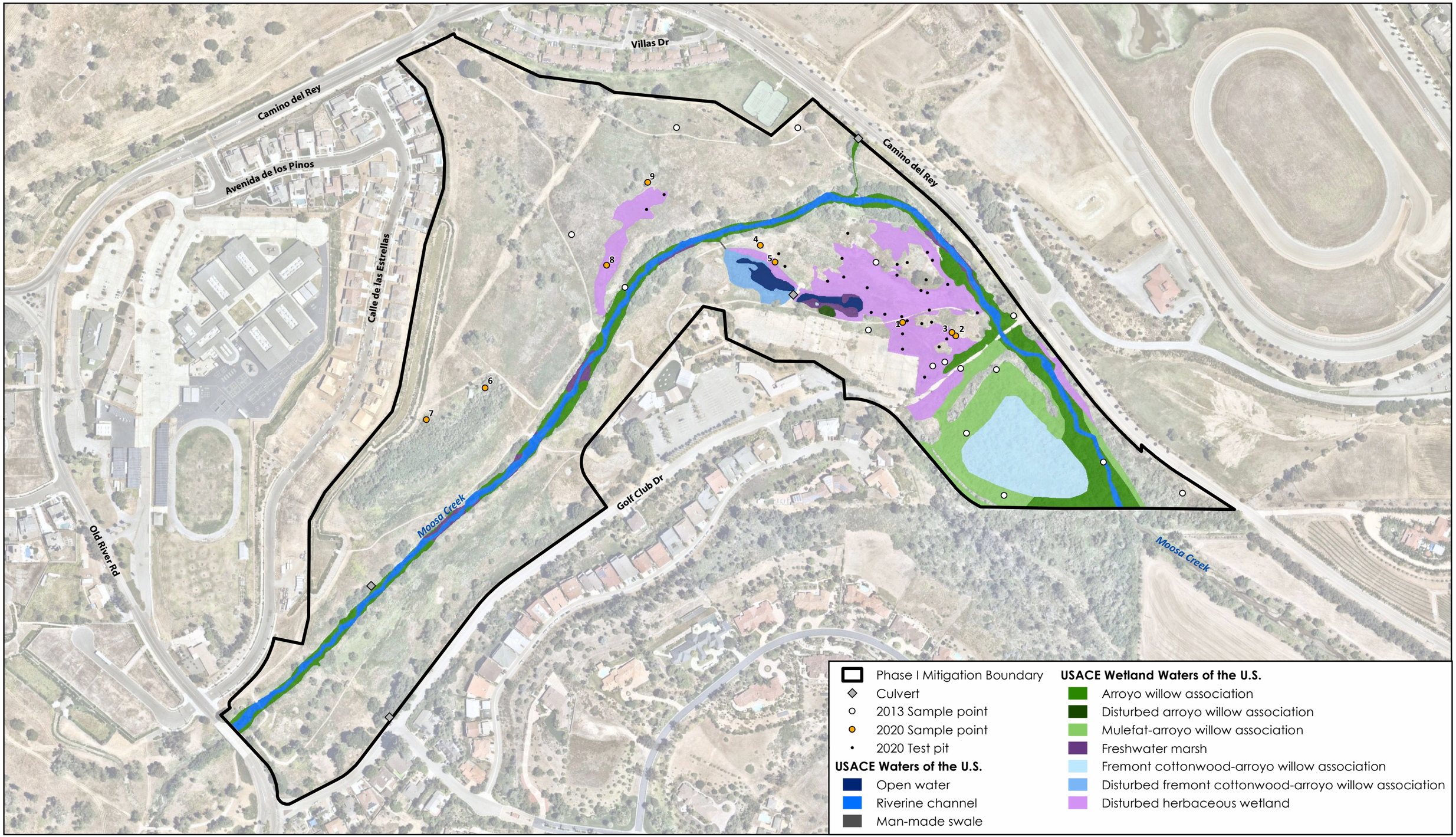
BLACKHAWK Environmental

N

0 300 Feet

Figure 1
Vegetation

Moosa Creek Restoration



Source: Nearmap 2020

BLACKHAWK Environmental

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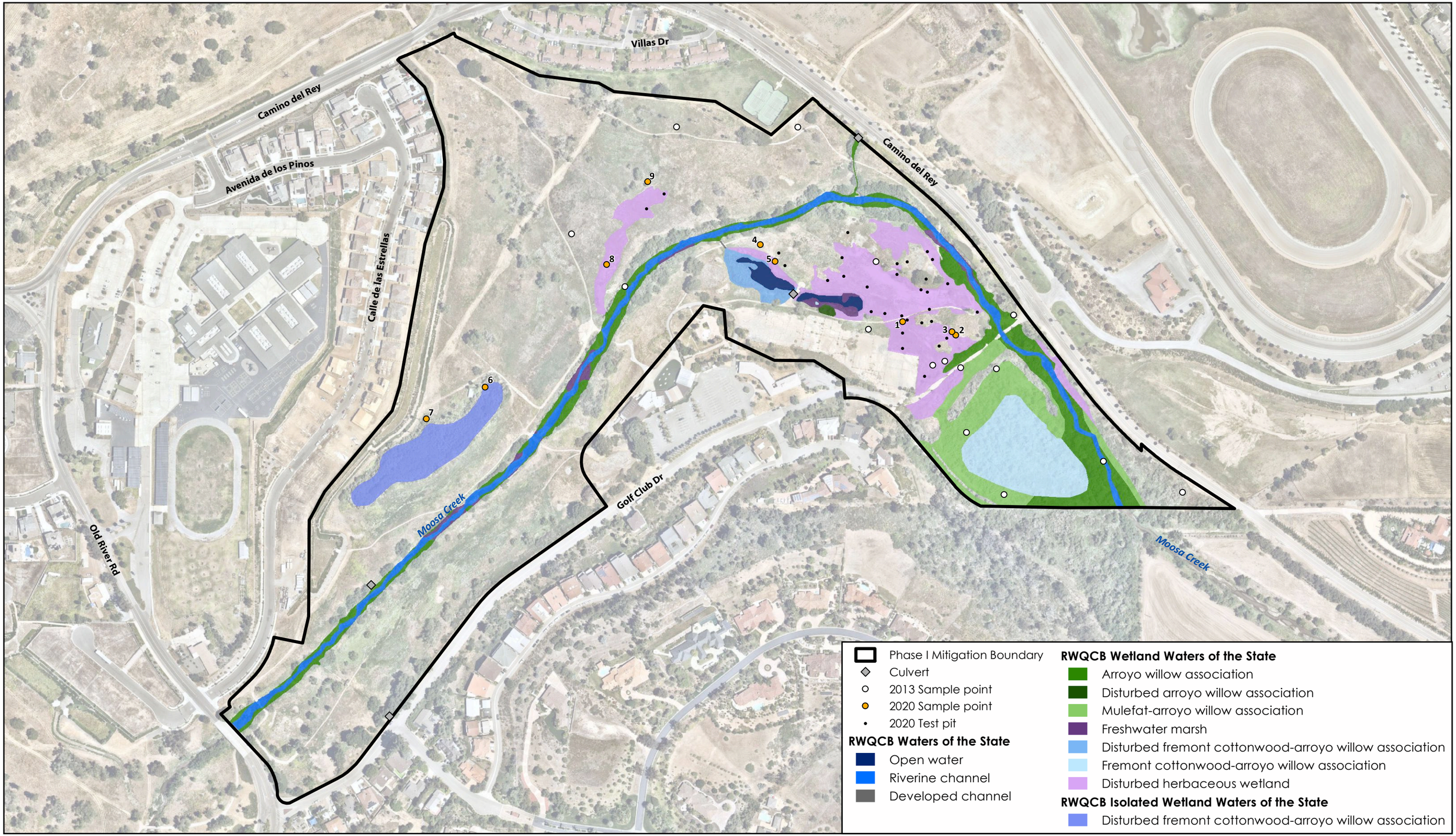
0 300 Feet

Figure 2
USACE Jurisdictional Resources

Moosa Creek Restoration



Source: Nearmap 2020

BLACKHAWK Environmental

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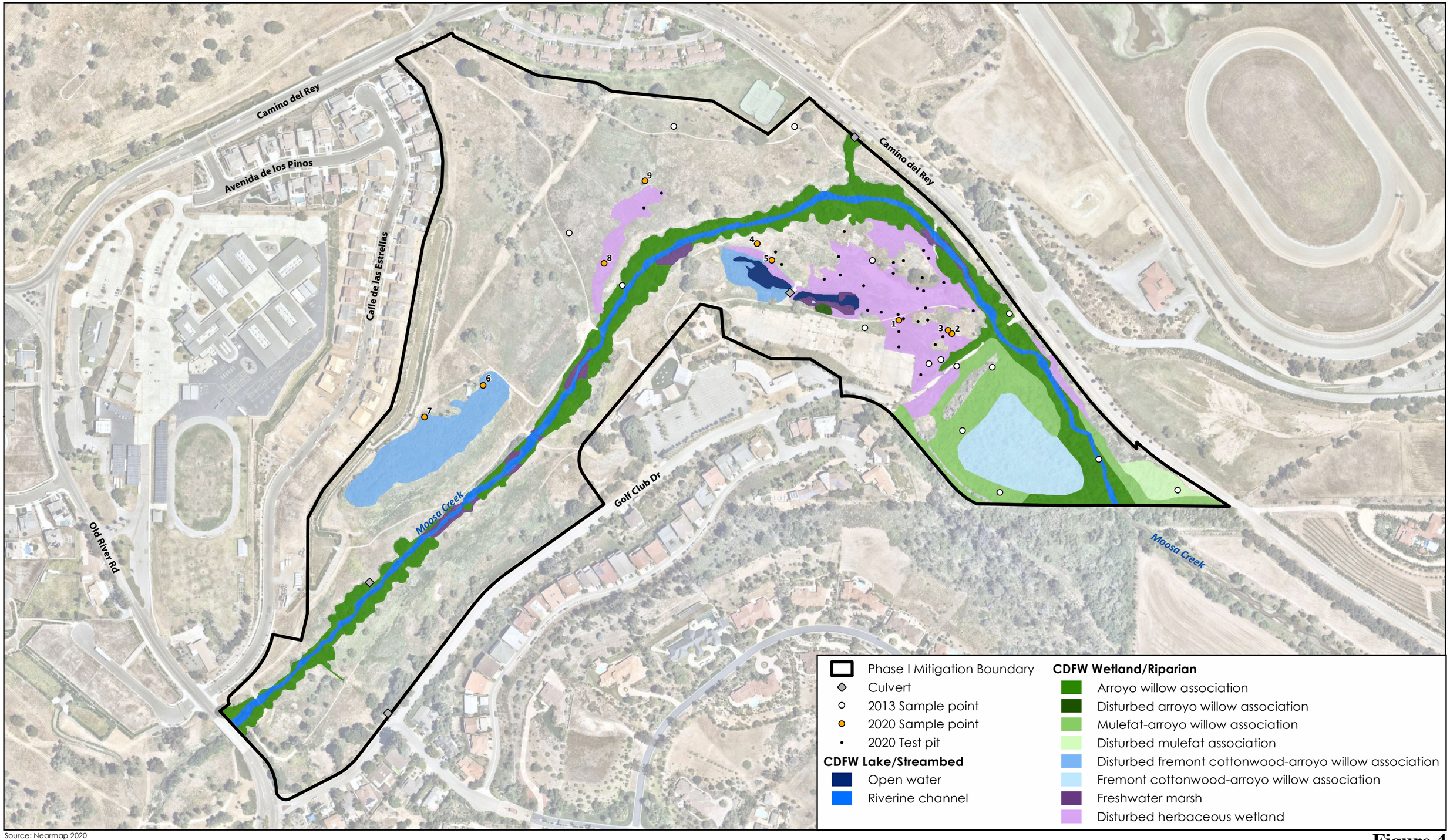
0 300 Feet

Figure 3
RWQCB Jurisdictional Resources

Moosa Creek Restoration



Source: Nearmap 2020

BLACKHAWK Environmental

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0 300 Feet

Figure 4
CDFW Jurisdictional Resources

Moosa Creek Restoration

ATTACHMENT B

Site Photographs

Blackhawk Environmental

Photo 1: Sample Point 1 soil sample showing formation of stratified layers hydric soils indicator occurring within disturbed herbaceous wetland habitat within sampling location and adjacent test pits.

Photo 2: Sample Point 2 soil sample showing formation of redox dark surface hydric soils indicator occurring within disturbed herbaceous wetland habitat within sampling location and adjacent test pits.

Photo 3: Sample Point 5 soil sample showing formation of redox dark surface hydric soils indicator occurring within disturbed herbaceous wetland habitat within sampling location and adjacent test pits.

Photo 4: Sample Point 8 soil sample showing formation of depleted below dark surface hydric soils indicator occurring within disturbed herbaceous wetland north of Moosa Creek.

Photo 5: Representative photograph of open water habitat fringed by adjacent freshwater marsh and disturbed herbaceous wetland habitats occurring south of and adjacent to Moosa Creek. These areas were observed to have hydrological connectivity to Moosa Creek.

Photo 6: Representative photograph depicts arroyo willow association and scouring across the Moosa Creek flood plains where disturbed herbaceous wetland was mapped near the northeastern boundary of the old golf course.

Photo 7: Representative photograph depicts downstream hydrological scouring and annual herbaceous vegetation from the area of Photo 6 across the flood plains of Moosa Creek where disturbed herbaceous wetland was mapped. This photo also shows the arroyo willow association in the background that is connected to this wetland.

ATTACHMENT C

Jurisdictional Delineation Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-4-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 1

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): nearly level flood zone Local relief (concave, convex, none): slightly concave Slope (%): 0-1

Subregion (LRR): C Lat: 33.287381 Long: 117.211448 Datum: NAD 83

Soil Map Unit Name: Grangeville fine sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

This area was developed as part of the golf course historically, and it has flooded annually during higher precipitation years. Therefore, the wetland-associated soils are present slightly deeper in the soil horizon.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Spergularia bocconi	10	No	FACW
2. Cynodon dactylon	20	No	FACU
3. Polypogon monspeliensis	95	Yes	FACW
4. Distichlis spicata	10	No	FAC
5. Bassia hyssopifolia	5	No	FAC
6. Xanthium strumarium	7	No	FAC
7. Rumex crispus	1	No	FAC
8.			
	148	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	105	x 2 =	210
FAC species	23	x 3 =	69
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	148 (A)		359 (B)

Prevalence Index = B/A = 2.43

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Some open areas exhibit salt crust. Aerial imagery review shows that this area has regularly flooded over time. It has not been maintained since around 2013.

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/4	100					silt	
3-5	10YR 3/3	100					silty clay	
5-10	10YR 4/2	90	2.5YR 3/6	10	C	M	sandy clay	also has salt inclusions
10-12	2.5Y 3/1	100					sand	some clay present
12-18	10YR 4/3	100					sand	fine grain sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ No ___

Remarks:

Hydric soils are present below the upper layers.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Flood zone with herbaceous wetland-associated vegetation.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-4-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 2

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): nearly level flood zone Local relief (concave, convex, none): slightly convex Slope (%): 0-1

Subregion (LRR): C Lat: 33.287262 Long: 117.210862 Datum: NAD 83

Soil Map Unit Name: Grangeville fine sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

This area was developed as part of the golf course historically, and it has flooded annually during higher precipitation years. Wetland indicators are present deeper in the horizon, but not up top.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 15x15)			
1. Bromus diandrus	60	Yes	UPL
2. Avena barbata	25	Yes	UPL
3. Ambrosia psilostachya	15	No	FCU
4. Hirschfeldia incana	5	No	UPL
5. Xanthium strumarium	3	No	FAC
6. Distichlis spicata	10	No	FAC
7. Rumex crispus	1	No	FAC
8. Lactuca serriola	2	No	FACU
	121	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	14	x 3 =	42
FACU species	17	x 4 =	68
UPL species	90	x 5 =	450
Column Totals:	121 (A)		560 (B)

Prevalence Index = B/A = 4.63

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Aerial imagery review shows that this area has regularly flooded over time. It has not been maintained since around 2013.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2	10YR 2/2	100					silty clay	
2-4	10YR 3/3	100					sand	also contains significant silt
4-6	7.5YR 4/4	100					sand	fine-grained
6-10.5	10YR 2/2	90	2.5YR 2.5/4	5	C	M	clay	some silt
			10YR 0/2	5	C	M	clay	suspended gley matrix
10.5-13	10YR 4/4	100					sand	
13-18	10YR 2/1	95	5YR 3/4	5	C	PL,M	sandy	sandy clay, pore linings/matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ No ___

Remarks:

Hydric soils present below the upper layers, consistent with the edge of wetland soils, but there is no dominance of hydrophytic vegetation. This pit is at the downward slope of an upland hummock.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Peripheral flooding area at the base of a gently sloping hummock with matted-down brome grasses left from this year's flooding.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-4-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 3

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): nearly level flood zone Local relief (concave, convex, none): slightly convex Slope (%): 0-1

Subregion (LRR): C Lat: 33.287292 Long: 117.210906 Datum: NAD 83

Soil Map Unit Name: Grangeville fine sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

This area was developed as part of the golf course historically, and it has flooded annually during higher precipitation years. Wetland indicators are present deeper in the horizon, but not up top.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 30x30)			
1. Bromus diandrus	50	Yes	UPL
2. Erigeron canadensis	12	No	UPL
3. Bromus madritensis rubens	40	Yes	UPL
4. Hirschfeldia incana	10	No	UPL
5. Conium macaulatum	15	No	FCW
6. Cynodon dactylon	7	No	FCU
7.			
8.			
	134	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	7	x 4 =	28
UPL species	112	x 5 =	560
Column Totals:	134 (A)		618 (B)

Prevalence Index = B/A = 4.61

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Aerial imagery review shows that this area has regularly flooded over time. It has not been maintained since around 2013.

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					sand	10% organic matter
4-18	7.5YR 3/3	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Heavily drained upland hummock within flood zone.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

"Island" of upland vegetation surrounded by flood zone.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-4-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 4

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): nearly level flood zone Local relief (concave, convex, none): slightly convex Slope (%): 0-1

Subregion (LRR): C Lat: 33.288079 Long: 117.213020 Datum: NAD 83

Soil Map Unit Name: Grangeville fine sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

This area was developed as part of the golf course historically, and it has flooded annually during higher precipitation years.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10x10)			
1. Polypogon monspeliensis	85	Yes	FCW
2. Distichlis spicata	20	No	FCW
3. Atriplex semibaccata	10	No	FAC
4. Erigeron candensis	4	No	UPL
5.			
6.			
7.			
8.			
	119	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	105	x 2 =	210
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	4	x 5 =	20
Column Totals:	119 (A)		260 (B)

Prevalence Index = B/A = 2.18

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Aerial imagery review shows that this area has regularly flooded over time. It has not been maintained since around 2013.

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					silty	silty loam
6-7	10YR 3/1	100					silty	silty sand
7-18	7.5YR 3/1	95	2.5Y 9/1	5	D	M	silty	silty clay loam, salty

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Hydric indicators weak at best.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Upland area just beyond the limits of flooding with hydrophytic vegetation, but no hydrology or hydric soil.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-4-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 5

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): nearly level flood zone Local relief (concave, convex, none): slightly concave Slope (%): 0-1

Subregion (LRR): C Lat: 33.287927 Long: 117.212856 Datum: NAD 83

Soil Map Unit Name: Grangeville fine sandy loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

This area was developed as part of the golf course historically, and it has flooded annually during higher precipitation years.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10x10)			
1. Polypogon monspeliensis	20	No	FCW
2. Distichlis spicata	15	No	FAC
3. Helminthotheca echioides	3	No	FCU
4. Rumex crispus	5	No	FAC
5. Conium maculatum	15	No	FCW
6. Xanthium strumarium	30	Yes	FAC
7. Lepidium latifolia	30	Yes	FAC
8. Melilotus alba	10	No	FCU
	118	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	80	x 3 =	240
FACU species	13	x 4 =	52
UPL species	0	x 5 =	0
Column Totals:	118 (A)		362 (B)

Prevalence Index = B/A = 3.07

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Aerial imagery review shows that this area has regularly flooded over time. It has not been maintained since around 2013.

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					silty clay	
3-3.5	10YR 4/3	100					sand	fine sand
3.5-4.5	10YR 2/2	100					sand	with organic matter
4.5-5	10YR 5/3	100					sand	
5-11	10YR 4/4	95	7.5YR 5/4	5	C	M	sand	some clay present
11-13	7.5 YR 3/1	85	5YR 3/3	15	C	PL	silty clay	
13-18	10YR 4/2	100					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Lush, green vegetation growing adjacent to the old golf course pond.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-11-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 6

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): old golf course pond Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): C Lat: 33.286742 Long: 117.216029 Datum: NAD 83

Soil Map Unit Name: Tujunga sand NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Pit dug in the old golf course pond, formerly mainatained by a pumping system to maintain water levels. Historic imagery shows open water without vegetation, but riparian growth is dense now.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 50x50)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tamarix ramoisissima	100	Yes	FACW
2. Salix gooddingii	10	No	FACW
3. Salix lasiolepis	10	No	FACW
4. Baccharis salicifolia	4	No	FAC
	124	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 50x50)			
1. Cyperus eragrostris	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: 50x50)			
1. Vitis girdiniana	15	Yes	FAC
2.			
	15	= Total Cover	

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	125	x 2 =	250
FAC species	19	x 3 =	57
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	144 (A)		307 (B)

Prevalence Index = B/A = 2.13

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Aerial imagery review shows that this was an artificial pond as late as 2013, but it has not been maintained since. Herb stratum is reduced due to recently flooded situation. Riparian vegetation is thick and dense.

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					silt	
4-11	10YR 4/2	85	5YR 3/4	15	C	M	sand	
11-18	10YR 2/2	94	5YR 3/3	6	C	PL	silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Formerly inundated golf course pond.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-11-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 7

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): old golf course pond Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): C Lat: 33.286444 Long: 117.216671 Datum: NAD 83

Soil Map Unit Name: Tujunga sand NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:
This area was on the golf course above the old golf course pond, formerly irrigated annual bluegrass turf.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10x10)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tamarix ramoisissima	20	Yes	FACW
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. None			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10x10)			
1. Eleocharis macrostachya	5	No	FACW
2. Ornamental sedge	90	Yes	FAC
3. Bromus catharticus	10	No	UPL
4.			
5.			
6.			
7.			
8.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. None			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	125 (A)		370 (B)

Prevalence Index = B/A = 2.96

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:
Aerial imagery review shows that this was an artificial pond as late as 2013, but it has not been maintained since. Tamarix included as overhanging vegetation, but it is not rooted in the higher area where this pit was dug.

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 2/2	100					sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Formerly irrigated golf course turf.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-11-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 8

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): slightly concave Slope (%): 0-1

Subregion (LRR): C Lat: 33.287883 Long: 117.214707 Datum: NAD 83

Soil Map Unit Name: Tujunga sand NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

This area was on the golf course, formerly irrigated annual bluegrass turf. It is the lowest lying area west of the Moosa Creek channel, where flood waters apparently recede toward and pond.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20x20)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 20x20)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 20x20)			
1. Distichlis spicata	80	Yes	FACW
2. Cynodon dactylon	20	No	FACU
3. Pennisetum clandestinum	15	No	FACU
4. Eleocharis macrostachya	5	No	FACW
5. Salicornia depressa	2	No	OBL
6. Schoenoplectus pungens	2	No	OBL
7.			
8.			
	124	= Total Cover	
Woody Vine Stratum (Plot size: 20x20)			
1. None			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	4	x 1 =	4
FACW species	85	x 2 =	170
FAC species	0	x 3 =	0
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	124 (A)		314 (B)

Prevalence Index = B/A = 2.53

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Polygon also has Rumex crispus, Polypogon monspeliensis, Helminthotheca echioides. Extends to interface with adjacent herbaceous upland communities to all sides except south where it connects to the creek zone. Map as "Disturbed herbaceous wetland".

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3.5	10YR 2/2	100					silty clay	
3.5-13	7.5YR 3/1	85	2.5YR 2.5/3	10	C	M,PL	clay	
			GLEY1 2.5N	5	C	M		compost smell
13-18	2.5Y 3/1	100					sand	coarse sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ No ___

Remarks:

Formerly irrigated golf course turf.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Flood zone adjacent to the riverway where low-lying wetland vegetation has now naturalized. The lower end of this swale polygon connects to the stream. Matted down vegetation adjacent to the west bank of Moosa Creek with directionality toward this wetland area indicate that this wetland is fed by flood waters that breach the bank. Golf course construction likely altered natural flows.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Moosa Creek Bank City/County: Bonsall, San Diego Sampling Date: 6-11-2020

Applicant/Owner: Burns & McDonnell State: CA Sampling Point: 9

Investigator(s): Ian Maunsell, Kris Alberts Section, Township, Range: Sec 20, T10S, R3W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): slightly concave Slope (%): 0-1

Subregion (LRR): C Lat: 33.288650 Long: 117.214263 Datum: NAD 83

Soil Map Unit Name: Tujunga sand NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

This area was on the golf course, and the cottonwoods were possibly planted or could be relics from the previous riparian system.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30x30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus fremontii	20	Yes	NI
2.			
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30x30)			
1. None			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 30x30)			
1. Distichlis spicata	45	Yes	FACW
2. Cynodon dactylon	5	No	FACU
3. Lactuca serriola	15	No	FACU
4. Avena barbata	35	Yes	UPL
5. Raphanus sativus	3	No	NI
6. Stipa millacea	2	No	NI
7. Helminthotheca echioides	5	No	FACU
8. Bromus diandrus	20	No	UPL
	130	= Total Cover	
Woody Vine Stratum (Plot size: 30x30)			
1. None			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	45	x 2 =	90
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	80	x 5 =	400
Column Totals:	150 (A)		590 (B)

Prevalence Index = B/A = 3.93

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	97	7.5YR 3/3	3	C	M	silty clay loam	mottling sparse

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✔ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✔ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ✔ No ___

Remarks:

Formerly irrigated golf course turf with weak hydric indicators consistent with just beyond the edge of the mapped wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✔ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✔ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Pit dug at slightly higher adjacent elevation to the the swale mapped today as “disturbed herbaceous wetland”. Drift deposits were present above any OHWM from flood waters that have receded.

Moosa Creek Riparian Restoration Habitat Management Plan

12/14/2020

Moosa Creek Riparian
Restoration Habitat Management Plan

12/14/2020

prepared by
Burns & McDonnell Engineering Company, Inc.
La Jolla, California

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
BMPs	Best management practices
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CE	Conservation Easement
County	County of San Diego
DRC	Declaration of Restrictive Covenants
HMP	Habitat Management Plan
MCAS	Marine Corps Air Station Camp Pendleton
Preserve	Moosa Creek Riparian Restoration Project
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

1.1 Background

Burns & McDonnell Engineering Company (Burns & McDonnell) is proposing to restore a mosaic of riparian and upland habitats on a 67+/- acre portion of the former Moosa Creek Golf Course in Bonsall, California. The Moosa Creek Riparian Restoration Preserve (the "Preserve") will remove existing infrastructure (pavement, structures, utilities) and recontour portions of the property to then be planted with native riparian and upland species. The Preserve will restore historic and enhance existing degraded riparian habitat that will serve as essential habitat for the federally endangered least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*). This restoration effort is being designed under the guidance of the United States Fish and Wildlife Service (USFWS) to offset corresponding riparian habitat impacts from Marine Corps Air Station (MCAS) Camp Pendleton infrastructure and flight safety improvements.

1.2 Goals

1.2.1 Goals

The primary goal of this Habitat Management Plan (HMP) is to provide a comprehensive restoration and management plan for the 67-acre Preserve site. The Preserve site supports native habitats that will be restored, preserved, and managed in perpetuity to enhance wildlife values and native ecosystem functions, and to offset impacts to riparian habitat supporting the federally endangered least Bell's vireo. The Preserve will generate restoration credits for MCAS Camp Pendleton as per the conservation measures and regulatory requirements contained in FWS-MCBCP-15B0299-19F1649 Formal Section 7 Consultation for the Clear Zone Project, dated 21 May 2020 (USFWS 2020), plus additional credits for future project impacts to riparian habitat occupied by federally listed species.[1] The HMP will outline the implementation of initial site clean-up and habitat restoration activities, maintenance and monitoring procedures, performance standards, and interim management goals and will provide guidance for long-term management of the site in perpetuity. The HMP will additionally serve as a descriptive inventory of biological resources that occur on this property and will provide an overview of the property's operation, maintenance, and personnel requirements to implement the management goals.

[1] Although the term "credit" is used in this HMP, implementation of the HMP will not result in the creation of a formal conservation bank that authorizes sale of credits to outside entities. Additional credits beyond those needed to satisfy the requirements in FWS-MCBCP-15B0299-19F1649 may be used to offset future impacts by MCAS Camp Pendleton (or other entity) to riparian habitat occupied by least Bell's vireo provided such impacts are addressed in a future consultation with the USFWS and are approved by the USFWS on a case by case basis.

2.0 SITE CHARACTERISTICS

2.1 Geographical Setting

The Preserve is located in unincorporated San Diego County (Figure 1), near the rural community of Bonsall on a portion of an abandoned golf course (Figure 2). The overall Preserve area is approximately 67 acres. The Preserve is bounded by Camino Del Rey to the east, Calle De Las Estrellas to the north, Old River Road to the west, and Golf Club Drive to the south. The entire site is within the Bonsall United States Geological Survey (USGS) 7.5-minute quadrangle map (USGS 2012). The Preserve area consists of County Assessor Parcel numbers 126-060-84 and 126-300-54.

The Preserve is bisected by Moosa Creek which flows from the eastern end of the site westward. Moosa Creek exits the site at the western end at Old River Road. Moosa Creek continues another half mile off site to the southwest before ultimately joining the San Luis Rey River. The site is a mostly level valley gradually sloping to the west towards the San Luis Rey River. The northern and southern edges slope upwards where residential developments are located, but the entire site sits within the 100-year floodplain.

2.2 Property Boundary and Adjacent Land

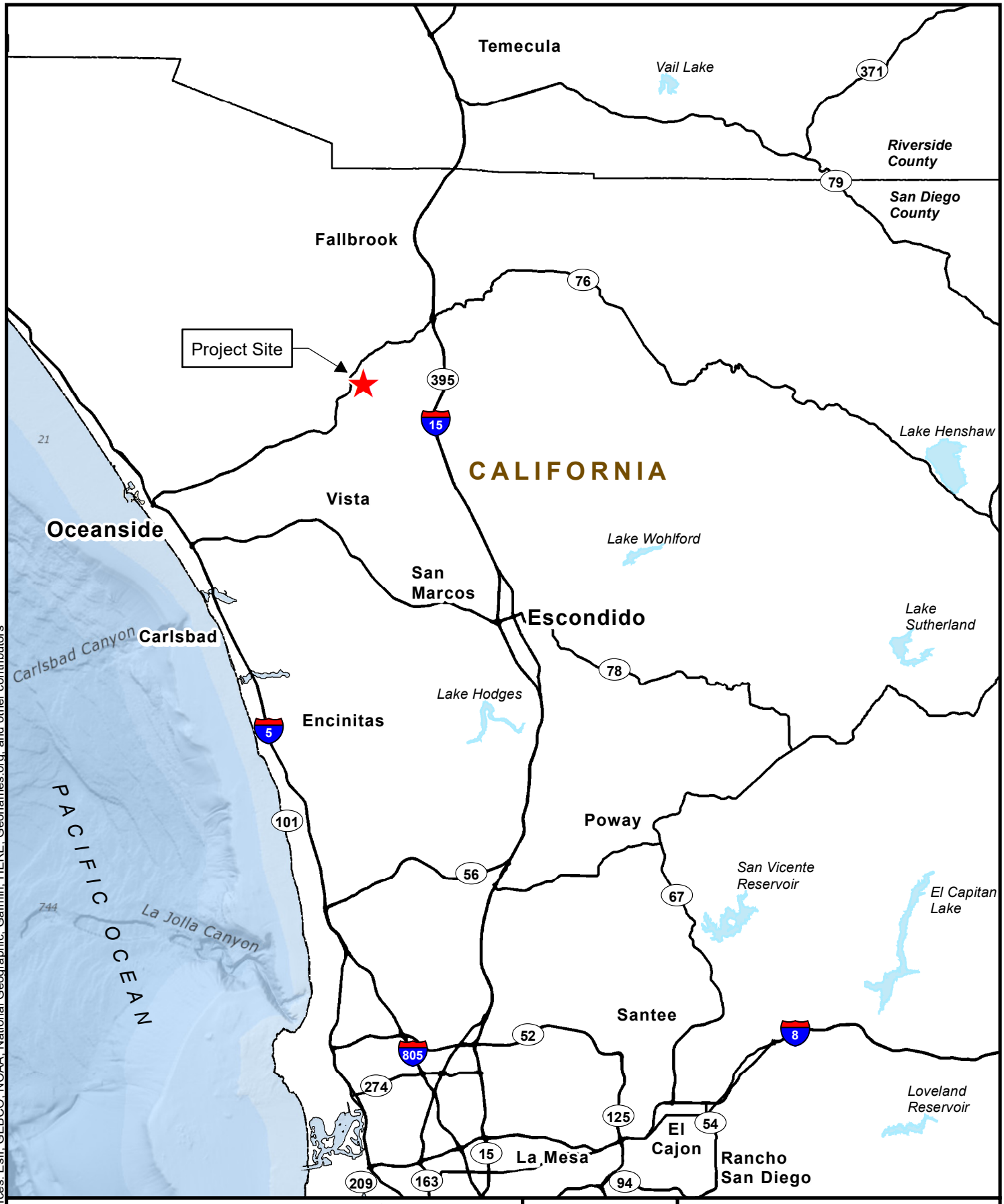
The Preserve area is bounded by an existing residential development to the northeast consisting of a condominium complex and a currently under construction housing development to the northwest. Bonsall Elementary School is also north of the site, just north of the new housing development. Existing residential neighborhoods are present to the south and southeast. Additional areas of the defunct golf course, west of Old River Road and north of the elementary school, are owned by the County of San Diego (County) which is planning to use the area for future habitat restoration (the County's property is shown in Figure 2). Moosa Creek runs off the Preserve through this County-owned land to the San Luis Rey River further west.

2.3 Geology, Soils, Climate, Hydrology

This section contains baseline soil, climate, and hydrology data for the Preserve area.

2.3.1 Geology and Soils

The soil survey of San Diego County (Bowman 1973) indicates that the Preserve area contains six soil types within five U.S. Department of Agriculture (USDA) soil series: Fallbrook sandy loam, 9 to 15 percent slopes, eroded (FaD2); Fallbrook vista sandy loams, 15 to 30 percent slopes (FvE), Grangeville fine sandy loam (GoA), 0 to 2 percent slopes, Placentia sandy loam, 9 to 15 percent slopes, eroded (PeD2), Visalia sandy loam, 0 to 2 percent slopes (VaA), and Tujunga sand, 0 to 5 percent slopes (TuB).



Source: ESRI

Issued: 5/27/2020

Site Boundary

San Diego County Owned Future Mitigation Area

NORTH

1 0.5 0 1

Miles

BURNS McDONNELL

Figure 2
Vicinity Map
Moosa Creek
San Diego County, CA

Source: ESRI

Issued: 8/11/2020

The majority of the site contains Tujunga sand and Grangeville fine sandy loam soil types, with the other four soil types occurring on the upland fringes of the site. Tujunga soils are somewhat excessively drained with negligible or very low runoff and rapid permeability. In some areas, flooding can be frequent. Grangeville soils can be found on alluvial fans and floodplains with slopes from 0 to 2 percent. This soil series is somewhat poorly drained with negligible to very low runoff and moderately rapid to moderate permeability in saline-sodic phases. These soil types are both considered hydric, as is the Visalia sandy soil at the furthest upstream portion of the site (USDA 2020a).

2.3.2 Climate

Southern California is characterized by a Mediterranean climate, with hot dry summers and cool wet winters. The average daily maximum temperature of the City of Vista, approximately 4 miles south southwest of the site, is 73.0 degrees Fahrenheit, while the average daily minimum temperature is 53.2 degrees Fahrenheit. The warmest months are July through September, with average daily maximum temperatures of 80.2 degrees to 81.9 degrees Fahrenheit. The coolest months are December through March, with average daily minimum temperatures of 44.9 degrees to 47.7 degrees Fahrenheit. Precipitation falls as rainfall with a total annual average of 13.14 inches (USDA 2020b). Rain-bearing weather systems are predominantly from the west, with the majority of rain falling between January and March (USDA 2020b).

2.3.3 Hydrology

Natural hydrologic sources of the Preserve include precipitation, surface runoff, Moosa Creek, and groundwater. Additionally, the entire Preserve is located within the 100-year floodplain and shows signs of high flow during extended precipitation events. Moosa Creek is currently a perennial stream being primarily fed via urban run-off from numerous residential and agricultural sources immediately adjacent and upstream of the site. Groundwater wells indicate the water table is between two to four feet below current grade throughout most of the site.

2.4 Vegetation Communities, Habitat, and Plant Species

Biological resource surveys were initially conducted for the Preserve in 2013 (WRA 2015) and were updated in June 2020 (Blackhawk 2020a). The results of the updated surveys are presented in this section as they reflect the current condition of the site.

2.4.1 Description of Onsite Vegetation Communities

Existing site conditions include developed and natural areas, including riparian areas (Table 1, Figure 3). General descriptions of each existing community are listed below.

Table 1: Existing Vegetation Communities

Vegetation Communities	Acreage
Non-native grassland	17.0
Ruderal weeds	16.7
Arroyo willow association	6.0
Non-native herbaceous wetland	3.8
Ornamental landscaping	3.4
Developed	3.2
Irrigated ornamental plants	3.0
Mulefat-arroyo willow association	2.7
Disturbed Fremont cottonwood-arroyo willow association	2.3
Fremont cottonwood association	2.1
Fremont cottonwood-arroyo willow association	2.1
Riverine channel	1.9
Coast live oak woodland	0.5
Freshwater Marsh	0.5
Disturbed Mulefat association	0.4
Disturbed habitat	0.4
Open water	0.3
Riprap	0.1
Annual bluegrass turf	0.1
Disturbed Arroyo willow association	0.0
Fremont cottonwood-Goodding's willow association	0.0
Total	**66.7**

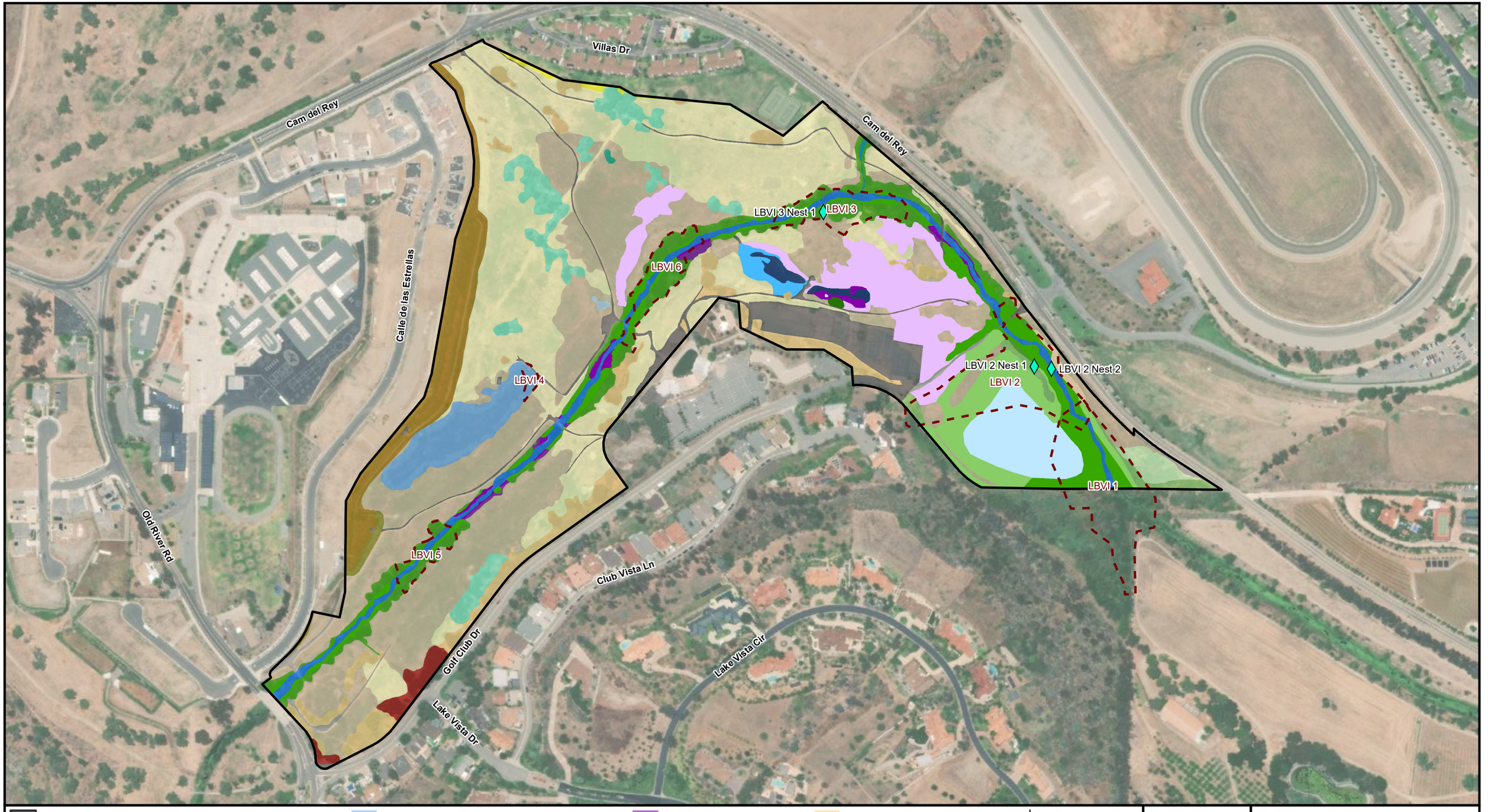
[1] Includes easement and fuel modification zone areas.

2.4.1.1 Native Habitat

Arroyo Willow Association

This structurally diverse community is characterized by a seasonally wet shrubland that is cold-deciduous. A dense, shrub layer dominated by arroyo willow (*Salix lasiolepis*) comprises the main understory and lower tree canopy. Other species that contributed to the multi-tiered canopy, but are not dominant, include western sycamore (*Platanus racemosa*) and Fremont cottonwood (*Populus fremontii*). The lower shrub layer also contains a high percentage of native shrubs, including mulefat (*Baccharis salicifolia*). Various native and non-native annuals and forbs were observed in the understory of this community, such as stinging nettle (*Urtica dioica*), western ragweed (*Ambrosia psilostachya*), wild radish (*Raphanus sativa*), and perennial pepperweed (*Lepidium latifolium*).

Path: \\bmcd\dfs\General\KCM\ESP\Marketing\Bus_Dev\MitBanking\California\GeoSpatial\San Diego Land Acquisition\02.JULY20\Moosa_Figure3_VegetationComm_20201211.mxd SNag 12/11/2020
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Site Boundary
Least Bell's Vireo Nest
Least Bell's Vireo Territory

Vegetation:
- Annual bluegrass turf
- Arroyo willow association
- Coast live oak woodland
- Developed
- Disturbed Arroyo willow association
- Disturbed Fremont cottonwood-arroyo willow association
- Disturbed Mulefat association
- Disturbed habitat
- Fremont cottonwood association
- Fremont cottonwood-Goodding's willow association
- Fremont cottonwood-arroyo willow association
- Freshwater Marsh
- Irrigated ornamental plants
- Mulefat-arroyo willow association
- Non-native grassland
- Non-native herbaceous wetland
- Open water
- Ornamental landscaping
- Rip-rap
- Riverine channel
- Ruderal weeds

NORTH

0 150 300 600
Scale in Feet

BURNS McDONNELL

Figure 3
Vegetation Communities Map
Moosa Creek
San Diego County, CA

Source: San Diego County, CA; ESRI;
Issued: 12/11/2020

Mulefat-Arroyo Willow Association

This community is generally characterized as a dense shrubland dominated by mulefat, interspersed with arroyo willows and contain greater than 50 percent relative cover of mulefat and arroyo willow in the shrub and lower tree canopy. This association is similar to arroyo willow association except that it has a lower-growing tree canopy and a higher relative proportion of mulefat. Associated species in the understory include stinging nettle, watercress (*Nasturtium officinale*), poison hemlock (*Conium maculatum*), and tall flatsedge (*Cyperus eragrostris*). This community occurs along stream channels and seasonally wet areas of the Preserve that are subject to frequent winter flooding that may limit the conversion of this community into an arroyo willow forest.

Disturbed Fremont Cottonwood-Arroyo Willow Association

This community occurs in seasonally wet or persistently wet portions of the Preserve and is very similar to Fremont cottonwood-arroyo willow association except that it contains a higher proportion of non-native species within the tree, shrub and understory layers, including salt cedar (*Tamarix ramosissima*), giant reed (*Arundo donax*), various non-native grasses, and ruderal weeds. This community consists of tall, open, broad-leaved, winter-deciduous riparian species and is dominated by Fremont cottonwood in the upper canopy and arroyo willow dominating the main understory along with scattered mulefat. This vegetation community is dense and structurally diverse.

Fremont Cottonwood Association

This community occurs in seasonally wet portions of the Preserve. This community is characterized by a dense, broadleaved, winter deciduous riparian vegetation community dominated by riparian species, namely Fremont cottonwood with less dominant arroyo willow and western sycamore trees. Associated plant species included Douglas mugwort (*Artemisia douglasiana*), stinging nettle, and non-native annual grasses. The largest Fremont cottonwood trees, mapped in the central portion of the Preserve west of Moosa Creek, may be relics from pre-development conditions or may be planted specimens.

Fremont Cottonwood-Arroyo Willow Association

This community occurs in seasonally wet or persistently wet portions of the Preserve and is very similar to disturbed Fremont cottonwood-arroyo willow association except that it contains a higher proportion of native species within the tree, shrub, and understory. This community consists of tall, open, broad-leaved, winter-deciduous riparian species and is dominated by Fremont cottonwood and arroyo willow in the upper canopy and mulefat dominating the main understory with scattered, generally low-growing, arroyo willows. This vegetation community is fairly dense and structurally diverse.

Coast Live Oak Woodland

This community is restricted to the southern edge of the Preserve and is characterized by dominant stands of coast live oak (*Quercus agrifolia*), most of which appear to have been planted, but some may be relics from pre-development conditions. A minimal shrub layer was documented in this community, likely as a result of landscaped maintenance. Sparse shrub and annual species occurring within the understory include ripgut brome (*Bromus diandrus*), Italian thistle (*Carduus pycnocephalus*), poison hemlock, Canadian horseweed (*Erigeron canadensis*), and foxtail brome (*Bromus madritensis*).

Freshwater Marsh

Freshwater marsh is characterized by persistent inundated or saturated soils capable of supporting freshwater wetland emergent plant species. This vegetation community is largely dominated by southern cattail (*Typha domingensis*) with sub-dominant hardstem bulrush (*Schoenoplectus acutus*) and threesquare bulrush (*Schoenoplectus pungens*) occurring along margins of open water riverine and ponded areas and along shallow, ponded portions of riverine channel of the Preserve.

Disturbed Mulefat Association

This community is characterized as a moderately dense shrubland dominated by mulefat, containing some small arroyo willows, but exhibiting greater than 50 percent relative cover of mulefat in the shrub layer. This association is similar to the mulefat association, except that it has a higher relative proportion of non-native vegetation, including salt cedar, and a slightly lower relative percent cover with more recent signs of anthropogenic disturbance. Associated species included poison hemlock, wild radish and tall flatsedge.

Disturbed Arroyo Willow Association

This structurally diverse community is characterized by a seasonally wet riparian woodland that is winter-deciduous. This association is very similar to arroyo willow association with a dense, shrub layer dominated by arroyo willow that comprises the main understory and lower tree canopy; however, it generally has a lower percent relative vegetation cover and a high proportion of non-native species such as salt cedar and perennial pepper weed.

Fremont Cottonwood-Goodding's Willow Association

This community occurs in seasonally wet portions of the Preserve and is very similar to Fremont cottonwood association, except that a higher proportion of Gooding’s black willow (*Salix gooddingii*) is documented in this community. This community consists of tall, open, broad-leaved, winter-deciduous riparian species and is dominated by Fremont cottonwood and Gooding’s black willow in the upper canopy and non-native herbaceous species in the understory such as ripgut brome, poison hemlock and

perennial pepperweed. Within the Preserve, this vegetation community is fairly open with a single tiered canopy.

Riverine Channel

This community is composed of unvegetated open water channels that convey permanent water flows and/or seasonal runoff from surrounding areas. Most of these channels are three to nine feet wide and likely convey mostly urban/agricultural runoff associated with surrounding developed areas and irrigation. Freshwater marsh inclusions were present within many areas of the riverine channels.

Open Water

This community is dominated by open, ponding waters with freshwater emergent species occurring along the periphery, including Gooding's black willow, arroyo willow, salt cedar, Fremont cottonwood, southern cattail, and common threesquare within shallow portions of the open water and along the margins.

2.4.1.2 Non-native Habitat

Non-Native Grassland

Non-native, annual grasses of Mediterranean origin typically characterize non-native grasslands. This vegetation community typically occurs in areas of both natural and anthropogenic disturbance and is dominated by various non-native annual grasses with varying relative ground cover. Non-native grassland within the Preserve is most prevalent along flat upland areas previously maintained as part of golf course operations and accounts for almost one third of the Preserve. Absolute vegetative cover within this vegetation community ranges from 70-120 percent.[2] Dominant species include rattail fescue (*Festuca myuros*), slender oat (*Avena barbata*), rescue brome (*Bromus catharticus*), ripgut brome, Bermuda grass (*Cynodon dactylon*), shortpod mustard (*Hirschfeldia incana*), foxtail barley (*Hordeum murinum*) with other less dominant non-native species such as western ragweed, fat-hen (*Atriplex prostrata*), Italian thistle, poison hemlock, Canadian horseweed, prickly ox-tongue (*Helminotheca echioides*), prickly lettuce (*Lactuca serriola*) and small wire lettuce (*Stephanomeria exigua*).

Ruderal Weeds

Ruderal weeds occur where there are few native plant species and generally contribute a low habitat value. Ruderal weeds are most prevalent particularly in areas disturbed by human activities. This community is dominated by non-native herbaceous species adapted to disturbance. Within the Preserve,

[2] Absolute cover can be over 100 percent due to two or more species being observed in the same vertical sample point. Two species may be in the same point due to being in different strata, i.e. an herb and shrub or tree occupying the same vertical sample point.

this community is dominated by shortpod mustard, Perennial pepperweed, wild radish, ripgut brome, rattail fescue, Bermuda grass, foxtail barley and rabbitsfoot grass (*Polypogon monspeliensis*). Other secondary species documented within this community include bull thistle (*Cirsium vulgare*), Canadian horseweed, common Mediterranean grass (*Schismus barbatus*), prickly ox-tongue, western ragweed, prickly lettuce, Bermuda grass, rabbitsfoot grass and cocklebur (*Xanthium strumarium*). Ruderal weeds were observed to integrate with other vegetation communities, particularly on the margins of arroyo willow association, mulefat-arroyo willow association, Fremont cottonwood association and non-native grasslands (Figure 3).

Non-Native Herbaceous Wetland

This community exhibits a dominance of non-native hydrophytic vegetation characterized by low growing non-woody vegetation providing relative ground cover near or in excess of 100-percent. Common plant species observed within this habitat include a mix of native and non-native species such as sea spurry (*Spergularia arvensis*), Bermuda grass, rabbitsfoot grass, salt grass (*Distichlis spicata*), cocklebur, curly dock (*Rumex crispus*), fivehook bassia (*Bassia hyssopifolia*), prickly lettuce, poison hemlock, and Australian saltbush (*Atriplex semibaccata*). Low microtopographic depressions and swales within these habitats are observed to support patchy occurrences of hydrophytes such as toad rush (*Juncus bufonius*), threesquare bulrush, pale rush (*Eleocharis macrostachys*) and pickleweed (*Salicornia depressa*).

Ornamental Landscaping

This vegetation community is composed of a variety of non-native, horticultural plant species that are commonly planted throughout Southern California. Some native species were also identified within this community, but in low numbers. Dominant species within this community include ash trees (*Fraxinus* ssp.), olive (*Olea europarea*), California fan palm (*Washingtonia filifera*), Mexican fan palm (*Washingtonia robusta*) with less abundant oleander (*Nerium oleander*), weeping willow (*Salix babylonica*) and Queen palm (*Syagrus romanzoffiana*). Understory species include various non-native annual grasses and annual forbs.

Developed

Developed lands generally include areas that have been physically altered to such an extent that conditions no longer exist to support native vegetation. These areas generally do not have the capacity to revegetate. Within the Preserve, this community is composed of primarily paved surfaces including concrete parking lots, paved golf cart paths and paved roadways that lacked vegetation.

Irrigated Ornamental Plants

This community consists of various non-native and native plant species often planted as ornamental shrubs and trees around developed areas. The majority of species within this community require irrigation in order to persist in a southern California climate. Species observed within this community include slender myoporum (*Myoporum parviflorum*), rosemary (*Rosmarinus officinalis*), Aleppo pine (*Pinus halepensis*), crimson bottlebrush (*Callistemon citrinus*), ash trees and oleander with scarce native trees such as western sycamore. The understory of this community is generally dominated by non-native grasses and annuals such as shortpod mustard, wild radish, ripgut brome and rescue brome with very few native species.

Disturbed Habitat

This vegetation community primarily identifies areas where severe anthropogenic impacts to natural communities has occurred to the extent that it is no longer functioning as a natural community. Within the Preserve, this community occurs where man-made dirt trails and road shoulders have been maintained in the past. These trails are predominantly bare ground with very scarce non-native grasses and ruderal weeds. This community does not provide any substantial ecological value.

Riprap

This community is composed of rock piles installed around the periphery of retention basins and channels associated with the adjacent residential development to the west leading into these channels and basins. Very sparse non-native species are observed growing along riprap areas, including slender oat, ripgut brome, prickly ox-tongue, common sow thistle (*Sonchus oleraceus*), rattail fescue and bur clover (*Medicago polymorpha*).

Annual Bluegrass Turf

This vegetation community is characterized as a mowed and maintained turf, dominated by annual blue grass (*Poa annua*) with lesser abundant Bermuda grass, Crete weed (*Hedypnois cretica*) and ripgut brome. Various non-dominant planted trees are documented within this community, primarily along the northern margin of the golf course and include olive and crimson bottlebrush.

2.4.2 Special-status Plant Species

Protocol surveys for rare plants were conducted in 2012, 2013 (WRA 2015), and 2020 (Blackhawk 2020b). Although several species have potential to occur, no species were observed during any of the surveys.

2.5 Special-status Wildlife Species

Protocol-level surveys for southwestern willow flycatcher (flycatcher), least Bell's vireo (vireo), and arroyo toad (*Anaxyrus californicus*) were completed in 2013 (WRA 2015). Six special-status species were detected over the entire golf course site (of which San Diego County currently owns the portion adjacent to the San Luis Rey River, while this Project occurs on the second portion, along Moosa Creek; Figure 2) during protocol-level surveys performed by Cummings and Associates and Blackhawk Environmental including flycatcher, vireo, vermillion flycatcher (*Pyrocephalus rubinus*), Nuttall's woodpecker (*Picoides nuttallii*), Brewster's yellow warbler (*Setophaga petechia brewsteri*), and yellow-breasted chat (*Icteria virens*).

Protocol surveys for vireo and flycatcher were conducted again in 2020 (Blackhawk 2020c), but limited to the Preserve property. Six vireo locations were observed during the 2020 surveys, four of which were determined to be breeding territories (Figure 3). All observed vireo were un-banded. Two of the pair observations occurred in the large riparian patch at the eastern end of the Preserve just south of Camino del Rey, including almost all of the riparian vegetation that abuts the roadway. The other two vireo pair territories occurred in the narrower, ribbon-like stretch of Moosa Creek that bisects the former golf course. An additional two vireo locations were of single transient males that did not establish paired territories on the Preserve; one of the single male locations was toward the southern end of the Preserve within Moosa Creek, and the other location was at the north end of the old golf course pond hydrologically disconnected from Moosa Creek toward the southwest edge of the Preserve. The vireo-occupied riparian habitat within the Preserve is best described as a combination of arroyo willow association, disturbed arroyo willow association, mulefat-arroyo willow association, Fremont cottonwood-arroyo willow association, and disturbed Fremont cottonwood-arroyo willow association. In addition, other assessed/surveyed habitats included adjacent areas of disturbed habitat (non-native grassland, ruderal vegetation, and ornamental plants), non-native herbaceous wetland and Fremont cottonwood association.

Two to six brown-headed cowbird (*Molothrus ater*) individuals were observed each of the survey days during the 2020 surveys, concentrating around the riparian habitat onsite.

No flycatcher were observed during protocol surveys for that species.

In general, a relatively large number of special-status species have at least a moderate potential to occur within the Preserve due to the fact that the site is in a semi-rural setting, contains valuable riparian habitat, is located along a large stream corridor, is within an otherwise arid landscape, and is contiguous with a fairly large area of existing and future natural habitat.

2.6 Wetland and Waters Resources

U.S Army Corps of Engineers (USACE) and California Department of Fish and Wildlife (CDFW) wetlands and water resources were mapped during updated wetland delineation surveys conducted in 2020 (Blackhawk 2020d). Acreages of USACE and CDFW mapped resources are presented in Tables 2 and 3, respectively. Note acreages of each overlap and are not cumulative.

Table 2. Potential Jurisdictional USACE Waters

Jurisdictional Waters	Acres
Likely USACE Jurisdiction	
Wetland Waters of the U.S.	**11.772**
Arroyo willow association	2.900
Disturbed arroyo willow association	0.037
Disturbed Fremont cottonwood-arroyo willow association	0.346
Disturbed herbaceous wetland	3.969
Fremont cottonwood-arroyo willow association	2.057
Freshwater marsh	0.335
Mulefat-arroyo willow association	2.128
Non-Wetland Waters of the U.S.	**2.137**
Developed Channel	0.003
Open Water	0.305
Riverine channel	1.829
Likely USACE Total Jurisdiction	**13.909**

Table 3. Potential Jurisdictional CDFW Waters

Jurisdictional Waters	Acres
Likely CDFW Jurisdiction	
Wetland/Riparian	**17.971**
Arroyo willow association	*6.072*
Disturbed arroyo willow association	*0.037*
Disturbed Fremont cottonwood-arroyo willow association	*2.252*
Disturbed herbaceous wetland	*3.969*
Fremont cottonwood-arroyo willow association	*2.057*
Freshwater marsh	*0.503*
Mulefat-arroyo willow association	*2.655*
Lake/Streambed	**2.136**
Open Water	*0.305*
Riverine channel	*1.829*
Likely CDFW Total Jurisdiction	**20.117**

2.7 Overall Biological Value

The Preserve currently supports approximately eight acres of disturbed riparian habitats and an additional five acres of open water. The Preserve will ultimately enhance the existing riparian areas and create an additional 20 acres of riparian habitat via restoration of existing man-made ponds and non-native uplands. The remainder of the site will also be restored to native riparian/upland transitional habitats. Restoration of the site will ultimately yield 37.4 riparian restoration credits (Table 4 in Section 3).

2.8 Fire History and Threats

Although the site is almost completely surrounded by development, it still has potential for wildfire. The most recent wildfire to occur at this site was the Lilac Fire in December 2017, about five years after the golf course was abandoned. Based on previous biological site assessments, when the fire occurred the site was primarily vegetated with dried annual grasses and shrubs. Several ornamental trees in this area show fire damage, with some dying after this, but many others showing signs of regrowth. Planned riparian and upland communities are successional habitats evolved to respond to periodic fires that are historically common in this ecosystem. As such, in the event a fire does occur, observations of the natural response will be evaluated to determine what actions, if any, are necessary. As noted in Section 3.7.5 below, fuel management zones are included within the Preserve boundaries to comply with Fire Marshal requirements.

3.0 RESTORATION WORK PLAN

3.1 Goals, Objectives, and Tasks

Goals, objectives, and tasks of the restoration plan portion of the project are described in this section.

3.1.1 Goals

The primary goal of the restoration work plan is to provide a comprehensive restoration plan for the 67-acre Preserve site. The Preserve site supports native habitats that will be restored, preserved, and managed in perpetuity to enhance wildlife values and native ecosystem functions, and to offset impacts to riparian habitat supporting the federally endangered least Bell's vireo. The restoration work plan will outline the implementation of initial site clean-up and habitat restoration activities, maintenance and monitoring procedures, performance standards, and interim management goals until the Preserve has been released for long-term management.

3.1.2 Objectives

The following objectives were identified to guide the management of the site towards meeting the goals stated above.

- Objective A: Restore native habitats within the Preserve site through grading, removal of golf course infrastructure, planting and seeding woody and herbaceous species, and weeding to provide a mosaic of riparian and upland habitats.
- Objective B: Maintain the riparian and upland habitat restoration and enhancement areas within the Preserve for the benefit of least Bell's vireo and other special-status wildlife species until the Preserve has been released for long-term management as defined in Section 4.

3.1.3 Tasks

The following tasks were developed to detail the steps taken to meet the goals and objectives outlined in this section.

- Task A.1: Conduct site cleanup (demolition and removal of golf course infrastructure) and grading. Detailed grading plans and planting and seeding plans are being created concurrently with the development of this HMP. Finalized grading and planting plans will be included with the submission of the as-built report following installation of the vegetation components.
- Task A.2: Conduct vegetation planting and seeding to restore site to native riparian and upland habitat as defined in this section of the HMP; performance standards for restoration success are provided in Section 4.1.3 of this restoration work plan.

- Task A.3: Conduct weed control both before and during the plant establishment period to allow native species to become established with reduced competition from non-native and invasive species.
- Task B.1: Maintenance and monitoring visits will occur to monitor site security and general conditions, with a focus on invasive species control and human incursions into the site including trash removal (Section 4.1.2).

3.2 Site Selection

The Preserve site was one of many investigated for potential riparian restoration opportunities in San Diego County. In conjunction with the USFWS, the Preserve site was selected as it is located within the San Luis Rey River Watershed, is bisected by Moosa Creek, contains the target riparian (mulefat/willow scrub) habitat and can support additional target habitat types.

3.3 Project Implementation

Project implementation will occur within one overarching project phase with two sub-stages, site cleanup and grading, and vegetation planting and seeding to restore the site to native riparian and upland habitats.

Demolition and site cleanup activities will be limited to removal of existing infrastructure (i.e., including the tennis courts, golf cart paths, bridges over Moosa Creek, and a remnant berm across the creek) and grading of portions of the site using heavy equipment such as scrapers, excavators, and dump trucks. Grading will be used to improve the channel morphology of Moosa Creek and to create floodplain benches along the streambed that will improve riparian habitat establishment. Grading will also remove soil to bring the finished grade down to within two to four feet of groundwater during the growing season. The existing constructed ponds will be converted to riparian scrub habitat, and therefore, any concrete lining will be demolished and removed and contouring of adjacent soils will be completed to achieve the desired depth to groundwater. Excavated soil from grading and recontouring activities will be placed on site in areas slated for restoration of upland habitat in areas where they will not be exposed to seasonal flooding. Vegetation planting and seeding activities will occur through much of the site to enhance existing degraded riparian habitat (mulefat and southern riparian woodlands) and to restore riparian, oak savannah (oaks and typical oak woodland understory species, and upland sage scrub transition species, mixing with mulefat/southern willow scrub), and floodplain (mix of species from the riparian and oak savannah habitats) habitats.

3.4 Timing and Sequence

Project implementation is planned to commence Fall 2021; however, demolition and weed control activities may occur before that time if permitting and regulatory requirements are finalized. Ideally, site cleanup and grading work will occur immediately after the avian breeding season ends (September), and is anticipated to occur in the following order or concurrently: demolition of the existing infrastructure, vegetation clearing, grading, excavation, and recontouring. Coordination with the USFWS will occur prior to any work occurring within the avian breeding season. A period of intensive invasive species control activities is likely to occur post site clean-up and grading, with planting and seeding activities occurring at the beginning of the rainy season for the region (late October) the following year.

3.5 Sources of Water

The long-term source of water for the restoration area will be rainfall, surface runoff, and groundwater associated with Moosa Creek. The restoration design will focus on getting the finished grades of each restoration area to the necessary level to reach groundwater and be self-sustaining, as such, the goal will be to rely on natural sources of water. Oak trees may need supplemental water during the first few years of growth. Should supplemental irrigation be required during the interim establishment period, it will consist of a drip or above ground system, fed by an on-site water meter, County-owned well just offsite, a temporary well installed onsite, or via water truck. If needed, supplemental water and irrigation costs will be accounted for in the establishment period budget.

3.6 Proposed grading plan

The proposed grading plan includes removing infrastructure from the site, light grading of ponds, and grading to enhance riparian areas. Cut soil will be spread to support restoration of upland habitat on the site. Concrete and asphalt materials may be placed under two or more feet of soil placed in the upland areas. Figure 5 (concept grading plan) illustrates areas of cut, fill, and infrastructure removal. A registered engineer will create construction grading plan drawings that will include specifics on cut and fill amounts, elevations, and locations, and which will incorporate detailed planting and seeding information.

3.7 Methods for Establishing the Desired Plant Communities

The desired plant communities will be established via proper site preparation, invasive species control, and appropriate plant material selection for the target communities. The target plant communities include enhancement of existing riparian habitat, re-establishment of new riparian habitat, establishment of new floodplain habitat, and establishment of new coast live oak savannah habitat (Table 4; Figure 4). Proposed seed and plant palettes are provided for each of these target communities below (Tables 5 to 8). Utility easements and fuel modification zones acreages are shown, but no restoration credit is being sought for

those areas. However, easement and fuel modification zones will still be seeded with native species, as described in this section.

Proper site preparation will include grading riparian target areas to within two to four feet of groundwater (in the growing season), which will provide the long-term support of that community. The proposed grading areas, including cut and fill locations, are shown in Figure 5. Invasive weed control both before and during the plant establishment period will allow native species to become established with reduced competition from invasive species. The ultimate goal is to develop a dense cover of native species that will help control the germination of invasive species, reducing the need for intensive weed control activities.

Planting the site with target community appropriate plant (container stock and cuttings) and seed material is also crucial to the successful attainment of target plant communities. Plant and seed material will be sourced from locations as close to the site as possible. Cuttings will be sourced from existing plants onsite or alternate sites within the ecoregion. Proposed planting and seeding palettes are provided, but may be altered by the restoration ecologist to substitute species that may not be available at the time of planting or to select species that may be better suited to on site conditions.

Table 4: Approximate Moosa Creek Restoration Target Acreages[1] and Proposed Credits

Target Vegetation	Total Acreage	Mitigation Ratio	Proposed Credits
Riparian Re-Establishment	23.0	1:1	23.0
Coast Live Oak Savannah Re-establishment	18.1	1:3	6.0
Riparian Enhancement	12.1	1:3	4.0
Floodplain Re-Establishment	4.4	1:1	4.4
Easement Totals	6.8[2]	-	-
Fuel Modification Zone Total	2.6[2]	-	-
Total Site	**67.0**		**37.4[3]**

[1] These acreages are approximate pending final design and permit approvals.
[2] Note there is a 0.3 acre overlap of easements and fuel modification zones, these numbers do not show that overlap.
[3] Note this number will change as the grading plan is finalized, with the total proposed credits being at least 33.

3.7.1 Riparian Re-establishment

- Riparian re-establishment areas include the widened riparian habitat corridor on either side of the creek, non-native herbaceous wetland, and areas where existing infrastructure will be removed.
- Infrastructure removal areas
  - The concept for these areas is to remove the infrastructure (Figure 5) at which point the elevation to groundwater should be within two to four feet of the resulting grade.

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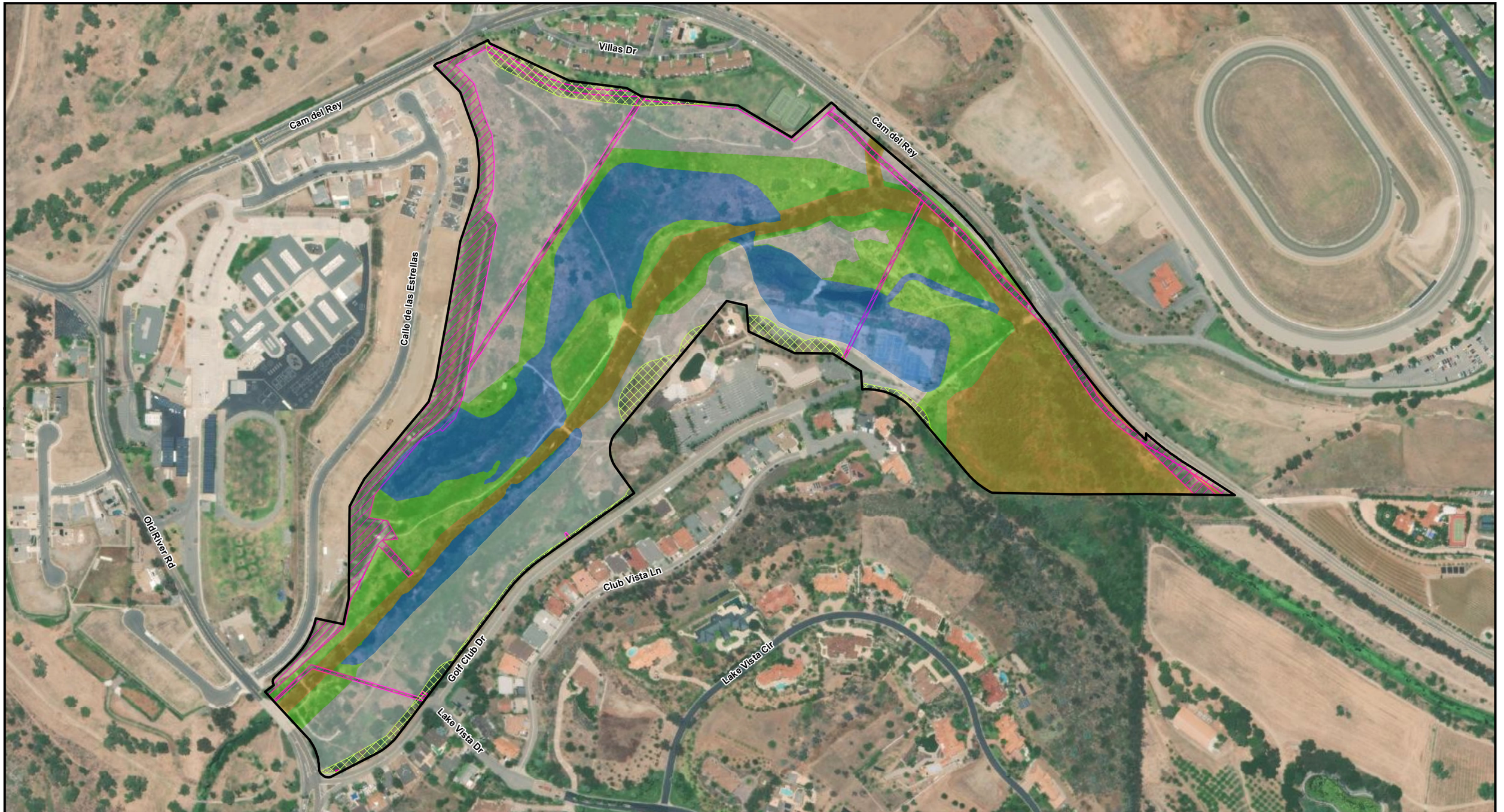
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



- Site Boundary
- Easements
- Fuel Modification Zones
- Floodplain Re-Establishment
- Coast Live Oak Savannah Re-establishment
- Riparian Enhancement
- Riparian Re-establishment

NORTH

0 150 300 600

Scale in Feet

BURNS McDONNELL

Figure 4
Vegetation in Relation to
Concept Design
Moosa Creek
San Diego County, CA

Source: San Diego County, CA; ESRI;

Issued: 12/11/2020

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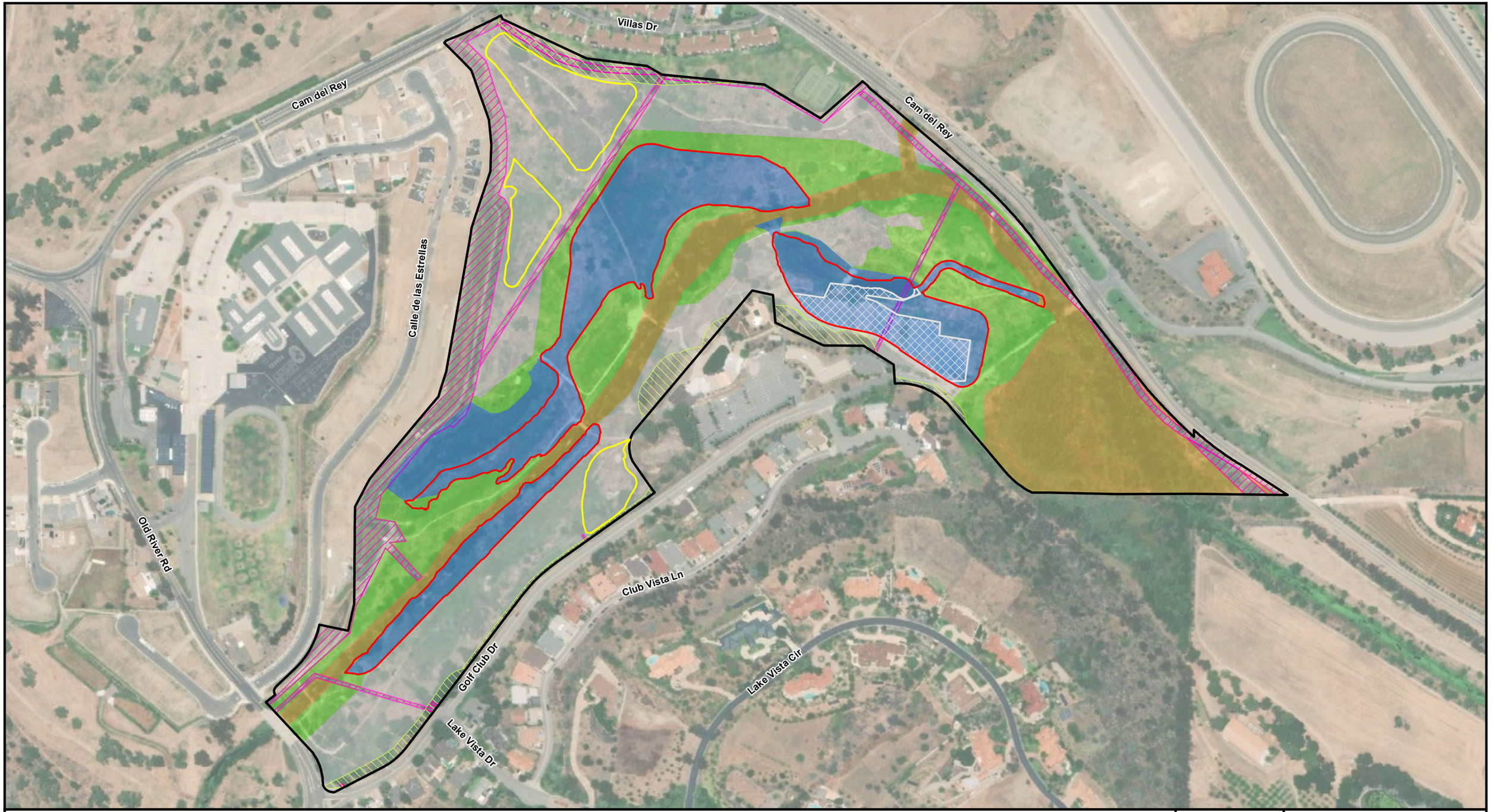

- Site Boundary
- Infrastructure Removal Locations
- Easements
- Fuel Modification Zones
- Floodplain Re-Establishment
- Coast Live Oak Savannah Re-establishment
- Riparian Enhancement
- Riparian Re-establishment
- Proposed Cut Locations
- Proposed Fill Locations

NORTH

0 150 300 600

Scale in Feet

BURNS McDONNELL

Figure 5
Grading Map
Moosa Creek
San Diego County, CA

Source: San Diego County, CA; ESRI; Burns & McDonnell Engineering Company, Inc.

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- Grading areas
  - Grading of approximately one to two feet is expected for this area to get the finished grade to within two to four feet of groundwater during the growing season.
  - Grading will occur to re-establish a high flow terraced floodplain while leaving the stream in its current configuration. Grading will also allow for secondary high flow channels to develop to help drainage of the site during heavy rains.

Table 5. Riparian Re-Establishment Plant/Seed Palette

Scientific Name	Common Name	Proposed Number of Plants/Cuttings (per Acre)	Proposed Seeding Rate (pounds seed/acre)
Ambrosia psilostachya	western ragweed	-	6
Anemopsis californica	yerba mansa	-	2
Artemisia douglasiana	mugwort	-	6
Baccharis salicifolia	mulefat	600	-
Distichlis spicata	saltgrass	-	4
Eleocharis macrostachys	pale spikerush	-	1
Juncus acutus	spiny rush	-	3
Oenothera elata spp. *hookeri*	Hooker's evening primrose	-	2
Pluchea odorata	marsh fleabane	-	3
Populus fremontii	Fremont cottonwood	100	-
Salix exigua	sandbar willow	175	-
Salix gooddingii	Goodding's black willow	150	-
Salix laevigata	red willow	75	-
Salix lasiolepis	arroyo willow	100	-
Total per acre		**1200**	**27**

- The plant palette (Table 5) will focus on willow and mulefat cuttings and a seed mix that includes wetland/riparian species currently located onsite in wetland and riparian areas.
- Weeding efforts will focus on invasive species (Section 3.8) during the growing seasons throughout the 5-year maintenance and monitoring period.

3.7.2 Coast Live Oak Savannah Re-establishment

- No excavation is proposed for this area. Soil excavated as a part of the riparian re-establishment activities will be placed in the coast live oak savannah re-establishment area prior to restoration (Figure 5). Asphalt and concrete debris from on-site golf cart paths and tennis courts will be broken up and placed a minimum of two feet below final grades in proposed fill areas as designated on the grading plan (Figure 5).

- The plant palettes (Table 6) will consist of oaks and typical oak woodland understory species and upland sage scrub transition species mixing with mulefat/southern willow scrub species.

- This area is currently dominated by annual grasses and other non-native species with some patches of native riparian and floodplain vegetation opportunistically growing sporadically throughout the area. Existing mature cottonwood trees will remain in place to the greatest extent feasible, with larger groupings being saved over single trees. The majority of the shrub and herb layer of this area is dominated by non-native species and a few opportunistic native species; however it will be most efficient to remove all of the understory and start over with the seed mix planned for this area.
- Initial weeding effort will focus on invasive species (Section 3.8) during the growing season.

Table 6. Coast Live Oak Savannah Plant/Seed Palette

Scientific Name	Common Name	Proposed Number of Plants/Cuttings (per Acre)	Proposed Seeding Rate (pounds seed/acre)
Acmispon glaber	deerweed	-	2
Amsinckia menziesii	fiddleneck	-	6
Artemisia californica	California sagebrush	-	3
Artemisia douglasiana	mugwort	-	5
Baccharis pilularis	coyote brush	-	3
Baccharis salicifolia	mulefat	600	-
Bromus carinatus	California brome	-	10
Deinandra fasciculata	clustered tarweed	-	4
Eriogonum fasciculatum	California buckwheat	-	5
Eschscholzia californica	California poppy	-	5
Heteromales arbutifolia	toyon	30	-
Heterotheca grandifolia	telegraph weed	-	2
Isocoma menziesii	coast goldenbush	40	-
Isomeris arbutifolia	bladderpod	15	-
Leymus triticoides	creeping wild rye	-	4
Muhlenbergia rigens	deergrass	-	3
Platanus racemosa	western sycamore	5	-
Populus fremontii	Fremont cottonwood	10	-
Stipa pulchra	purple needlegrass	-	3
Quercus agrifolia	coast live oak	70	-
Sambucus mexicana	blue elderberry	50	-
Toxicodendron diversilobum	poison oak	30	-
Total per acre		**850**	**55**

3.7.3 Riparian Enhancement

- This area includes the existing riparian and wetland areas associated with Moosa Creek. It contains mostly native vegetation and a lesser extent of non-native species.
- Minimal grading is proposed for this area to tie the existing creek corridor to the expanded riparian re-establishment areas (Figure 5).Enhancement activities will focus on weeding, seeding, use of cuttings, and other passive enhancement tactics. No container planting, watering or major earthmoving is planned for this area.
- The plant palette (Table 7) for open (un-vegetated) and weeded areas will be a riparian (mulefat and willow scrub) focused seed mix (Table 7).
  - Seed will be incorporated into the upper layer of soil prior to rainy season to take advantage of natural rainfall for efficient germination.
  - Willow and mulefat cuttings will also be used to help supplement seeding.
- Initial weeding effort will focus on invasive species (Section 3.8) during the growing season.

Table 7. Riparian Enhancement Plant/Seed Palette

Scientific Name	Common Name	Proposed Number of Plants/Cuttings (per Acre)	Proposed Seeding Rate (pounds seed/acre)
Artemisia douglasiana	mugwort	-	10
Baccharis salicifolia	mulefat	50	-
Isocoma menziesii	coast goldenbush	-	5
Oenothera elata spp. *hookeri*	Hooker's evening primrose	-	2
Salix sp.	willow species	200	-
Total per acre		**250**	**17**

3.7.4 Floodplain Re-establishment

- Floodplain re-establishment areas includes an area north of the creek that appears to be lower than the surrounding areas and shows signs of flood flows and a higher density of vegetation growth, likely due to the availability of more water than other parts of the site.
- The plant palette (Table 8) will focus on a mix of species from the riparian and coast live oak re-establishment areas (Table 8)
  - This area will include species such as California rose, blue elderberry, San Diego marsh elder, spiny rush, Fremont cottonwood, mulefat and willow cuttings, and potentially California sycamore.
- Initial weeding effort will focus on invasive species (Section 3.8) during the growing season.
- Well data in this area show depth to groundwater of just over four feet.

Once the Preserve site has been planted and seeded, routine maintenance and monitoring will take place to make sure the site progresses towards self-reliance within five years. The interim maintenance and monitoring schedule is provided in Table 10 in Section 4. This will include annual vegetation monitoring to track progress against final performance standards and routine invasive species control to allow native species to establish. Adaptive measures, such as supplemental seeding or planting, may be required depending on monitoring results.

Table 8. Floodplain Re-Establishment Plant/Seed Palette

Scientific Name	Common Name	Proposed Number of Plants/Cuttings (per Acre)	Proposed Seeding Rate (pounds seed/acre)
Ambrosia psilostachya	western ragweed	-	6
Anemopsis californica	yerba mansa	-	2
Artemisia californica	California sagebrush	-	2
Artemisia douglasiana	mugwort	-	8
Baccharis pilularis	coyote brush	-	3
Baccharis salicifolia	mulefat	300	-
Bromus carinatus	California brome	-	10
Deinandra fasciculata	clustered tarweed	-	4
Eschscholzia californica	California poppy	-	5
Heteromeles arbutifolia	toyon	15	-
Heterotheca grandifolia	telegraph weed	-	2
Isocoma menziesii	coast goldenbush	150	4
Platanus racemosa	western sycamore	5	-
Pluchea sericea	arrowweed	25	-
Populus fremontii	Fremont cottonwood	5	-
Rosa Californica	California wild rose	20	-
Rubus ursinus	California blackberry	10	-
Sambucus mexicana	blue elderberry	50	-
Toxicodendron diversilobum	poison oak	50	-
Total per acre		**630**	**46**

3.7.5 Fuel Modification Zones

- These areas will not count as credit for restoration but will be seeded with native species to help prevent the spread of non-native species on site.
- The fuel modification zones will be managed to keep vegetation under 18 inches or less. This will be accomplished by conducting non-native species control in these areas and then seeding with the native plant mix below (Table 9). Native trees and shrubs that opportunistically grow in these areas and are in accordance and comply with the Fire Marshal's regulations, will be left as is, with the assumption they can be removed, mowed, or trimmed as needed.

- These areas will be managed in perpetuity by mowing up to twice a year, once when the vegetation begins to die off at the end of the growing season, and potentially one more time as needed.

Table 9. Fuel Modification Zone Seed Mix

Scientific Name	Common Name	Proposed Seeding Rate (pounds seed/acre)
Acmispon glaber	deerweed	2
Amsinckia menziesii	fiddleneck	6
Artemisia douglasiana	mugwort	5
Bromus carinatus	California brome	10
Leymus triticoides	creeping wild rye	4
Stipa pulchra	purple needlegrass	3
Total per acre		**30**

3.7.6 Easements

- These areas will not count as credit for restoration but will be seeded with the associated target community they overlap with in order to help prevent the spread of non-native species. No trees or shrubs will be planted in the easement areas, but these areas will receive non-native species maintenance going forward. Native trees and shrubs that opportunistically grow in these areas will be left as is, with the assumption the easement holder can remove or mow them as needed.
- Seeding for these areas will follow the seed mixes suggested for each of the target restoration areas the easements overlap with, see above for those seed mixes.
- Easements are described further in Appendix C.

3.8 Plan to Control Non-Native Plant Species

Control of non-native species is a key factor in the success of the habitat restoration areas within the Preserve. Although non-native species will be treated in general, the longer-term focus will be on invasive species. Several non-native species considered invasive by the California Invasive Plant Counsel (Cal-IPC) were observed within the Preserve area during initial site surveys. While some invasive species were generally confined to localized infestations, several species were ubiquitous throughout the Preserve and/or were characteristic species of defined vegetation alliances. For practical reasons, efforts to control non-native grasses (other than giant reed) will be reduced after initial efforts to focus management efforts on species that can be feasibly controlled given the available resources. The species noted in the list below will be prioritized for control (with a long-term overall cover objective of maintaining less than one

percent untreated targeted highly invasive species after five years), with other non-native species controlled to a lesser degree (less than ten percent untreated overall cover after five years).

Initial mapping of invasive non-native plant species will occur during the first species inventory surveys, these maps will be included with the first monitoring report as an appendix. Large patches of non-native species will be identified and controlled during habitat restoration implementation. After the initial effort to control the non-native species, regular visits will occur during the interim management period to control non-native species such that the target native vegetation becomes established. The interim maintenance and monitoring schedule is provided in Table 10 in Section 4. Highly invasive species as noted below, will be targeted for eradication. To meet final performance standards, less than 1 percent of the Preserve cover would be determined to be untreated targeted highly invasive species. This determination will be conducted by visual estimate. Other non-native species will be limited to less than 10 percent (untreated) cover by year five.

Targeted highly invasive species include:

- Acacia (*Acacia* spp.)
- Giant reed (*Arundo donax*)
- Tree of heaven (*Ailanthus altissma*)
- Sahara mustard (*Brassica tournefortii*)
- Hottentot fig (*Carpobrotus edulis, Carpobrotus* spp.)
- Pampas grass (*Cortaderia selloana*)
- Artichoke thistle (*Cynara cardunculus*)
- Eucalyptus (*Eucalyptus* spp.)
- Tree tobacco (*Nicotiana glauca*)
- Castor bean (*Ricinus communis*)
- Pepper tree (*Schinus* spp.)
- Salt cedar (*Tamarix* sp.)
- Mexican fan palm (*Washingtonia robusta*)

Non-native species will be removed by hand (hand tools), with mechanical weed cutters, and/or herbicide application. If mechanical weed control and removal activities are necessary during the vireo breeding season (February 15 to September 15) the following minimization measures will apply.

- A biologist (biological monitor) familiar with the vireo[3] will conduct pre-construction surveys for vireos and their nests within 500 feet of the work the area prior to work being conducted.
    - If an active vireo nest (nest containing eggs or an empty or partial nest with adults actively exhibiting breeding behaviors) is observed within 500 feet of the work area, the biological monitor will use the distance to the maintenance limits and local topography to determine if maintenance activities are likely to significantly disturb vireo nesting activities.
    - Where disturbance of any vireo nest(s) is likely, the biological monitor will establish an appropriate buffer[4] and if mechanical equipment or machinery will be used, the biological monitor will remain on site to monitor.
        - After initial identification of the nest, the biological monitor will not approach within 25 feet of an active vireo nest. Nest monitoring will occur with binoculars from outside of the 25-foot buffer and only to confirm that the project-related activities will not significantly disturb nesting activities.

3.9 Erosion control measures

Erosion control measures will be implemented that will conform to site-specific Best Management Practices (BMPs) to prevent migration of disturbed soils. BMPs such as straw wattles, silt fencing, etc., will be utilized, as necessary. The grading plan will contain details regarding BMPS use.

[3] The biological monitor will be a trained ornithologist with at least 40 hours of documented vireo observation in the field and at least 20 hours of documented supervised experience locating and monitoring vireo nests.
[4] A minimum of 50 feet if no mechanical equipment will be used and a minimum of 100 feet if mechanical equipment will be used.

4.0 MANAGEMENT AND MONITORING STRATEGIES

This section outlines the interim and long-term management and monitoring strategies of the Preserve.

4.1 Interim Management Plan

The interim management plan describes the maintenance and monitoring activities that will occur between implementation of the restoration activities and achievement of the final performance standards, which is expected to be five years or less. Once the site meets the final performance standards and is signed off by the USFWS, the Preserve will enter the long-term management phase (Section 4.2).

4.1.1 Goals, Objectives, and Tasks

4.1.1.1 Goals

The primary goal of the interim management plan of the HMP is to provide a comprehensive maintenance and monitoring plan for the restoration of the 67-acre Preserve site. The Preserve site supports native habitats that will be restored, preserved, and managed in perpetuity to enhance wildlife values and native ecosystem functions, and to offset impacts to riparian habitat supporting the federally endangered least Bell's vireo. The interim management plan will provide guidance for interim management of the site from implementation of the restoration work until all final performance standards have been met.

4.1.1.2 Objectives

The following objectives were identified to guide the management of the site towards meeting the goals stated above.

- Objective A: Maintain the riparian and upland habitat restoration and enhancement areas within the Preserve through the performance of regular monitoring of the site, both qualitative and quantitative to document the progress of the restoration efforts in comparison to the performance standards and to monitor site security and general conditions.
- Objective B: Conduct maintenance of the riparian and upland habitats within the Preserve by conducting regular non-native species control and any supplemental planting or seeding required to keep the site on track towards meeting performance standards.

4.1.1.3 Tasks

The following tasks were developed to detail the steps taken to meet the goals and objectives outlined in this section. Tasks maybe be adjusted to meet long-term management goals as site conditions change over time.

- Task A.1: Quantitative surveys will be conducted annually in the spring to document vegetation performance which will be used to estimate progress against performance standards (Section 4.1.3).
- Task A.2: Conduct quarterly qualitative visits throughout the year to informally check the progress of the site and to note non-native species flare ups that require attention or site security concerns.
- Task A.3: Photo-documentation will be used to track health and changes in vegetation onsite. Permanent photopoints will be established after the initial site cleanup and grading activities are completed.
- Task A.4: A written report will be prepared at the end of each management year and will document the results of maintenance and monitoring activities on an annual basis, including invasive species control and public access issues.
- Task B.1: Routine non-native species control will be conducted in the spring and as directed based on the findings of the quarterly monitoring site visits. Non-native species will be controlled by an approved method in a timely manner.
- Task B.2: Maintenance and monitoring visits will occur to monitor site security and general conditions, with a focus on invasive species control and human incursions into the site including trash removal.

4.1.2 Maintenance and Monitoring Site Visits

Approximately ten site visits will occur annually during the interim phase of the project, four qualitative visits, one quantitative annual visit, up to two non-native species maintenance visits, up to two fuel modification zone mowing visits, and one fence repair visit. Site security and trespassing issues will be monitored on all visits to the site.

4.1.2.1 Monitoring

The goal of monitoring is to track progress towards meeting the final performance objectives and to determine if any maintenance will be required for the Preserve to meet these objectives. A restoration ecologist will visit the site quarterly for the entire five-year monitoring period (Table 10). Qualitative information on site security, trash, weed management, and general vegetation progress will be collected on every visit. One quantitative visit will also be made each year and will include the collection of qualitative and vegetation monitoring data, typically coinciding with late spring or early summer to

capture the peak of the growing season. Quantitative surveys will be conducted to measure performance standards, and may include plots or line-intercept methods of estimating plant cover using the same sampling points year after year to compare progress. Transects/plots and photo stations will be identified and mapped during the first quantitative survey. The locations will be noted in the annual report and will be used for quantitative surveys and site documentation going forward. Any future modification of these locations will be discussed with the USFWS and documented in annual reports.

Table 10. Interim Maintenance and Monitoring Schedule Target

Year	Q1 (Jan-Mar)			Q2 (Apr-Jun)			Q3 (Jul-Sep)			Q4 (Oct-Dec)		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	AB, QL		QL	M	MW	A	M	QL	MW	AF		QL
2	QL, R		QL	M	MW	A	M	QL	MW	AF		QL
3	QL, R		QL	M	MW	A	M	QL	MW	AF		QL
4	QL, R		QL	M	MW	A	M	QL	MW	AF		QL
5	QL, R		QL	M	MW	A	M	QL	MW	AF		QL
6+	R											

NOTE: AB – As-Built submittal, M – Maintenance Activity (as needed), QL – Qualitative/Security Visit, A – Annual Quantitative Visit, R – Annual Report, MW – Fuel Mod Zone Mowing (variable dates, annual cycle determined based on site conditions as needed), AF – Annual Fence and Signage Maintenance (as needed)

Quantitative monitoring visits will begin after submittal of as-builts, and supporting annual monitoring reports will be submitted by January 31st of the following year, after the as-built report is submitted and once the site has gone through one full growing season (typically at least 365 days from the end of construction). The as-built report will include final grading plans, final restoration plant and seed palettes, documentation of any changes to the restoration plan outlined in this document, final acreages of each restoration area, and discussion of any changes and/or adaptive management decisions that were made during installation.

The rationale for a higher frequency of monitoring during the interim period is to identify and act on any issues immediately to prevent bigger issues from occurring in the future. Photos will be taken during each annual visit to compare progress over time. Quantitative data results and site photographs will be provided in the annual report.

4.1.2.2 Maintenance and Invasive Species Control

Maintenance activities will focus on non-native species control (with an emphasis on invasive species), but may also include irrigation repair, trash/vandalism clean-up, and supplemental planting activities, as necessary. Non-native plant control will be initiated based on the results of the monitoring visits, with an emphasis on determining if non-native control is necessary during the growing season, spring, and early summer. If weed control or other maintenance is required, the restoration biologist will schedule the work and provide an update of the activities in the annual report.

Invasive plant species will be removed by hand, with mechanical weed cutters, and/or herbicide application. When appropriate, debris will be bagged and disposed of offsite at a suitable location. During the general avian breeding season and least Bell's vireo breeding season (March 15 to August 31) noise-producing equipment such as string trimmers or chainsaws may not be used without following the steps described in Section 3.8 above, which include pre-construction surveys and monitoring by a qualified biologist and an appropriate buffer between removal activities and any active nests.

The anticipated maintenance schedule is described in Table 10, but will be dependent on need as determined by a restoration ecologist during qualitative visits. Two non-native species visits, and two fuel modification zone visits are planned annually.

4.1.2.3 Fencing, litter, and vandalism

At this time, it is not anticipated that litter or other disturbances would occur onsite, however, any trash observed will be removed during quarterly maintenance visits. Site access issues will be noted and addressed during the interim phase. One fencing repair visit is planned annually. If required, fencing will be repaired/reinstalled during this visit (see Section 4.2.3.3 for additional details). Fencing should not impede wildlife movement across the site; therefore, the bottom wire should be at least 24" of the ground. No improved trails are proposed as a part of this HMP, and existing paths associated with the previous use of the site as a golf course will be removed.

4.1.2.4 Photo-documentation and Transects

Photo-documentation will be used to track health and changes in vegetation onsite. Permanent photo stations will be established after the initial site cleanup and grading activities are completed. Photo stations coordinates will be recorded with a GPS device and mapped so that later photographs can easily

be taken from the same location. Transects/plots will also be identified, recorded with a GPS device, and mapped during the first quantitative survey. The locations will be noted in the annual report and will be used for quantitative surveys and site documentation going forward. Any future modification of these locations will be discussed with the USFWS and documented in annual reports

4.1.3 Performance Standards

Performance standards for the Preserve are based on the existing riparian conditions at the upstream end of the site and the context of the site within the surrounding built environment. While focused on the establishment of native vegetation. Tables 11 to 14 contain the performance standards for the four restoration areas proposed for this project. Vegetative standards are based on absolute overall ground cover for native and non-native species, species richness, and tree height requirements as applicable based on the plant palette of each restoration area. Native cover includes native species in the plant palettes and also opportunistic native recruits. Tree height standards for container trees in all applicable areas are presented in Table 15. Willow heights will not be measured for performance as they will all be installed via cuttings. Due to the prevalence of non-native grasses onsite, the performance standard will focus on non-native forbs and shrubs. USFWS approval/sign-off will be required to verify the restoration areas have successfully met their final performance standards.

4.1.4 Reporting

Burns & McDonnell will submit a brief annual monitoring report describing the previous calendar year's activities to the USFWS by January 31st of each year until performance standards have been achieved and interim restoration monitoring requirements are satisfied.

The annual monitoring report will contain, at a minimum, the following:

- Monitoring methodology
- Performance standards
- Annual monitoring data (past and present)
- Quantitative comparison of current year data with former years' results
- Photographs from established photopoints
- Discussion of the performance standards status (success or failure) related to individual parameters and to the whole Preserve.
- Management actions that were taken within the past year including trash and invasive species removal efforts.

Table 11. Riparian Re-Establishment Performance Standards

Year	Cover				Species Richness[2]
	Native Cover	Non-Native cover			
		General Non-Natives	Target Non-Natives[1]	Total Non-Natives	
1	35%	<25%	<10%	<35%	50%
2	40%	<20%	<10%	<25%	60%
3	50%	<15%	<8%	<20%	70%
4	60%	<12%	<5%	<15%	80%
5	70%	<10%	<1%	<10%	90%

[1] Target invasive non-native list is located in Section 3.8

[2] Species richness is a count of native species based on a percentage of species in the plant palette for this area, but may also include opportunistic native recruits not in the plant palette.

Table 12. Floodplain Re-Establishment Performance Standards

Year	Cover					Species Richness[2]	Container Stock Survival[3]
	Native Cover		Non-Native cover				
	Native Shrubs	Total Natives	General Non-Natives	Target Non-Natives[1]	Total Non-Natives		
1	5%	25%	<25%	<10%	<35%	50%	80%
2	10%	35%	<20%	<10%	<25%	60%	80%
3	20%	45%	<15%	<8%	<20%	70%	-
4	30%	55%	<12%	<5%	<15%	80%	-
5	40%	65%	<10%	<1%	<10%	90%	-

Year	Cover					Species Richness[2]	Container Stock Survival[3]
	Native Cover		Non-Native cover				
	Native Shrubs	Total Natives	General Non-Natives	Target Non-Natives[1]	Total Non-Natives		

[1] Target invasive non-native list is located in Section 3.8

[2] Species richness is a count of native species based on a percentage of species in the plant palette for this area, but may also include opportunistic native recruits not in the plant palette.

[3] Container stock survival for container plants and trees only (not including cuttings) and only for first two years. Cuttings are limited to mulefat and willow species. Survival percent based on baseline plants per acre rates noted in Table 8.

Table 13. Coast Live Oak Savannah Re-Establishment Performance Standards

Year	Cover					Species Richness[2]	Container Stock Survival[3]
	Native Cover		Non-Native cover				
	Native Shrubs	Total Natives	General Non-Natives	Target Non-Natives[1]	Total Non-Natives		
1	5%	205	<25%	<10%	<35%	50%	80%
2	10%	30%	<20%	<10%	<25%	60%	80%
3	20%	40%	<15%	<8%	<20%	70%	-
4	30%	50%	<12%	<5%	<15%	80%	-
5	40%	60%	<10%	<1%	<10%	90%	-

[1] Target invasive non-native list is located in Section 3.8

[2] Species richness is a count of native species based on a percentage of species in the plant palette for this area, but may also include opportunistic native recruits not in the plant palette.

[3] Container stock survival for container plants and trees only (not including cuttings) and only for first two years. Cuttings are limited to mulefat and willow species. Survival percent based on baseline plants per acre rates noted in Table 6.

Table 14. Riparian Enhancement Performance Standards

Year	Non-Native cover		
	General Non-Natives	Target Non-Natives[1]	Total Non-Natives
1	<25%	<10%	<35%
2	<20%	<10%	<25%
3	<15%	<8%	<20%
4	<12%	<5%	<15%
5	<10%	<1% untreated	<10% untreated

[1] Target non-native list in located in Section 3.8

Table 15. Tree Height Performance Standards

Scientific Name	Common Name	Year Five Minimum Average Tree Height Requirement (feet) [1]
Riparian Re-Establishment Area		
Populus fremontii	Fremont cottonwood	8
Floodplain Re-Establishment Area		
Platanus racemosa	western sycamore	6
Populus fremontii	Fremont cottonwood	8
Coast Live Oak Savannah Re-Establishment Area		
Platanus racemosa	western sycamore	6
Populus fremontii	Fremont cottonwood	8
Quercus agrifolia	coast live oak	5

[1] Minimum average height requirement measurement evaluated in year five

- A map documenting notable biological observations, such as sensitive species.
- Any changes in herbicide use and other invasive species control method modifications.
- Any measures taken to reduce human incursions into the site such as installation of fencing or signage.
- A brief description of proposed management actions for the upcoming year (if needed).

4.2 Long-term Management Plan

The long-term management plan will go into effect once the site has met the final performance standards. Long-term management activities will be conducted by Burns & McDonnell until transferred to a third-party entity.

4.2.1 Goals, Objectives, and Tasks

4.2.1.1 Goals

The primary goal of the long-term management plan for the HMP is to provide a comprehensive management plan for the 67-acre Preserve site. The Preserve site supports native habitats that will be restored, preserved, and managed in perpetuity to enhance wildlife values and native ecosystem functions, and to offset impacts to riparian habitat supporting the federally endangered least Bell's vireo. The long-term management plan will provide guidance for long-term management of the site in perpetuity. The long-term management plan will additionally serve as a descriptive inventory of biological resources which occur on this property and will provide an overview of the property's operation, maintenance, and personnel requirements to implement the management goal.

4.2.1.2 Objectives

The following objectives were identified to guide the management of the site towards meeting the goals stated above.

- Objective A: Maintain the restored riparian and upland habitat associations within the Preserve for the benefit of least Bell's vireo and other special-status wildlife species.
- Objective B: Maintain the riparian and upland habitats within the Preserve by preventing degradation from invasive plant species.
- Objective C: Maintain the physical conditions of the property through conducting land management activities in a way that is consistent with the conservation goal and purposed of the property.

4.2.1.3 Tasks

The following tasks were developed to detail the steps taken to meet the goals and objectives outlined in this section. Tasks maybe be adjusted to meet long-term management goals as site conditions change over time.

- Task A.1: Baseline mapping of native riparian and upland habitat will occur prior to implementation of the long-term management plan. These maps will be included with the first long-term management report as part of an appendix.
- Task A.2: Baseline mapping of invasive and non-native plant species will occur prior to implementation of the long-term management plan. These maps will be included with the first long-term management report as part of an appendix.
- Task A.3: General floral and faunal species inventory surveys will be conducted every five years. In addition to species inventories, surveys will monitor the species composition of onsite habitats and note general vegetation conditions, especially if a wildfire occurs onsite. If additional special-status species are detected during these general surveys, the species will be mapped.
- Task A.4: A protocol survey for the least Bell's vireo will occur at the end of the 5-year interim maintenance and monitoring period to serve as a data point of vireo use of the site post restoration.
- Task A.5: The goal of the Preserve is to create a self-sustaining site with multiple habitat communities and a minimum of 36.16 credits (as described in Section 1.2 above (i.e., the combined need of two projects) of suitable least Bell's vireo habitat. It is anticipated that there will be some drift as the communities stabilize, climate change advances and regional development continues. It is not uncommon for natural communities to mature and change over time, if such change does occur, it is likely to take decades to manifest. This natural maturing process is something that will be noted, and if the site dips below 36.16 acres of suitable least Bell's vireo habitat, mature willow trees will be removed to open up the canopy and allow native shrub scrub to return. With the planning and design being developed, we do not believe this will happen to any detrimental level for decades, but we will be prepared to implement adaptive management to maintain at least 36.16 credits of suitable least Bell's vireo habitat as noted above.
- Task A.6: A written report will be prepared at the end of each management year and will document the results of maintenance and monitoring activities on an annual basis, including invasive species control and public access issues.

- Task B.1. Biannual maintenance visits will occur to address non-native species control issues as invasive species continue to germinate onsite. Any changes in herbicide use and other invasive species control method modifications will be reported as part of the annual report.
- Task C.1. Seven site security/qualitative visits will occur annually to monitor site security and general conditions, with a focus on human incursions into the site. Signage and fencing if used, will be inspected. Non-native species issues will also be noted during these visits to help direct maintenance visits.
- Task C 2: Control access to the property through installation of signage and physical barriers, conducting inspections, and repair or replacement of the signage and physical barriers as needed to protect the property without impeding wildlife.
- Task C 3: Establish a regular presence on the property, conducting site visits at monthly through the various qualitative (seven) and maintenance (five) visits conducted throughout the year (Table 16).
- Task C 4: Report instances of trespassing, encampments, illegal dumping, vandalism, and other damage to local law enforcement. Any evidence of illegal dumping will be recorded and addressed in an expedited fashion.

4.2.2 Monitoring

Once the site has met its final performance standards, general site biological monitoring will move from annual to every five years. In addition, qualitative biological and site security site visits will be conducted seven times each year, while maintenance visits will occur at least biannually. Additionally, there will be up to two mowing visits and one fence repair visit. Between these biological, security and maintenance activities, a minimum of 12 site visits will occur annually during the long-term management period. See Table 16 for the long-term maintenance and monitoring schedule.

Focus points during long-term monitoring visits (which will be in the spring or early summer) will include:

- General floral and faunal species inventory surveys every 5 years
    - Observation for and mapping of new special-status species and raptors/raptor nests, if detected
    - Discussion of the status of the vegetation and species lists
    - Observations of cowbirds
- Protocol least Bell's vireo surveys every 10 years (including cowbird egg removal if applicable)
- Discussion of any steps taken as a result of quarterly qualitative biological/security visits

Focus points during qualitative biological/security visits will include:

- Checking the site for any vandalism or trespassing issues and discussion of follow up actions, as necessary
- Observation and mapping of any sensitive species
- Observation of vegetation progress and discussion of follow up actions, as necessary
- Observation of potential non-native species issues and discussion of follow up actions, as necessary

Table 16. Long-Term Maintenance and Monitoring Schedule Target

Year	Q1 (Jan-Mar)			Q2 (Apr-Jun)			Q3 (Jul-Sep)			Q4 (Oct-Dec)		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Annual[1]	QL, R	QL	QL	M	MW	QL	M	QL	MW	AF	QL	QL
5[2]	QL, R	QL	QL	M	FF, MW	QL	M	QL	MW	AF	QL	QL
10[2]	QL, R	QL	QL	V, M	FF, MW	QL	M	QL	MW	AF	QL	QL
30[3]	QL, R	QL	QL	V, M	FF, MW	QL	M	QL	MW	HM	QL, FR	QL

NOTE: M – Maintenance Activity (as needed), QL – Qualitative/Security Visit, R – Annual Report, AF – Annual Fence and Signage Maintenance (as needed), MW – Fuel Mod Zone Mowing (variable dates, annual cycle determined based on site conditions as needed), V – Protocol Vireo Survey, FF – Floral and Faunal Survey

[1] After performance standards are met and the Preserve enters the long-term management phase, the annual monthly monitoring schedule may be adjusted based on site specific and seasonal factors. Monthly adjustments will be discussed in annual reports.

[2] Floral and Faunal Survey conducted every 5 years.

[3] Protocol least Bell's Vireo surveys conducted every 10 years, with all other visits following previous schedule.

[4] Fence Replacement (FR) and tree removal for vireo Habitat Management (HM) estimated recurrence every 30 years (as needed)

4.2.3 Maintenance

The Preserve has been designed to be self-sustaining once performance standards have been attained. Site security issues will be document during all maintenance visits in addition to the long-term maintenance activities described in this section.

4.2.3.1 Non-Native Species Management

Invasive plant species will be removed by hand, with mechanical weed cutters, and/or herbicide application. See Section 3.8 for non-native species management protocols that will also be followed for the interim management period.

4.2.3.2 Trash/ Vandalism Clean-Up

Trash within the property is a concern as litter attracts urban-adapted predators, which can be predators of many native species. Litter and trash dumping could become an issue as rural residential roads are particularly subject to illegal dumping. Trash and littering are not anticipated to be a problem at this time. However, any trash observed will be removed during biannual maintenance visits and disposed of in accordance with applicable local ordinances. Signs or fencing that are subject to vandalism will be replaced or repaired as quickly as possible. In addition to the qualitative monitoring/site security visits, there will be another five maintenance-related visits to the Preserve throughout the year during which signs of trash, vandalism, and trespassing will be looked for. This should be adequate for observing any trespass or vandalism related issues in a timely manner. Instances of trespassing, encampments, illegal dumping, vandalism, and other damage will be reported to local law enforcement.

4.2.3.3 Sign and Fencing maintenance (if applicable)

Onsite habitat could be negatively impacted by unauthorized access. At least twelve site visits will occur throughout the year, during which site security and general conditions will be noted, with a focus on human incursions into the site. No improved trails are proposed as a part of this HMP, and existing paths associated with the previous use of the site as a golf course will be removed. Perimeter signage that informs the public of the sensitivity of the site will serve as the primary method to deter unauthorized site access. Signage will be maintained and replaced as necessary, with some maintenance expected annually. Any fencing that was erected where existing trails/paths cross into the site will also be maintained as necessary. Although fencing of the entire site is not proposed at this time, if unauthorized use of the Preserve or trespassing becomes detrimental to the goals of the Preserve, installation of strand-wire fencing will be considered. It is anticipated that the need for fencing will be determined during the interim management period, during which time fencing will be installed if needed. If fencing becomes necessary, it should not impede wildlife movement across the site; therefore, the bottom wire should be at least 24” of the ground. Site access issues will be noted and addressed during the long-term management phase.

4.2.3.4 Annual Mowing of Fuel Modification Zones

The fuel modification zones will be managed to keep vegetation under 18 inches or as required by local fire ordinances. These areas will be managed in perpetuity by mowing up to twice a year, once when the vegetation begins to die off at the end of the growing season, and potentially one more time as needed.

4.2.3.5 General Flora and Faunal Species Inventory

General floral and faunal species inventory surveys will be conducted every five years. In addition to species inventories, surveys will monitor the species composition of onsite habitats and note general vegetation conditions, especially if a wildfire occurs onsite. If additional special-status species are detected during these general surveys, the species will be mapped.

4.2.4 Protocol Least Bell's Vireo Surveys

A protocol survey for the least Bell's vireo will occur the first year the site enters the long-term maintenance and monitoring period to serve as a data point of vireo use of the site post restoration. Thereafter, protocol vireo surveys will occur every 10 years within all suitable nesting habitat. Occurrences of least Bell's vireo and other sensitive species onsite will be noted concurrently with the general plant and wildlife surveys conducted every five years. Observed species will be mapped and locations will be included within the annual reports for that year. A biologist qualified to conduct vireo nest surveys and also qualified to remove cowbird eggs will conduct the vireo protocol level surveys. Should they discover any vireo nests with cowbird eggs in them, they will remove cowbird eggs during these surveys.

4.2.5 Brown-Headed Cowbird Management

Cowbird trapping will not occur as a standalone practice on the Preserve. In addition to opportunistic removal of cowbird eggs when discovered in vireo nests noted in Section 4.2.4. The Preserve will coordinate with larger regional cowbird trapping efforts by allowing access to the Preserve for permitted trapping projects. Due to cost, cowbird trapping at the preserve level is not seen as an efficient mechanism to curtail nest parasitism within the larger regional area, where a coordinated regional effort would. If nest parasitism or the presence of cowbirds is observed, the regional coordinator (if any) for the ongoing trapping program will be notified. Any extra funds generated by the endowment that are not used for long-term management of the site may be directed toward cowbird management programs if/when they materialize in the future.

4.2.6 Reporting

Reports will be submitted to the USFWS by January 31st of the year the long-term monitoring visit was conducted. Items to include in this report include, but are not limited to:

- Results of general survey, including species lists and biological resources map.
- Photographs
- Any changes in herbicide use and other invasive species control method modifications
- Any measures taken to reduce human incursions into the site such as installation of fencing or signage
- Summary of all management actions that were taken since previous report
- Any issues or concerns that were documented including responses to address those concerns
- A brief description of proposed management actions for the upcoming five-year period (if needed)
- An annual financial statement from the endowment holder to include the current amount in the endowment, the expenditures from the previous year, and gains or losses from investments.

4.3 Adaptive Management Plan

An adaptive management plan applied during interim and long-term periods, in partnership with the previously described monitoring requirements, can be used as a tool to keep the Preserve on track to meet performance criteria.

If Burns & McDonnell determines that the Preserve is at risk of not meeting the performance criteria, Burns & McDonnell shall recommend corrective actions to ensure that performance criteria are achieved. Potential corrective actions include but are not limited to additional seeding/plantings and targeted herbicide application. Any suggested corrective actions shall be outlined in the annual monitoring report and submitted to the USFWS. Potential adaptive management will consider extreme flood events. All corrective actions under the adaptive management plan will be the financial responsibility of the long-term site manager. Any modifications to the HMP will be subject to review and approval by the USFWS.

4.4 Public Use

No trails or other public access are proposed through the site. Extensive signage (7 by 10 inches or similar) will be added along the site perimeter to inform the public of the sensitivity of the site and will serve as the primary method to deter unauthorized site access. Two-wire fencing will also be erected where existing trails/paths cross into the site, along with signage to further deter public entry. Fencing will not impede wildlife movement across the site, with the bottom wire being at least 24” of the ground. All existing paths on the property will be removed as well. Access issues will be noted during all visits to the site, especially during the 5-year interim maintenance and monitoring period. Should additional site fencing be required due to excessive trespassing issues, it will be installed prior to the long-term management phase. If any unauthorized access issues manifest, they will most likely occur during the interim phase and additional measures will be implemented during that time. Should additional measures

be necessary in the long-term monitoring phase, they will be discussed as adaptive management suggestions.

4.5 Easements

There are four utility easements running through the Preserve and one along the boundary (Figure 6). The easements running through the Preserve include two 10-foot wide, one 15-foot wide, and one 20-foot wide easements held by the Rainbow Water District for water and sewer lines. Collectively these easements total approximately 4.4 acres. An easement along the northwestern Preserve boundary provides a stormwater runoff system for the adjacent housing development and is approximately 2.4 acres. No credit is being requested for these easement acreages. Additional details of these easements are described further in Appendix C.

4.6 Contingency Measures

In the event the site suffers loss of vegetation stemming from an unexpected catastrophe (flood, fire, infestation, emergency action, etc.) contingency measures will be implemented to both address the source of the loss if possible, and also to aid in restoration of the site. These contingency measures could include, but are not be limited to, the following: installation of additional erosion control materials; vegetation management and alteration performed in the course of fire management activities by fire personnel to prevent potential fires from spreading; pest management; supplemental planting or seeding to aid in restoration of native habitat; additional weeding to reduce non-native species numbers; additional site visits to monitor the site until problem areas are on track to being fixed.

Managing these contingencies will fall to Burns & McDonnell during the interim management period. Once the site has been restored and performance standards have been met, these contingencies will be managed by the long-term manager.

4.6.1 Fire Management

No active fire management (i.e., prescribed burning) is proposed for the site. Fuel modification zone setbacks are illustrated on Figure 6 along with existing easements on the site. These fuel modification zones are required due to the proximity of offsite structures to the site boundaries. These areas will follow the fuel modification requirements for those areas, i.e. non-woody plantings, annual mowing, and vegetation height limits of 18 inches or as otherwise required by local fire ordinance. A native plant palette that would work with annual mowing is described further in Section 3.7.5.

Fire management activities on this parcel will be conducted in accordance with the laws and regulations for fire management in conjunction with CalFire and the North Valley Fire Protection District. Fuel

modification zones will be excluded from restoration crediting and will be delineated in the field by markers to make the limits of fuel clearing distinct and prevent encroachment into the restoration site.

Path: Z:\General\KCM\ESP\Marketing\Bus_Dev\MitBanking\California\GeoSpatial\San Diego Land Acquisition\02JULY20\Moosa_Figure6_ConceptDesignFuelModZones_20200811.mxd gacox 8/27/2020
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Site Boundary
Fuel Modification Zones

Easements: **Rainbow Municipal Water District**
- Pipelines (20 feet)
- Public Sewer (10 feet)
- Public Pipelines and Appurtenances (10 feet)
- Pipelines (15 feet)

Slope, Utility, and Irrigation
County ROW

NORTH
0 150 300 600
Scale in Feet

BURNS McDONNELL

Figure 6
Fuel Modification Zones
Moosa Creek
San Diego County, CA

Source: San Diego County, CA; ESRI;
Issued: 8/27/2020

5.0 FUNDING, OPERATIONS, STAFFING, AND ACCESS

5.1 Funding and Budgets

The overall Preserve project – entitlement, construction, implementation, interim management, and endowment - is being funded by Burns & McDonnell. Burns & McDonnell has the financial strength to provide the necessary assurances to complete construction and successful interim maintenance/monitoring after construction is complete. Appendix A provides an example letter that describes the financial stability of Burns & McDonnell.

A long-term endowment will be funded once construction as-builts have been approved, which will perform as a non-wasting endowment providing funds for the long-term management of the site. A summary of the long-term costs and associated endowment funding requirements is included in Appendix B. To provide for unforeseen contingencies, the endowment fund includes (a) a contingency of 20% on calculated annual management costs, and (b) will be in place for at least three years prior to any funding draws and the start of the long-term maintenance period. The long-term endowment will be held by a third-party entity approved by the USFWS consistent with a Funding Agreement reviewed and approved by the Service. The final endowment amount will be subject to the review and approval of the selected long-term endowment holder and site manager to ensure costs have been appropriately budgeted.

An annual financial statement from the endowment holder will be provided to the USFWS in the annual report. This statement will include the current amount in the endowment, the expenditures from the previous year, and gains or losses from investments.

5.2 Long-Term Site Protection.

Upon approval of Preserve As-Builts by the USFWS, either a Declaration of Restrictive Covenants (DRC) or a Conservation Easement (CE) will be recorded on title to protect the Preserve's conservation values and maintain it in a natural condition consistent with this HMP. DRC and CE templates are attached to this HMP for reference.

5.3 Operations

Burns & McDonnell will oversee Preserve development. The Preserve Sponsor is Burns & McDonnell, an engineering, architecture, and environmental consulting firm that was established in 1898 and today is composed of more than 7,000 engineers, architects, construction professionals, scientists, consultants, and entrepreneurs. Burns & McDonnell mitigation specialists have implemented client specific mitigation and conservation projects in more than 10 states. Burns & McDonnell is based in Kansas City, Missouri, with local offices in La Jolla and offices across the Nation.

As the Preserve Sponsor, Burns & McDonnell will be responsible for all activities and costs associated with the establishment and operation of the Project. Questions regarding this Preserve and all subsequent questions, reviews, agency communications, and submittals related to the Program should be directed to:

Paul Sherman
Burns & McDonnell Engineering Company, Inc.
4224 Executive Square, Suite 500 La Jolla, CA 92037
p. 916.577.0659
e. pasherman@burnsmcd.com

A qualified long-term manager, as approved by the USFWS, will be selected during the interim management period.

5.4 Staffing

As noted in the previous section, the development of the Preserve will be overseen by Burns & McDonnell with technical work done by qualified subcontractors. Burns & McDonnell senior environmental scientist Sundeep Amin will specifically oversee the restoration and subsequent management components of the work. Mr. Amin lives and works in San Diego and throughout Southern California. He has over 15 years of experience conducting special-status species surveys, habitat assessments, vegetation mapping, wetland delineations, habitat restoration, mitigation planning, and permitting. While at Burns & McDonnell, Mr. Amin has been focusing his time on mitigation and restoration projects, specifically in entitlement of mitigation projects across the country.

A qualified long-term manager, as approved by the USFWS, will be selected during the interim management period.

5.5 Access

Two access points will be maintained to provide access to the site. Locking gates will be installed for this purpose to allow access for maintenance and monitoring and use by easement holders. One gate will be installed at the terminus of Golf Club Drive where the current access to the site is to allow access to areas south of Moosa Creek. The second gate will be installed along Old River Road, immediately south of Calle De Las Estrellas and immediately north of the bridge over Moosa Creek. This gate will allow access to the site north of the creek. Habitat conservation signs and gates will be installed once restoration activities have been completed.

6.0 REFERENCES

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