Appendix D.3

Jurisdictional Delineation MBI, 2021

Travertine SPA
Draft EIR
SCH# 201811023
Technical Appendices

October 2023

Appendix A – Delineation of State and Federal Waters, Travertine Project, City of La Quinta, Riverside County, California

TRAVERTINE PROJECT

CITY OF LA QUINTA, COUNTY OF RIVERSIDE, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

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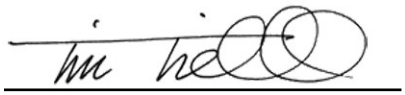
June 2021
JN 182517

TRAVERTINE PROJECT

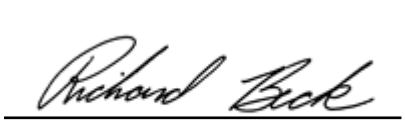
CITY OF LA QUINTA, COUNTY OF RIVERSIDE, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

The undersigned certify that this report is a complete and accurate account of the findings and conclusions of jurisdictional wetland and non-wetland "waters of the U.S.," "waters of the State," and streambed/banks and associated riparian vegetation delineation for the above-referenced project.



Tim Tidwell
Regulatory Specialist



Richard Beck, PWS, CEP, CPESC
Vice President

June 2021
JN 182517

Executive Summary

On behalf of the TRG Land, Inc., Michael Baker International (Michael Baker) has prepared this Delineation of State and Federal Jurisdictional Waters Report for the proposed Travertine Project (project or project site), located in the City of La Quinta, Riverside County, California. The project proposes to develop a variety of land uses on approximately 855 acres. Residential land uses would range from low to medium density and total 1,200 residential units. The proposed project also includes a resort and spa facility, a golf practice facility, public driving range, putting course, and hiking trails.

This report was prepared to document aquatic features identified by Michael Baker within the project site that are potentially subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Federal Clean Water Act (CWA), the Regional Water Quality Control Board (Regional Board) pursuant to Section 401 of the CWA and/or Section 13263 of the California Porter-Cologne Water Quality Control Act, and the California Department of Fish and Wildlife (CDFW) pursuant to Sections 1600 *et seq.* of the California Fish and Game Code (CFGC).

State jurisdictional features observed within the project site consisted of numerous ephemeral drainage features located within five drainage areas (Drainage Area A through Drainage Area E) and Regional Board jurisdiction totaled approximately 90.96 acres non-wetland waters of the State and 90.96 acres of CDFW jurisdiction (jurisdictional streambed). In addition, the on-site Desert Dry Wash Woodland (DDWW) habitat is considered CDFW jurisdiction and totaled approximately 55.98 acres. Table ES-1 below provides a breakdown of total acreages of jurisdictional features within the project site as they relate to each regulatory agency. Delineation methods followed the most recent, acceptable guidelines for conducting a jurisdictional delineation in this region. However, only the regulatory agencies can make a final determination of jurisdictional limits.

ES-1: Summary of Aquatic Resources and Jurisdictional Limits within the Project Site[1]

Drainage Area	Flow Regime and Feature Type	Cowardin Type	Jurisdictional Limits (acres)			
			Regional Board		CDFW	
			Non-Wetland Waters	Wetland Waters	Streambed	Desert Dry Wash Woodland
A	Ephemeral Streams	Riverine	16.39	0.00	16.39	1.27
B	Ephemeral Streams	Riverine	0.27	0.00	0.27	0.00
C	Ephemeral Streams	Riverine	46.01	0.00	46.01	22.58

[1] Under the Navigable Waters Protection Rule, jurisdictional tributaries include perennial and intermittent rivers and streams that contribute surface flow to traditional navigable waters in a typical year and must flow more often than just after a single precipitation event. Based on field observations and data derived from the National Hydrography Dataset (NHD), the on-site aquatic features do not meet the definition of a water of the U.S. (WoUS) and therefore are not subject to regulation under Section 404 of the CWA.

Drainage Area	Flow Regime and Feature Type	Cowardin Type	Jurisdictional Limits (acres)			
			Regional Board		CDFW	
			Non-Wetland Waters	Wetland Waters	Streambed	Desert Dry Wash Woodland
D	Ephemeral Streams	Riverine	26.40	0.00	26.40	23.29
E	Ephemeral Streams	Riverine	1.89	0.00	1.89	8.84
		TOTAL	**90.96**	**0.00**	**90.96**	**55.98**

Based on a detailed review of current site conditions and project design plans, the following regulatory permits/authorizations would be required prior to construction within the identified jurisdictional areas:

1. Approved Jurisdictional Determination (AJD) or similar approval from the Corps to formal receive concurrence that ephemeral aquatic features within the project site do not qualify as waters of the U.S. (WoUS) and therefore are not subject to regulation under Section 404 of the CWA;

2. Regional Board Waste Discharge Requirements (WDR) for impacts associated with the placement of dredge and/or fill material into waters of the State pursuant to the Porter-Cologne Act; and

3. CDFW Section 1602 Lake or Streambed Alteration Agreement (or other approval in-lieu of a formal agreement such as an Operation-by-Law letter) for alteration of streambed/banks and/or associated vegetation.

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ACRONYMS AND ABBREVIATIONS

AJD	Approved Jurisdictional Determination
amsl	above mean sea level
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFGC	California Fish and Game Code
Corps	U.S. Army Corps of Engineers
Corps Manual	*1987 Corps Wetland Delineation Manual*
CWA	Federal Clean Water Act
DBH	diameter at breast height
EPA	Environmental Protection Agency
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
LSAA	Lake or Streambed Alteration Agreement
MESA Field Guide	Field Guide to Mapping Episodic Stream Activity
NHD	National Hydrography Dataset
NWI	National Wetlands Inventory
NWPR	Navigable Waters Protection Rule
OBL	Obligate Wetland
OHWM	ordinary high-water mark
Porter-Cologne Act	California Porter-Cologne Water Quality Control Act
Procedures	State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State
project	Travertine Project
Rapanos	*Rapanos v. United States*
Regional Board	Regional Water Quality Control Board
Regional Supplement	*Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0*
SWANCC	*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*
TNW	Traditional Navigable Waters
UPL	Upland
USDA	U.S. Department of Agriculture, Natural Resources Conservation Service
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
WDR	Waste Discharge Requirements
WoUS	waters of the U.S.
WQC	Water Quality Certification

Section 1 Introduction

On behalf of TRG Land, Inc., Michael Baker International (Michael Baker) has prepared this Delineation of State and Federal Jurisdictional Waters Report to describe, map, and quantify aquatic and other associated aquatic features located within the project site for the proposed Travertine Project (project or project site).

This report describes the regulatory setting, methodologies, and results of the jurisdictional delineation, including recommendations for any proposed impacts to previously documented or potential jurisdictional resources. This report presents Michael Baker's best professional effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies; however, only the regulatory agencies can make a final determination of jurisdictional limits.

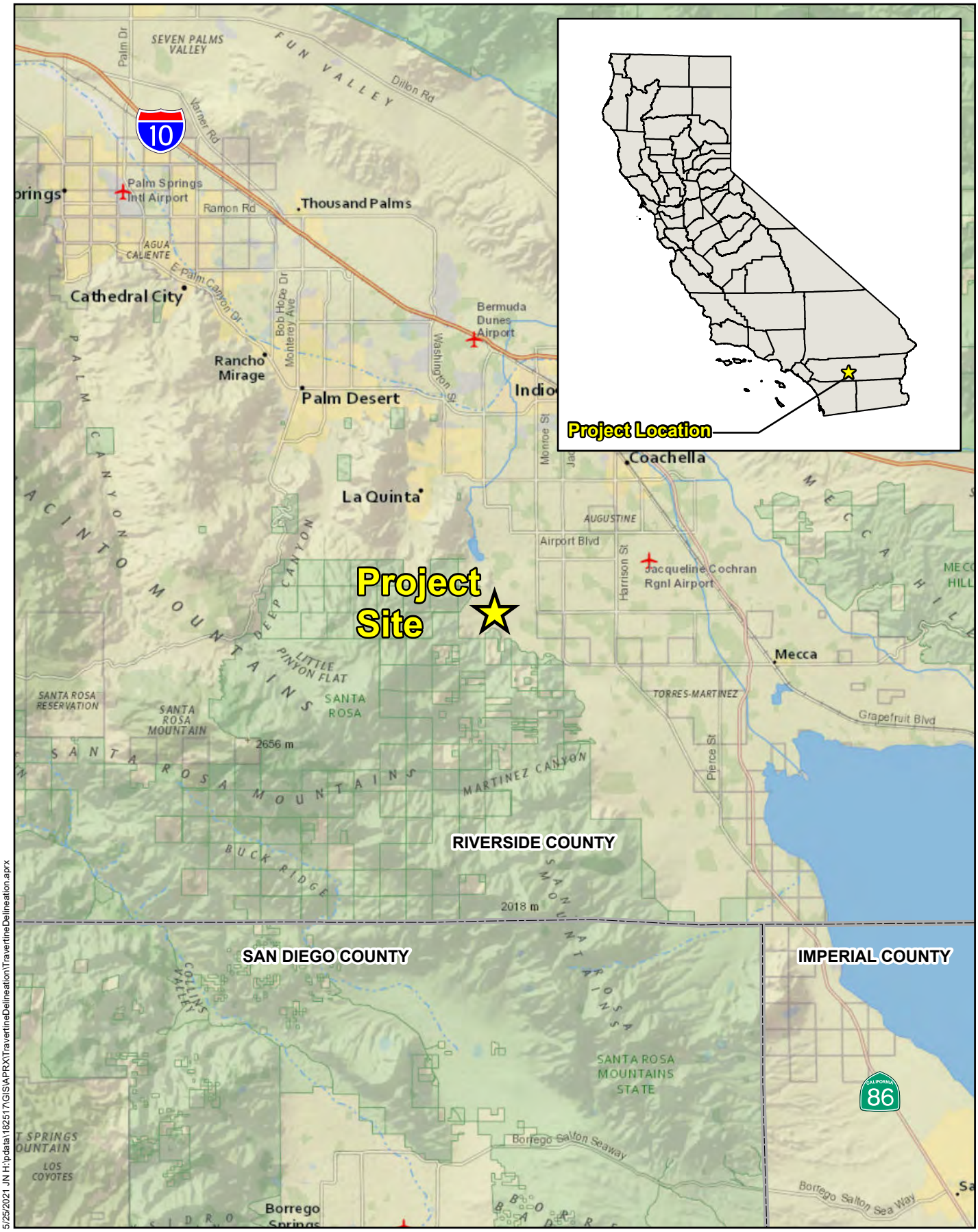
1.1 PROJECT LOCATION

The project site is located in the southern portion of the City of La Quinta, County of Riverside, State of California (Figure 1, *Regional Vicinity*). Specifically, the project site is depicted within Sections 4, 5, and 33, Township 6 and 7 South, Range 7 East, of the U.S. Geological Survey's (USGS) *Martinez Mountain, California* 7.5-minute topographic quadrangle (Figure 2, *Project Vicinity*). The project site is located adjacent to the Martinez Rockslide and the Santa Rosa Mountains and is comprised of undeveloped land and a historic vineyard including unimproved dirt roads (refer to Exhibit 3, *Project Site*).

1.2 PROJECT DESCRIPTION

The proposed Specific Plan Amendment covers an area of approximately 855 acres. The proposed project will be comprised of a variety of land uses. Residential land uses will range from low density (1.5 to 4.5 dwelling units per acre) to medium density (4.5 to 8.5 dwelling units per acre) and total 1,200 residential units. A resort/spa facility located in Planning Area (PA) 1 will serve residents, tourists and recreational visitors and feature a 45,000-square-foot boutique hotel with a 175-seat restaurant, 97,500 square feet of resort lodging to allow 100 villas. An 8,700 square foot spa and wellness center will offer activities to include yoga, tennis, walking and hiking trails.

A 4-hole golf practice facility with clubhouse is located in PA-11 adjacent to a banquet and restaurant facility that will be shared with the wedding garden facilities. The private golf training academy is located in the southeastern corner of the project area. A public driving range, putting course with restaurant and bar, pro-shop and tracking bays will serve the daily needs of the community and its visitors in PA 19. Table 2.1, Proposed Planning Area Summary, shows the land use associated with each planning area. Exhibit 2.1, Conceptual Land Use Plan, shows the location of each project planning area.



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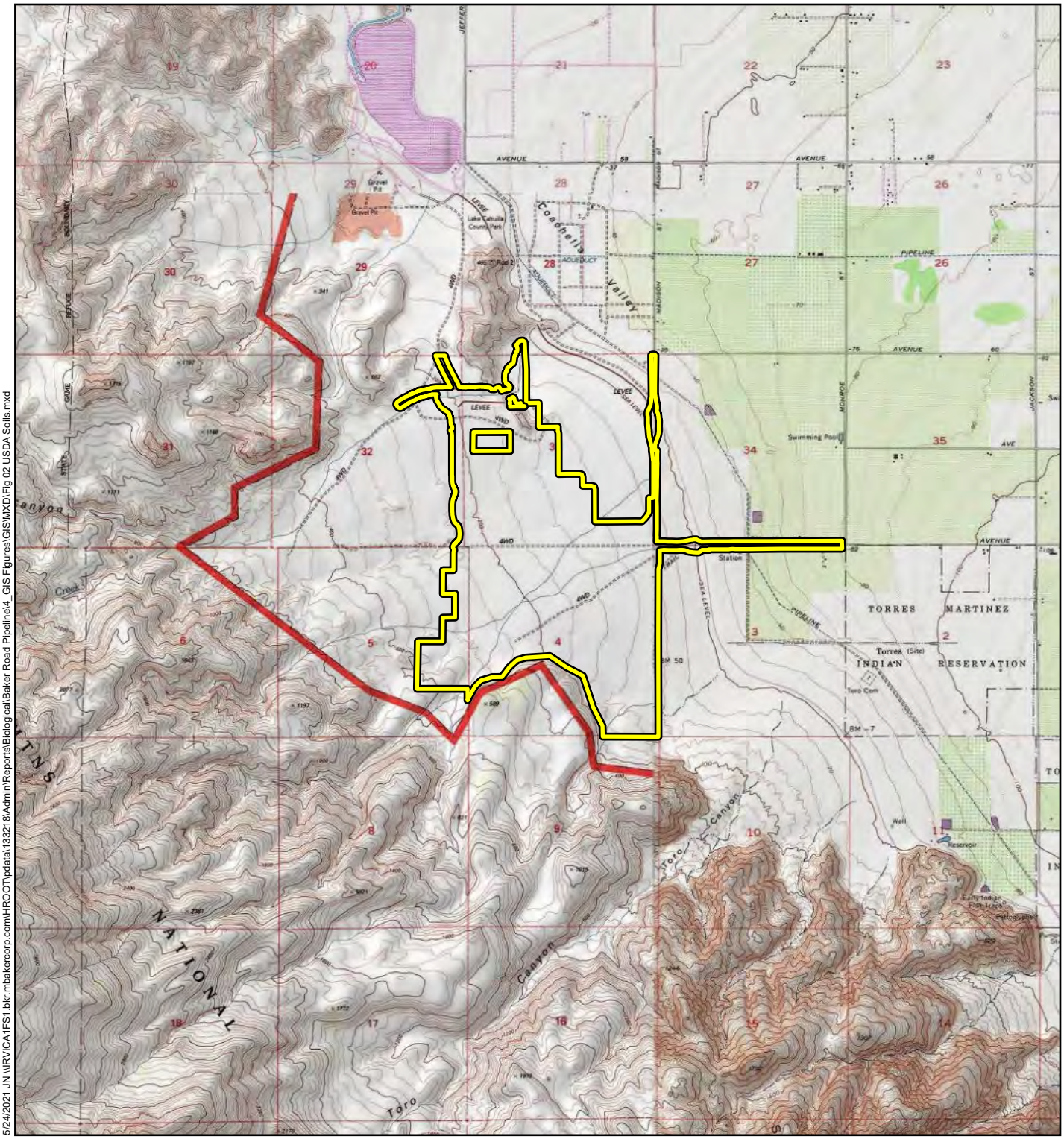
Source: ArcGIS Online, 2018

Michael Baker INTERNATIONAL

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Vicinity

Figure 1



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Legend

- Project Site
- Federal Boundary

Michael Baker INTERNATIONAL

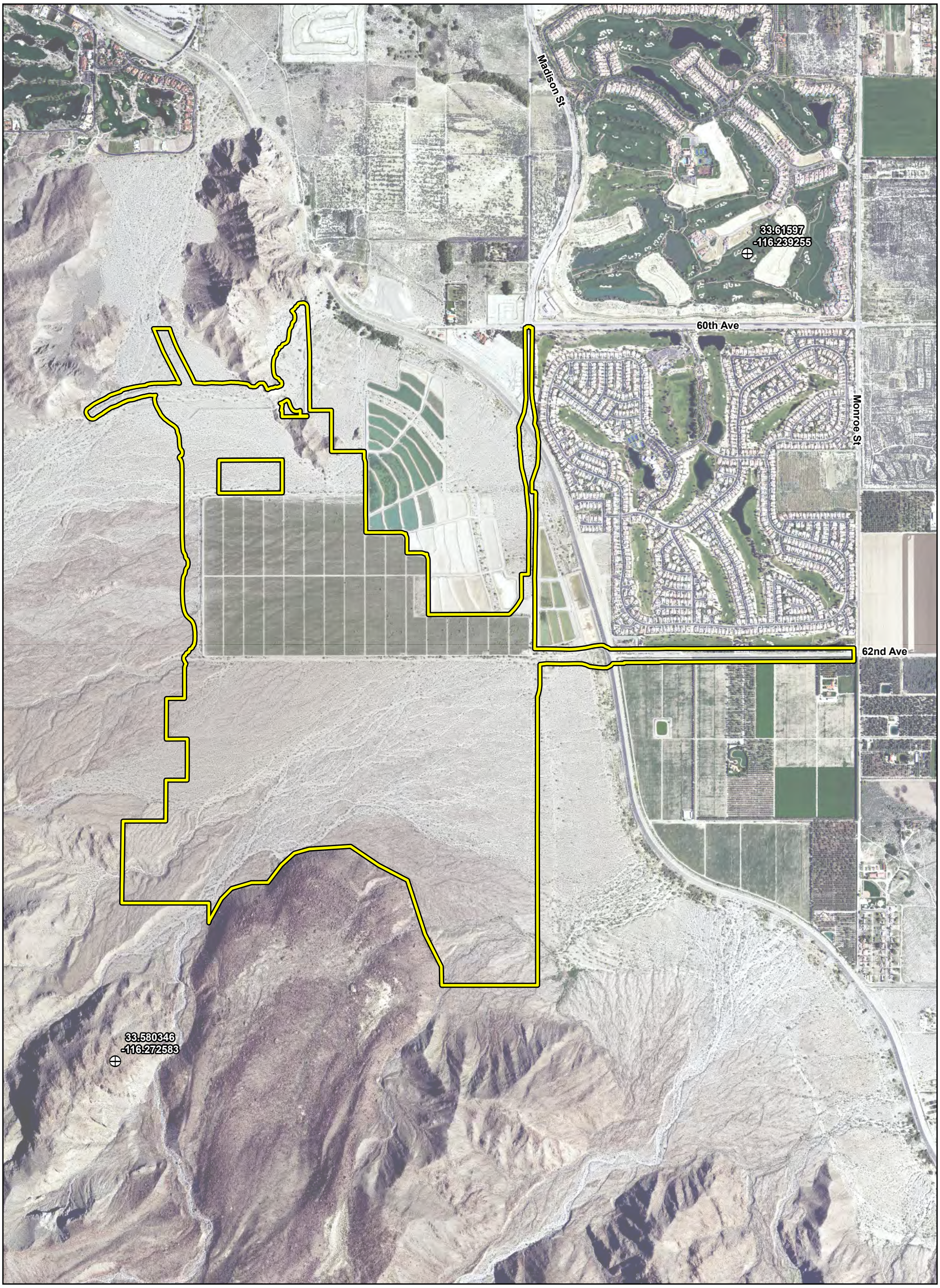
0 0.38 0.75 Miles

Source: USGS 7.5-Minute topographic quadrangle maps: *Martinez Mountain, California (2018)*

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Project Vicinity

Figure 2



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Legend

- Project Site
- Reference Point

Michael Baker INTERNATIONAL

0 750 1,500 Feet

Source: NearMap (2020)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Project Site

Figure 3

The project components shall include:

- 1,200 Dwelling Units of varying types
    - 758 Low Density Units and 442 Medium Density Units
    - Estate Homes, Single Family Luxury Homes, Single Family Mid Homes, Single Family Entry Homes, Patio Homes, Single Family Attached Units
- Golf training facility with public Driving Range, 4-hole practice facility, and private golf training academy
- Putting course with restaurant and bar
- Wedding garden and banquet facilities
- 100-villa resort
- Wellness Spa
- Tourist serving recreational facilities and amenities including restaurants, small shops, spa facilities, lounge and activity rooms, outdoor activities, tennis, yoga, etc.
- Bike lanes throughout community, including Class II bike lanes located along both sides of Jefferson Street
- Pedestrian walkways and a Travertine community trail – a network of trails suitable for pedestrian use planned throughout the community
- Recreational Open Space uses, including picnic tables, barbeques, golf practice facilities, a tot lot playground, and staging facilities for the regional interpretive trail
- Two community parks for residents
- One staging area located to the south of the Avenue 62 extension with parking
- Coachella Valley Water District (CVWD) Well Sites (quantity to be determined by CVWD)
- Future 5-acre substation will be located off-site within a 2.5-mile radius of the project area.
- Perimeter flood protection barrier along the western and southern boundaries to manage alluvial fan flows. The barrier will consist of a raised edge condition with a slope lining to protect against scour and erosion.
- Two booster stations. One facility located on Avenue 62 and Monroe, and the second to be located within the project site.

Section 2 Regulations

Three agencies regulate activities within inland streams, wetlands, and riparian areas in California. The U.S. Army Corps of Engineers (Corps) Regulatory Division regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA). Of the State agencies, the California Department of Fish and Wildlife (CDFW) regulates activities under Sections 1600 *et seq.* of the California Fish and Game Code (CFGC), and the Regional Water Quality Control Board (Regional Board) regulates activities pursuant to Section 401 of the CWA and/or Section 13263 of the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act).

2.1 U.S. ARMY CORPS OF ENGINEERS

Navigable Waters Protection Rule

On January 23, 2020, the EPA and the Corps finalized the Navigable Waters Protection Rule to define WoUS. On April 21, 2020, the EPA and the Corps published the Navigable Waters Protection Rule in the Federal Register. On June 22, 2020, 60 days after publication in the Federal Register, the Navigable Waters Protection Rule became effective across the nation including the state of California.

Under the Navigable Waters Protection Rule, waters considered jurisdictional WoUS are outlined in four categories as follows:

1. Territorial Seas and TNWs

    - Under the final rule, the territorial seas and traditional navigable waters include large rivers and lakes as well as tidally-influenced waterbodies used in interstate or foreign commerce.

2. Tributaries

    - Under the final rule, tributaries include perennial and intermittent rivers and streams that contribute surface flow to traditional navigable waters in a typical year.
    - These naturally occurring surface water channels must flow more often than just after a single precipitation event – that is, tributaries must be perennial or intermittent.
    - Tributaries can connect to a traditional navigable water or territorial sea in a typical year either directly or through other WoUS, through channelized non-jurisdictional surface waters, through artificial features (including culverts and spillways), or through natural features (including debris piles and boulder fields).
    - Ditches are to be considered tributaries only where they satisfy the flow conditions of the perennial and intermittent tributary definition and either were constructed in or relocate a tributary or were constructed in an adjacent wetland and contribute perennial or intermittent flow to a traditional navigable water in a typical year.

3. Lakes, Ponds, and Impoundments of Jurisdictional Waters

    - Lakes, ponds, and impoundments of jurisdictional waters are jurisdictional where they contribute surface water flow to a TNW or territorial sea in a typical year either directly or through other WOUS, through channelized non-jurisdictional surface waters, through artificial features (including culverts and spillways), or through natural features (including debris piles and boulder fields).
    - Lakes, ponds, and impoundments of jurisdictional waters are also jurisdictional where they are flooded by a "water of the United States" in a typical year.

4. Adjacent Wetlands

    - Wetlands that physically touch other jurisdictional waters are "adjacent wetlands."
    - Wetlands separated from a WoUS by only a natural berm, bank or dune are also "adjacent."
    - Wetlands inundated by flooding from a WoUS in a typical year are "adjacent."
    - Wetlands that are physically separated from a jurisdictional water by an artificial dike, barrier, or similar artificial structure are "adjacent" so long as that structure allows for a direct hydrologic surface connection between the wetlands and the jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.
    - An adjacent wetland is jurisdictional in its entirety when a road or similar artificial structure divides the wetland, as long as the structure allows for a direct hydrologic surface connection through or over that structure in a typical year.

The final rule also outlines what features are not WoUS. The following waters/features are not jurisdictional under the Navigable Waters Protection Rule:

- Waterbodies that are not included in the four categories of WoUS.
- Groundwater, including groundwater drained through subsurface drainage systems, such as drains in agricultural lands.
- Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools.
- Diffuse stormwater run-off and directional sheet flow over upland.
- Many farm and roadside ditches.
- Prior converted cropland.
- Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease.
- Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters.

- Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel.
- Stormwater control features excavated or constructed in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater run-off.
- Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention and infiltration basins and ponds, that are constructed in upland or in non-jurisdictional waters.
- Waste treatment systems.

2.2 REGIONAL WATER QUALITY CONTROL BOARD

Applicants for a Federal license or permit for activities that may discharge to WoUS must seek a Water Quality Certification (WQC) from the State or Indian tribe with jurisdiction[2]. In California, there are nine (9) Regional Boards that issue or deny Certification for discharges within their geographical jurisdiction. Such Certification is based on a finding that the discharge will meet water quality standards, which are defined as numeric and narrative objectives in each Regional Board's Basin Plan, and other applicable requirements. The State Water Resources Control Board has this responsibility for projects affecting waters within multiple Regional Boards. The Regional Board's jurisdiction extends to all WoUS, including wetlands, and to waters of the State (described below).

The Porter-Cologne Act gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool for the regulatory environment following the SWANCC[3] and Rapanos[4] court cases, with respect to the state's authority over isolated and otherwise insignificant waters. Generally, in the event that there is no nexus to a Traditionally Navigable Water (TNW), any person proposing to discharge waste into waters of the State that could affect its water quality must file a Report of Waste Discharge. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

On April 2, 2019 the State Water Resources Control Board adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (Procedures), for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. The Procedures consist of four major elements: 1) a wetland definition; 2) a framework for determining if a feature that meets the wetland definition is a water of the state; 3) wetland delineation procedures; and 4) procedures for the submittal, review and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities. The

[2] Title 33, United States Code, Section 1341; Clean Water Act Section.
[3] *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001).
[4] *Rapanos v. United States*, 547 U.S. 715 (2006).

Procedures were approved by the Office of Administrative Law on August 28, 2019 and became effective May 28, 2020.

2.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Sections 1600 *et seq.* of the CFGC establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely affect fish and wildlife resources, or when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Section 1602 of the CFGC requires any person, State, or local governmental agency or public utility to notify CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;

(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or

(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

This applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State, including the maintenance of existing drain culverts, outfalls, and other structures.

Section 3 Methodology

The analysis presented in this report is supported by a site reconnaissance and verification of site conditions conducted on February 2, 2021, February 3, 2021, February 10, 2021, February 19, 2021, and February 24, 2021 by certified wetland delineators Josephine Lim, PWS, and Tim Tidwell. A field delineation was conducted to determine the jurisdictional limits of WoUS and waters of the State (including potential wetlands), located within the boundaries of the project site. While in the field, jurisdictional features were recorded on an aerial base map at a scale of 1" = 100' using topographic contours and visible landmarks as guidelines. Data points were obtained with a Garmin Map62 Global Positioning System to record and identify specific widths for OHWM indicators and the locations of photographs, soil points, and other pertinent jurisdictional features, if present. These data were then transferred as a .shp file and added to the report's jurisdictional figures. The jurisdictional figures were prepared using ESRI ArcMap Version 10 software and comply with the Corps Minimum Standards for Acceptance of Aquatic Resource Delineations, dated January 2016.

3.1 WATERS OF THE U.S. AND WATERS OF THE STATE

The limits of the Corps' jurisdiction in non-tidal waters extend to the OHWM, which is defined as "*...that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*"[5] An OHWM can be determined by the observation of a natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; presence of litter and debris; wracking; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; deposition; multiple observed flow events; bed and banks; water staining; and/or change in plant community.

The Regional Board generally shares the Corps jurisdictional methodology, unless the waterbody is not jurisdictional under the Navigable Waters Protection Rule. In the case the waterbody is not a WoUS, the Regional Board considers such waterbodies to be jurisdictional waters of the State. The CDFW's jurisdiction extends to the top of bank of the streambed or to the limit (outer dripline) of the adjacent riparian vegetation. For arid regions, the *Field Guide to Mapping Episodic Stream Activity* (MESA Field Guide) is used to guide delineation methods for mapping of ephemeral streams (watercourses that flow only during and shortly after precipitation events). The MESA Field Guide illustrates and describes fundamental stream forms, processes, and functions to correctly identify and delineate episodic streams.

[5] CWA regulations 33 CFR §328.3(e).

3.2 WETLANDS

For this project location, jurisdictional wetlands were delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Regional Supplement; Corps, 2008). This document is part of a series of regional supplements to the *1987 Corps Wetland Delineation Manual* (Corps' Manual). According to the Corps' Manual, identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. In order to be considered a wetland, an area must exhibit at least minimal characteristics within these three (3) parameters. The Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Arid West Region. In the field, vegetation, soils, and evidence of hydrology have been examined using the methodology listed below and documented on Corps wetland determination data forms, when applicable.

The Procedures adopted by the State Water Resources Control Board on April 2, 2019, contain a wetland definition and wetland delineation procedures. The State wetland definition and delineation procedures are largely consistent with the three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology implemented by the Corps and outlined in the 2010 Regional supplement to the Corps Manual. However, one exception is that an area can lack vegetation and still qualify as a wetland water of the State if it satisfies both the hydric soil and wetland hydrology parameters.

3.2.1 VEGETATION

Nearly 5,000 plant types in the United States may occur in wetlands. These plants, often referred to as hydrophytic vegetation, are listed in regional publications by the U.S. Fish and Wildlife Service (USFWS). In general, hydrophytic vegetation is present when the plant community is dominated by species that can tolerate prolonged inundation or soil saturation during growing season. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Vegetation strata are sampled separately when evaluating indicators of hydrophytic vegetation. A stratum for sampling purposes is defined as having 5 percent or more total plant cover. The following vegetation strata are recommended for use across the Arid West Region:

- *Tree Stratum:* Consists of woody plants 3 inches or more in diameter at breast height (DBH);
- *Sapling/shrub Stratum:* Consists of woody plants less than 3 inches in DBH, regardless of height;
- *Herb Stratum:* Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size; and
- *Woody Vines:* Consists of all woody vines, regardless of size.

The following indicator is applied per the test method below[6]. Hydrophytic vegetation is present if any of the indicators are satisfied.

Indicator 1 – Dominance Test

Cover of vegetation is estimated and is ranked according to their dominance. Species that contribute to a cumulative total of 50 percent of the total dominant coverage, plus any species that comprise at least 20 percent (also known as the "50/20 rule") of the total dominant coverage, are recorded on a wetland determination data form. Wetland indicator status is assigned to each species using *The National Wetland Plant List, version 3.4* (U.S. Army Corps of Engineers, 2018). If greater than 50 percent of the dominant species from all strata were Obligate Wetland, Facultative Wetland, or Facultative species, the criteria for wetland vegetation is considered to be met. Plant indicator status categories are described below:

- *Obligate Wetland (OBL):* Plants that occur almost always in wetlands under natural conditions, but which may also occur rarely in non-wetlands;
- *Facultative Wetland (FACW):* Plants that occur usually in wetlands, but also occur in non-wetlands;
- *Facultative (FAC):* Plants with similar likelihood of occurring in both wetlands and non-wetlands;
- *Facultative Upland (FACU):* Plants that occur sometimes in wetlands, but occur more often in non-wetlands; and
- *Obligate Upland (UPL):* Plants that occur rarely in wetlands but occur almost always in non-wetlands under natural conditions.

3.2.2 HYDROLOGY

Wetland hydrology indicators are presented in four (4) groups, which include:

Group A – Observation of Surface Water or Saturated Soils

Group A is based on the direct observation of surface water or groundwater during the site visit.

Group B – Evidence of Recent Inundation

Group B consists of evidence that the site is subject to flooding or ponding, although it may not be inundated currently. These indicators include water marks, drift deposits, sediment deposits, and similar features.

Group C – Evidence of Recent Soil Saturation

[6] Although the Dominance Test is utilized in most wetland delineations, other indicator tests may be employed. If one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present, then the Prevalence Test (Indicator 2) may be performed. If the plant community satisfies the Prevalence Test, then the vegetation is hydrophytic. If the Prevalence Test fails, then the Morphological Adaptation Test may be performed, where the delineator analyzes the vegetation for potential morphological features.

Group C consists of indirect evidence that the soil was saturated recently. Some of these indicators, such as oxidized rhizospheres surrounding living roots and the presence of reduced iron or sulfur in the soil profile, indicate that the soil has been saturated for an extended period.

Group D – Evidence from Other Site Conditions or Data

Group D consists of vegetation and soil features that indicate contemporary rather than historical wet conditions and include shallow aquitard and the FAC-neutral test.

If wetland vegetation criteria are met, the presence of wetland hydrology is evaluated at each transect by recording the extent of observed surface flows, depth of inundation, depth to saturated soils, and depth to free water in the soil test pits. The lateral extent of the hydrology indicators is used as a guide for locating soil pits for evaluation of hydric soils and jurisdictional areas. In portions of the stream where the flow is divided by multiple channels with intermediate sand bars, the entire area between the channels is considered within the OHWM and the wetland hydrology indicator is considered met for the entire area.

3.2.3 SOILS

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper 16-20 inches[7]. The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. It should also be noted that the limits of wetland hydrology indicators are used as a guide for locating soil pits. If any hydric soil features are located, progressive pits are dug moving laterally away from the active channel until hydric features are no longer present within the top 20 inches of the soil profile.

Once in the field, soil characteristics are verified by digging soil pits along each transect to an excavation depth of 20 inches; in areas of high sediment deposition, soil pit depth may be increased. Soil pit locations are usually placed within the drainage invert or within adjoining vegetation. At each soil pit, the soil texture and color are recorded by comparison with standard plates within a *Munsell Soil Chart* (2012). Munsell Soil Charts aid in designating color labels to soils, based by degrees of three simple variables – hue, value, and chroma. Any indicators of hydric soils, such as organic accumulation, iron reduction, translocation, and accumulation, and sulfate reduction, are also recorded. Hydric soil indicators are present in three groups, which include:

[7] According to the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps 2008), growing season dates are determined through on-site observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature.

All Soils

"All soils" refers to soils with any U.S. Department of Agriculture, Natural Resources Conservation Service (USDA) soil texture. Hydric soil indicators within this group include histosol, histic epipedon, black histic, hydrogen sulfide, stratified layers, 1-centimeter muck, depleted below dark surface, and thick dark surface.

Sandy Soils

Sandy soils" refers to soil materials with a USDA soil texture of loamy fine sand and coarser. Hydric soil indicators within this group include sandy mucky mineral, sandy gleyed matrix, sandy redox, and stripped matrix.

Loamy and Clayey Soils

"Loamy and clayey soils" refers to soil materials with a USDA soil texture of loamy very fine sand and finer. Hydric soil indicators within this group include loamy mucky mineral, loamy gleyed matrix, depleted matrix, redox dark surface, depleted dark surface, redox depressions, and vernal pools.

Section 4 Literature Review

A thorough review of relevant literature and materials was conducted to preliminarily identify areas that may fall under the jurisdiction of the regulatory agencies. A summary of materials utilized during the literature review is provided below and in Appendix A, *Documentation*. In addition, refer to Section 8 for a complete list of references used throughout the course of this delineation.

4.1 WATERSHED REVIEW

The project site is located within the Guadalupe Creek-Whitewater River (HUC 181002010804) sub-watershed of the larger Salton Sea watershed (Hydrologic Unit Code 18100200). The Salton Sea watershed includes the counties of Imperial, Riverside, San Bernardino, and San Diego. There are four surrounding watersheds (Devils Canyon, Middle-North Canyon, Middle-South Canyon, and Toro Canyon) that are tributaries to a dike located to the southeast of the site; the path of each tributary crosses over the project area as described below.

Devil Canyon comprises 7.7 square miles and has a streambed length of 5.4 miles from its headwaters to its alluvial fan apex. Devil Canyon and its internal tributary, Guadalupe Creek Canyon, exit the Santa Rosa Mountains onto an alluvial fan that distributes alluvium onto the valley floor downstream of the canyon apex. Middle-North Canyon is located south of Devil Canyon and comprises a watershed area of 1.2 square miles with a streambed length as measured 3.3 miles between the canyon headwaters and the apex of the downstream alluvial fan. Middle-South Canyon consists of a 6.2 square mile watershed and a streambed length of 5.6 miles as measured between the canyon headwaters and the apex of the downstream alluvial fan. Toro Canyon is the southernmost watershed, comprising 5.0 square miles with a streambed length of 4.9 miles as measured between the canyon headwaters and the apex of the downstream alluvial fan. During flood conditions, all canyons as described above would pass through the project site as alluvial fan flow.

4.2 LOCAL CLIMATE

The Salton Sea Watershed is characterized by a year-round desert climate, with warm, sunny, dry summers, and cool, rainy, mild winters. According to the Western Regional Climate Center, the average maximum temperature in this area of California is 88.5° F annually, and average minimum temperature is at 56.3° F annually. The warmest month on average is July at a maximum of 106.7° F, and the coolest month on average is December at a minimum of 37.7° F. Most precipitation occurs between November and March in the form of rain, with occasional and steadily increasing precipitation through the late summer and fall; the average total precipitation is 2.96 inches annually. Snowfall does not typically occur within this area of the watershed regardless of the season. According to the MESA Field Guide, lands receiving less than 8 inches of precipitation are considered “arid.”

4.3 USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE

The majority of the project site is located within Sections 4, 5, and 33, Township 6 South and 7 South, Range 7 East, San Bernardino Meridian in the USGS *Martinez Mountain* 7.5-minutes topographic quadrangle map. Portions of the project site also extend to Section 34, Township 6 South and 7 South, Range 7 East, San Bernardino Meridian in the USGS *Valerie* 7.5-minutes topographic quadrangle map.

The site slopes gently to the northeast but is generally flat, with onsite elevations generally ranging from approximately 400 feet amsl at the highest point in the southwest to approximately 40 feet below mean sea level in northernmost and easternmost areas. Two unnamed blue line streams are mapped entering the southwestern portion of the project site where they quickly converge into a single feature which continues across the project site in a generally northeasterly direction; no additional aquatic features such as ponds or basins were noted on the topographic map. The foothills of Martinez Mountain comprise the southern boundary of the project site; Whitewater River, also referred to as the Coachella Valley Storm Water Channel, occurs approximately seven miles to the east, and the Salton Sea occurs approximately 12 miles to the southeast.

4.4 AERIAL PHOTOGRAPH

Prior to the field visits, Michael Baker reviewed a current aerial photograph dated December 11, 2019 from Google Earth Imaging for the project site. Aerial photographs can be useful during the delineation process, as the photographs often indicate the presence of drainages and riparian vegetation within the boundaries of the project site (if any). Based on the aerial image, the project site is composed primarily of undeveloped land with former agricultural uses (vineyard) located in the central portion of the project site. Numerous ephemeral drainages are noted traversing the southern and northern portions of the site as part of alluvial fans generally flowing in a easterly direction from the mountains to the west. Sparse desert vegetation consistent with the surrounding area is noted throughout the project site.

The project site is surrounded by undeveloped land and open space to the south, and west. Residential uses are noted to the north of the eastern portion of the project site and agricultural uses are noted to the south of the eastern portion of the site. Multiple groundwater recharge basins are noted to the east and north of the project site and a levee is noted to the east intersecting the northern and eastern portions of the project site preventing all flows within the on-site ephemeral drainages from proceeding further east.

4.5 SOIL SURVEY

Soils within the project site were researched prior to the field delineation using the *Custom Soil Resource Report for Anza-Borrego Area, California; and Riverside County, Coachella Valley Area, California* (USDA, 2021). The presence of hydric soils is initially investigated by comparing the mapped soil series for the site to the County list of hydric soils. Soil surveys furnish soil maps and interpretations originally needed in providing technical assistance to farmers and ranchers; in guiding other decisions about soil selection, use, and management; and in planning, research, and disseminating the results of the research.

In addition, soil surveys are now heavily utilized in order to obtain soil information with respect to potential wetland environments and jurisdictional areas (i.e., soil characteristics, drainage, and color). The following soil series have been reported onsite:

Carrizo stony sand, 2 to 9 percent slopes (CcC)

The Carrizo series consists of very deep, excessively drained soils formed in mixed alluvium derived from granite. Carrizo soils are on flood plains, alluvial fans, fan piedmonts, and bolson floors. Slope ranges from 2 to 9 percent. Elevations are recorded at 2,000 feet above msl, mean annual precipitation is approximately four inches, and the and runoff is very low. Carrizo soils are generally alkaline and are typically used for rangeland and wildlife habitat. This soil type is not listed as hydric.

Carsitas gravelly sand, 0 to 9 percent slopes (CdC), and Carsitas cobbly sand, 2 to 9 percent slopes (ChC)

The Carsitas soils consist of very deep, somewhat excessively drained soils that formed in alluvium from granitoid and/or gneissic rocks. These soils formed on alluvial fans, fan aprons, valley fills, dissected remnants of alluvial fans and in drainageways. Slopes range from 0 to 30 percent with a mean annual precipitation of three inches and negligible to low runoff. Soils in the Carsitas series are typically neutral to alkaline. Carsitas gravelly sand, 0 to 9 percent slopes, and Carsitas cobbly sand, 2 to 9 percent slopes, are both considered hydric soils.

Gilman Fine Sandy Loam, 0 to 5 Percent Slopes (GaB), and Gilman Fine Sandy Loam, 2 to 5 Percent Slopes (GbB)

The Gilman series consists of very deep, well drained soils that formed in stratified stream alluvium. Gilman soils are on flood plains and alluvial fans have slopes of 0 to 5 percent. Mean annual precipitation for these soils is 2 to 10 inches with low runoff. Elevations range from 1,080 to 1,600 feet above msl. These soils are nonsaline to very slightly saline and are used for prime farmland if irrigated. These soil types are not listed as hydric.

Indio Fine Sandy Loam (Ip), and Indio Fine Sandy Loam, wet (Ir)

The Indio series consists of very deep, well, or moderately well drained soils, formed in alluvium derived from mixed rock sources. Indio soils are on alluvial fans, lacustrine basins, and flood plains and have slopes of 0 to 2 percent with low runoff. Elevations range up to 300 feet above msl. Used for irrigated cropland and livestock grazing. Such areas provide ephemeral grazing in unusually wet years. These soil types are not listed as hydric.

Myoma fine sand, 0 to 5 percent slopes (MaB)

Myoma soils are light olive gray, moderately alkaline fine and very fine sands to a depth of about 31 inches. Below 31 inches they are strongly alkaline and very fine sands. They are derived from wind-blown sandy alluvium and are considered somewhat excessively drained. Elevation ranges from 200 below sea level to 1,800 feet amsl with slopes from 0 to 5 percent and negligible run off. This soil type is considered hydric.

Rock Outcrop (RO)

Rock outcrops consists of exposures of bare bedrock other than lava flows and rock-lined pits. These areas derive from residuum weathered from igneous, metamorphic, and sedimentary rock. Elevation can range from 650 to 4,000 feet above msl with slopes from 15 to 75 percent. Due to the impervious nature of these outcroppings, these areas are typically susceptible to very high levels of runoff. This soil type is considered hydric.

Rubble Land (RU)

Rubble land consists of areas of cobbles, stones, and boulders. Rubble land commonly occurs at the base of mountains; however, some areas include deposits of cobbles, stones, and boulders left on mountainsides by glaciation or periglacial processes. Stones and boulders may occur as alluvium. Elevations range from 650 to 4,000 feet amsl. This soil type is considered hydric.

A large portion of the southern half of the project site has not been subject to complete soil mapping procedures per the NRCS soil survey. It is assumed these areas of incomplete mapping are comprised of similar soil series as listed above.

4.6 HYDRIC SOILS LIST OF CALIFORNIA

The Hydric Soils List of California (USDA, 2021) was reviewed in an effort to verify whether on-site soils are considered to be hydric[8]. It should be noted that lists of hydric soils along with soil survey maps provide off-site ancillary tools to assist in wetland determinations, but they are not a substitute for field investigations. According to the soils list, Carsitas gravelly sand, 0 to 9 percent slopes (CdC); Carsitas cobbly sand, 2 to 9 percent slopes (ChC); Myoma fine sand 0 to 5 percent slopes (MaB); Rock Outcrop (RO); and Rubble Land (RU) are listed as hydric.

4.7 NATIONAL WETLANDS INVENTORY

The USFWS National Wetlands Inventory maps were reviewed. According to the National Wetland Inventory, three riverine features occur within the project site boundary according to the National Wetland Inventory. One riverine wetland feature is reported to be of the riverine system, intermittent subsystem, streambed class, intermittently flooded (R4SBJ). Two riverine wetland features are reported to be of the riverine system, intermittent subsystem, streambed class, seasonally flooded (R4SBC). One freshwater pond in the northern portion of the project site is reported to be of the palustrine system, unconsolidated bottom, permanently flooded, excavated freshwater pond (PUBHx). However, this area is mapped as occurring within a developed area and is assumed incorrect. Refer to Appendix A, *Documentation*.

[8] A hydric soil is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions.

4.8 FLOOD ZONE

The Federal Emergency Management Agency's (FEMA) National Flood Insurance Program was reviewed for available flood data within the project site. According to *Flood Insurance Rate Map (FIRM) No. 06065C2900H* (FEMA, 2017) and *FIRM No. 06065C2925H* (FEMA, 2018), portions of the project site are located within Zone A which are special flood hazard areas subject to inundation by the one percent annual chance flood, generally without determined base flood elevations. The remaining areas onsite are mapped as Zone X (areas of 0.2% annual chance of flood hazard or areas of 1% annual chance of flood with average depth less than one foot or with drainage areas of less than one square mile) or as Zone D (areas of undetermined flood hazard). Refer to Appendix A, *Documentation*.

4.9 NATIONAL HYDROGRAPHY DATASET

The National Hydrography Dataset was reviewed for available hydrography data within the project site using the USGS The National Map Advanced Viewer. According to the National Hydrography Dataset, multiple ephemeral streams are noted throughout the project site generally flowing from southwest to northeast. In addition, one reservoir is noted in the eastern portion of the project site. In addition, multiple reservoirs are noted adjoining the project site to the northeast. Refer to Appendix A, *Documentation*.

Section 5 Site Conditions

Certified wetland delineators and regulatory specialists Josephine Lim, PWS, Ryan Phaneuf, and Tim Tidwell conducted multiple site investigations on February 2, 2021, February 3, 2021, February 10, 2021, February 19, 2021, and February 24, 2021 to verify existing site conditions as well as document the extent of jurisdictional areas within the boundaries of the project site. Field staff did not encounter any access limitations during the site visits. The following sections provide a description of site conditions documented during the February 2021 site visits. Refer to Appendix B, *Site Photographs* taken throughout the project site.

5.1 JURISDICTIONAL FEATURES

5.1.1 DRAINAGE FEATURES

The majority of the on-site drainage features are characterized as desert dry wash and encompass multiple alluvial fans, which originate from multiple canyons of the Santa Rosa Mountains located to the west and south. The ephemeral drainage features generally display a sinuous form comprised of single and/or braided active channels. Generally, the active channels exhibited a very flat bed topography with high width to depth ratios. The identified ephemeral drainage features exhibited clear evidence of hydrology and are generally characterized by the great variability in rainfall and runoff volumes typical of the arid desert region. However, typical of desert dry wash systems and alluvial fans, segments of discontinuous sheet flow occur as flows become insignificant or lack channel confinement. On-site drainage features were compiled into five drainage areas based on location within the project site and general direction of flow, solely for discussion purposes. Refer to Figure 4, *Drainage Areas*, for a depiction of the drainage areas located throughout the project site.

Drainage Area A

Drainage Area A is located within the northern portion of the project site to the north of the historic vineyard. Drainage Area A is comprised of an alluvial fan with multiple earthen ephemeral drainage features which convey surface flows from the Santa Rosa Mountains and surrounding land. These ephemeral drainage features enter the site from the west as desert dry washes which generally flow from west to east through the project site and proceed toward a mountain in the northeast portion of the project site. Two dikes comprised of boulders and cobble extend west from the mountain in the northeast portion of the project site. These dikes redirect the ephemeral drainage features east and prevent additional flows from migrating south toward the historic vineyard. The ephemeral drainage features converge at the base of the mountain and are diverted north through two confined waterfalls or northeast around the southern base of the mountain and continue offsite.

33.612921
-116.272715

INSET MAP

SEE INSET MAP

33.584164
-116.249242

A
A
A
B
C
C
C
D
D
D
E
E

Legend

- Project Site
- Reference Point
- Discontinuous Sheet Flow

Drainage Areas

- Drainage Area A
- Drainage Area B
- Drainage Area C
- Drainage Area D
- Drainage Area E

0 400 800 Feet

Source: National Agricultural Inventory Project (NAIP, 2018)

Michael Baker INTERNATIONAL

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Drainage Areas

Figure 4

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

The identified ephemeral drainage features within Drainage Area A generally display a sinuous form with multiple active channels. The active channels generally consist of an earthen substrate comprised of coarse sand, gravel, and cobble. Although no surface water was observed, the mapped drainage features exhibited clear evidence of hydrology and an OHWM was observed via the following indicators: scour, a break in bank slope, presence of litter and debris, sediment sorting and deposition, cobble bars behind obstructions, and a change in vegetation community (from no terrestrial vegetation in the active channel to upland shrubs outside the active channel).

Within Drainage Area A, many of the active channels were generally devoid of vegetation although sparse occurrences of palo verde (*Parkinsonia florida*), catclaw (*Acacia greggii*), and smoke tree (*Psorothamnus spinosus*) occur in association with the developed ephemeral drainage feature adjoining the historic vineyard to the north as well as within the two dikes to the north. Vegetation along the banks of the active channels or on higher terraces consisted of upland species consistent with the surrounding area including creosote bush (*Larrea tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), fourwing saltbush (*Atriplex canescens*), burrobush (*Ambrosia salsola*), brittlebush (*Encelia farinosa*) and allscale saltbush (*Atriplex polycarpa*).

Drainage Area B

Drainage Area B is located within the northeastern portion of the project site to the east of the historic vineyard and Drainage Area A. Drainage Area B is comprised of multiple earthen ephemeral drainage features, which convey surface flows from the surrounding land east toward Dike No. 4.

The active channels generally consist of an earthen substrate comprised of coarse sand, gravel, and cobble. Although no surface water was observed, the mapped drainage features exhibited clear evidence of hydrology and an OHWM was observed via the following indicators: scour, a break in bank slope, presence of litter and debris, sediment sorting and deposition, cobble bars behind obstructions, and a change in vegetation community (from no terrestrial vegetation in the active channel to upland shrubs outside the active channel). Segments of discontinuous sheet flow occur throughout Drainage Area B as flows become insignificant or lack channel confinement.

The active channels within Drainage Area B were generally devoid of vegetation although sparse occurrences of palo verde and catclaw were identified. Upland vegetation outside the active channels consisted of upland species consistent with the surrounding area including creosote bush, rubber rabbitbrush, burrobush, brittlebush, and fourwing saltbush.

Drainage Area C

Drainage Area C is located within the southern portion of the project site to the south of the historic vineyard. Drainage Area C is comprised of multiple alluvial fans with many earthen ephemeral drainage features, which convey surface flows from the Santa Rosa Mountains and surrounding land. These ephemeral drainage features enter the site from the west and generally flow from southwest to northeast through the project site as braided channels toward a large channel at the southern edge of the historic

vineyard. A boulder and rock dike located at the southern edge of the historic vineyard prevents flows from proceeding further northeast and redirects them east toward Dike No. 4 and offsite.

The active channels generally consist of an earthen substrate comprised of coarse sand, gravel, and cobble. Although no surface water was observed, the mapped drainage features exhibited clear evidence of hydrology and an OHWM was observed via the following indicators: scour, a break in bank slope, presence of litter and debris, sediment sorting and deposition, cobble bars behind obstructions, and a change in vegetation community (from no terrestrial vegetation in the active channel to upland shrubs outside the active channel). Segments of discontinuous sheet flow occur throughout Drainage Area C as flows become insignificant, are subject to transmission losses, or lack channel confinement within the downstream portions of the alluvial floodplains. In addition, upland areas above active alluvial floodplain areas were identified by field indicators including rock weathering, desert pavement, rock varnish, and surface color/tone.

The active channels within Drainage Area C were generally devoid of vegetation although sparse occurrences of palo verde and catclaw were identified. Upland vegetation outside the active channels consisted of upland species consistent with the surrounding area including creosote bush, rubber rabbitbrush, burrobush, brittlebush, and fourwing saltbush. In addition, ocotillo (*Fouquieria splendens*), pencil cholla (*Opuntia ramosissima*), and California barrel cactus (*Ferocactus cylindraceus*) were distributed throughout upland areas located on high terraces well beyond the alluvial floodplain.

Drainage Area D

Drainage Area D is located within the southern portion of the project site to the south of the historic vineyard and adjacent (east) to Drainage Area C. Drainage Area D is comprised of numerous braided channels located on an alluvial floodplain which convey surface flows from the Santa Rosa Mountains and surrounding land in a general southwest to east direction toward Dike No. 4 and offsite.

The active channels generally consist of an earthen substrate comprised of coarse sand, gravel, and cobble. Although no surface water was observed, the mapped drainage features exhibited clear evidence of hydrology and an OHWM was observed via the following indicators: scour, a break in bank slope, presence of litter and debris, sediment sorting and deposition, cobble bars behind obstructions, and a change in vegetation community (from no terrestrial vegetation in the active channel to upland shrubs outside the active channel). Segments of discontinuous sheet flow occur throughout Drainage Area D as flows become insignificant, are subject to transmission losses, or lack channel confinement within the downstream portions of the alluvial floodplain. In addition, upland areas primarily in the southeastern portion of the project site well above active alluvial floodplain areas were identified by field indicators including rock weathering, desert pavement, rock varnish, and surface color/tone.

The active channels within Drainage Area D were generally devoid of vegetation although sparse occurrences of palo verde, smoke tree, and catclaw were identified. Upland vegetation outside the active channels consisted of upland species consistent throughout the project site. In addition, ocotillo, pencil

cholla, and California barrel cactus were distributed throughout upland areas located on high terraces well beyond the alluvial floodplain.

Drainage Area E

Drainage Area E is located in the southeastern portion of the project site to the south of Drainage Area D. Drainage Area E is comprised of multiple active channels which convey surface flows originating from the Martinez Rockslide east through the project site toward Dike No. 4 and offsite.

The active channels generally consist of an earthen substrate comprised of coarse sand, cobble, and rock. No surface water was observed. However, the mapped drainage features exhibited clear evidence of hydrology and an OHWM was observed via the following indicators: scour, a break in bank slope, presence of litter and debris, sediment sorting and deposition, cobble bars behind obstructions, and a change in vegetation community (from a lack of terrestrial vegetation in the active channel to upland shrubs outside the active channel). Segments of discontinuous sheet flow occur throughout Drainage Area E as flows become insignificant or lack channel confinement within the downstream portions of the alluvial floodplain. In addition, upland areas well above active alluvial floodplain areas were identified by field indicators including rock weathering, desert pavement, rock varnish, and surface color/tone.

The active channels within Drainage Area E contained sparse occurrences of palo verde, smoke tree, catclaw, and desert lavender (*Hyptis emoryi*) were identified. Upland vegetation outside the active channels consisted of upland species consistent throughout the project site as well as ocotillo, pencil cholla, and California barrel cactus distributed throughout upland areas located on high terraces well beyond the alluvial floodplain.

5.1.2 WETLAND FEATURES

Two soil pits were performed within the project site where evidence of wetland hydrology was observed. Soil Pit 1 (SP1) was performed within the eastern portion of the project site where wetland hydrology (surface soil cracks) was observed. SP1 was performed within a depressional area to a depth of approximately 16 inches and consisted of a single layer. SP1 exhibited a texture of clay loam and displayed a matrix color of 10YR 3/3 when moist with no redoximorphic features identified within the soil profile. Vegetation surrounding SP1 consisted primarily of catclaw (Not Listed [NL]). Vegetation surrounding SP1 did not meet the Dominance Test or the Prevalence Index to satisfy the hydrophytic vegetation parameter. Based on the results of the field delineation, it was determined that SP1 only met one (hydrology) of the three required wetland parameters and thus did not qualify as a wetland.

Soil Pit Two (SP2) was performed within the channel of an ephemeral drainage feature in the central portion of the project site to a depth of approximately 8 inches prior to encountering a restrictive layer of rock and cobble. SP2 consisted of a single layer and exhibited a texture of sand. SP2 displayed a matrix color of 2.5Y 4/3 when moist with no redoximorphic features identified within the soil profile. Vegetation surrounding SP2 consisted paloverde (NL). Vegetation surrounding SP2 did not meet the Dominance Test or the Prevalence Index to satisfy the hydrophytic vegetation parameter. Within the vicinity of SP2, indicators of wetland hydrology were observed via drainage patterns, drift deposits, and sediment deposits.

Based on the results of the field delineation, it was determined that SP2 only met one (hydrology) of the three required wetland parameters and thus did not qualify as a wetland. Refer to Appendix C for a copy of the wetland determination data forms.

5.1.3 DESERT DRY WASH WOODLAND

Desert Dry Wash Woodland (DDWW) habitat was identified in association with the larger and more developed ephemeral drainage features throughout the project site. Mapped DDWW was primarily dominated by blue palo verde and to a lesser extent catclaw. Mature palo verde trees ranged from 10 to 20 feet in height and crown diameter and were observed to be in good health. The catclaw observed within identified DDWW generally displayed a shrublike form. Other species identified in association with the on-site DDWW habitat included smoke tree, desert lavender, cheesebush (*Hymenoclea salsola*), and jojoba (*Simmondsia chinensis*). In general, the observed woodlands contained low densities of the composite species. DDWW species were identified throughout the project site, however the largest areas of identified DDWW habitat are located within the southern portion of the project site in association with the upstream portions of ephemeral drainage features where significant surface flows originating from the mountains to the west and south are primarily confined. Lower densities of DDWW species occur as surface flows are conveyed east into the braided and discontinuous channels of the downstream portions of the alluvial fans. Areas of sparse occurrences of the indicated species or individual DDWW trees located significantly far from and not in association with a drainage feature were excluded from DDWW habitat boundaries.

Section 6 Findings

This delineation documents the jurisdictional authority of the Corps, Regional Board, and CDFW within the project site. This report presents our best effort at determining the extent of jurisdictional features using the most up-to-date regulations, written policy, and guidance from the regulatory agencies. However, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdictional boundaries.

6.1 U.S. ARMY CORPS OF ENGINEERS

6.1.1 WATERS OF THE U.S. DETERMINATION

Evidence of an OHWM was noted within the boundaries of the project site. However, aquatic features within the project site are considered ephemeral and do not meet the definition of a WoUS pursuant to the Navigable Waters Protection Rule. Therefore, on-site aquatic features would not be subject to regulation under Section 404 of the CWA and would not be considered Corps' jurisdiction.

6.2 REGIONAL WATER QUALITY CONTROL BOARD

6.2.1 NON-WETLAND WATERS OF THE STATE DETERMINATION

As mentioned in Section 6.1.1 *Water of the U.S. Determination*, the on-site aquatic features are considered ephemeral and therefore would not meet the definition of a WoUS pursuant to the Navigable Waters Protection Rule. However, the on-site features qualify as waters of the State and Regional Board jurisdiction totals approximately 90.96 acres non-wetland waters of the State. Refer to Table 1*: Summary of Aquatic Resources and Jurisdictional Limits within the Project Site* and Figures 5, and 5A through 5I, *Regional Board & CDFW Jurisdictional Map*. Based on a review of project design plans, the proposed project would temporarily impact approximately 12.15 acres and permanently impact 53.15 acres of non-wetland waters of the State. Refer to Figure 6, *Regional Board & CDFW Jurisdictional Impact Map*, below.

6.2.2 WETLAND DETERMINATION

As previously noted, an area must exhibit all three wetland parameters described in the 2010 Regional supplement to the Corps Manual to be considered a Corps jurisdictional wetland. In addition, the State wetland definition and delineation procedures are largely consistent with the three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology implemented by the Corps. However, one exception is an area can lack vegetation and still satisfy the parameter for hydrophytic vegetation thus qualifying the area as a wetland water of the State if the hydric soil, and wetland hydrology parameters are also fulfilled. Two soil pits (SP1 – SP2) were dug within the a depressional area and the channel of an ephemeral drainage feature where evidence of wetland hydrology was observed. Although wetland hydrology was present at SP1 and SP2, hydric soils and hydrophytic vegetation were not encountered. Based on the results of the field delineation, it was determined that no wetland waters of the

State are located within the boundaries of the project site. Refer to Appendix C, *Wetland Determination Data Forms*.

Table 1: Summary of Aquatic Resources and Jurisdictional Limits within the Project Site[9]

Drainage Area	Flow Regime and Feature Type	Cowardin Type	Jurisdictional Limits (acres)			
			Regional Board		CDFW	
			Non-Wetland Waters	Wetland Waters	Streambed	Desert Dry Wash Woodland
A	Ephemeral Streams	Riverine	16.39	0.00	16.39	1.27
B	Ephemeral Streams	Riverine	0.27	0.00	0.27	0.00
C	Ephemeral Streams	Riverine	46.01	0.00	46.01	22.58
D	Ephemeral Streams	Riverine	26.40	0.00	26.40	23.29
E	Ephemeral Streams	Riverine	1.89	0.00	1.89	8.84
		TOTAL	**90.96**	**0.00**	**90.96**	**55.98**

6.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The on-site drainage features exhibited a clear bed and bank and qualify as CDFW jurisdictional streambed. Based on the results of the field investigations, a total of approximately 90.96 acres of CDFW jurisdictional streambed occurs within the boundaries of the project site. In addition, the on-site DDWW habitat is considered CDFW jurisdiction and totaled 55.98 acres. Approximately 20.56 acres of DDWW habitat is located within the 90.96 acres of CDFW jurisdictional streambed and an additional 35.42 acres of DDWW habitat is associated with the CDFW jurisdictional streambed. Refer to Table 1 above and Figures 5, and 5A through 5I, *Regional Board & CDFW Jurisdictional Map*, below. Based on a review of project design plans, the proposed project would temporarily impact approximately 12.15 acres and permanently impact 53.15 acres of CDFW jurisdictional Streambed. In addition, the proposed project would temporarily impact approximately 2.67 acres and permanently impact 10.73 acres of CDFW jurisdictional DDWW habitat. Approximately 1.26 acres of temporary impact and 5.82 acres of permanent impact to DDWW habitat is located within CDFW jurisdictional streambed and the remaining 1.41 acres of temporary impact and 4.91 acres of permanent impact to DDWW habitat is associated with CDFW jurisdictional streambed. Refer to Figure 6, *Regional Board & CDFW Jurisdictional Impact Map*.

[9] Under the Navigable Waters Protection Rule, jurisdictional tributaries include perennial and intermittent rivers and streams that contribute surface flow to traditional navigable waters in a typical year and must flow more often than just after a single precipitation event. Based on field observations and data derived from the National Hydrography Dataset (NHD), the on-site aquatic features do not meet the definition of a water of the U.S. (WoUS) and therefore are not subject to regulation under Section 404 of the CWA.

33.612921
-116.272715

INSET MAP

P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P18
P19
P20
SP1
SP2

SEE INSET MAP

33.584164
-116.249242

6/2/2021 JN H:\pdata\18251\7\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Legend

- Project Site
- Soil Pits
- Photograph Point and Direction
- Reference Point
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- CDFW Desert Dry Wash Woodland Habitat (55.98 acres)
- Discontinuous Sheet Flow

Michael Baker INTERNATIONAL

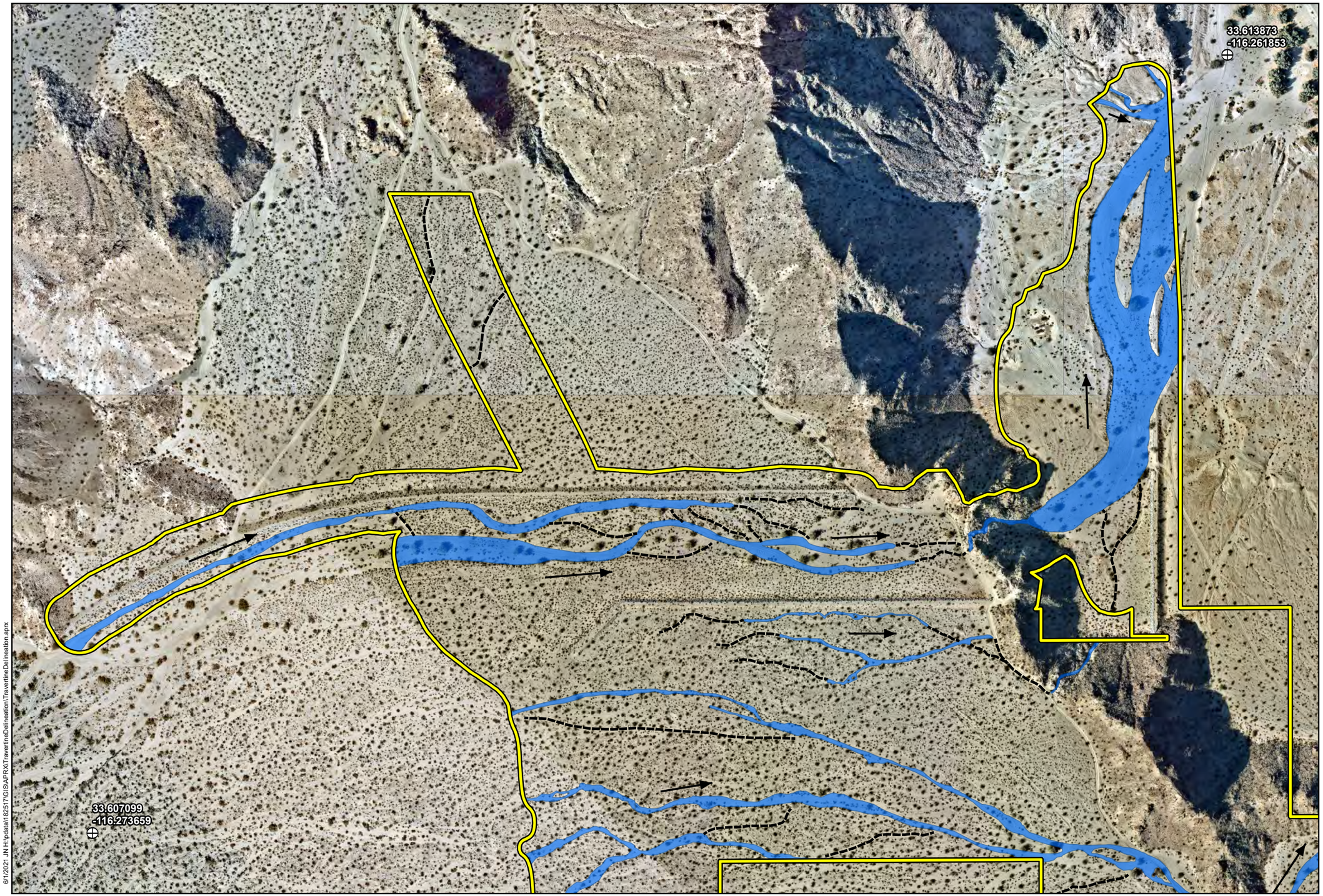
0 400 800 Feet

Source: National Agricultural Inventory Project (NAIP, 2018)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

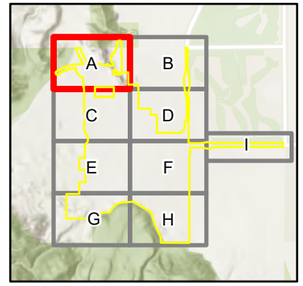
Regional Board & CDFW Jurisdictional Map

Figure 5



Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 150 300 Feet

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Michael Baker INTERNATIONAL

Source: Nearmap (September 2021)

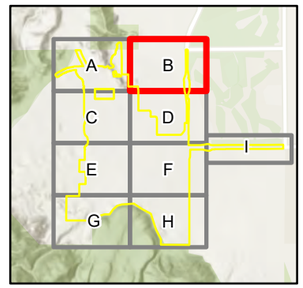
TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

Figure 5A

Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 150 300 Feet

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Source: Nearmap (September 2021)

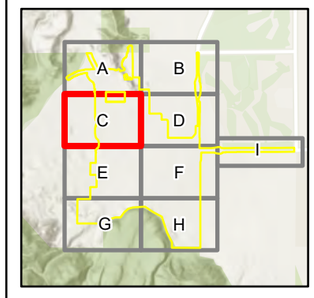
TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

Figure 5B

Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- CDFW Desert Dry Wash Woodland Habitat (55.98 acres)
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 150 300
Feet

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Michael Baker INTERNATIONAL

Source: Nearmap (September 2021)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

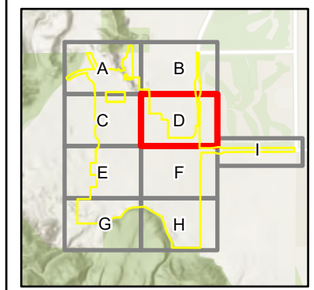
Figure 5C

33.606138
-116.248091

33.599383
-116.260375

Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 150 300
Feet

Source: Nearmap (September 2021)

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Michael Baker INTERNATIONAL

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

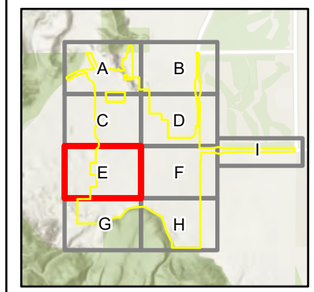
Figure 5D

33.598502
-116.261555

33.591558
-116.273772

Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- CDFW Desert Dry Wash Woodland Habitat (55.98 acres)
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 150 300
Feet

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Michael Baker INTERNATIONAL

Source: Nearmap (September 2021)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

Figure 5E

33.598475
-116.260311

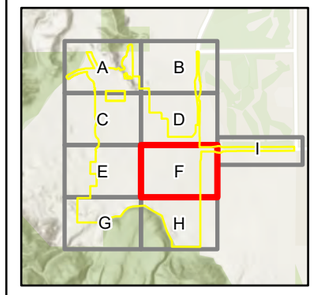
SP2

SP1

33.591561
-116.248584

Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- CDFW Desert Dry Wash Woodland Habitat (55.98 acres)
- Discontinuous Sheet Flow
- Soil Pits
- Flow Direction
- Reference Point



0 150 300
Feet

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Michael Baker INTERNATIONAL

Source: Nearmap (September 2021)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

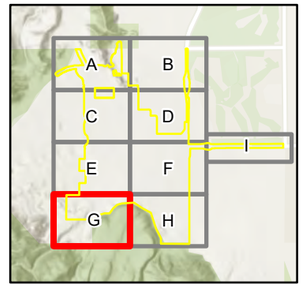
Figure 5F

33.590571
-116.27374

33.583871
-116.261776

Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- CDFW Desert Dry Wash Woodland Habitat (55.98 acres)
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 150 300
Feet

6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Source: Nearmap (September 2021)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

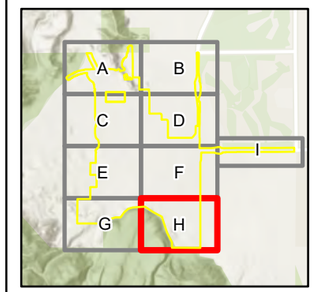
Figure 5G

33.590519
-116.248347

33.583871
-116.260277

Legend

- Project Site
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed (90.96 acres)
- CDFW Desert Dry Wash Woodland Habitat (55.98 acres)
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 150 300
Feet

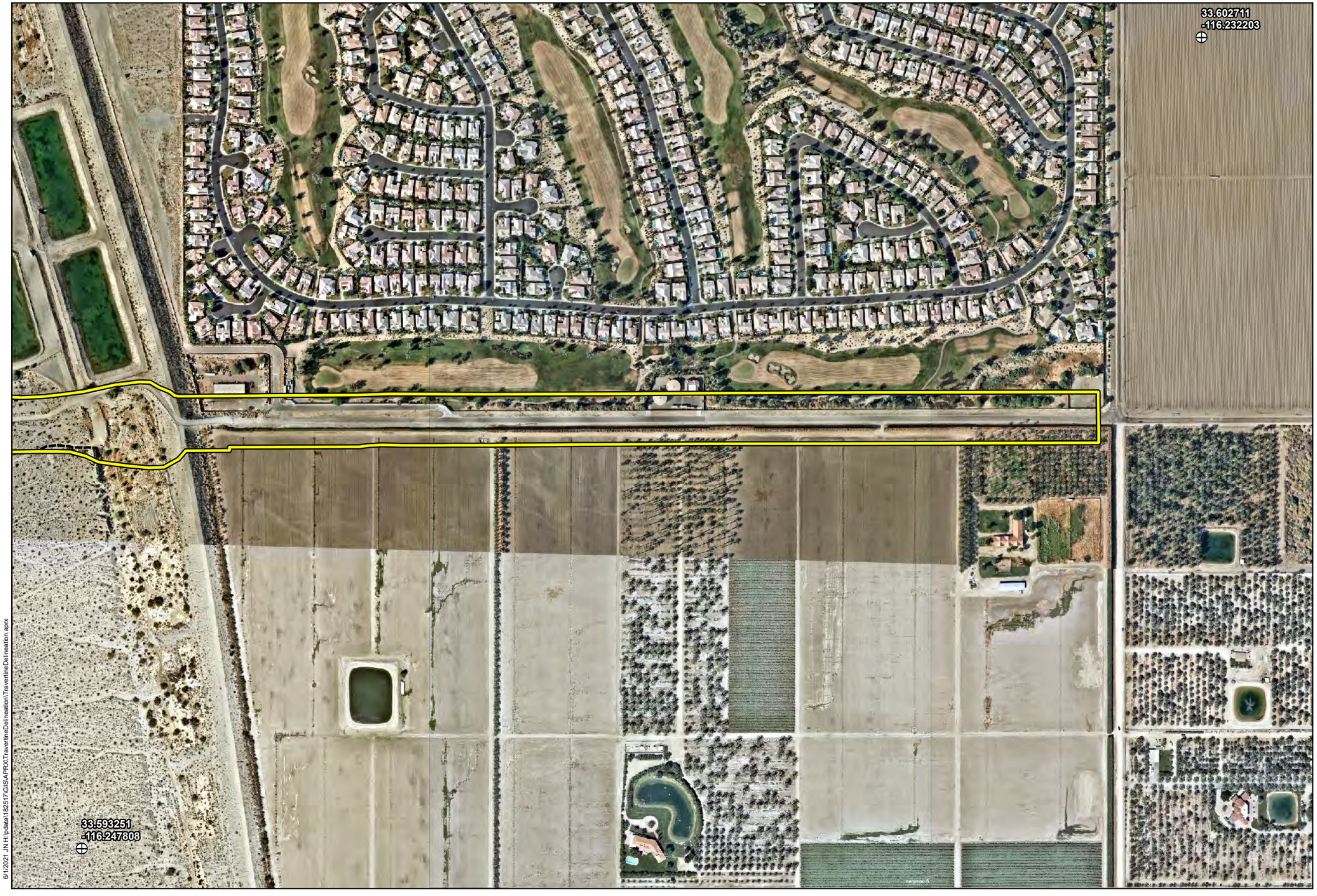
6/1/2021 JN H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Source: Nearmap (September 2021)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

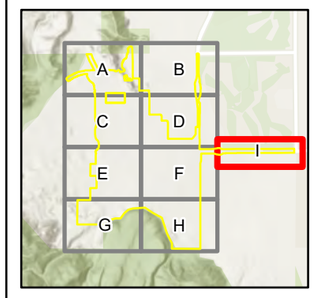
Regional Board & CDFW Jurisdictional Map

Figure 5H



Legend

- Project Site
- Discontinuous Sheet Flow
- Flow Direction
- Reference Point



0 200 400 Feet

6/1/2021 JN:H:\pdata\182517\GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Source: Nearmap (September 2021)

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Map

Figure 5I

33.612921
-116.272715

INSET MAP

SEE INSET MAP

33.584164
-116.249242

Legend

- Project Site
- Temporary Impact Area
- Permanent Impact Area
- Reference Point
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed No Impact (25.66 Acres)
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed Temporary Impact (12.15 Acres)
- Regional Board Non-Wetland Waters & CDFW Jurisdictional Streambed Permanent Impact (53.15 Acres)
- CDFW Desert Dry Wash Woodland Habitat No Impact (42.58Acres)
- CDFW Desert Dry Wash Woodland Habitat Temporary Impact (2.67 Acres)
- CDFW Desert Dry Wash Woodland Habitat Permanent Impact (10.73 Acres)
- Discontinuous Sheet Flow

Michael Baker INTERNATIONAL

0 400 800 Feet

Source: National Agricultural Inventory Project (NAIP), 2018

TRAVERTINE PROJECT
JURISDICTIONAL DELINEATION OF STATE AND FEDERAL WATERS

Regional Board & CDFW Jurisdictional Impact Map

Figure 6

6/3/2021 JN H:\pdata\182517GIS\APRX\TravertineDelineation\TravertineDelineation.aprx

Section 7 Regulatory Approval Process

This report has been prepared for TRG Land, Inc. to delineate the Corps, Regional Board, and CDFW jurisdictional authority within the project site. Below is a summary of the various permits/authorizations that would be required prior to temporarily or permanently impacting on-site jurisdictional features.

7.1 U.S. ARMY CORPS OF ENGINEERS

On January 23, 2020, the EPA and the Corps finalized the Navigable Waters Protection Rule to define WoUS. On April 21, 2020, the EPA and the Corps published the Navigable Waters Protection Rule in the Federal Register which became effective on June 22, 2020. Under the Navigable Waters Protection Rule, ephemeral features such as those identified within the project site, do not meet the definition of a WoUS and are not subject to regulation under Section 404 of the CWA. Therefore, it would be necessary for the applicant to prepare and process an Approved Jurisdictional Determination (AJD) or similar approval with the Corps to receive formal concurrence that ephemeral aquatic features within the project site do not qualify as WoUS and therefore are not subject to regulation under Section 404 of the CWA.

7.2 REGIONAL WATER QUALITY CONTROL BOARD

The Regional Board regulates discharges to surface waters under Section 401 of the CWA and Section 13263 of the Porter-Cologne Act. This includes waters that are determined to be ephemeral and do not meet the definition of a WoUS under the Navigable Waters Protection Rule. In the absence of a Section 404 permit issued from the Corps, a Section 401 Water Quality Certification (WQC) is not applicable. However, a Waste Discharge Requirements (WDR) issued from the Regional Board would be required prior to commencement of any construction activities within Regional Board jurisdictional areas. The Regional Board also requires that California Environmental Quality Act (CEQA) compliance be obtained prior to issuance of the final WDR. Further, an application fee is required, which is based on both total temporary and permanent impact acreages (as applicable).

7.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The CDFW regulates alterations to streambed under Section 1602 of the CFGC. Therefore, formal notification to, and subsequent authorization from CDFW, would be required prior to commencement of any construction activities within the CDFW jurisdictional areas. The CDFW also requires that CEQA compliance be obtained prior to issuing the final LSAA. In addition, a notification fee is required, which is calculated based on project costs within CDFW jurisdictional areas.

7.4 RECOMMENDATIONS

As part of the regulatory permitting process, this delineation will be forwarded to each of the regulatory agencies for their concurrence. The concurrence/receipt would typically be valid up to five years and would solidify findings noted within this report.

Section 8 References

Brady, Roland H. III, Kris Vyverberg. 2013. MESA - *A Field Guide to Mapping Episodic Stream Activity (MESA)*. Final Draft V5: July 3, 2013.

Brady, Roland H. III, Kris Vyverberg. 2013. *Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants*. California Energy Commission, Publication Number: CEC-500-2014-013.

California Department of Fish and Wildlife. *Lake and Streambed Alteration Program*. Accessed online at: https://www.wildlife.ca.gov/Conservation/LSA.

Calflora, *What Grows Here?,* Accessed online at: https://www.calflora.org/entry/wgh.html.

Corps. 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0),* ed. J.S. Wakeley, R. W. Lichvar, and C. V. Nobel. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

Federal Register. 2020. *The Navigable Waters Protection Rule: Definition of "Waters of the United States"*, 85 F.R. 22250 (April 21, 2020) (to be codified at 33 C.F.R. 328 and 40 C.F.R. pts. 110, 112, 116, 117, 120, 122, 230, 232, 300, 302, & 401).

Google, Inc. 2019. Google Earth Pro Imagery Version 7.3.3.7786, build date July 21, 2020. Aerial Image dated December 11, 2019.

Lichvar, R.W., D.C. Finnegan, M.P. Ericsson, and W. Ochs. 2006. *Distribution of Ordinary High Water Mark Indicators and their Reliability in Identifying the Limits of "Waters of the United States" in the Arid Southwestern Channels*. ERDC/CRREL TR-06-5. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

Lichvar, R.W., and S.M McColley. 2008. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual*. ERDC/CRREL TR-08-12. Hanover, NH: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

Michael Baker International. 2016. *Travertine Development Project, Delineation of State and Federal Jurisdictional Waters*. Prepared for the Travertine Corporation.

Munsell Color. 2012. *Munsell Soil Color Charts*. X-rite. Grand Rapids, Michigan.

State Water Resources Control Board. April 2019. *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*. Effective May 28, 2020. Accessed online at: https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html.

U.S. Army Corps of Engineers (USACE). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).* ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

USACE. 2016. *Special Public Notice: Updated Map and Drawing Standards for the South Pacific Regulatory Division Regulatory Program*. Issued on February 10, 2016.

USACE. 2017. *Special Public Notice: Minimum Standards for Acceptance of Aquatic Resources Delineation Reports*. Issued on March 16, 2017.

USACE. 2017. *Special Public Notice: Reissuance of the Nationwide Permits and Issuance of Final Regional Conditions for the Los Angeles District*. Issued on March 22, 2017.

USACE. 2018. *National Wetland Plant List, Version 3.4.* U.S. Army Corps of Engineers, Engineer Research and Development Center Cold Regions Research and Engineering Laboratory. Accessed online at: http://wetland-plants.usace.army.mil/.

U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), *Custom Soil Resources Report for Western Riverside Area, California*. Accessed online at: https://websoilsurvey.sc.egov.usda.gov/.

USDA, NRCS. 2020. *Hydric Soils List of California*. Accessed online at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

U.S. Department of Homeland Security (USDHS), Federal Emergency Management Agency (FEMA), National Flood Hazard Layer Viewer. 2008. *Flood Insurance Rate Map Nos. No. 06065C2900H, 06065C2925H.* Accessed online at: https://msc.fema.gov/portal/home.

U.S. Fish and Wildlife Service (USFWS). *National Wetlands Inventory Mapper*. 2020. Accessed online at: http://www.fws.gov/wetlands/Data/Mapper.html.

U.S. Geological Survey (USGS). 7.5-Minute Topographic Quadrangle, *Martinez Mountain, California,* 2018.

USGS. National Hydrography Dataset and Wetland Boundary Dataset. Accessed online at: https://viewer.nationalmap.gov/advanced-viewer/.

Western Regional Climate Center. 2016 – 2020. *Period of Record Monthly Climate Summary for the Desert Resorts Regional Airport (048892), California*. Accessed online at: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca8892.

Appendix A Documentation

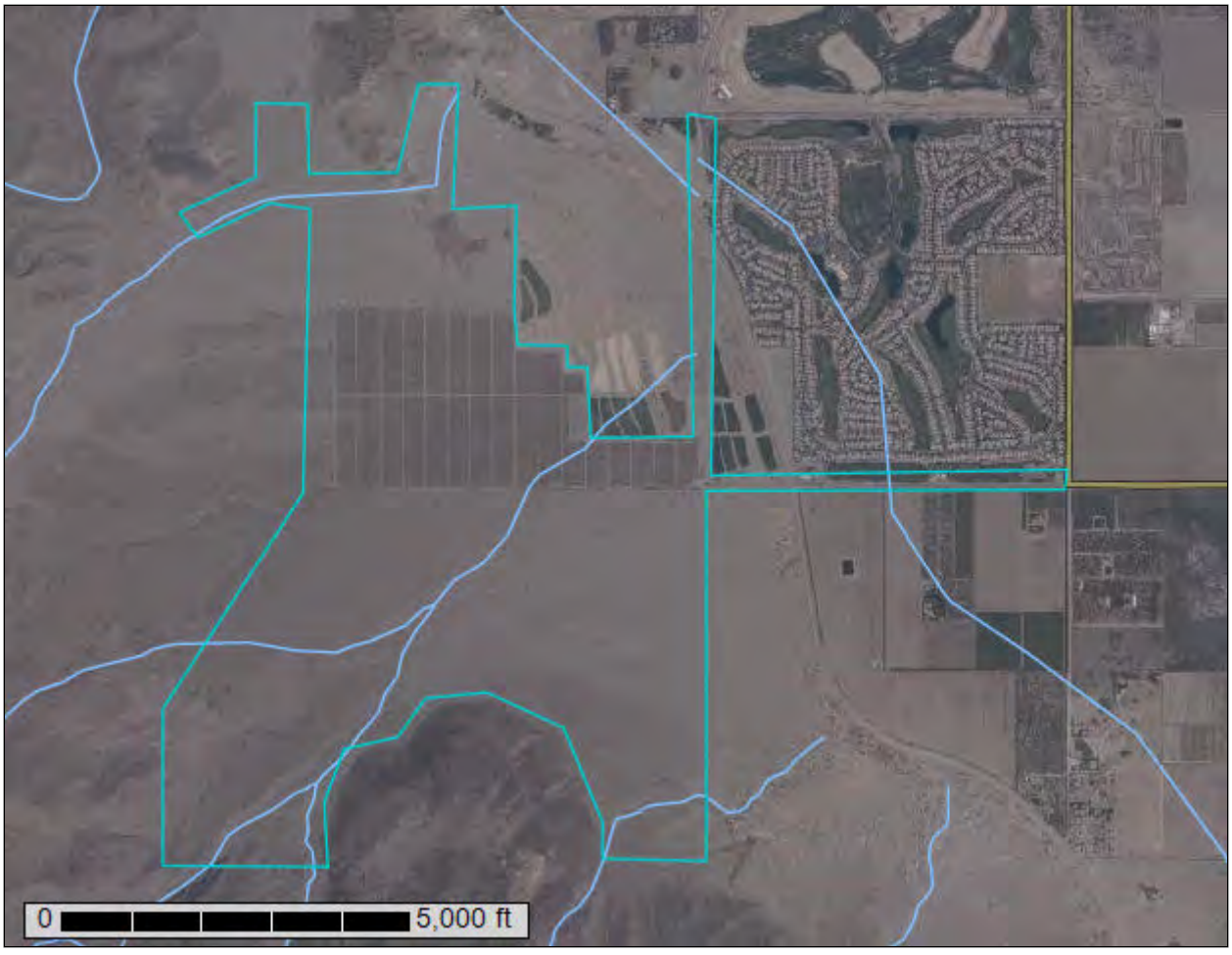
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Anza-Borrego Area, California; and Riverside County, Coachella Valley Area, California



June 2, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

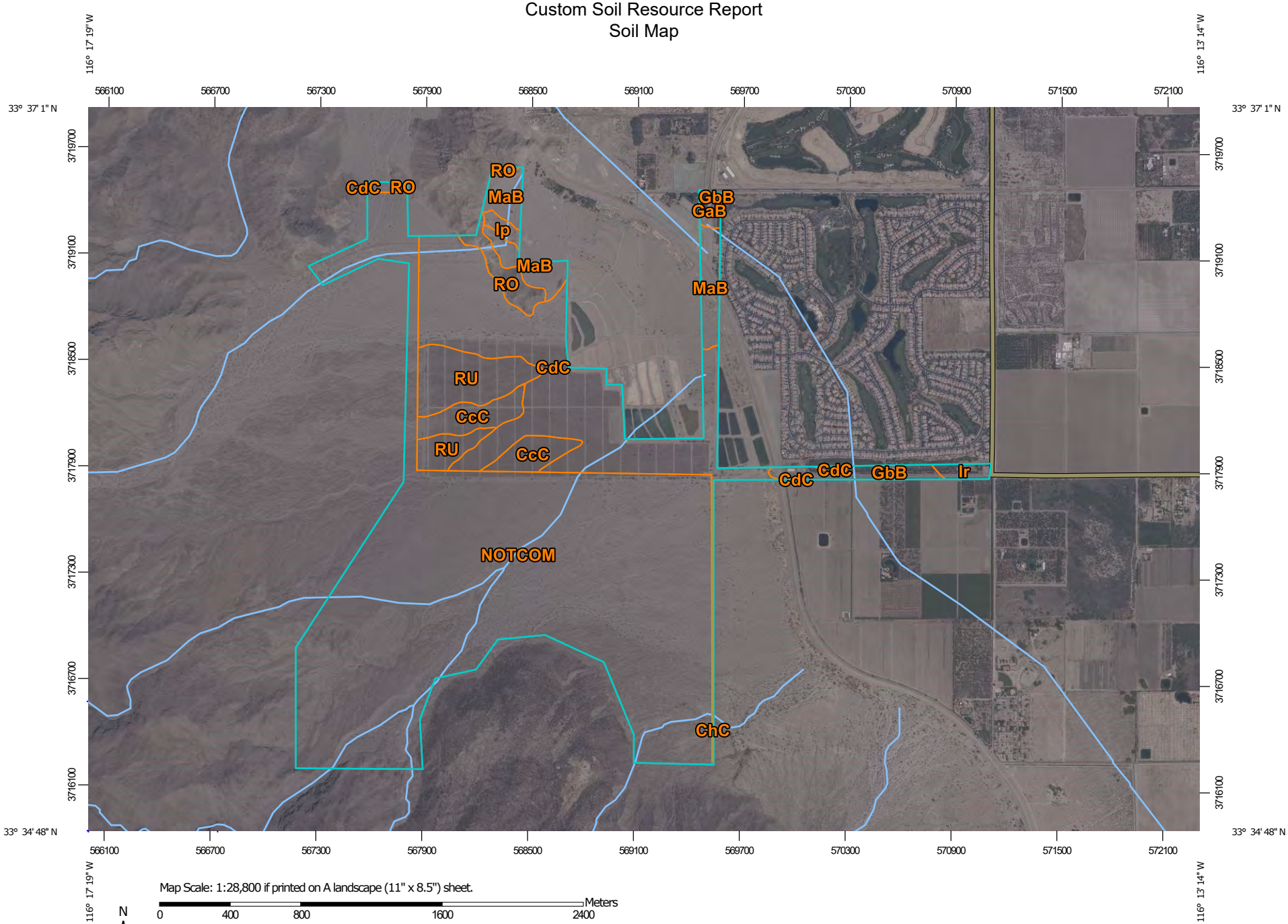
alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:28,800 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 400 800 1600 2400

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Anza-Borrego Area, California
Survey Area Data: Version 2, Sep 17, 2019

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 12, Jun 8, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 18, 2018—Aug 22, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	769.2	64.1%
Subtotals for Soil Survey Area		**769.2**	**64.1%**
Totals for Area of Interest		**1,200.9**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CcC	Carrizo stony sand, 2 to 9 percent slopes	39.2	3.3%
CdC	Carsitas gravelly sand, 0 to 9 percent slopes	232.0	19.3%
ChC	Carsitas cobbly sand, 2 to 9 percent slopes	0.8	0.1%
GaB	Gilman loamy fine sand, 0 to 5 percent slopes	5.3	0.4%
GbB	Gilman fine sandy loam, 2 to 5 percent slopes	17.2	1.4%
Ip	Indio fine sandy loam	4.9	0.4%
Ir	Indio fine sandy loam, wet	6.2	0.5%
MaB	Myoma fine sand, 0 to 5 percent slopes	47.4	3.9%
RO	Rock outcrop	18.6	1.5%
RU	Rubble land	60.1	5.0%
Subtotals for Soil Survey Area		**431.7**	**35.9%**
Totals for Area of Interest		**1,200.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Anza-Borrego Area, California

NOTCOM—No Digital Data Available

Map Unit Composition

Notcom: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Notcom

Properties and qualities

Riverside County, Coachella Valley Area, California

CcC—Carrizo stony sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hktz
Elevation: 2,000 feet
Mean annual precipitation: 8 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 260 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Carrizo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carrizo

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: stony sand
H2 - 10 to 39 inches: very gravelly coarse sand
H3 - 39 to 60 inches: stony coarse sand

Properties and qualities

Slope: 2 to 9 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Carsitas

Percent of map unit: 10 percent

Hydric soil rating: No

Chuckawalla

Percent of map unit: 2 percent
Hydric soil rating: No

Myoma

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed, cobbly or gravelly

Percent of map unit: 1 percent
Hydric soil rating: No

CdC—Carsitas gravelly sand, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: hkv0
Elevation: 800 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 to 73 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Carsitas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carsitas

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: gravelly sand
H2 - 10 to 60 inches: gravelly sand

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 4 percent
Landform: Channels
Hydric soil rating: Yes

Carsitas

Percent of map unit: 4 percent
Hydric soil rating: No

Myoma

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, stony or gravelly

Percent of map unit: 3 percent
Hydric soil rating: No

ChC—Carsitas cobbly sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hkv3
Elevation: 800 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 to 73 degrees F
Frost-free period: 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Carsitas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carsitas

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Gravelly alluvium derived from granite

Typical profile
H1 - 0 to 10 inches: cobbly sand
H2 - 10 to 60 inches: gravelly sand

Properties and qualities
Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Very low (about 3.0 inches)

Interpretive groups
Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Riverwash
Percent of map unit: 4 percent
Landform: Channels
Hydric soil rating: Yes

Carrizo
Percent of map unit: 4 percent
Hydric soil rating: No

Chuckawalla
Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 3 percent
Hydric soil rating: No

GaB—Gilman loamy fine sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: hkvk
Elevation: 1,080 to 1,600 feet
Mean annual precipitation: 2 to 10 inches

Mean annual air temperature: 72 to 73 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Gilman and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilman

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: loamy fine sand
H2 - 8 to 60 inches: stratified loamy sand to silty clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 8 percent
Hydric soil rating: No

Indio

Percent of map unit: 5 percent
Hydric soil rating: No

Salton

Percent of map unit: 2 percent
Hydric soil rating: No

GbB—Gilman fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkvm
Elevation: 1,080 to 1,600 feet
Mean annual precipitation: 2 to 10 inches
Mean annual air temperature: 72 to 73 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Gilman and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilman

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 60 inches: stratified loamy sand to silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Unnamed, sandy surface
Percent of map unit: 5 percent
Hydric soil rating: No

Coachella
Percent of map unit: 4 percent
Hydric soil rating: No

Indio
Percent of map unit: 4 percent
Hydric soil rating: No

Salton
Percent of map unit: 2 percent
Hydric soil rating: No

Ip—Indio fine sandy loam

Map Unit Setting
National map unit symbol: hkvy
Elevation: 300 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Indio and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indio

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile
H1 - 0 to 10 inches: fine sandy loam
H2 - 10 to 60 inches: very fine sandy loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Salton

Percent of map unit: 5 percent
Hydric soil rating: No

Gilman

Percent of map unit: 5 percent
Hydric soil rating: No

Coachella

Percent of map unit: 5 percent
Hydric soil rating: No

Ir—Indio fine sandy loam, wet

Map Unit Setting

National map unit symbol: hkvz
Elevation: 300 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Indio and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Indio

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: fine sandy loam
H2 - 10 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Gilman

Percent of map unit: 5 percent
Hydric soil rating: No

Salton

Percent of map unit: 5 percent
Hydric soil rating: No

Coachella

Percent of map unit: 5 percent
Hydric soil rating: No

MaB—Myoma fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkw3
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unnamed, noncalcareous soils

Percent of map unit: 4 percent
Hydric soil rating: No

Coachella

Percent of map unit: 4 percent
Hydric soil rating: No

Carsitas

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

RO—Rock outcrop

Map Unit Setting

National map unit symbol: hkwc
Elevation: 650 to 4,000 feet
Mean annual precipitation: 8 to 15 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 75 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Rubble land

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

Carsitas
Percent of map unit: 2 percent
Hydric soil rating: No

RU—Rubble land

Map Unit Setting
National map unit symbol: hkwf
Elevation: 650 to 4,000 feet
Mean annual precipitation: 8 to 50 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 75 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Rubble land: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rubble Land

Setting
Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stony and bouldery alluvium

Typical profile
H1 - 0 to 60 inches: fragmental material

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Carrizo
Percent of map unit: 14 percent
Hydric soil rating: No

Carsitas
Percent of map unit: 10 percent
Hydric soil rating: No

Riverwash
Percent of map unit: 6 percent
Landform: Channels
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands

February 1, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands

February 1, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
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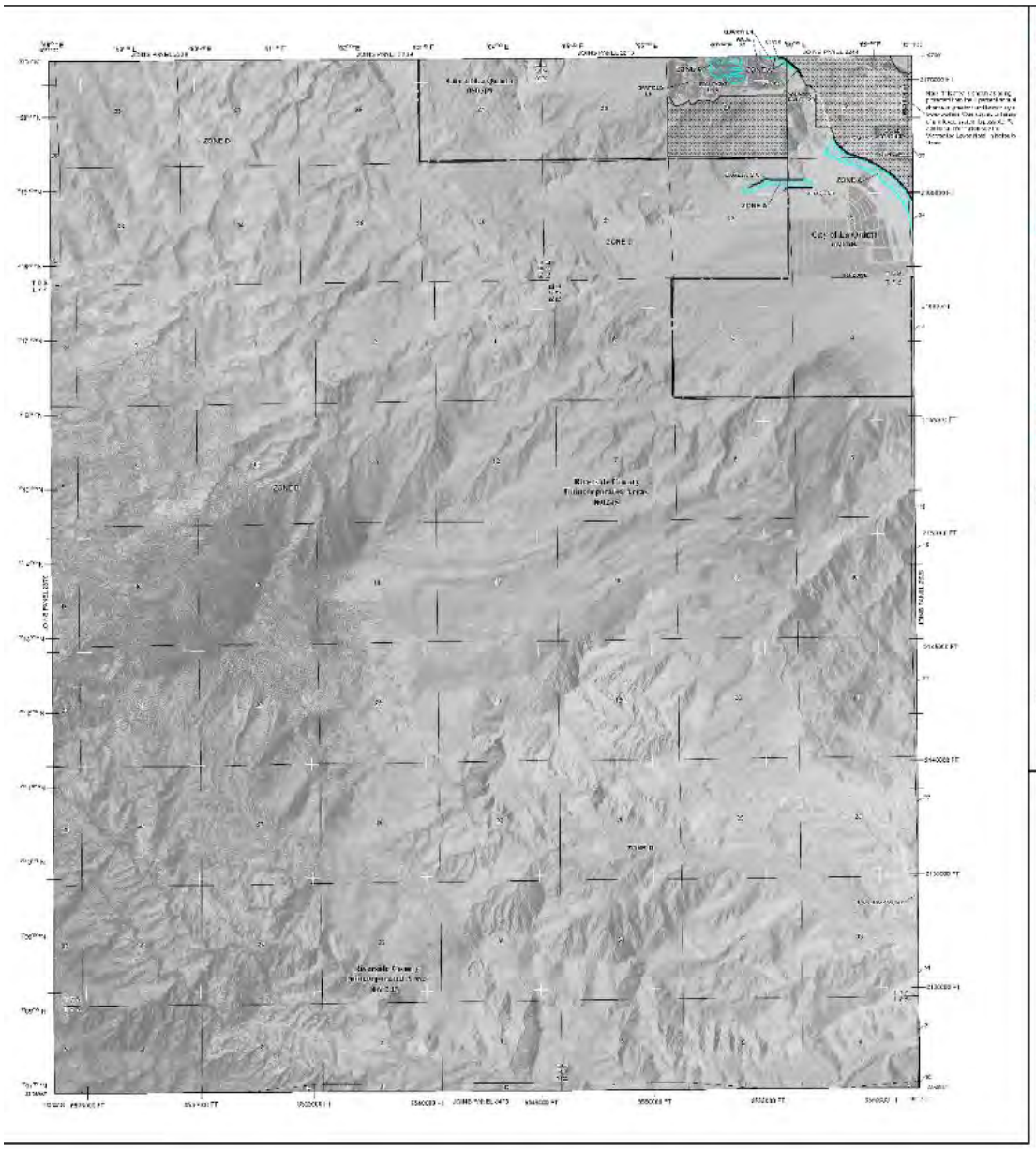
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2900H

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

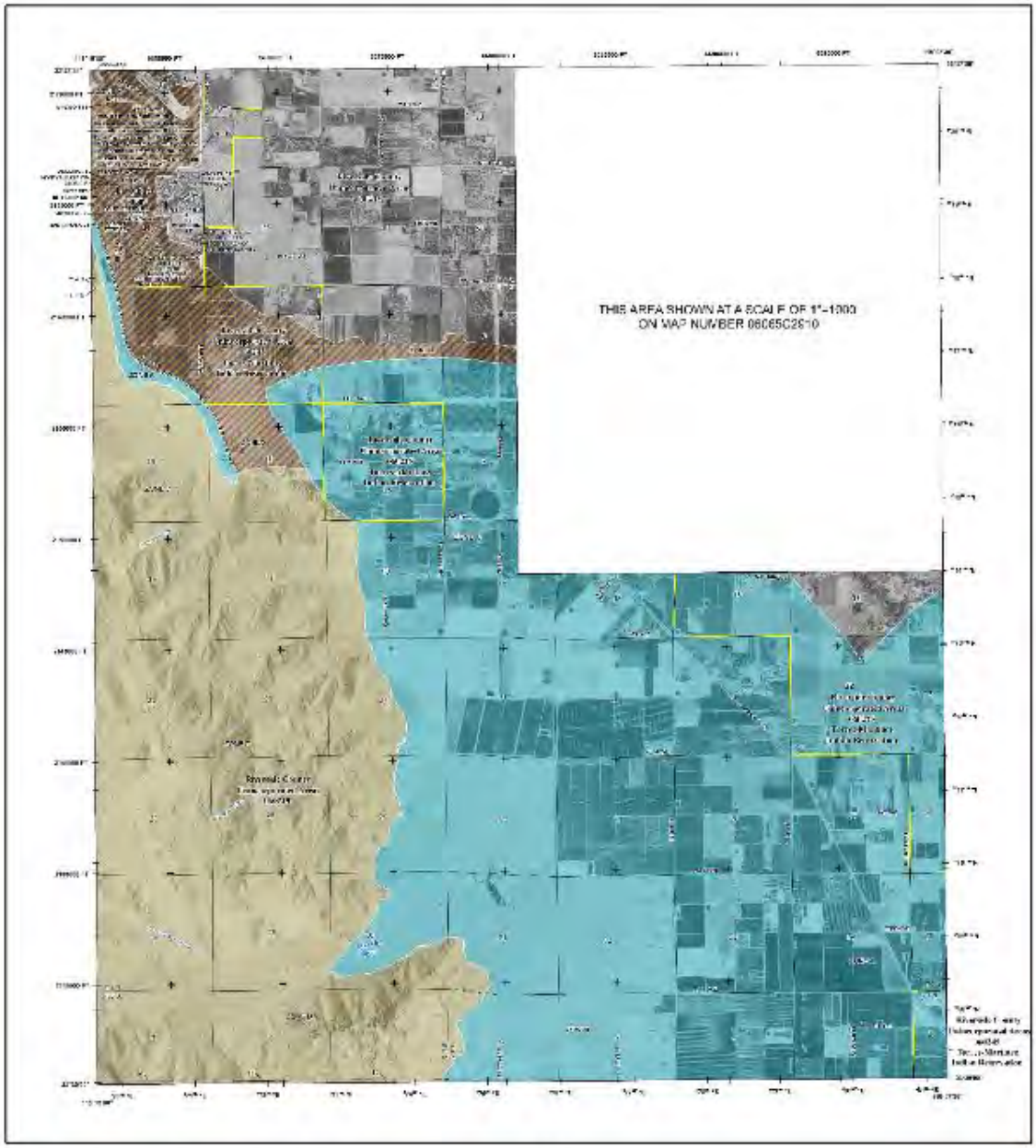
PANEL 2900 OF 3905

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

MAP NUMBER
06065C2900H

MAP REVISED
APRIL 19, 2017

Federal Emergency Management Agency



FLOOD HAZARD INFORMATION

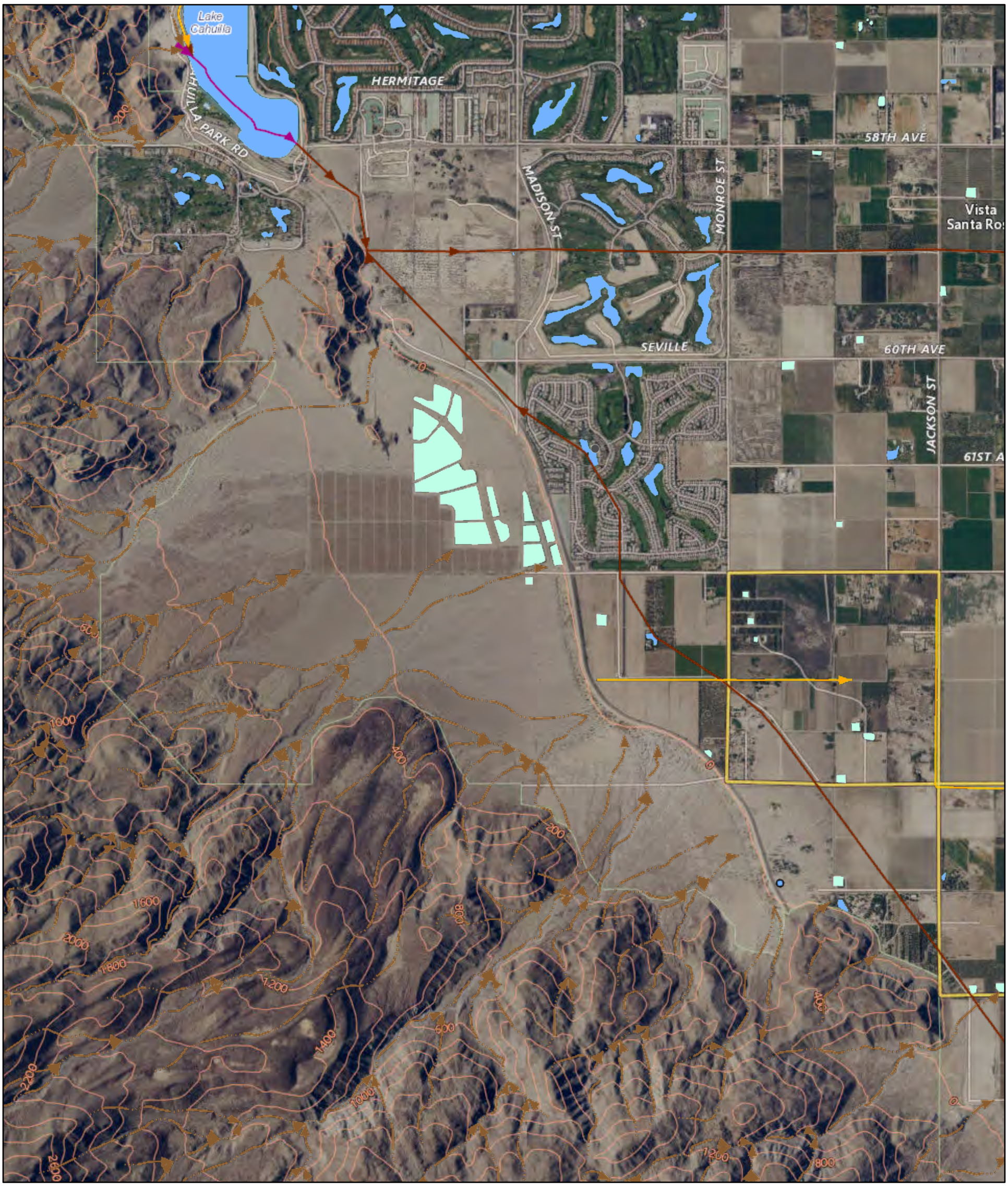
NOTES TO USERS

SCALE

PANEL LOCATOR

FEMA
National Flood Insurance Program

The National Map Advanced Viewer



2/16/2021, 1:19:46 PM

1:36,112

0 0.33 0.65 1.3 mi

0 0.5 1 2 km

Waterbody - Large Scale
- Estuary
- Ice Mass
- LakePond
- Playa
- Reservoir
- SwampMarsh

Area - Large Scale
- Area of Complex Channels
- Area to be Submerged
- BayInlet
- Bridge
- CanalDitch
- DamWeir
- Flume
- Foreshore
- Hazard Zone
- Inundation Area
- Lock Chamber
- Rapids
- SeaOcean
- Special Use Zone
- Spillway
- StreamRiver
- Submerged Stream
- Wash
- Water IntakeOutflow

Flowline - Large Scale
- Perennial
- Intermittent
- Ephemeral
- Artificial Path
- Canal Ditch
- Coastline
- Connector
- Pipeline
- Underground Conduit

Flow Direction
- Connector
- CanalDitch
- Underground Conduit
- StreamRiver
- StreamRiver - Perennial
- StreamRiver - Intermittent
- StreamRiver - Ephemeral
- Pipeline
- Artificial Path

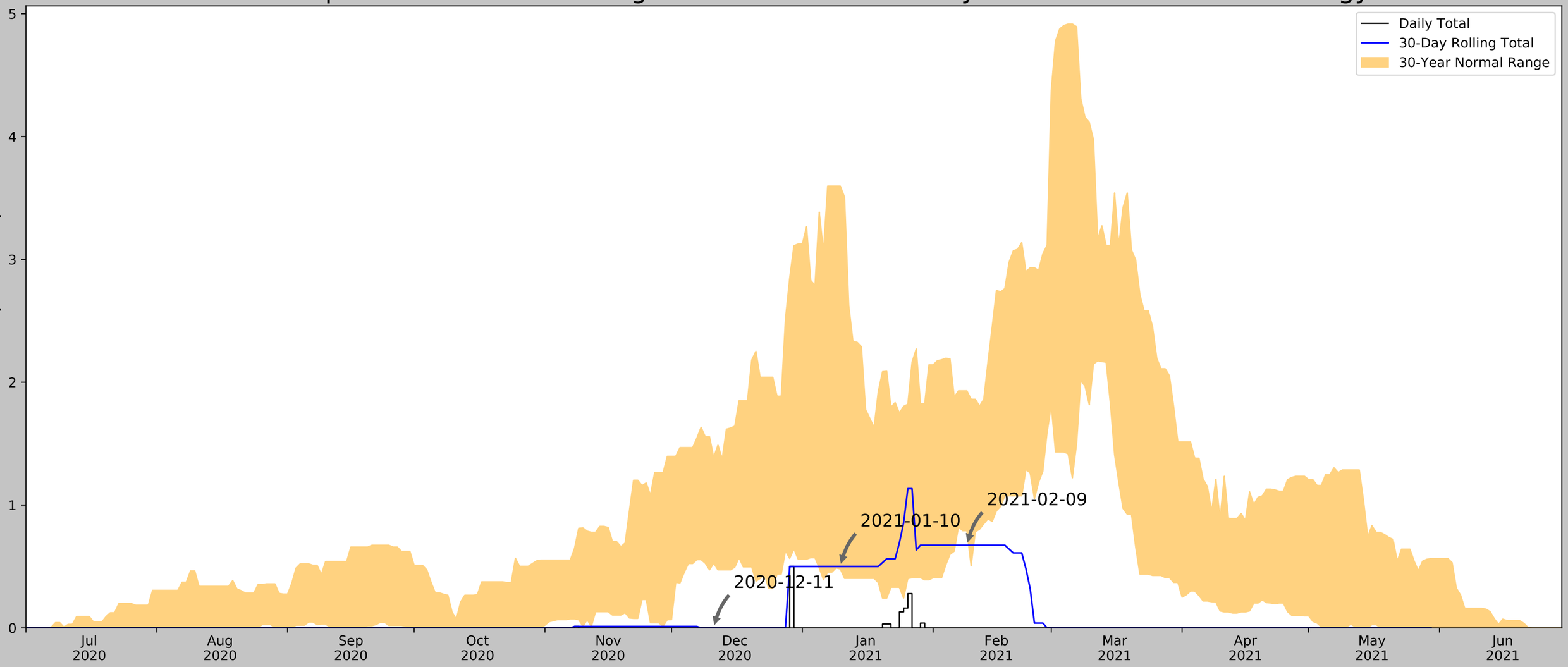
Line - Large Scale
- Line
- Tunnel

Point Event
- Dam
- Gaging Station
- Divergence Structure
- Other

USGS TNM – National Hydrography Dataset. Data Refreshed January, 2021.
USGS The National Map: Orthoimagery and US Topo. Data refreshed January, 2021.

USGS

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.594494, -116.260383
Observation Date	2021-02-09
Elevation (ft)	177.86
Drought Index (PDSI)	Severe drought
WebWIMP H_2O Balance	Dry Season

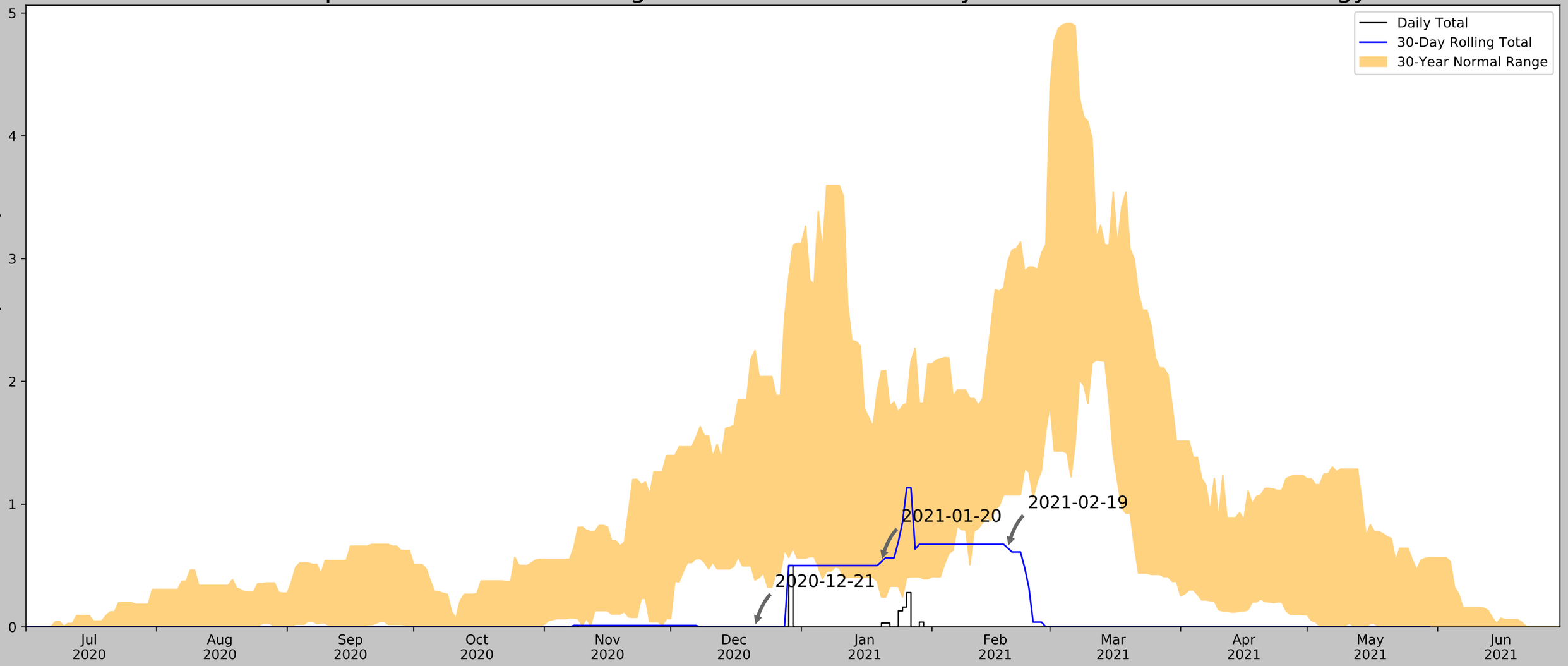
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2021-02-09	0.791339	1.929921	0.673228	Dry	1	3	3
2021-01-10	0.479921	3.596851	0.5	Normal	2	2	4
2020-12-11	0.526378	1.387402	0.0	Dry	1	1	1
Result							Drier than Normal - 8

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
IDYLLWILD 1.8 NW	33.7631, -116.735	6325.131	29.671	6147.271	195.748	3266	0
THOUSAND PALMS 0.7 W	33.8212, -116.3978	253.937	17.543	76.077	9.229	41	1
PALM DESERT 5.0 ENE	33.7711, -116.301	108.924	12.424	68.936	6.447	3	0
RANCHO MIRAGE 3.0 NNW	33.7986, -116.4418	351.05	17.54	173.19	10.931	606	0
PALM DESERT 2.1 ENE	33.7442, -116.3421	229.003	11.361	51.143	5.693	111	78
BORREGO SPRINGS 2.4 WSW	33.2225, -116.3904	776.903	26.774	599.043	28.087	25	0
BORREGO SPRINGS 7.1SE	33.1934, -116.2786	574.147	27.733	396.287	23.47	330	11
ANZA	33.5558, -116.6739	3915.026	23.954	3737.166	100.299	5274	0
BORREGO DESERT PARK	33.2558, -116.4036	810.039	24.816	632.179	26.855	1663	0
DEEP CANYON LAB	33.6514, -116.3764	1200.131	7.747	1022.271	11.406	3	0
DESERT RESORTS RGNL AP	33.6267, -116.1594	-118.11	6.222	295.97	4.641	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



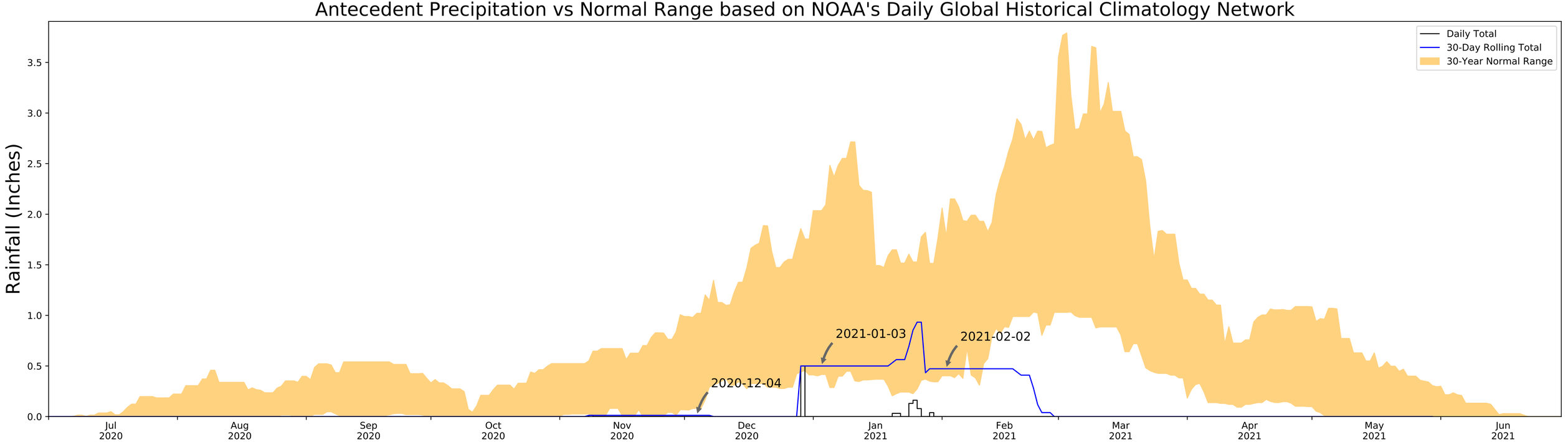
Coordinates	33.594494, -116.260383
Observation Date	2021-02-19
Elevation (ft)	177.86
Drought Index (PDSI)	Severe drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2021-02-19	1.075591	2.976772	0.641732	Dry	1	3	3
2021-01-20	0.242126	2.085827	0.531496	Normal	2	2	4
2020-12-21	0.379921	2.252362	0.0	Dry	1	1	1
Result							Drier than Normal - 8

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
IDYLLWILD 1.8 NW	33.7631, -116.735	6325.131	29.671	6147.271	195.748	3266	0
THOUSAND PALMS 0.7 W	33.8212, -116.3978	253.937	17.543	76.077	9.229	41	1
PALM DESERT 5.0 ENE	33.7711, -116.301	108.924	12.424	68.936	6.447	3	0
RANCHO MIRAGE 3.0 NNW	33.7986, -116.4418	351.05	17.54	173.19	10.931	606	0
PALM DESERT 2.1 ENE	33.7442, -116.3421	229.003	11.361	51.143	5.693	111	77
BORREGO SPRINGS 2.4 WSW	33.2225, -116.3904	776.903	26.774	599.043	28.087	25	0
BORREGO SPRINGS 7.1SE	33.1934, -116.2786	574.147	27.733	396.287	23.47	330	12
ANZA	33.5558, -116.6739	3915.026	23.954	3737.166	100.299	5274	0
BORREGO DESERT PARK	33.2558, -116.4036	810.039	24.816	632.179	26.855	1663	0
DEEP CANYON LAB	33.6514, -116.3764	1200.131	7.747	1022.271	11.406	3	0
DESERT RESORTS RGNL AP	33.6267, -116.1594	-118.11	6.222	295.97	4.641	31	0



Coordinates	33.594494, -116.260383
Observation Date	2021-02-02
Elevation (ft)	177.86
Drought Index (PDSI)	Severe drought
WebWIMP H_2O Balance	Dry Season

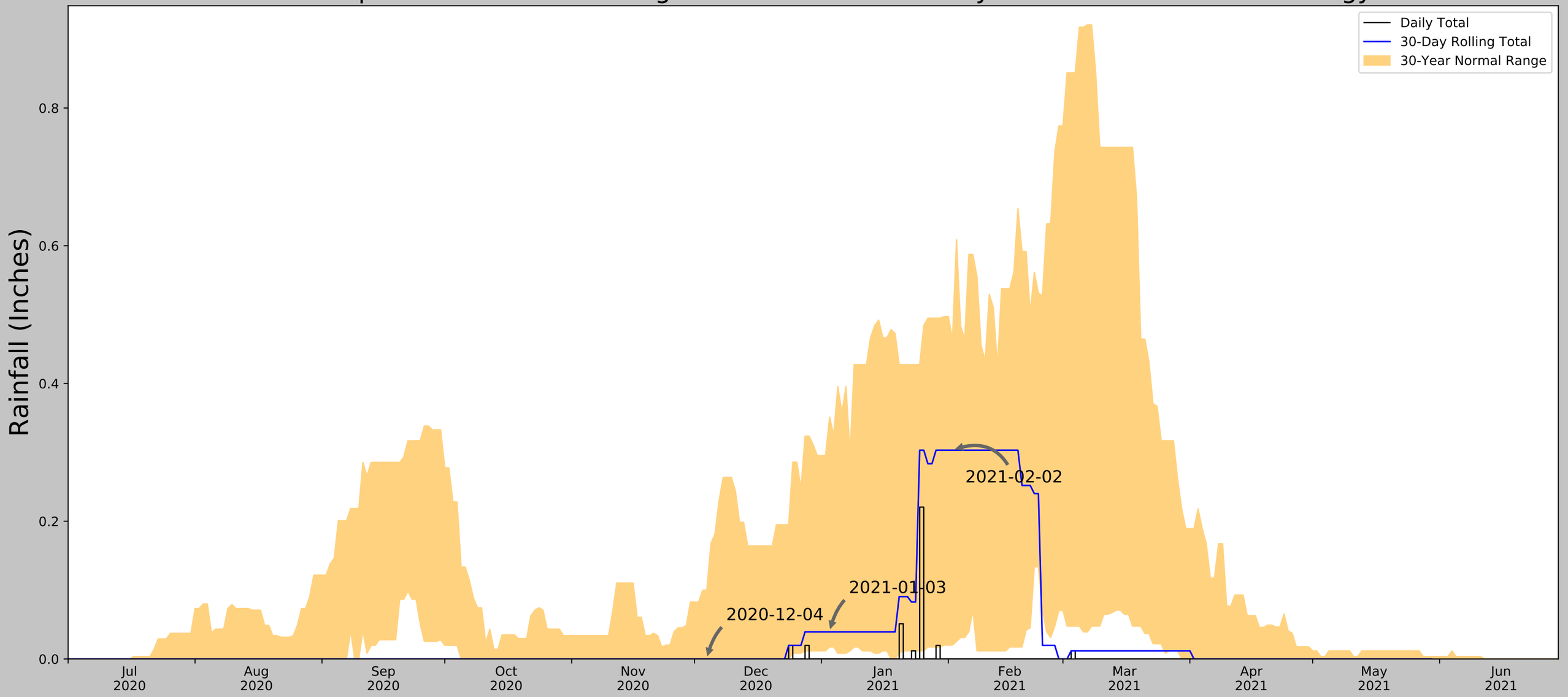
30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2021-02-02	0.40315	1.779921	0.472441	Normal	2	3	6
2021-01-03	0.415748	2.035433	0.5	Normal	2	2	4
2020-12-04	0.082677	1.020866	0.011811	Dry	1	1	1
Result							Normal Conditions - 11

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
RANCHO MIRAGE 3.0 NNW	33.7986, -116.4418	351.05	17.54	173.19	10.931	636	0
PALM DESERT 5.0 ENE	33.7711, -116.301	108.924	12.424	68.936	6.447	724	0
PALM DESERT 2.1 ENE	33.7442, -116.3421	229.003	11.361	51.143	5.693	111	79
THOUSAND PALMS 0.7 W	33.8212, -116.3978	253.937	17.543	76.077	9.229	91	0
IDYLLWILD 1.8 NW	33.7631, -116.735	6325.131	29.671	6147.271	195.748	2465	0
BORREGO SPRINGS 2.4 WSW	33.2225, -116.3904	776.903	26.774	599.043	28.087	25	0
BORREGO SPRINGS 7.1SE	33.1934, -116.2786	574.147	27.733	396.287	23.47	330	11
ANZA	33.5558, -116.6739	3915.026	23.954	3737.166	100.299	5274	0
BORREGO DESERT PARK	33.2558, -116.4036	810.039	24.816	632.179	26.855	1663	0
DEEP CANYON LAB	33.6514, -116.3764	1200.131	7.747	1022.271	11.406	3	0
PALM SPRINGS RGNL AP	33.8281, -116.5053	420.932	21.417	243.072	14.844	31	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.594494, -116.260383
Observation Date	2021-02-02
Elevation (ft)	177.86
Drought Index (PDSI)	Severe drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2021-02-02	0.020079	0.464173	0.30315	Normal	2	3	6
2021-01-03	0.017323	0.351181	0.03937	Normal	2	2	4
2020-12-04	0.0	0.1	0.0	Normal	2	1	2
Result							Normal Conditions - 12

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
DESERT RESORTS RGNL AP	33.6267, -116.1594	-118.11	6.222	295.97	4.642	11242	90
MECCA FIRE STN	33.5697, -116.0731	-183.071	6.339	64.961	3.264	110	0
INDIO FIRE STN	33.7086, -116.2153	-20.997	6.508	97.113	3.561	1	0

Appendix B Site Photographs

Photo 1: View looking east at an ephemeral drainage in the northern portion of the project site.

Photo 2: View looking north at an ephemeral drainage in the northern portion of the project site.

Photo 3: View looking east at ephemeral drainage in the northern portion of the project site.

Photo 4: View looking east at ephemeral drainage in the northern portion of the project site.

Photo 5: View looking east at an ephemeral drainage in the northeastern portion of the project site.

Photo 6: View looking northwest at an ephemeral drainage in the eastern portion of the project site.

Photo 7: View looking southwest at an ephemeral drainage in the central portion of the project site.

Photo 8: View looking northwest at an ephemeral drainage and desert dry wash woodland in the western portion of the project site.

Photo 9: View looking west at an ephemeral drainage and desert dry wash woodland in the central portion of the project site.

Photo 10: View looking west at an ephemeral drainage feature in the central portion of the project site.

Photo 11: View looking southwest at an ephemeral drainage feature in the western portion of the project site.

Photo 12: View looking southwest at an ephemeral drainage feature in the southern portion of the project site.

Photo 13: View looking southwest at an ephemeral drainage feature in the southwestern portion of the project site.

Photo 14: View looking southeast at multiple ephemeral drainage features and desert dry wash woodland in the southern portion of the project site.

Photo 15: View looking east at an ephemeral drainage feature and desert dry wash woodland in the southeastern portion of the project site.

Photo 16: View looking southeast at an ephemeral drainage feature and desert dry wash woodland in the southeastern portion of the project site.

Photo 17: View looking northeast at non-jurisdictional uplands in the southeastern portion of the project site.

Photo 18: View looking east at non-jurisdictional uplands (historic vineyard) in the central portion of the project site.

Photo 19: View looking northwest at Soil Pit 1 in a depressional area in the eastern portion of the project site.

Photo 20: View looking east at Soil Pit 2 in an ephemeral drainage feature in the central portion of the project site.

Appendix C Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Travertine Project City/County: La Quinta/Riverside Sampling Date: 2/18/21

Applicant/Owner: TRD Land, Inc. State: CA Sampling Point: SP1

Investigator(s): Tim Tidwell, Josephine Lim Section, Township, Range: Sections 4,5,33; Range 7E;Township 6,7S

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

Subregion (LRR): C-Mediterranean Lat: 33.596376° Long: -116.250553° Datum:

Soil Map Unit Name: Carsitas cobbly sand, 2 to 9 percent slopes NWI classification: NA

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:

SP1 performed within a depression (former basin). Trash and debris present in basin and soil profile.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Acacia greggii	5	Y	NL
2. Larrea tridentata	1	N	NL
3. Parkinsonia florida	1	N	NL
4.			
5.			
	7 = Total Cover		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = 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: 0 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 0 (A)	_____ (B)

Prevalence Index = B/A = 0

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:

Dead herbs present within the vicinity of SP1.

SOIL

Sampling Point: SP1

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
0-16	10 YR 3/3	100	-	-	-	-	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: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Trash and debris are noted within the soil pit.

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: Travertine Project City/County: La Quinta/Riverside Sampling Date: 2/18/21

Applicant/Owner: TRD Land, Inc. State: CA Sampling Point: SP2

Investigator(s): Tim Tidwell, Josephine Lim Section, Township, Range: Sections 4,5,33; Range 7E;Township 6,7S

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

Subregion (LRR): C-Mediterranean Lat: 33.597986° Long: -116.257198° Datum: _____

Soil Map Unit Name: NA NWI classification: NA

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:

SP2 performed within channel of ephemeral drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Parkinsonia florida	10	Y	NL
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 100 % 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: 1 (B)

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 0 (A)	_____ (B)

Prevalence Index = B/A = 0

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: SP2

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
0-8	2.5Y 4/3	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: Rock/Cobble

Depth (inches): 8

Hydric Soil Present? Yes _____ No ✓

Remarks:

No redoximorphic features identified. Significant cobble throughout profile. Sand collapses within soil pit while digging.

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:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Traveative | **Date:** 2/18/21 | **Time:** 2:30pm
Project Number: | **Town:** | **State:**
Stream: | **Photo begin file#:** | **Photo end file#:**
Investigator(s): J. Lim

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: Northern portion

Projection: **Datum:**
Coordinates:

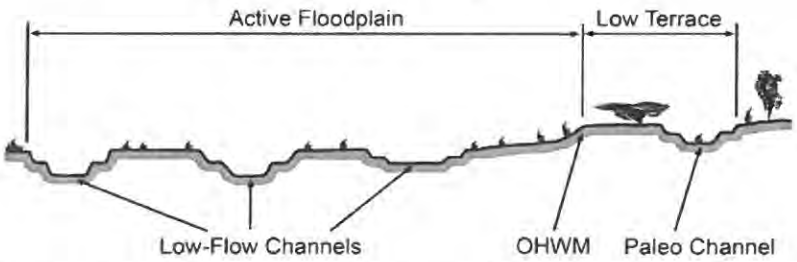
Potential anthropogenic influences on the channel system:
Adjacent to offroad use.

Brief site description:
sandy wash

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☒ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

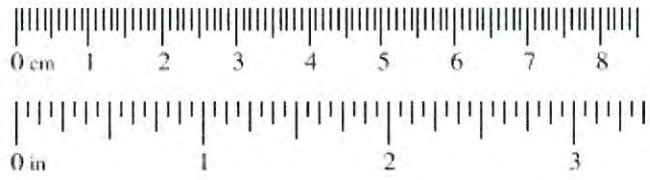


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS
   - ☒ Other: Nikon Camera

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00		
0.039	1.00	Very coarse sand	
		Coarse sand	
0.020	0.50		Sand
1/2 0.0098	0.25	Medium sand	
		Fine sand	
1/4 0.005	0.125		
1/8 0.0025	0.0625	Very fine sand	
		Coarse silt	
1/16 0.0012	0.031		
		Medium silt	
1/32 0.00061	0.0156		Silt
		Fine silt	
1/64 0.00031	0.0078		
		Very fine silt	
1/128 0.00015	0.0039		
		Clay	Mud



Project ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:

OHWM

GPS point: OHWM

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:

Vegetation coverage is sparse in channel. Signs of scour, drift/deposit and sediment sorting.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: same as OHWM

Characteristics of the floodplain unit:

Average sediment texture: very fine sand

Total veg cover: ____ % Tree: ____ % Shrub: 1 % Herb: ____ %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Travertine | **Date:** 2/18/21 | **Time:** 2:00pm
Project Number: | **Town:** | **State:**
Stream: | **Photo begin file#:** | **Photo end file#:**
Investigator(s): T. Tidwell J. Lim

Y ☐ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☐ Is the site significantly disturbed?

Location Details:

Projection: **Datum:**
Coordinates:

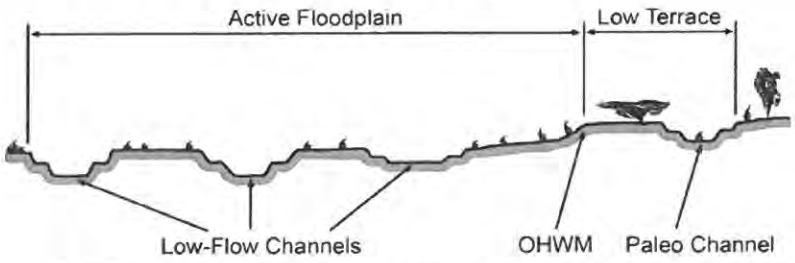
Potential anthropogenic influences on the channel system:
Drainage channel adjacent to Avenue L2. Some trash is visible. Local residence hike along the road.

Brief site description:
Sandy wash

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☒ Other studies Previous delineations
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

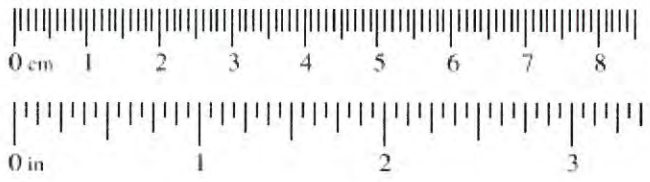


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS
   - ☒ Other: Nikon Camera

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64	Pebble	
0.157	4	Granule	
0.079	2.00	Very coarse sand	
0.039	1.00	Coarse sand	
0.020	0.50	Medium sand	Sand
1/2 0.0098	0.25	Fine sand	
1/4 0.005	0.125	Very fine sand	
1/8 0.0025	0.0625	Coarse silt	
1/16 0.0012	0.031	Medium silt	
1/32 0.00061	0.0156	Fine silt	Silt
1/64 0.00031	0.0078	Very fine silt	
1/128 0.00015	0.0039	Clay	Mud



Project ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:

OHWM

GPS point: OHWM

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:

scour, drift/debris, sediment sorting present

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: same as OHWM

Characteristics of the floodplain unit:

Average sediment texture: very fine sand

Total veg cover: ____% Tree: ____% Shrub: 1 % Herb: ____%

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

Vegetation is sparse within the channel

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Travertine
Project Number:
Stream:
Investigator(s): Tim Tidwell

Date: 2-18-21 **Time:** 2:40 pm
Town: La Quinta **State:** CA
Photo begin file#: 7888 US **Photo end file#:** 7889 DS

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [X] / N [ ] Is the site significantly disturbed?

Location Details:

Projection: **Datum:**
Coordinates:

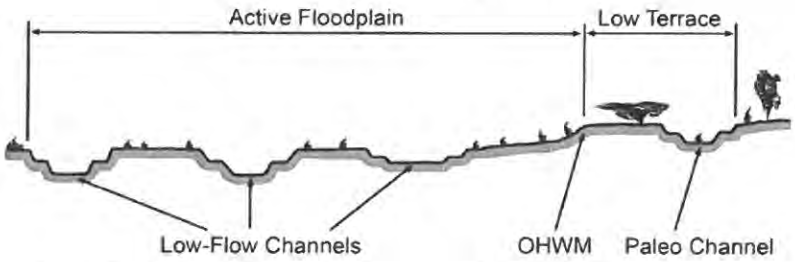
Potential anthropogenic influences on the channel system:
Tire tracks from off-road activity in channel. Old vineyards to south, debris + trash present.

Brief site description:
Large desert dry wash flows from west to east substrate is very sandy. Large rocks along bank.

Checklist of resources (if available):

- [X] Aerial photography
  Dates: 9-2020
- [ ] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

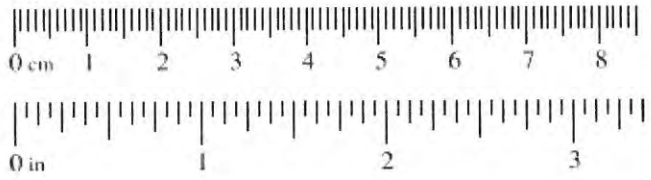


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [X] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [X] GPS
   - [ ] Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00	Very coarse sand	
0.039	1.00	Coarse sand	
0.020	0.50	Medium sand	Sand
1/2 0.0098	0.25	Fine sand	
1/4 0.005	0.125	Very fine sand	
1/8 0.0025	0.0625	Coarse silt	
1/16 0.0012	0.031	Medium silt	
1/32 0.00061	0.0156	Fine silt	Silt
1/64 0.00031	0.0078	Very fine silt	
1/128 0.00015	0.0039	Clay	Mud



Project ID: Traverline **Cross section ID:** DS-Tim **Date:** 7/18/21 **Time:** 2:40 pm

Cross section drawing: Looking upstream

OHWM

GPS point: OHWM Tim

Indicators:

- [X] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [X] Other: Slumbing
- [X] Other: Rooted veg on channel bank

Comments:

Floodplain unit: [X] Low-Flow Channel [X] Active Floodplain [ ] Low Terrace

GPS point: Same as DS-Tim Low flow and Active FP are the same.

Characteristics of the floodplain unit:

Average sediment texture: very coarse Sand and Granule

Total veg cover: 10 % Tree: 10 % Shrub: — % Herb: — %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [X] Late (herbaceous, shrubs, mature trees) overhanging SMOKE tree branches.

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [X] Drift and/or debris
- [X] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [X] Other: Drainage Patterns
- [X] Other: Sediment deposits
- [ ] Other: _____

Comments:

Channel is very sandy No terraces present Beyond bank is upland areas.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Travertine | **Date:** 2/18/21 | **Time:** 12:58
Project Number: | **Town:** | **State:** CA
Stream: | **Photo begin file#:** U.S. 7883 | **Photo end file#:** DS 7884
Investigator(s): TT, RP, JL

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details:

Projection: **Datum:**
Coordinates:

Potential anthropogenic influences on the channel system: historic debris/trash, signs of vehicles driving through.

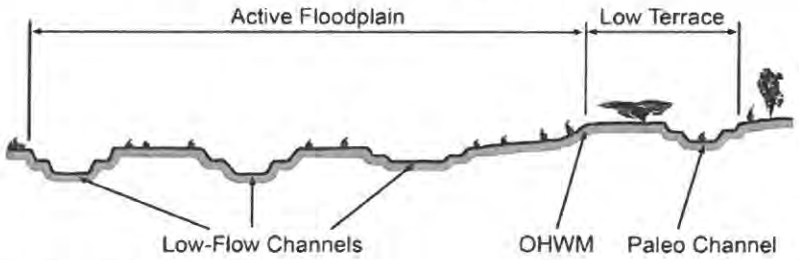
Brief site description: Desert ephemeral wash/alluvial fan system, mixed creosote bush scrub surrounding.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☑ Other studies (prev. mapping)

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
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4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
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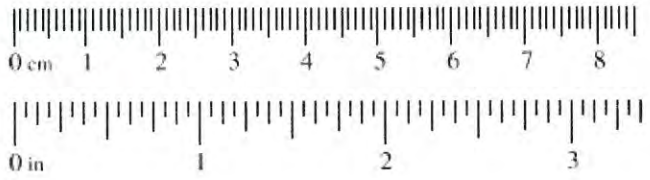
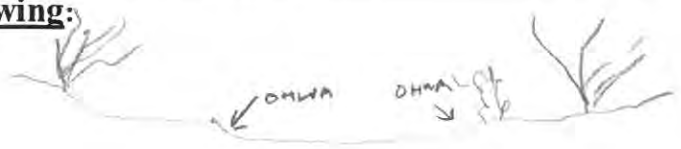
1/64 0.00031	0.0078	Fine silt	
1/128 0.00015	0.0039	Very fine silt	
		Clay	Mud



Project ID: **Cross section ID:** 1 **Date:** 2/18/21 **Time:** 1:03

Cross section drawing:



OHWM

GPS point: DS 1

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments: Finer sand in channel invert below OHW, transitioning to larger grain size / gravel and cobbles. Base of vegetation below OHWM, vegetation established along banks, in upland. Clear break in bank slope.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: DS 1

Characteristics of the floodplain unit:

Average sediment texture: very coarse sand - granule

Total veg cover: 0 % Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

Clear bed and bank, break in bank slope. Benches forming above OHWM. Change in elevation profile from one end of FP to other.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: LT-1

Characteristics of the floodplain unit:

Average sediment texture: granule - pebble

Total veg cover: 5 % Tree: ____% Shrub: ____% Herb: 5 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☑ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☑ Other: sediment sorting
- ☑ Other: changes in vegetation cover
- ☐ Other: ____

Comments:

Surface relief and some sediment sorting along low terrace. Bed and bank and changes in veg cover indicating transition from low terrace to upland.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____

Characteristics of the floodplain unit:

Average sediment texture: ____

Total veg cover: ____% Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Travertine
Project Number:
Stream:
Investigator(s): RP

Date: 2/18/21
Town:
Photo begin file#: U.S. 3636

Time: 1:29 PM
State: CA
Photo end file#: DS 3637

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details:

Projection: **Datum:**
Coordinates:

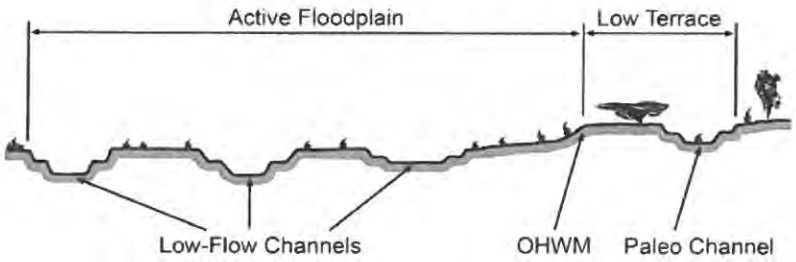
Potential anthropogenic influences on the channel system: Historic debris/trash, tire tracks

Brief site description: Ephemeral desert wash/alluvial fan system, creosote scrub in upland.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☑ Other studies prev. mapping
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

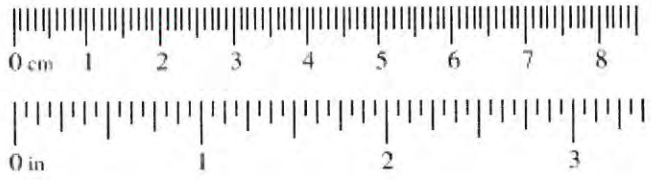


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00	Very coarse sand	
0.039	1.00	Coarse sand	
0.020	0.50	Medium sand	Sand
1/2 0.0098	0.25	Fine sand	
1/4 0.005	0.125	Very fine sand	
1/8 0.0025	0.0625	Coarse silt	
1/16 0.0012	0.031	Medium silt	
1/32 0.00061	0.0156	Fine silt	Silt
1/64 0.00031	0.0078	Very fine silt	
1/128 0.00015	0.0039	Clay	Mud



Project ID: **Cross section ID:** 1 **Date:** 2/18/21 **Time:** 1:34 PM

Cross section drawing:

OHWM

GPS point: OHWM 2

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: sediment sorting
- [ ] Other:

Comments: Sediment finer in channel bed, courser above OHWM and in channel bars, sediment sorting occurring below OHWM, channel bed bare of vegetation, some upland vegetation established above OHWM

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: OHWM 2

Characteristics of the floodplain unit:

Average sediment texture: very course sand

Total veg cover: 10 % Tree: ____ % Shrub: 5 % Herb: 5 %

Community successional stage:

- [ ] NA
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Early (herbaceous & seedlings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: sediment sorting
- [x] Other: change in veg. cover
- [ ] Other:

Comments: Clear bed and bank with break in bank slope. Sediment sorting indicates occassional flows above OHWM. Some vegetation established above OHWM (limited in AF) but none below OHWM.

Project ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: LT-2

Characteristics of the floodplain unit:

Average sediment texture: pebble

Total veg cover: 15 % Tree: ____ % Shrub: 10 % Herb: 5 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☑ Presence of bed and bank
- ☑ Benches
- ☐ Soil development
- ☑ Surface relief
- ☑ Other: sediment sorting
- ☐ Other: ____
- ☐ Other: ____

Comments:

Bed and bank indicating occasional flows. Benches forming, with sediment sorting present (cobbles higher up, smaller grain size lower down).

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____

Characteristics of the floodplain unit:

Average sediment texture: ____

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments:

Travertine

New Mexico Environment Department Surface Water Quality Bureau

LEVEL 1 Hydrology Determination Field Sheet

Date: 2/2/21	Time: 9:35 AM	Evaluators: Tim T., Jo. L
Stream Name:	Site Description:	
WQS as found under NMAC (20.6.4):	Assessment Unit: 172m length	
Starting Latitude:	Ending Latitude:	
Starting Longitude:	Ending Longitude:	
Starting Elevation:	Ending Elevation:	
TOTAL POINTS*: *See Hydrology Protocol for determination		

WEATHER CONDITIONS	DROUGHT CONDITIONS:	Nearest weather station:	PAST 48 HOURS**:	CURRENTLY**:
	12-mo. SPI Value: 12-mo. SPEI Value: Drought Condition: Obtained from: Date Obtained:	Precipitation past 48 hours:	___ storm (heavy rain) ___ rain (steady rain) ___ intermittant rain ___ % cloud cover ___ clear/sunny	___ storm (heavy rain) ___ rain (steady rain) ___ intermittant rain ___ % cloud cover ___ clear/sunny
	**Field evaluations should be performed at least 48 hours after the last major rainfall event.			

SITE OBSERVATIONS ALONG ENTIRE REACH	Nearest Stream Modification (description and proximity):
	Nearest Diversion (description and proximity):
	Nearest Discharge (description and proximity):
	Include any and all modifications/discharges and diversions regardless of perceived impact to hydrologic regime along with any field observations

	Thalwag Height (#1)	Bankfull Height (#2)	Change in Height (#1 - #2)	Change in Height x 2 (#3)	Flood-prone Area Height (#1-#3)
CALCULATIONS FOR DETERMINING FLOODPLAIN AND CHANNEL DIMENSIONS (Use for 1.8 on Field Survey)	0"	5"		10"	
		width 4.3m			
				Flood-prone width:	6.8
				Bankfull Width:	4.3
				Flood-prone Width to Bankfull Width Ratio:	1.58
	Alternative Methods used (describe)?			6.8/4.3 = 1	

PHOTO DOCUMENTATION (include additional photographs as attachment)	Time	Photo #	Description	Identifiable References	Photographer
	9:50 AM	6620	Looking west/upstream	-	Tim T.
		6621	East		

OTHER SITE CHARACTERISTIC NOTES/ SCHEMATICS	

LEVEL 1 INDICATORS	Stream Condition (identify all that apply then choose most prominent score)			
	Strong	Moderate	Weak	Poor
1.1 Water In Channel	☐ Flow is evident throughout reach ☐ Flow is observed in riffles ☐ Flow may not be evident in runs	☐ Wet Channel ☐ Flow is barely discernable ☐ Floating object needed to observe flow	☐ Dry Channel with standing pools ☐ Saturated or moist sediment under rocks/debris ☐ Evidence of base flows	☒ Dry Channel ☐ Dry under rocks/debris ☐ No evidence of base flows
	6	4	2	0
	Notes/Comments:			
1.2 Fish in Channel	☐ Found easily ☐ Found consistently throughout reach	☐ Found with little difficulty ☐ Not consistent throughout reach	☐ Found with difficulty (10 or more minutes of searching)	☒ Not present (after 10 or more minutes of searching)
	3	2	1	0
	Species Observed and Notes/Comments:			
1.3 Benthic Macroinvertebrates in Channel	☐ Found easily ☐ Found consistently throughout reach	☐ Found with little difficulty ☐ Not consistent throughout reach	☐ Found with difficulty (10 or more minutes of searching)	☒ Not present (after 10 or more minutes of searching)
	3	2	1	0
	Species Observed and Notes/Comments:			
1.4 Filamentous Algae/Periphyton in Channel	☐ Found easily ☐ Found consistently throughout reach	☐ Found with little difficulty ☐ Not consistent throughout reach	☐ Found with difficulty (10 or more minutes of searching)	☒ Not present (after 10 or more minutes of searching)
	3	2	1	0
	Notes/Comments:			
1.5 Vegetation along cooridor (within floodplain)	☐ Dramatic compositional species difference between upland and riparian corridor ☐ Distinct riparian corridor exists along entire reach ☐ Riparian, aquatic or wetland species dominate entire reach	☐ Distinct riparian corridor exists but not along entire reach ☐ Compositional species difference between upland and riparian corridor ☐ Riparian species interspersed with upland species	☒ Minimal compositional species difference between upland and riparian corridor ☐ Vegetation growing along the riparian area occurs in greater density or grows more vigorously than in the adjacent uplands	☐ No compositional species difference between upland and riparian corridor ☐ Vegetation growing along the riparian cooridor does not occur in greater density or grow more vigorously than in the adjacent uplands
	3	2	1	0
	Species Observed and Notes/Comments:			
1.6 Rooted Upland Plants in Channel	☒ Rooted upland plants are absent within the streambed/thalweg	☐ There are a few rooted upland plants within the streambed/thalweg	☐ Rooted upland plants are consistently dispersed throughout the streambed/thalweg	☐ Rooted upland plants are prevalent within the streambed/thalweg
	3	2	1	0
	Species Observed and Notes/Comments:			
				SUBTOTAL (1.1-1.6)

BF width = 4.3m
BF Depth = .1m X 2 = .2m = FP Depth
FP width = 6.8m

Entrenchment Ratio
6.8/4.3 = 1.58

1.7 Sinuosity of Segment (for length no less than two meanders)	☐ Calculated ratio > 1.4 ☐ Numerous closely spaced bends ☐ Few straight sections	☐ Calculated ratio 1.4 <> 1.2 ☐ Mostly bends ☐ Some straight sections	☐ Calculated ratio 1.2 <> 1.0 ☐ Few bends ☐ Mostly straight sections	☐ Calculated ratio = 1.0 ☐ Completely straight
	3	2	1	0
	☐ Calculated ☐ Observed	Notes/Comments:		
1.8 Floodplain and Channel Dimensions	☐ Calculated ratio > 2.5 ☐ Minimally confined ☐ Wide, active floodplain	☐ Calculated ratio 2.5 <> 1.2 ☐ Moderately confined ☐ Floodplain active during larger events	☐ Calculated ratio < 1.2 ☐ Incised/confined channel ☐ Flooplain absent or narrow ☐ Floodplain not connected	
	3	1.5	0	
	☐ Calculated ☐ Observed	Notes/Comments:		
1.9 In-Channel Structure: Riffle-Pool Sequence	☐ Frequent number of riffle and pools observed throughout reach ☐ Obvious transition between riffles and pools	☐ Less frequent number of riffle and pools ☐ Transition between riffles and pools difficult to distinguish	☐ Mostly has areas of pools or of riffles	☐ No riffles or pools observed
	3	2	1	0
	Notes/Comments:			
			SUBTOTAL (1.1-1.9)	
1.10 Particle Size or Stream Substrate Sorting	☐ Particle sizes in the channel are noticeably different from particle sizes outside the channel in the flood-prone area. ☐ Clear distribution of various sized substrates in the stream channel.	☐ Particle sizes in the channel are moderately similar to particle sizes outside the channel in the flood-prone area. ☐ Various sized substrates are present in the stream channel. ☐ Higher ratio of larger particles (gravel/cobble).	☐ Particle sizes in the channel are similar or comparable to particle sizes outside the channel in the flood-prone area. ☐ Substrate sorting is not readily observed in the stream channel.	
	3	1.5	0	
	☐ Calculated ☐ Observed	Notes/Comments:		
1.11 Hydric Soils Within Flood-Prone Area	☐ Hydric soils were observed in reach	☐ Hydric soils were not observed in reach		
	3	0		
	Notes/Comments:			
1.12 Sediment on Plants and Debris	☐ Sediment found readily on plants and debris in: ☐ channel ☐ streambank ☐ floodplain	☐ Sediment found but not prevalent on plants and debris. ☐ Sediment mostly accumlated on plants and debris in pools	☐ Sediment on plants and debris is isolated in small amounts along the sample reach.	☐ No sediment is present on plants or debris.
	1.5	1	0.5	0
	Notes/Comments:			
1.13 Seeps and Springs	☐ Seeps and/or springs present in reach	☐ Seeps and/or springs not present in reach		
	1.5	0		
	Notes/Comments:			
1.14 Iron Oxidizing Bacteria/Fungi	☐ Iron-oxizing bacteria/fungi present in reach	☐ Iron-oxizing bacteria/fungi not pressent in reach		
	1.5	0		
	Notes/Comments:			
			TOTAL POINTS (1.1-1.14)	7.5

Total <9, the stream is determined to be EPHEMERAL.
Total ≤9 and <12, the stream is determined to be INTERMITTENT until further analysis indicates otherwise
Total ≥ 12.0 and ≤ 19.0, the stream is determined to be INTERMITTENT
Total > 19.0 and ≤ 22.0, the stream is determined to be PERENNIAL until further analysis indicates otherwise
Total > 22.0, the stream is determined to be PERENNIAL.

New Mexico Environment Department Surface Water Quality Bureau
LEVEL 1 Hydrology Determination Field Sheet

Date: 2/18/21	Time: 1.00pm	Evaluators:
Stream Name: Travertine	Site Description:	
WQS as found under NMAC (20.6.4):	Assessment Unit:	
Starting Latitude:	Ending Latitude:	
Starting Longitude:	Ending Longitude:	
Starting Elevation:	Ending Elevation:	
TOTAL POINTS*: *See Hydrology Protocol for determination		

WEATHER CONDITIONS	DROUGHT CONDITIONS:	Nearest weather station:	PAST 48 HOURS**:	CURRENTLY**:
	12-mo. SPI Value: 12-mo. SPEI Value: Drought Condition: Obtained from: Date Obtained:	Precipitation past 48 hours:	___ storm (heavy rain) ___ rain (steady rain) ___ intermittant rain ___ % cloud cover ___ clear/sunny	___ storm (heavy rain) ___ rain (steady rain) ___ intermittant rain ___ % cloud cover ___ clear/sunny
	**Field evaluations should be performed at least 48 hours after the last major rainfall event.			

SITE OBSERVATIONS ALONG ENTIRE REACH	Nearest Stream Modification (description and proximity):
	Nearest Diversion (description and proximity):
	Nearest Discharge (description and proximity):
	Include any and all modifications/discharges and diversions regardless of perceived impact to hydrologic regime along with any field observations

	Thalwag Height (#1)	Bankfull Height (#2)	Change in Height (#1 - #2)	Change in Height x 2 (#3)	Flood-prone Area Height (#1-#3)
CALCULATIONS FOR DETERMINING FLOODPLAIN AND CHANNEL DIMENSIONS (Use for 1.8 on Field Survey)	0	0.03m		0.6m	
				Flood-prone width:	3.6m
				Bankfull Width:	3m
				Flood-prone Width to Bankfull Width Ratio:	1.2
	Alternative Methods used (describe)?				

	Time	Photo #	Description	Identifiable References	Photographer
PHOTO DOCUMENTATION (include additional photographs as attachment)	1:01 pm	7883	upstream in channel		TT
	1:01 pm	7884	downstream in channel		TT

OTHER SITE CHARACTERISTIC NOTES/ SCHEMATICS	

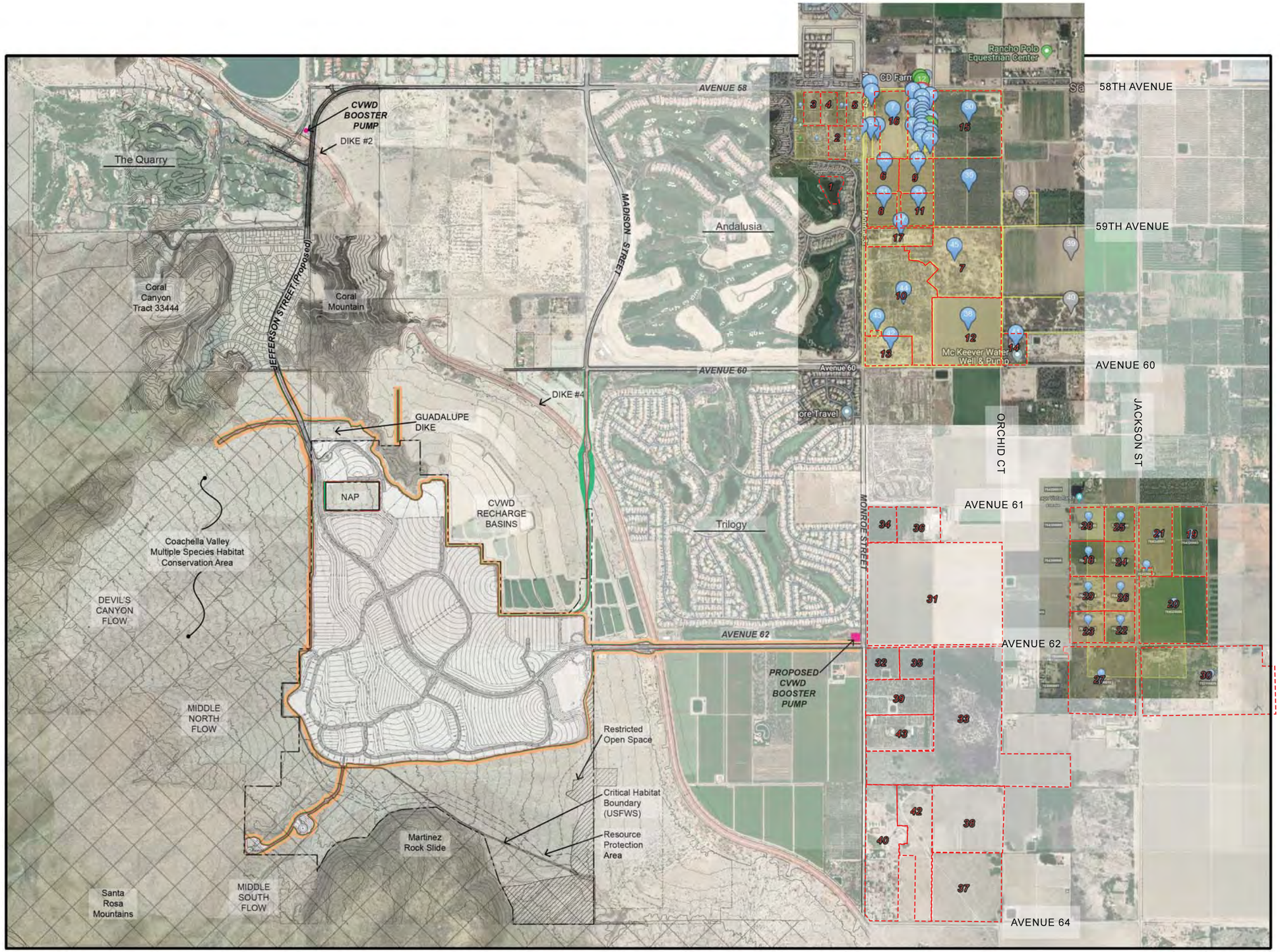
BF_W 3m BF H: 0.3m FP: .6m FP_W 3.6m

LEVEL 1 INDICATORS	Stream Condition (identify all that apply then choose most prominent score)			
	Strong	Moderate	Weak	Poor
1.1 Water In Channel	☐ Flow is evident throughout reach ☐ Flow is observed in riffles ☐ Flow may not be evident in runs	☐ Wet Channel ☐ Flow is barely discernable ☐ Floating object needed to observe flow	☐ Dry Channel with standing pools ☐ Saturated or moist sediment under rocks/debris ☐ Evidence of base flows	☑ Dry Channel ☐ Dry under rocks/debris ☑ No evidence of base flows
	6	4	2	0
	Notes/Comments:			
1.2 Fish in Channel	☐ Found easily ☐ Found consistently throughout reach	☐ Found with little difficulty ☐ Not consistent throughout reach	☐ Found with difficulty (10 or more minutes of searching)	☑ Not present (after 10 or more minutes of searching)
	3	2	1	0
	Species Observed and Notes/Comments:			
1.3 Benthic Macroinvertebrates in Channel	☐ Found easily ☐ Found consistently throughout reach	☐ Found with little difficulty ☐ Not consistent throughout reach	☐ Found with difficulty (10 or more minutes of searching)	☑ Not present (after 10 or more minutes of searching)
	3	2	1	0
	Species Observed and Notes/Comments:			
1.4 Filamentous Algae/Periphyton in Channel	☐ Found easily ☐ Found consistently throughout reach	☐ Found with little difficulty ☐ Not consistent throughout reach	☐ Found with difficulty (10 or more minutes of searching)	☑ Not present (after 10 or more minutes of searching)
	3	2	1	0
	Notes/Comments:			
1.5 Vegetation along cooridor (within floodplain)	☐ Dramatic compositional species difference between upland and riparian corridor ☐ Distinct riparian corridor exists along entire reach ☐ Riparian, aquatic or wetland species dominate entire reach	☐ Distinct riparian corridor exists but not along entire reach ☐ Compositional species difference between upland and riparian corridor ☐ Riparian species interspersed with upland species	☑ Minimal compositional species difference between upland and riparian corridor ☐ Vegetation growing along the riparian area occurs in greater density or grows more vigorously than in the adjacent uplands	☐ No compositional species difference between upland and riparian corridor ☐ Vegetation growing along the riparian cooridor does not occur in greater density or grow more vigorously than in the adjacent uplands
	3	2	1	0
	Species Observed and Notes/Comments:			
1.6 Rooted Upland Plants in Channel	☐ Rooted upland plants are absent within the streambed/thalweg	☑ There are a few rooted upland plants within the streambed/thalweg	☐ Rooted upland plants are consistently dispersed throughout the streambed/thalweg	☐ Rooted upland plants are prevalent within the streambed/thalweg
	3	2	1	0
	Species Observed and Notes/Comments:			
			SUBTOTAL (1.1-1.6)	3

1.7 Sinuosity of Segment (for length no less than two meanders)	☐ Calculated ratio > 1.4 ☐ Numerous closely spaced bends ☐ Few straight sections	☐ Calculated ratio 1.4 <> 1.2 ☐ Mostly bends ☐ Some straight sections	☒ Calculated ratio 1.2 <> 1.0 ☐ Few bends ☐ Mostly straight sections	☐ Calculated ratio = 1.0 ☐ Completely straight
	3	2	1	0
	☐ Calculated ☐ Observed	Notes/Comments:		
1.8 Floodplain and Channel Dimensions	☐ Calculated ratio > 2.5 ☐ Minimally confined ☐ Wide, active floodplain	☒ Calculated ratio 2.5 <> 1.2 ☐ Moderately confined ☐ Floodplain active during larger events	☐ Calculated ratio < 1.2 ☐ Incised/confined channel ☐ Flooplain absent or narrow ☐ Floodplain not connected	
	3	1.5	0	
	☐ Calculated ☐ Observed	Notes/Comments:		
1.9 In-Channel Structure: Riffle-Pool Sequence	☐ Frequent number of riffle and pools observed throughout reach ☐ Obvious transition between riffles and pools	☐ Less frequent number of riffle and pools ☐ Transition between riffles and pools difficult to distinguish	☐ Mostly has areas of pools or of riffles	☒ No riffles or pools observed
	3	2	1	0
	Notes/Comments:			
				SUBTOTAL (1.1-1.9)
1.10 Particle Size or Stream Substrate Sorting	☐ Particle sizes in the channel are noticeably different from particle sizes outside the channel in the flood-prone area. ☐ Clear distribution of various sized substrates in the stream channel.	☒ Particle sizes in the channel are moderately similar to particle sizes outside the channel in the flood-prone area. ☐ Various sized substrates are present in the stream channel. ☐ Higher ratio of larger particles (gravel/cobble).	☐ Particle sizes in the channel are similar or comparable to particle sizes outside the channel in the flood-prone area. ☐ Substrate sorting is not readily observed in the stream channel.	
	3	1.5	0	
	☐ Calculated ☐ Observed	Notes/Comments:		
1.11 Hydric Soils Within Flood-Prone Area	☐ Hydric soils were observed in reach		☒ Hydric soils were not observed in reach	
	3		0	
	Notes/Comments:			
1.12 Sediment on Plants and Debris	☐ Sediment found readily on plants and debris in: ☐ channel ☐ streambank ☐ floodplain	☐ Sediment found but not prevalent on plants and debris. ☐ Sediment mostly accumulated on plants and debris in pools	☐ Sediment on plants and debris is isolated in small amounts along the sample reach.	☒ No sediment is present on plants or debris.
	1.5	1	0.5	0
	Notes/Comments:			
1.13 Seeps and Springs	☐ Seeps and/or springs present in reach		☒ Seeps and/or springs not present in reach	
	1.5		0	
	Notes/Comments:			
1.14 Iron Oxidizing Bacteria/Fungi	☐ Iron-oxizing bacteria/fungi present in reach		☒ Iron-oxizing bacteria/fungi not pressent in reach	
	1.5		0	
	Notes/Comments:			
				TOTAL POINTS (1.1-1.14)

Total <9, the stream is determined to be EPHEMERAL.
Total ≤9 and <12, the stream is determined to be INTERMITTENT until further analysis indicates otherwise
Total ≥ 12.0 and ≤ 19.0, the stream is determined to be INTERMITTENT
Total > 19.0 and ≤ 22.0, the stream is determined to be PERENNIAL until further analysis indicates otherwise
Total > 22.0, the stream is determined to be PERENNIAL.

Appendix B – Potential Well Site Locations



HOFMANN LAND DEVELOPMENT COMPANY

Preliminary Impact Diagram with Andalusia West

TRG land INC

NOVEMBER 18, 2020

0 500 1000 2000

TRAVERTINE

AVE 58

APN	Map #	Owner Name	Land Use	Land Use Type	Mailing Street Address	Mailing City State	Mailing Zip	Lot Acres	Total Assessed Value	Last Sale Price
764200086	1	T D DESERT DEV	RESIDENTIAL ACREAGE	Residential	81570 Carboneras	La Quinta, CA	92253	4.65	$16,417	
764190003	2	HAMMER WILLIAM JOSEPH	AGRICULTURAL LAND	Commercial	45510 Cielito Dr	Indian Wells, CA	92210	5.01	$37,124	
764180002	3	PALMDALE CAPITAL SHAYAN CAPITAL	FARMS	Commercial	24933 Ariella Dr	Calabasas, CA	91302	4.6	$300,614	$265,000
764180003	4	VAJDI MEHRON & LADAN	RESIDENTIAL ACREAGE	Residential	24933 Ariella Dr	Calabasas, CA	91302	4.84	$650,000	$625,000
764180006	5	HAMMER WILLIAM J HAMMER KIM M	AGRICULTURAL (NEC)	Commercial	PO Box 278	Palm Desert, CA	92261	4.35	$324,671	$300,000

AVE 60

APN	Map #	Owner Name	Land Use	Land Use Type	Mailing Street Address	Mailing City State	Mailing Zip	Lot Acres	Total Assessed Value	Last Sale Price
764230002	6	HAMMER WILLIAM JOSEPH HAMMER KIM M	DESERT	Commercial	PO Box 278	Palm Desert, CA	92261	9.13	$189,907	
764240027	7	BARTON LAND LA QUINTA	RESIDENTIAL ACREAGE	Residential	751 Laurel St 519	San Carlos, CA	94070	43.41	$1,373,000	$7,000,000
764230001	8	HAMMER WILLIAM JOSEPH HAMMER KIM M	DESERT	Commercial	PO Box 278	Palm Desert, CA	92261	8.3	$171,399	
764230003	9	HAMMER WILLIAM JOSEPH HAMMER KIM M	DESERT	Commercial	PO Box 278	Palm Desert, CA	92261	9.96	$153,893	
764240026	10	BARTON LAND LA QUINTA	RESIDENTIAL ACREAGE	Residential	751 Laurel St 519	San Carlos, CA	94070	55.21	$1,746,000	$7,000,000
764230004	11	HAMMER WILLIAM JOSEPH HAMMER KIM M	DESERT	Commercial	PO Box 278	Palm Desert, CA	92261	9.1	$139,212	
764240006	12	PETER RABBIT FARMS INC	FARMS	Commercial	85810 Grapefruit Blvd	Coachella, CA	92236	38.18	$85,890	
764240021	13	BARTON LAND LA QUINTA	RESIDENTIAL ACREAGE	Residential	751 Laurel St 519	San Carlos, CA	94070	11.79	$372,000	$7,000,000
764240009	14	A & J MCKEEVER HOLDINGS	FARMS	Commercial	49024 Croquet Ct	Indio, CA	92201	7.2	$377,864	
764220028	15	TOWER ENERGY GROUP	FARMS	Commercial	1983 W 190th St 100	Torrance, CA	90504	39.01	$1,559,568	$18,500,000
764220005	16	ALS FUND INC MANSSOURIAN MERGERDOON	FARMS	Commercial	964 Calle Amable	Glendale, CA	91208	17.03	$535,000	
764240001	17	HAMMER WILLIAM JOSEPH HAMMER KIM M	GREENHOUSE	Commercial	PO Box 278	Palm Desert, CA	92261	9.78	$438,348	$415,000

AVE 62

APN	Map #	Owner Name	Land Use	Land Use Type	Mailing Street Address	Mailing City State	Mailing Zip	Lot Acres	Total Assessed Value	Last Sale Price
764300013	18	DOPIERALA JENNIE BOZEK SHIRLEY ANN	RANCH	Commercial	1830 La Manzanita St	South Pasadena, CA	91030	10.08	$83,000	
764320003	19	M & M DESERT LANDSCAPE INC	AGRICULTURAL LAND	Commercial	54 400 Jackson St	Thermal, CA	92274	19.7	$479,400	$10,000,000
764320008	20	JACKSON 80 LAND CO	FARMS	Commercial	4545 Allstate Dr	Riverside, CA	92501	38.2	$395,364	
764320001	21	M & M DESERT LANDSCAPE INC	AGRICULTURAL LAND	Commercial	54 400 Jackson St	Thermal, CA	92274	18.3	$445,740	$1,847,272
764300016	22	JDMI PROP	AGRICULTURAL (NEC)	Commercial	211 S Spalding Dr S505	Beverly Hills, CA	90212	8.55	$136,234	$600,000
764300017	23	JDMI PROP	AGRICULTURAL (NEC)	Commercial	211 S Spalding Dr S505	Beverly Hills, CA	90212	9.47	$150,310	$600,000
764300012	24	DOPIERALA JENNIE BOZEK SHIRLEY ANN	RANCH	Commercial	1830 La Manzanita St	South Pasadena, CA	91030	10.06	$79,659	
764300011	25	DOPIERALA JENNIE BOZEK SHIRLEY ANN	RANCH	Commercial	1830 La Manzanita St	South Pasadena, CA	91030	10.05	$79,659	
764300015	26	JDMI PROP	AGRICULTURAL (NEC)	Commercial	211 S Spalding Dr S505	Beverly Hills, CA	90212	9.24	$146,820	$600,000
753090011	27	USA 753	DESERT	Commercial	PO Box 2245	Palm Springs, CA	92263	39.5		
764300010	28	DOPIERALA JENNIE BOZEK SHIRLEY ANN	RANCH	Commercial	1830 La Manzanita St	South Pasadena, CA	91030	10.08	$90,118	$85,500
764300014	29	JDMI PROP	AGRICULTURAL (NEC)	Commercial	211 S Spalding Dr S505	Beverly Hills, CA	90212	10.09	$211,453	$600,000
753110035	30	PARS RANCH	AGRICULTURAL (NEC)	Commercial	100 Wilshire Blvd 1280	Santa Monica, CA	90401	74.45	$1,545,096	

AVE 61-62

APN	Map #	Owner Name	Land Use	Land Use Type	Mailing Street Address	Mailing City State	Mailing Zip	Lot Acres	Total Assessed Value	Last Sale Price
764300004	31	SALES CARDINAL PRODUCE POWELL JOHN P	FARMS	Commercial	85810 Peter Rabbit Ln	Coachella, CA	92236	117.42	$3,114,000	
753090001	32	DOYLE KELLY A	FARMS	Commercial	41 Washington Blvd	Marina Del Rey, CA	90292	9.77	$212,034	
753090020	33	USA 753	DESERT	Commercial	PO Box 2245	Palm Springs, CA	92263	118.36	$206,854	
764300001	34	FAUSEL RICHARD E FAUSEL ROSEMARY M	FARMS	Commercial	42311 May Pen Rd	Bermuda Dunes, CA	92203	9.04	$209,470	
753090002	35	MCGOLDRICK SHANE	DESERT	Commercial	9554 Josephine St	Thornton, CO	80229	9.79	$176,253	$118,000
764300002	36	CAL SUNGOLD INC	AGRICULTURAL (NEC)	Commercial	PO Box 1540	Indio, CA	92202	11.42	$1,318,878	$1,000,500

AVE 62-63

APN	Map #	Owner Name	Land Use	Land Use Type	Mailing Street Address	Mailing City State	Mailing Zip	Lot Acres	Total Assessed Value	Last Sale Price
753100012	37	USA 753	DESERT	Commercial	PO Box 2245	Palm Springs, CA	92263	39.09		
753100001	38	WEBER WARREN T & AMY NATHAN	DESERT	Commercial	445 Woodland Rd	Kentfield, CA	94904	40.12	$200,385	
753090010	39	KECK HOWARD	FARMS	Commercial	7947 Woodley Ave	Van Nuys, CA	91406	19.54	$406,975	$137,000
753100011	40	USA 753	DESERT	Commercial	PO Box 2245	Palm Springs, CA	92263	39.14		
753100013	41	MARSHALL ERIKA GLORIA DIAZ JOSE MARIA CHAVEZ	DESERT	Commercial	2202 Zion Way	Hanford, CA	93230	31.17	$193,167	
753090021	42	GOMEZ JOSE L GOMEZ IRMA C	SFR	Residential	PO Box 877	Thermal, CA	92274	20	$2,160,937	

Appendix C - 2005 Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92011

In Reply Refer To:
FWS-ERIV-2735.3

DEC 07 2005

Memorandum

To: Field Manager, Bureau of Land Management, Palm Springs, California

Area Manager, Bureau of Reclamation, Yuma Area Office, Yuma, Arizona

From: Assistant Field Supervisor, Carlsbad Fish and Wildlife Office, Carlsbad, California

Subject: Endangered Species Consultation on the Proposed Travertine Project, City of La Quinta, Riverside County, California

This biological opinion responds to your request to initiate consultation under section 7 of the Endangered Species Act of 1973, as amended [16 U.S.C. 1531 *et seq.*, (Act)]. Your request dated June 25, 2004, was received by the U.S. Fish and Wildlife Service (Service) on June 28, 2004. At issue are the effects of the subject project on the Peninsular bighorn sheep (*Ovis canadensis*) and its designated critical habitat.

After receipt of a regional species list from the Service dated February 3, 2003, representatives of the Service, Bureau of Land Management (BLM), Bureau of Reclamation (BOR), and Travertine Corporation further assessed the suitability of the project site and environs to support the ten listed species included in the list. Based on this review, the Service agreed that seven of the species were unlikely to be found on or adjacent to the project site but that a more refined assessment was needed for the remaining three species. Travertine then sponsored a habitat assessment for the endangered triple-ribbed milk-vetch (*Astragalus tricarinatus*). In a letter from Dr. Andrew Sanders, dated September 16, 2003, the author concluded that the species was unlikely to be present based on a map/photograph that was provided for his review. Travertine also sponsored a field survey for the threatened desert tortoise (*Gopherus agassizii*), which was conducted in September 2003 largely following Service protocol but did not detect any tortoise or tortoise sign (letter from Ecological Ventures California, Inc., dated September 12, 2003). Based on numerous site visits by Service personnel, reconfiguration of project boundaries, and results of species surveys and habitat assessments, the Service agrees that the proposed project is unlikely to affect the milk-vetch or tortoise, which will not be addressed further in this opinion.

This biological opinion is based on (1) the *Biological Assessment of the Impacts to Peninsular Bighorn Sheep, Desert Tortoise, and Triple-ribbed milkvetch for the Proposed Travertine Development, City of La Quinta, Riverside County, California*, dated June 2004; (2) an addendum to the biological assessment, entitled *Addendum to Biological Assessment for the*

Travertine Development, La Quinta, CA, dated February 2005; (3) another addendum to the biological assessment, entitled *Section 5 Addendum to Travertine Biological Assessment*, transmitted by email on September 29, 2005; (4) various email and verbal communications between representatives of the project proponent, Service, California Department of Fish and Game, BOR, BLM, and City of La Quinta (City); and (5) the scientific literature, unpublished data, various maps, file materials, and meeting notes.

CONSULTATION HISTORY

Originally, BLM requested on April 8, 1997, initiation of a conference on Peninsular bighorn sheep pursuant to 50 CFR 402.10. However, based on a memo from the Service dated June 18, 1998, the conference was not completed. Subsequently, after meeting with prospective partners and their representatives with an interest in the project, and learning that a right-of-use application had been submitted to the BOR for access across Federal lands, the Service wrote BOR on March 12, 2002, requesting project-related information and initiation of formal consultation. This request led to a series of meetings involving representatives of the permit applicant, BOR, BLM, Service, California Department of Fish and Game (CDFG), Coachella Valley Association of Governments (CVAG), and City. On March 21, 2003, BOR requested initiation of consultation but the Service responded on June 2, 2003, and deferred initiation pending completion of a biological assessment per 50 CFR 402.14(c)(6). After numerous additional meetings among the interests listed above, and reviews of several draft biological assessments, BLM requested initiation of consultation with submittal of the biological assessment on June 25, 2004, which was received by the Service on June 28, 2004. Numerous additional meetings were held, primarily between the permit applicant and Service, and an addendum to the biological assessment was received by the Service on March 12, 2005. Following another series of meetings, Travertine submitted the *Section 5 Addendum to the Travertine Biological Assessment*. A complete administrative record of this consultation is on file in the Carlsbad Fish and Wildlife Office.

DESCRIPTION OF THE PROPOSED ACTION

The proposed Travertine development is located in the City of La Quinta (City) at the base of the Santa Rosa Mountains in the Coachella Valley, Riverside County, California. The project area is in T6S, R7E, Section 33, and T7S, R7E, Sections 3, 4, and 5, San Bernardino Base Meridian (Figure 1). About one section of land within the current Travertine project site was acquired into private ownership through the Toro Canyon land exchange in a trade for public acquisition of about five sections of land within the Santa Rosa Mountains National Scenic Area by BLM. In addition to the public interest benefits of acquiring in-holdings within the National Scenic Area, the Toro Canyon exchange was to have a positive impact on management of public lands that also provided habitat for Peninsular bighorn sheep. Once the land exchange was approved, the City annexed the project site and adjoining areas from the County in 1993, and the site was incorporated into the City as Low Density Residential (LDR, 2 to 4 dwelling units per acre) and

Open Space. In 1995, the proposed Travertine development (Specific Plan 94-026) and Environmental Impact Report (EIR) (State Clearinghouse No. 94112047) were approved by the City through adoption of Resolution 95-39. In 1999, the City approved an indefinite time extension of the final specific plan by adoption of Resolution 99-061.

The original project area was 906 acres but Travertine Corporation currently has acquired an additional 35 acres in Section 5 immediately adjacent to Travertine's western boundary for conservation of bighorn sheep habitat and golf course expansion. Travertine continues to investigate the acquisition of additional lands in Section 5 for conservation of bighorn sheep. Additional lands not to exceed about 150 acres in Section 33 along the project's northeastern corner outside of designated critical habitat may also be added to the project site. This increase in acreage would potentially accommodate larger lot sizes with the total number of residential units not exceeding 2,000 units and an additional nine holes of golf to bring the total to 36 holes.

The proposed Travertine development is a master-planned resort community that would include a variety of land uses, including residential, recreational/open space, commercial, and resort hotel/conference center. At least three proposed residential types, including estate homes, resort homes, and villas, would be oriented around up to 36 holes of golf and a driving range. A neighborhood commercial site is proposed to provide local services. A resort hotel/conference center will include the opportunity for a tennis facility, which may provide additional recreational opportunities for both residents and visitors to the Travertine community.

The project would be developed in multiple phases over a number of years. The anticipated project phases are depicted in Table 1. After construction of the golf course, phasing of project area development would be driven primarily by the construction of the two water reservoirs, each of which would serve a different portion of the development. At build-out, the project would result in impacts to approximately 826 acres, of which about 267acres are in designated critical habitat. The total acreage of Travertine could increase as described above, in consultation with the Service. This information is from the Travertine Specific Plan and exhibits prepared by The Keith Companies (1995a, 1995b, 1999) and Travertine Corporation.

Table 1. Proposed Phasing of the Travertine Development, City of La Quinta, Riverside County, California.

Phase	Description
1	Selective grading of project site, and construction of Madison Street from Avenue 60 to Avenue 62.
2	Construction of lower contour water reservoir, water mains, sewer, & other backbone infrastructure.
3	Golf course development (driving range & first 18 holes around southern perimeter).

4	Phase 1 of residential development of approximately 500 units and construction of Jefferson Street.
5	Clubhouse construction.
6	Phase 2 of residential development of approximately 500 units.
7	Golf course development (second 18 holes).
8	Phase 3 of residential development of approximately 500 units.
9	Construction of upper water reservoir.
10	Phase 4 of residential development of approximately 500 units.
11	Construction of Resort Hotel & associated facilities.
12	Construction of Commercial Site & associated facilities.
13	Construction of Connector Trail & Trail User Parking Lot (to connect CVRPD, Madison Street, and Dike #4 Trail, with Boo Hoff Trail).

Residential Land Use: The project could include a total of 2,000 home sites, consisting of multiple residential land uses consistent with local concepts of Estate Homes, Resort Homes, and Villas. This land use concept provides for a variety of residential housing and lot sizes. The combination of lot numbers, sizes, and residential acreage is the best projection available based on current market conditions. The actual combination at the time of development will be determined through the entitlement process with the City.

Commercial Land Use: The neighborhood commercial site would be approximately 10 acres in size, although the exact size has not been determined at this time. The commercial site will provide local services such as a dry cleaner, a convenience store, and restaurants.

Resort Hotel & Tennis Facility: The project includes an approximately 25-acre, 500-room resort hotel with associated visitor facilities, including tennis club and spa. (The exact number of rooms and the exact size of these facilities have not been determined at this time.)

Recreational/Open Space: Encompassing about 298 acres, the desert-style golf facilities will consist of up to 36 holes and a driving range. Associated with the golf facility will be a single clubhouse and related uses, including a driving range and maintenance facilities that would encompass an additional 4 acres. The desert golf course design will maximize retention of native open space that will naturally merge into the adjoining desert scrub and woodland. A 100-foot wide recreational trail corridor and the golf course will front the project: habitat edge, providing a minimum 200-foot wide buffer between residential units and desert habitat proposed for conservation. These setback measures provide additional buffer between the development and bighorn sheep habitat. Together, natural and artificial open space uses, including golf course and intermixed desert open space, trail corridor, and conserved habitat for bighorn sheep, total approximately 413 acres.

The trail corridor proposed along the golf course perimeter is intended to connect with other trail segments on adjoining properties that would link the Coachella Valley Recreation and Park

District's (CVRPD) Dike #4 Trail with the Boo Hoff Trail. This altered alignment of the City's General Plan trail network was agreed to by Travertine, the City, BLM, BOR, and the Service. The Travertine connector trail, to be located along the Madison Street alignment south of Avenue 62, will provide public access for viewing of the Martinez Rockslide, a prominent geological feature adjacent to Travertine and is hereafter referred to as the Rockslide Access Trail. Unauthorized trails currently in use on Travertine's property will be closed to minimize impacts to bighorn sheep.

The proposed Rockslide Access Trail begins on Dike #4 at Avenue 62 and proceeds south on the Madison Street alignment, as requested by the City to the development: habitat edge, , where it then roughly follows the golf course alignment to the base of the Martinez Rockslide. The trail then follows the base of the rockslide until it veers in a northwesterly direction toward the junction of sections 4, 5, 32 and 33, again following along or through the golf course. The Trail would then parallel the section line between Section 32 and Section 33 on the west side of the proposed Jefferson Street (i.e.,, until it connects with the Boo Hoff Trail. Parking for trail users will be located on the project site at two locations: one at Madison Street and Avenue 62, and the other approximately 0.75 miles south of there near the southern terminus of the proposed Madison Street extension.

Support Facilities: All project infrastructures will be designed and constructed to serve only the Travertine project or lands east of Travertine. No additional capacity will be installed to provide service for potential projects in Section 5. Support facilities for the Travertine development would entail two gravity-distribution water reservoirs. Imperial Irrigation District Energy (IIDE) is the local electric power provider to the project. Coachella Valley Water District (CVWD) is the local water and sewer services provider to the project site. Currently, domestic water service lines exist in the area of the intersection of Avenue 60 and Madison Street.

Electrical Power: IIDE plans to provide electrical power to the Travertine project. Travertine anticipates that the electrical power lines will be located within Madison Street and possibly within Avenue 62. All distribution lines would be under-grounded. Section 5 landowners other than Travertine will be solely responsible for providing utilities, adequate utility system capacities, and any associated system upsizing for potential developments there. Please refer to the *Section 5 Addendum to the Travertine Biological Assessment* for a detailed discussion of the impacts of the Travertine project on Section 5.

Reservoirs: CVWD plans to provide the Travertine project with water by dividing Travertine into two pressure zones, each of which will be served by a separate reservoir. CVWD has determined that the only locations suitable for the two proposed water reservoirs are in Section 5, with one placed at the 332-foot elevation and the other at the 405-foot elevation. Both reservoirs will be depressed and screened to the greatest extent possible. Any above-ground tank appurtenances will be painted with non-reflective paint colored to blend with the surrounding habitat. The post-construction footprint of the reservoirs and access road is expected to be about

6 acres and all areas temporarily disturbed during construction will be revegetated using locally endemic native plant species/materials. Access would be strictly limited to CVWD personnel and maintenance vehicles. An access road would be constructed with an all-weather, typical Class 2 road base of compacted gravel. An access gate will be constructed to prevent public use and proliferation of unauthorized trailheads. Electrical power to the reservoirs will be under-grounded and no night-lighting will be used.

Federal Action

To access and develop the proposed project site, Travertine Corporation requires three ROW permits, two from BOR and one from BLM. Specifically, Travertine requires a new ROW permit from BOR for an extension of Madison Street, and an amendment to an existing permit for expansion of Avenue 62 across BOR Levee No. 4 and adjacent BOR lands. Madison Street would provide primary access to the development. The Avenue 62 permit is required by the City to provide access for local traffic from the east. From BLM, Travertine requires a ROW permit for an extension of Jefferson Street across BLM-managed lands. Jefferson Street would provide secondary access to the development. The Madison Street and Jefferson Street ROW permits are also needed because the Riverside County Fire Marshal requires two all-weather public access roads at separate locations to and from the Travertine project site. Details regarding these roadway extensions are provided below.

The need for these ROW permits arises from the fact that the property is virtually surrounded by Federal lands. Without the permits, the Travertine property would remain landlocked, with no access via public roads. Also, acquisition of the ROW permits is required as a condition of approval imposed by the City for approval of the land use entitlements sought by Travertine.

Madison Street: The Madison Street ROW, which would provide primary access to the project area, would extend across BOR Levee No. 4 between Avenue 60 and Avenue 62, located along the section line between Sections 33 and 34 (Figure 2b). This stretch is designated as a secondary arterial street in the City's General Plan. By agreement with BOR, the Madison Street ROW will be in the form of a recorded easement. The ROW that Travertine is requesting would be approximately 2,600 feet long and 100 feet wide. The ultimate ROW will include a 12-foot parkway with sidewalk, curb and gutter, a six-foot wide bike lane (each side), painted median, and two 12-foot wide travel lanes. There will also be additional slope and drainage easements, since Madison Street must cross Dike No. 4 between Avenue 60 and Avenue 62. These easements will be needed as part of the proposed street improvements.

All construction staging would take place from nearby privately owned lands. Buried utilities planned within the access road easement would include water and sewer, electric distribution lines, and storm drains sized for the Travertine project only. Dry utilities (e.g., cable television, telephone, and gas lines) would also be buried within the ROW. After construction of this portion of Madison Street is completed, BOR will require that the ROW be conveyed to the City,

who will be responsible for long-term operation and maintenance of the roadway and appurtenances.

Jefferson Street: The Jefferson Street ROW, which would provide secondary access to the development site, would extend across BLM-managed lands located in the northeast corner of Section 32 (Figure 2b). The ROW would consist of four lanes (two lanes in either direction). Buried utilities planned within the access road easement would include water, sewer, electric distribution lines, and storm drains sized for the Travertine project only. Dry utilities (e.g., cable television, telephone, and gas lines) would also be buried within the ROW. The ROW would be approximately 1,600 feet long and 100 feet wide. All construction staging would take place from nearby privately owned lands. After the construction of this portion of Jefferson Street is completed, BLM will assign the ROW license to the City, who will be responsible for operation and maintenance of the roadway and appurtenances.

Avenue 62: BOR and Travertine Corporation are parties to a ROW agreement, which allows vehicular traffic across Levee No. 4 at the Avenue 62 alignment (Figure 2b). The Riverside County Fire Department has indicated to Travertine Corporation that it may be necessary to use this access point for fire and other public safety vehicles. Avenue 62 is also designated as a public street in the City's General Plan for local traffic to and from the east. As in the other rights-of-way above, any utilities and infrastructure would be restricted in size to meet the needs only of Travertine. This proposed use would expand the current authorized use of the existing ROW. Therefore, Travertine Corporation requires BOR approval to expand the scope of the existing ROW permit. The existing loose gravel road would be improved to conform to the City's standards for public asphalted streets.

Conservation Measures

Following several meetings in 2002 and 2003 with the Service and CDFG, the development plan was extensively modified and reconfigured to remove development in bighorn sheep habitat from the southern portion of the Travertine property, specifically in Sections 4 and 5 in the vicinity of the Martinez Rockslide. Based on these discussions, the project boundary was established on May 1, 2003, during a field visit with Travertine, Service, and CDFG, which was depicted in the draft Coachella Valley Multiple Species Habitat Conservation Plan, dated October 15, 2004 (CVMSHCP). Subsequent meetings with the Service in 2005 refined the project boundary to encompass approximately 170 acres of conserved habitat within Travertine's original land holdings (Figure 1). This area to be conserved as bighorn sheep habitat lies in the southern portion of the project site adjacent to the Martinez Rockslide and would be preserved in perpetuity through a deed restriction consistent with California Civil Code Section 815, *et seq.*, as approved by the Service, prior to recording the first final map for the project. The only project-related development within this area of conserved habitat would be the two subterranean water reservoirs located in Section 5, and associated access roads, which would encompass about

6 acres. These conserved lands would become part of the habitat reserve system proposed by the CVMSHCP, if that plan is adopted.

In addition to the lands subject to Specific Plan 94-026, Travertine has acquired 35 acres additional acres in Section 5, of which 14.4 acres would be used for the proposed golf course and about 19.7 acres would be permanently protected as bighorn sheep habitat. These parcels are strategically located to make development in Section 5 beyond the Travertine ownership more difficult (see the *Section 5 Addendum to the Travertine Biological Assessment* for more details). Travertine also has committed to acquire an additional approximately 100 acres of bighorn sheep habitat in Section 5 that is strategically located to fragment larger blocks of land into smaller units with significantly reduced development potential (Figure 1).

Travertine Corporation proposes a variety of additional conservation measures to avoid and minimize potential impacts to bighorn sheep, based on discussions with the Service, BLM, BOR, and the City. The following measures augment the conservation commitments described in the BA, which may contain more detail in certain instances:

(1) Relocation of the City's General Plan trails out of the central portions of Sections 5 and 32, to the Rockslide Access Trail along the golf course buffer zone of the Travertine project. The final design and location of the Rockslide Access Trail will be approved by the Service and the City to minimize disturbance to bighorn sheep. If necessary, the southern and/or western boundaries of the trail and golf course alignments will be fenced, as described in Conservation Measure 5 below.

Unauthorized trails currently in use on Travertine's property will be closed to minimize impacts to bighorn sheep and replaced with the Rockslide Access Trail described above. Other than this trail, no additional trails would be proposed or allowed as part of the Travertine development. A variety of other measures will be implemented to restrict human access to surrounding hills, including: (a) placement of "no trespass" signs at legally enforceable intervals along the trail and habitat/development interface, with legally enforceable language; (b) development of CC&Rs and educational materials that explain to residents and members the ecology of bighorn sheep and the rules concerning unauthorized hiking into sheep habitat; (c) the strategic location of select golf holes outside (i.e., south) of the Rockslide Access Trail at certain points to serve as passive restraints to inhibit users of the trail from venturing into the canyons situated on east and west sides of the rockslide; and (d) implementation of a program to train golf course marshals and other personnel to monitor and control human access to adjacent hills.

(2) Strategic acquisition of land in Section 5. In addition to the lands subject to Specific Plan 94-026, Travertine has acquired 35 acres in Section 5, of which 14.4 acres would be used for the proposed golf course and 19.7 acres would be permanently protected as bighorn sheep habitat. Due to recent escalation in land values, Travertine accelerated the purchase and acquisition of

these lands to make development in Section 5 beyond the Travertine ownership more difficult due to economic, topographic, regulatory, and land planning constraints.

Prior to recording the first final map, Travertine also has committed to acquire an additional approximately 100 acres of bighorn sheep habitat in Section 5 that also are strategically located to fragment larger blocks of land into smaller units with reduced development potential. All lands proposed for conservation in Section 5 will be approved by the Service and protected in perpetuity consistent with California Civil Code Section 815, *et seq.* For more detail, please refer to the *Section 5 Addendum to the Travertine Biological Assessment.*

In addition, if the CVMSHCP is adopted, Travertine has agreed to loan $2 million to CVAG or Coachella Valley Conservation Commission (CVCC), as specified at Section 4.3.21 of the CVMSHCP and per separate agreement between the parties. CVAG/CVCC would be obligated per the terms of the CVMSHCP to use the loan to acquire additional bighorn sheep habitat within Section 5, and would guarantee repayment of the $2 million loan without interest to Travertine or its successor if the CVMSHCP is adopted.

(3) Establishment of a $500,000 endowment with the Center for Natural Lands Management (CNLM) to be managed by the Service to assist with the long-term management of bighorn sheep. Of this total, $100,000 will be provided upon issuance of the first grading permit on the Travertine site with the balance of $400,000 paid in installments of $100,000 per year over the next four years.

(4) Provision of an additional $100,000 to the CNLM endowment above to support the gathering of information on the effects of the regional trails system on bighorn sheep, including trails in and around the Travertine development.

(5) Because fences could block wildlife movement, fences will not be used as an initial deterrent to unauthorized access; however, a fencing contingency plan is needed to address potential indirect effects of the project. To avoid complications with the installation of any future fence, Travertine will (1) provide appropriate wildlife fence easements that will be located at the exterior boundary of either the golf course or the trail corridor, whichever is the outer most perimeter of the project; (2) create a Home Owners Association (HOA) as the legally responsible party for such installation; and (3) provide or identify a dedicated source of funds to construct the fence, all to be completed prior to recording the first final map. Following formation of the HOA and prior to completion of the habitat interface golf course, Travertine Corporation will establish and convene a three-person committee consisting of a representative from the HOA, the Service, and CDFG, which will be charged with the responsibility to assess the need for a buffer fence between the development and adjoining habitat to keep bighorn sheep off the project site and control human access to sheep habitat. Based on these two criteria, the committee will cooperate in good faith in determining a need for the fence, and agreeing on its design and specific location. The committee members shall have access to the habitat-urban interface areas on the project site to monitor sheep activity through various means, including interviews with residents

and staff, and the use/collection of any scientific information. If available information suggests that either of the above two criteria has been met, the committee may decide to conduct further studies on the extent of the problem, funded by the HOA, before voting on whether to require the HOA to construct an 8-foot fence (or functional equivalent) between the development and the adjoining habitat. Though the Service may decide in its sole discretion whether a fence is required, it will not require construction of a fence without evidence that either of the above criteria have occurred. Prior to construction of any fence, the committee shall coordinate and solicit views on fence design issues with local interests and only approve a given design after a meeting with residents of the Travertine project. The committee shall exist for ten years from the date of creation of the HOA, but the committee may be extended indefinitely if recommended by any of the committee members. Violators of CC&Rs and club rules will be subject to increasingly severe penalties Travertine will consult with the Service during the drafting of the initial set of Rules and Regulations concerning appropriate rules and regulations to protect the bighorn sheep. With Travertine's consent, the Master Declaration of Conditions, Covenants and Restrictions for the entire Travertine project will incorporate certain rules and regulations specifically addressing the bighorn sheep, which rules and regulations may be modified, amended or deleted only with the express written consent of the Service.

(6) The Jefferson Street extension through Section 32 will be constructed using active and passive design features to prevent public roadside parking and foot access into bighorn sheep habitat (e.g., boulders, k-rail, berm, narrow road shoulder, bar ditch, and restrictive signage), subject to review and approval by the Service.

(7) Within the project boundary, approximately 100 yards at the west end of the newly constructed Jefferson Street Loop in the southwest corner of Section 33, where it connects with the Avenue 62 alignment, will be left as undeveloped desert. This design feature, in combination with enhanced native landscaping, will discourage unauthorized vehicle access into bighorn sheep habitat in Section 5 adjacent to the Travertine project boundary.

(8) The golf course will be designed in a desert/links-style to minimize loss of native plants and wildlife (compared to conventional golf courses) and reduce potential impediment to movement wildlife movement. The golf course design will use a locally endemic native plant species palette for restoration of any areas that may be disturbed during development.

(9) No exotic plants known to be toxic to Peninsular bighorn sheep, or invasive in desert environments, will be used in project landscaping.

(10) All internal streets would be separated from the hillsides by golf holes and home sites (i.e., there would be no direct public access from internal streets to hillside sheep habitat).

(11) The Martinez Rockslide Access Trail and golf holes will form the southern and western perimeters of the Travertine project.

(12) Berms will be located at various points on the golf course to deter bighorn sheep access to the project site. Natural landscaping and berms around residential areas and golf courses would reduce noise, light, and visual impacts on surrounding hills.

(13) The best management practices will be used to preclude the establishment of potential disease vectors at open water features (i.e., water bodies will be designed with steep, unvegetated slopes and deep enough water to prevent establishment of emergent wetland vegetation).

(14) CC&R's, Specific Plan conditions, and club rules will prohibit activities that emit noise above specified levels (not to exceed 60 dB(A) for sensitive receptors or 75 dB(A) for non-residential receptors (per City Ordinance 9.100.210 Noise Control). For example, Travertine will require that only quiet electric golf carts will be used for service, maintenance, and play. Whenever possible, automobiles, gasoline-powered golf carts, and gasoline-powered leaf-blowers will be prohibited from the completed golf course.

(15) Outdoor lighting will be down-shielded and directed away from the hillsides in accordance with the City municipal code.

(16) To increase public awareness regarding the sensitivity of Peninsular bighorn sheep in the region, educational materials will be provided to homeowners and made available to users of the public facilities within the Travertine development. This material will be prepared in cooperation with the Service and CDFG. In addition, Travertine will provide within the project an area dedicated as an interpretive center concerning the bighorn sheep.

(17) The two water reservoirs will be constructed of steel or concrete and buried underground to the extent possible. Any tank appurtenances (e.g., valves) remaining above-ground will be painted with non-reflective paint colored to blend with the surrounding habitat and to prevent light from being reflected toward sheep habitat in the Santa Rosa Mountains.

(18) Dogs and other pets are not allowed within the National Monument and Travertine will install appropriate signage at the designated trailhead parking areas and any other access points to prohibit dogs along the Rockslide Access Trail. Travertine project homeowner CC&Rs and club rules will require pets to remain on a leash while outside enclosed areas, and will prohibit pets from entering the hills at any time. Compliance with the local "leash law" will also be enforced pursuant to City ordinance and the project's Specific Plan conditions.

STATUS OF THE SPECIES/CRITICAL HABITAT

Legal/Listing Status: The Peninsular bighorn sheep was federally listed as endangered on March 18, 1998 (63 FR 13134). A recovery plan was approved in October 2000 and 844,897 acres of critical habitat were designated on February 1, 2001 (66 FR 8649). The decision to list the Peninsular bighorn sheep was made because of declining population numbers and continuing

habitat loss, degradation, and fragmentation throughout a significant portion of bighorn sheep habitat within the Peninsular Ranges. In addition, periods of depressed recruitment, likely associated with disease, and high predation, coincided with low population numbers endangering the continued existence of these animals in southern California. The California Fish and Game Commission listed bighorn sheep inhabiting the Peninsular Ranges as "rare" in 1971. In 1984, the designation was changed to "threatened" by the CDFG to conform with the terminology in the amended California Endangered Species Act.

Species Description: Bighorn sheep inhabiting the Peninsular Ranges were once considered a separate subspecies (*Ovis canadensis cremnobates*) and were one of the 4 desert subspecies (*O. c. nelsoni, O. c. mexicana, O. c. cremnobates,* and *O. c.weemsi*) recognized by Cowan (1940). The validity of these subspecies delineations was questioned and reassessed. Based on morphometric and genetic results, Wehausen and Ramey (1993) placed Peninsular bighorn within the *O. c. nelsoni* subspecies, which is the current taxonomy.

The overall range of the subspecies extends from the San Jacinto Mountains near Palm Springs, California south to Volcan Tres Virgenes near Santa Rosalia, Baja California, Mexico. However, only the distinct vertebrate population segment within the United States is listed as endangered and addressed in this document. For a population to be listed under the Act as a distinct vertebrate population segment, three elements are considered (61 FR 4722): 1) the discreteness of the population segment in relation to the remainder of the species to which it belongs; 2) the significance of the population segment to the species to which it belongs, and 3) the population segment's conservation status in relation to the Act's standards for listing. Within the United States, the range extends along the Peninsular Ranges from the San Jacinto Mountains of southern California south to the United States - Mexico border. Bighorn sheep habitat in the Peninsular Ranges is restricted to the east facing, lower elevation slopes typically below 4,600 feet along the northwestern edge of the Sonoran Desert.

Distribution: An examination of past records and current data suggests that the distribution of bighorn sheep has been altered during the past 25 years. Ewe groups along the Mexican border and in the northern San Jacinto Mountains (north of Chino Canyon) have disappeared since the 1980's. DeForge *et al.* (1997) suggested disturbance and habitat fragmentation were the primary factors driving the changes in bighorn distribution in the northern San Jacinto Mountains. Ewes ceased occupying the northern San Jacinto Mountains about 20 years after construction of the Palm Springs Aerial Tramway in Chino Canyon, though rams still occasionally cross Chino Canyon and use the area formerly occupied by the ewe group. Loss of the border population was poorly documented, but the construction of Interstate 8 in the mid-1960's, railroad activity, livestock grazing, poaching, and fire suppression appear to be the most likely factors contributing to the isolation and decline of bighorn sheep in the area (Rubin *et al.* 1998).

In the northern Santa Rosa Mountains, the number and distribution of bighorn sheep is substantially reduced from the 1980's, with formerly important use areas, such as Carrizo and

Dead Indian Canyons, currently supporting few animals (DeForge and Scott 1982; DeForge *et al.* 1995; Bighorn Institute 1998, 1999). Rubin *et al.* (1998) suggested that in portions of the range, roads or increased traffic have contributed to fragmentation by restricting ewe movement, as evidenced by 4 ewe groups having home ranges delineated by roadways. In the 1970's, ewes were observed to cross Highway 74 in the Santa Rosa Mountains (V. Bleich, pers. comm.; D. Jessup, *in litt.* 1999). No radio-collared ewes were observed to cross this road from 1993 to 2001. California Department of Transportation records indicate that Highway 74 traffic has approximately tripled since 1970. In addition, bighorns use significantly less of the Santa Rosa Mountains since the construction of the Dunn Road (DeForge *in litt.* 1997).

The Peninsular Ranges of California are northern extensions of the mountain ranges of Baja California, Mexico, and the majority of Peninsular bighorn sheep are located in Mexico. Peninsular bighorn sheep are found along steep, east-facing escarpments in the desert regions of the Baja Peninsula, south to the Las Virgenes Mountains near the town of San Ignacio. The mountain ranges of Baja are remote and rugged, thus obtaining accurate population estimates is very difficult. Biologists currently estimate that approximately 2,500 Peninsular bighorn sheep inhabit northern Baja, much less than the estimates of over 28,000 from the turn of the century. The problems facing Peninsular bighorns in Baja are different than the challenges facing them in the United States. Habitat loss resulting from housing, resort, and golf course development does not currently pose the same level of threat present in the United States, but poaching, competition with domestic and feral livestock, predation, and diseases introduced from domestic livestock continue to impact these herds (DeForge *et al.* 1999).

Habitat Affinities: Bighorn sheep in the Peninsular Ranges have important habitat requirements that relate to topography, visibility, water availability, and forage quality and quantity. Bighorn sheep evolved predator evasion behaviors that depend critically on the use of escape terrain, which is generally defined as steep, rugged slopes (Hansen 1980c, Cunningham 1989). Escape terrain is important because bighorn sheep typically do not outrun their predators, but depend upon their climbing abilities to escape their enemies (Geist 1971, McQuivey 1978). When ewes are ready to give birth they will typically seek out the most precipitous terrain, where their lambs will presumably be safest (Geist 1971). The presence of such steep terrain for predator evasion and lambing is, therefore, a crucial component of bighorn sheep habitat. Variation in slope and aspect also help bighorn sheep to survive in a harsh environment. During hot weather, desert bighorn seek shade under boulders and cliffs, or may move to north facing slopes (Merritt 1974, Andrew 1994). During inclement weather they may again seek protected caves or overhangs, or move to sunny, south facing slopes (Andrew 1994), or slopes that are protected from strong winds.

In addition to mountainous terrain, other types of habitat are crucial to bighorn sheep populations. Areas of flat terrain, such as valley floors, serve as important linkages between neighboring mountainous regions, thereby providing bighorn sheep temporary access to resources (e.g., forage, water, or lambing habitat) in neighboring areas, and allowing gene flow

to occur between subpopulations (Krausman and Leopold 1986, Schwartz *et al.* 1986, Bleich *et al.* 1990a, Bleich *et al.* 1996). Low rolling terrain and washes seasonally provide an important source of high quality forage, with a greater diversity of browse species than steeper terrain (Leslie and Douglas 1979). In summer, washes also provide a source of high quality browse longer than other areas (Andrew 1994). Leslie and Douglas (1979) noted that these areas became increasingly important to bighorn sheep not only in summer, but during any period of limited forage availability.

The predator evasion behavior of bighorn sheep depends on the ability to visually detect danger at a distance. Bighorn sheep will avoid habitat in which dense vegetation reduces visibility (Risenhoover and Bailey 1985, Etchberger *et al.* 1989). This appears to be the case in the Peninsular Ranges, where bighorn sheep usually remain below the elevation of chaparral and other dense vegetation associations. In the Peninsular Ranges, bighorn sheep habitat occurs along the east-facing desert slopes, typically below approximately 1,400-meter (4,600-foot) elevations (Jorgensen and Turner 1975, DeForge *et al.* 1997). The elevational patterns of vegetation associations in the Peninsular Ranges, in combination with bighorn sheep predator avoidance behavior, result in habitat use patterns that are more restricted to lower elevations than in most other bighorn populations. The available habitat of Peninsular bighorn sheep can, therefore, be visualized as a long, narrow band that runs north-south along the lower elevations of the Peninsular Ranges.

In hot, arid deserts, water is an important resource for bighorn sheep (Jones *et al.* 1957, Blong and Pollard 1968, Leslie and Douglas 1979, Turner and Weaver 1980, Elenowitz 1984, Cunningham and Ohmart 1986). A number of studies have shown that desert bighorn sheep will concentrate around water sources in the summer, with most animals found within a 3- to 5-kilometer (2- to 3-mile) radius of water (Jones *et al.* 1957, Leslie and Douglas 1979, Cunningham and Ohmart 1986). During periods of high rainfall, sheep distribution is less coincident with permanent water sources (Leslie and Douglas 1979). Apparently, bighorn sheep obtain enough water from forage to meet their requirements during wetter portions of the year. Lactating ewes and lambs appear to be more dependent on free-standing water and are often found closer to water sources (Blong and Pollard 1968, Leslie and Douglas 1979, Bleich *et al.* 1997). Water sources are most valuable to bighorn sheep if they occur in proximity to adequate escape terrain with good visibility. Therefore, the juxtaposition of open escape terrain to water sources is an important factor in their utilization (Cunningham 1989, Andrew 1994).
The critical importance of free-standing water to bighorn sheep has been questioned (Krausman and Leopold 1986, Broyles 1995), and some small populations apparently exist without free-standing water (Krausman *et al.* 1985, Krausman and Leopold 1986, Broyles 1995). However, in most populations, bighorn sheep will drink regularly when water is available and concentrate near water sources during the warmer months.

In the Peninsular Ranges, bighorn sheep use a wide variety of plant species as their food source (Weaver *et al.* 1968, Jorgensen and Turner 1973). Turner (1973) recorded the use of at least 43

species, with browse being the food category most frequently consumed. Cunningham and Ohmart (1986) determined that the bighorn sheep diet in Carrizo Canyon (at the south end of the U.S. Peninsular Ranges) consisted of 57 percent shrubs, 32 percent forbs, 8 percent cacti, and 2 percent grasses. Scott (1986) and Turner (1976) reported similar diet compositions at the north end of the range. Diet composition varied among seasons (Cunningham and Ohmart 1986, Scott 1986), presumably because of variability in forage availability, selection of specific plant species during different times of the year (Scott 1986), and seasonal movements of bighorn sheep.

The time period surrounding late gestation, lambing, and nursing is very demanding in terms of the energy and protein required by bighorn ewes. Failure to acquire sufficient nutrients during late gestation and during nursing adversely affects the survival of newborn ungulates (Thorne *et al.* 1976, Julander *et al.* 1961, Holl *et al.* 1979). Crude protein and digestible energy values of early green-up species are usually much higher than those of dormant forages during the critical late gestation, lambing, and rearing seasons. With their high nutrient content, even minor volumes of these forages within the overall diet composition may contribute important nutritional value at critical life stages (Wagner 2000). However, during the reproductive season, due to the varied topography of bighorn sheep habitat, these forages typically are concentrated on specific sites, such as alluvial fans and washes, where more productive soils support greater herbaceous growth than steeper, rockier soils. Furthermore, forage green-up follows an elevational gradient with lower elevations beginning spring growth earlier than higher elevations (Wehausen 1980, Berger 1991). Access to a range of elevations provides bighorn sheep enhanced opportunities to acquire nutrients during critical seasons.

Life History: The movement patterns and habits of ewes are learned by their offspring (Geist 1971). By following older animals, young bighorn sheep gather knowledge about escape terrain, water sources, foraging areas, and lambing habitat (Geist 1971). As young rams reach 2 to 4 years of age, they begin to follow older rams away from their natal group (Geist 1971, Festa-Bianchet 1991). Because, bighorn sheep rely on vigilance to detect predators, they benefit from gregariousness and group alertness (Geist 1971, Berger 1978).

The adult sexes tend to loosely segregate during much of the year, coming together primarily during the rut (Geist 1971, Bleich *et al.* 1997), which typically peaks from August through October in the Peninsular Ranges (Rubin *et al.* 2000). During the rut, rams join the ewe groups and compete to breed with receptive ewes. The largest rams presumably are the most successful breeders, but smaller rams have been reported to breed as well (Hogg 1984). During the period of sexual segregation, ewes and their lambs are typically found in steeper, more secure habitat, while rams may be found in less steep or rugged terrain (Geist 1971, Bleich *et al.* 1997).

Desert bighorn sheep are primarily diurnal (Krausman *et al.* 1985) but may be active at any time of day or night (Miller *et al.* 1984). Their daily activity pattern includes alternating feeding and resting/ruminating periods. Forage quality influences activity patterns because when forages are low in digestibility, bighorn sheep must spend more time ruminating and digesting forage.

Consequently, bighorn sheep may establish a cycle of feeding and ruminating that reflects forage quality and optimizes nutrient intake (Wagner and Peek 1999, Wagner 2000).

Size of individual or group home range depends on the juxtaposition of required resources (water, forage, escape, or lambing habitat) and, therefore, varies geographically. Home range size also is affected by forage quantity and quality, season, sex, and age of the animal (Leslie 1977, McQuivey 1978). Although most desert bighorn sheep do not seasonally migrate along elevational gradients like many populations in higher latitude mountain ranges, they do exhibit seasonal differences in habitat use patterns. In many populations, animals will have a smaller home range in summer (McQuivey 1978, Leslie and Douglas 1979, Elenowitz 1983), presumably due to their limited movement away from permanent water sources. During the cooler or wetter months of the year, bighorn sheep often exhibit an expanded range as animals move farther from water sources (Simmons 1980). Ewes generally display a higher degree of philopatry to their seasonal home ranges than do rams. Rams tend to range more widely, often moving among ewe groups (Boyce *et al.* 1997, DeForge *et al.* 1997, Rubin *et al.* 1998). In most populations of desert bighorn sheep, ram home ranges have been found to be larger than those of ewes (Simmons 1980, DeForge *et al.* 1997).

The gregarious and philopatric behavior of ewes limits their dispersal and exploratory abilities relative to those of rams (Geist 1967, 1971). Geist (1971) theorized, however, that a young ewe might switch to a new ewe group if she encountered neighboring sheep and followed them away from her natal ewe group. In the Peninsular Ranges, movement of radio-collared ewes between ewe groups is rare, however, inter-group movement does occasionally occur. During a 3-year study, one ewe moved over 30 kilometers (18.6 miles) and temporarily joined another ewe group (Rubin *et al.* 1998). No emigration of ewes has been observed even though radio-collared animals have been regularly monitored in the northern Santa Rosa Mountains since 1981 (Ostermann *et al.* 2001) and throughout the range since 1993 (E. Rubin, pers. comm.; DeForge *et al.* 1997). Genetic analyses reflect a low rate of ewe dispersal across the Peninsular Ranges in the evolutionary past (Boyce *et al.* 1999).

An important consideration in the conservation of Peninsular bighorn sheep is their behavioral response to humans and human activity. Bighorn have been considered a wilderness species, because they do not thrive in contact with human development (Leopold 1933). The impacts of human development extend beyond the urban edge into bighorn sheep habitat. A growing human population and increased activity adjacent to and within bighorn sheep habitat have the potential to adversely affect bighorn sheep. Numerous researchers have expressed concern over the impact of human activity on Peninsular bighorn sheep (Jorgensen and Turner 1973, Hicks 1978, Olech 1979, Cunningham 1982, DeForge and Scott 1982, Gross 1987, Sanchez *et al.* 1988), as well as on sheep in other areas (Graham 1980, Gionfriddo and Krausman 1986, Smith and Krausman 1988). A variety of human activities such as hiking, mountain biking, hang gliding, horseback riding, camping, hunting, livestock grazing, dog walking, and use of aircraft and off-road-vehicles have the potential to disrupt normal bighorn sheep social behaviors and use

of essential resources, and cause bighorn sheep to abandon traditional habitat (McQuivey 1978, MacArthur *et al.* 1979, Olech 1979, Wehausen 1979, Leslie and Douglas 1980, Graham 1980, MacArthur *et al.* 1982, Bates and Workman 1983, Wehausen 1983, Miller and Smith 1985, Krausman and Leopold 1986, Krausman *et al.* 1989, Goodson 1999, Papouchis *et al.* 1999). Etchberger *et al.* (1989) found that habitat abandoned by bighorn sheep in the Pusch Ridge Wilderness had greater human disturbance than currently occupied habitat. Etchberger and Krausman (1999) observed the abandonment of lambing habitat while construction activities were ongoing within the home range of the ewe group. Ewes eventually returned to the area following cessation of construction activities.

Although cases have been cited in which bighorn sheep populations did not appear to be greatly affected by human activity, numerous researchers have documented altered bighorn sheep behavior in response to anthropogenic disturbance. Even when bighorn sheep appear to be tolerant of a particular activity, continued and frequent human use of an area can cause them to avoid the area, eventually interfering with use of resources, such as water, mineral licks, lambing or feeding areas, or use of traditional movement routes (Jorgensen and Turner 1973, McQuivey 1978, Graham 1980, Leslie and Douglas 1980, DeForge and Scott 1982, Hamilton *et al.* 1982, Krausman and Leopold 1986, Rubin *et al.* 1998). In addition, disturbance can result in physiological responses, such as elevated heart rate, even when no behavioral response is discernable, and the cumulative energetic cost of such responses may potentially affect the nutritional status of individuals potentially populations (MacArthur *et al.* 1979, 1982).

Bighorn response to human activity is variable and depends on many factors, including but not limited to: the type and predictability of the activity, presence of domestic dogs, the animal's previous experience with humans, size or composition of the bighorn sheep group, location of bighorn sheep relative to the elevation of the activity, distance to escape terrain, and distance to the activity (Weaver 1973; McQuivey 1978; Hicks 1977, 1978; Hicks and Elder 1979; MacArthur *et al.* 1979, 1982; Wehausen 1980; Hamilton *et al.* 1982; Whitacker and Knight 1998; Papouchis *et al.* 1999). Ewes with lambs typically are more sensitive to disturbance (Light and Weaver 1973, Wehausen 1980). Responses can range from cautious curiosity to immediate flight or abandonment of habitat. Bighorn sheep use of an area within the Peninsular Ranges was reduced by 50 percent when off-road vehicle use was allowed (Jorgensen 1974). Cardiac and behavioral responses of bighorn sheep to an approaching human were determined to be greatest when a person was accompanied by a dog or approached from over a ridge (MacArthur *et al.* 1979, 1982). Though the effect of human activity in bighorn sheep habitat is not always obvious, human presence or activity in many cases has been found to detrimentally alter normal behavioral and habitat use patterns. Bighorn sheep have evolved to deal with occasional stress, such as the presence of a predator. However, long-term chronic stress may cause physiological reactions that impair immune function, endocrine regulation, and growth and development (Desert Bighorn Council 1991). Bighorn sheep prevented from using their normal range by frequent human disturbance or dogs may be subject to nutritional deprivation, which can also adversely affect the immune system (Festa-Bianchet 1988).

Desert bighorn sheep have fared poorly when urban areas have expanded around and within their ranges. In the Sandia Mountains of New Mexico and the Santa Catalina Mountains of Arizona, two populations of desert bighorn sheep faced situations very similar, to the one now challenging the bighorn sheep inhabiting the Peninsular ranges of California. The bighorn sheep population in the Sandia Mountains has declined to extinction, and the population in the Santa Catalina Mountains appears to be extinct (Krausman *et al.* 2001). Factors, such as predation or disease, do not appear to have played a significant role in either of the above extinctions. Instead, in both cases the level of human activity appears to have been too great for bighorn sheep to survive. In the Sandia Mountains human activity doubled from 1975 to 1990, as hiking trails, ski areas, restaurants, and a tramway were built (Krausman *et al.* 2001). In the Santa Catalina Mountains, real estate developments directly eliminated bighorn sheep habitat (Krausman 1993), hiking activity, dog use, and other recreational activities increased in more remote areas (Schoenecker 1997), and fire suppression allowed the vegetation in some areas to become too dense for bighorn sheep (Gionfriddo and Krausman 1985, Krausman *et al.* 1996). In San Bernardino National Forest, California, Light and Weaver (1973) studied the reaction of bighorn sheep to human activities when ski areas and other developments were built in their habitat. They concluded bighorns abandoned suitable habitat to ostensibly remain out-of-sight.

The breeding period, or rut, occurs in the late summer and fall months. In the Peninsular Ranges, ewes estimated to be between 2 and 16 years of age have been documented to produce lambs (Rubin *et al.* 2000, Ostermann *et al.* 2001). As parturition approaches, ewes seek isolated sites with shelter and unobstructed views (Turner and Hansen 1980), and seclude themselves from other females while finding sites to bear their lambs (Etchberger and Krausman 1999). Lambs are born after a gestation of approximately 6 months-171 to 185 days (Turner and Hansen 1980, Shackleton *et al.* 1984, Hass 1995). During a 4-year (1993 to 1996) study conducted in the Peninsular Ranges south of the San Jacinto Mountains, the lambing season extended from February through August; however, 87 percent of the lambs were born from February to April, and 55 percent of the lambs were born in March (Rubin *et al.* 2000). DeForge *et al.* (1997) and Cunningham (1982) reported a similar onset of the lambing season in the San Jacinto Mountains and in Carrizo Canyon, respectively. In the San Jacinto and northern Santa Rosa Mountains, ewe groups, the lambing season begins in January during some years (Bighorn Institute 1997). Lambs usually are weaned by 6 months of age (Hansen and Deming 1980, Wehausen 1980).

From 1993 to 1996, the reproductive patterns of five ewe groups (Carrizo Canyon, south San Ysidro Mountains, north San Ysidro Mountains, Santa Rosa Mountains [Deep Canyon], and northern Santa Rosa Mountains) were monitored and annual lamb production averaged 77 percent (0.77 lambs born per "ewe-year") for the 4-year period (E. Rubin, pers. comm.). Using a fecal-based enzyme immunoassay, Borjesson *et al.* (1996) determined that in the fall of 1992, at least 85 percent of sampled adult ewes were pregnant. Both of these observations suggest that conception rates are not currently limiting population growth in the Peninsular Ranges.

Lamb survival (to 6 months of age) was variable among groups and across years. A year of high lamb survival in one group was not necessarily a high survival year in another group (Rubin *et al.* 2000). Of the four groups studied, the northern Santa Rosa Mountains group typically had the lowest lamb survival, while the neighboring Deep Canyon group, located less than 8 kilometers (5 miles) away, had the highest lamb survival. Researchers working in the northern portion of the Santa Rosa Mountains have expressed concern over the low lamb recruitment observed in this area since approximately 1977 (DeForge *et al.* 1982, DeForge and Scott 1982, Turner and Payson 1982). Periods of low lamb to ewe ratios, as well as clinical signs of pneumonia among lambs, have occasionally been observed in Anza-Borrego Desert State Park (Jorgensen and Turner 1973, Jorgensen and Turner 1975, Hicks 1978), but years of high lamb to ewe ratios (Cunningham 1982; M. Jorgensen, pers. comm.) have been observed in these areas as well (Rubin *et al.* 2000).

Wehausen (1992) suggested that periods of low recruitment may not warrant alarm because long-lived animals such as bighorn sheep can exist in viable populations if periods of low offspring recruitment are interrupted by periodic pulses of high offspring recruitment. Most ewe groups in the Peninsular Ranges appear to have exhibited such pulses of high recruitment but declining population trends suggest that they have not been sufficient to balance adult mortality over longer time periods.

In ruminants, reproductive success is related to the mother's body weight, access to resources, quality of home range, and age (Etchberger and Krausman 1999). Survival of offspring also depends on birth weight and parturition date. Festa-Bianchet and Jorgenson (1996) found that female sheep reduce the care of lambs when resources are scarce to favor their own nutritional requirements over their lamb's development. Ewes that fail to acquire a minimum level of energy reserves (i.e., body weight) may not conceive (Wehausen 1984) or will produce smaller offspring with a poorer chance of survival (Price and White 1985). Several studies have documented a positive relationship between winter precipitation and lamb recruitment in the following year (Douglas and Leslie 1986, Wehausen *et al.* 1987). However, the relationships between climate, lamb recruitment, and population trends likely differ among different bighorn sheep populations, and are not fully understood (Rubin *et al.* 2000).

Lamb and yearling age classes experience high mortality rates relative to adult bighorns. After reaching adulthood at two years of age, most bighorn sheep survive high until ten years of age (Hansen 1980b), or until shortly before the age of ecological longevity (Cowan and Geist 1971). However, observed values of annual adult survivorship in the Peninsular bighorn sheep appear low relative to other reported desert populations. During November 1992 to May 1998, survivorship of 113 adult radio-collared bighorn sheep (97 ewes and 16 rams) was monitored between Highway 74 (in the Santa Rosa Mountains) and the U.S.-Mexico border. During this period, overall annual adult survival was 0.79, with no significant difference among three age classes of adults (Hayes *et al.* 2000). Annual survivorship of individual ewe groups ranged from 0.70 to 0.87, and a year of high survivorship in one group was not necessarily a year of high

survivorship in other groups (Rubin *et al.* 1998). In the northern Santa Rosa Mountains ewe group, adult survivorship was monitored during a 14-year period (1985 to 1998), and was found to range between 0.50 and 1.00 annually (Ostermann *et al.* 2001). In the San Jacinto Mountains, DeForge *et al.* (1997) monitored the survival of adult (2 or more years of age) radio-collared bighorn sheep during 1993 to 1996 and estimated annual adult survival to be 0.75.

Survival of desert bighorn sheep in greater southeastern California averaged 0.91 (Andrew 1994), 0.86 or greater in northwest Arizona (when highway mortalities were excluded, (Cunningham and deVos 1992), 0.82 in New Mexico (Logan *et al.* 1996), and 0.85 or greater for four populations studied in the Mojave Desert (Wehausen 1992).

Population Trends: Bighorn sheep have been documented in the Peninsular Ranges since early explorers, such as Anza, observed them in the 1700's (Bolton 1930). Grinnell and Swarth (1913) described the area of Deep Canyon in the southern Santa Rosa Mountains, "...well worn trails, footprints, and feces were plentiful. In places it looked as though a herd of domestic sheep had been over the region." Rangewide population estimates were not made until the 1970's. Published estimates were as high as 971 in 1972 (Weaver 1972), and 1,171 in 1974 (Weaver 1975).

Recent range-wide population estimates were 570 in 1988 (Weaver 1989), 400 in 1992 (U.S. Fish and Wildlife Service 1992), and between 327 and 524 in 1993 (Torres *et al.* 1994). Starting in 1994 biennial helicopter census were conducted throughout the Peninsular Ranges using radio-collared animals to correct for visibility bias. The population estimates were 347, 276, 334, and 400 for the years 1991-2000, respectively. From the historic highs of the 1970's, population estimates declined to a low of 276 adults in 1996 (Service 2000); since that low, the population has apparently increased. Currently, at least 8 ewe groups exist in the range, and the population trajectory of each ewe group appears to be determined independently (Rubin *et al.* 1998). Climatic patterns are correlated across the Peninsular Ranges, suggesting that other local factors specific to ewe groups play important roles in determining long-term abundance trends (Rubin *et al.* 1998). Independent population trends also were observed among ewe groups in the Mojave Desert (Wehausen 1992).

In the southern part of the San Jacinto Mountains, a ewe group currently consists of 29 adult male and female bighorn sheep, with only 4 native adult ewes and 6 captive-released ewes. The subpopulation has remained approximately stable (17-26 individuals) from 1992-2000, but the unbalanced sex ratio causes concern (Bighorn Institute 2000). The three Santa Rosa Mountain ewe groups declined 69 percent from 1984 to 1990, remained stable at 115-120 individuals from 1990-1995, until declining in 1996 to approximately 95 adults. Currently, these 3 ewe groups total approximately 129 adults (CDFG 2004 helicopter surveys, unpublished data). The ewe groups in the northern Santa Rosas and southern San Jacinto Mountains continue to receive intensive monitoring from the Bighorn Institute, and have periodically been augmented with captive-reared individuals.

Helicopter surveys south of the Santa Rosa Mountains, indicated a 28 percent decline in ewe numbers in a recent 2-year period (from an estimate of 141 females in 1994 to 102 females in 1996; Rubin *et al.* 1998), and a statistically non-significant increase (from approximately 102 to 112 females) from 1996 to 1998 (Rubin *et al.* 1999). Ewe groups in Coyote Canyon, North San Ysidro Mountains, and South San Ysidro Mountains currently average approximately 36 individuals each, with the number of ewes ranging from 17 to 27. The 2000 helicopter survey indicated that the Vallecitos Mountains and Carrizo Canyon (southern) ewe groups have increased significantly since 1996.

Bighorn sheep are relatively long-lived animals that have the potential to reproduce over an extended period of time (2-16 years). Therefore, periods of above average recruitment may compensate for periods of low recruitment (Wehausen 1992). Forage quality and quantity vary with environmental conditions, and thus female condition, and conception, parturition and lamb survival rates reflect this natural variation. However, if mortality agents begin impacting adult survival, then subpopulation levels may drop dramatically, endangering the existence of a ewe group. Consequently, a ewe group's persistence is always vulnerable to disease outbreaks, high levels of predation, mortality caused by urbanization, and habitat loss from human disturbance and development.

Threats: Cause specific mortality in the San Jacinto Mountains was studied from 1992 to 1998. During this period, five mortalities were attributed to mountain lion (*Puma concolor*) predation, two were attributed to bobcat or mountain lion predation, and three died of unknown causes (DeForge *et al.* 1997; Bighorn Institute 1997, 1998).

In the northern Santa Rosa Mountains, artificially irrigated vegetation attracts bighorn sheep and creates a hazard for them. Though often thought to be the product of releasing captive-reared animals into the wild, behavioral habituation to urban sources of food and water began when urbanization started encroaching into bighorn habitat in the 1950's, several decades before population augmentation began in 1985 (Tevis 1959, DeForge and Scott 1982, Ostermann *et al.* in press, V. Bleich, pers. comm.). A study of cause-specific mortality conducted from 1991 to 1996 revealed that predation accounted for 28 percent of 32 adult bighorn sheep mortalities (25 percent due to lion predation and 3 percent due to either lion or bobcat predation) and 34 percent were directly caused by urbanization (DeForge and Ostermann 1998b). The remaining mortalities were due to disease (3 percent) and undetermined causes (34 percent). Of the 11 adult mortalities attributed to urbanization, 5 were due to automobile collisions, 5 were caused by exotic plant poisoning, and 1 bighorn ram was strangled in a wire fence. An additional four bighorn sheep were struck but not killed by vehicles. Toxic plants causing mortality included oleander (*Nerium oleander*) and laurel cherry (*Prunus* sp.) (Bighorn Institute 1995, 1996). Preliminary results from an ongoing study of radio collared lambs indicate that urbanization is also affecting lamb survival in this ewe group. Eight of nine deaths occurred within 300 meters (980 feet) of the urban interface (Bighorn Institute 1999). Of the nine lamb mortalities recorded in 1998 and 1999, five were attributed to coyote or bobcat predation, one to mountain lion

predation, and three to the direct and indirect effects of urbanization (automobile collision and drowning in a swimming pool). Dogs also have been observed to chase bighorn ewes and their lambs near residential areas (E. Rubin, pers. comm.), and dogs likely caused the death of 2 yearlings in April 2001 (J. DeForge, pers. comm.).

Though mule deer (*Odocoileus hemionus*) are the primary prey of mountain lions in North America (Anderson 1983), and the range of bighorn sheep in the Peninsular Ranges largely avoids overlap with mule deer, lion predation may threaten individual ewe groups in the Peninsular Ranges (Hayes *et al.* 2000), and has the potential to affect population recovery. From November 1992 to May 1998, Hayes *et al.* (2000) found the primary cause of death of radio-collared adult bighorn sheep between Highway 74 (in the Santa Rosa Mountains) and the U.S.-Mexico border was predation by mountain lions. Lion predation accounted for at least 69 percent of the 61 adult mortalities and occurred in each of the ewe groups in this portion of the range (Hayes *et al.* 2000). Annually, lion predation accounted for 50 to 100 percent of the bighorn sheep mortality, and did not exhibit a decreasing or increasing trend during 1993 to 1997. Lion predation appeared to show a seasonal pattern, with the majority of incidents occurring during the cooler and wetter months of the year. A bighorn sheep's risk of predation did not appear to be related to its age. It is unknown, however, how current levels of lion predation observed throughout the Peninsular Ranges compare to historic levels. Reported incidents of lion predation were not common in the past and predation was not considered to be a serious risk to bighorn sheep (Weaver and Mensch 1970, Jorgensen and Turner 1975, Cunningham 1982). It is important to note that the increase in the number of radio-collared bighorn sheep since 1993 has greatly increased the detection of such mortalities, and it is possible that other factors influencing Peninsular bighorn sheep and alternate prey species have altered the proportion of mortalities caused by lion predation. Bighorn sheep evolved in the presence of predators, and developed effective physical and behavioral mechanisms for dealing with them. Similar to other desert bighorn populations, sheep in the Peninsular Ranges have likely experienced varying levels of lion predation for thousands of years. However, when other factors, such as drought, habitat loss and fragmentation due to urbanization, diseases, and other mortality factors reduce populations to low levels and/or alter the abundance and distribution of alternate prey species, such as mule deer, then the influence of predation on population dynamics may increase (Logan and Sweanor 2001).

In areas of the Peninsular Ranges beyond the Coachella Valley, past field observations and records documented mortalities resulting from predation (of lambs) by coyotes (*Canis latrans*) (Weaver and Mensch 1970, Jorgensen and Turner 1975, DeForge and Scott 1982), train collisions (Jorgensen and Turner 1973), automobile collisions (Turner 1976, Hicks 1978), poaching (Jones *et al.* 1957, Jorgensen and Turner 1973, Cunningham 1982), and accidental falls (Turner 1976). Golden eagles (*Aquila chrysaetos*) and bobcats (*Lynx rufus*) are also potential predators.

The westward spread of Europeans and their domestic livestock across North America was thought to play a significant role in reducing the distribution and abundance of bighorn sheep due to the introduction of new infectious diseases (Spraker 1977, Onderka and Wishart 1984). In particular, domestic sheep have been repeatedly implicated in *Pasteurella* pneumonia die-offs of bighorn sheep. It has been hypothesized that disease has played an important role in the population dynamics of bighorn sheep in the Peninsular Ranges (DeForge *et al.* 1982, DeForge and Scott 1982, Turner and Payson 1982, Wehausen *et al.* 1987). Numerous pathogens have been isolated or detected by serologic assay from bighorn sheep in these ranges. These pathogens include bluetongue virus, contagious ecthyma virus, parainfluenza-3 virus, bovine respiratory syncytial virus, *Anaplasma*, *Chlamydia*, *Leptospira*, *Pasteurella*, *Psoroptes*, and *Dermacentor* (DeForge *et al.*, 1982; Clark *et al.* 1985, 1993; Mazet *et al.* 1992; Elliott *et al.* 1994; Boyce 1995; Crosbie *et al.*, 1997, DeForge *et al.* 1997).

DeForge *et al.* (1982) found multiple pathogens (contagious ecthyma virus, blue tongue, *Pasteurella*, and parainfluenza virus) and low lamb recruitment in association with overall population declines. Between 1982 and 1998, 39 lambs showing signs of illness (lethargy, droopy ears, nasal discharge, and lung consolidation) were collected from the Santa Rosa (northern and southern), Jacumba, and In-Ko-Pah Mountains for disease research and rehabilitation at the Bighorn Institute (Ostermann *et al.* 2001). Additionally, DeForge *et al.* (1995) documented a population decline throughout the Santa Rosa Mountains during 1983 to 1994, resulting from inadequate recruitment. Although a cause and effect relationship between disease and population decline has not been clearly established in the Peninsular Ranges, results from several studies provide support for this hypothesis (DeForge *et al.* 1982, Clark *et al.* 1985, Wehausen *et al.* 1987, Clark *et al.* 1993, Elliot *et al.* 1994, DeForge *et al.* 1995). Analysis of spatial variation in pathogen exposure among bighorn sheep sampled between 1978 to 1990 showed that Peninsular bighorn sheep populations and other populations in southern California have higher levels of pathogen exposure than other populations of bighorn sheep in the State (Elliott *et al.* 1994). The presence of feral goats in portions of the Santa Rosa Mountains until the late 1970's to early 1980's may have contributed to exposure of wild bighorn to disease during this period of population decline (D. Jessup, *in litt.* 1999). All evidence indicates that the influence of disease in the Peninsular Ranges has subsided in recent years. For example, recent sampling and examination of bighorn sheep throughout the range indicated that most animals were clinically normal (Boyce 1995; DeForge *et al.* 1997; Bighorn Institute 1997, 1998, 1999). Additional research is necessary to better understand the relationship between disease and population trajectories. Furthermore, it appears that risk of disease and parasites might differ among ewe groups based on their exposure and habitat use patterns, therefore future research should address these questions at the level of the ewe group and population. Although an epizootic does not currently appear to be occurring in the Peninsular Ranges, diseases pose a threat that could potentially occur at any time, especially if sheep experience chronic levels of disturbance (Geist 1971, Hamilton *et al.* 1982, Spraker *et al.* 1984, King and Workman 1986, Festa-Bianchet 1988, Desert Bighorn Council 1992).

Habitat loss is a leading cause of current species extinctions and endangerment worldwide (Burgman *et al.* 1993). It represents a particularly serious threat to Peninsular bighorn sheep, because they live in a narrow band of lower elevation habitat that represents some of the most desirable real estate in the California desert, and it is being developed at a rapid pace. At least 7,490 hectares (18,500 acres or about 30 square miles) of suitable habitat has been lost to urbanization and agriculture within the range of the three ewe groups that occur along the urban interface between Palm Springs and La Quinta. Within the narrow band of habitat, bighorn sheep make use of sparse and sometimes sporadically available resources found within their home ranges. As humans encroach into this habitat, these resources are eliminated or reduced in value, and the survival of ewe groups is threatened. Bighorn sheep are also sensitive to habitat loss or modification because they are poor dispersers (Geist 1967, 1971), largely learning their ranging patterns from older animals. When habitat is lost or modified, the affected group is likely to remain within their familiar surroundings but with a reduced likelihood of population persistence, due to the reduced quantity and/or quality of resources.

Encroaching urban development and anthropogenic disturbances have the dual effect of restricting animals to a smaller area and severing connections between ewe groups. Fragmentation poses a particularly severe threat to species with a metapopulation structure because overall survival depends on interaction among subpopulations. The movement of rams and occasional ewes between ewe groups maintains genetic diversity and augments populations of individual ewe groups (Brown and Kodric-Brown 1977, Soulé 1980, Krausman and Leopold 1986, Schwartz *et al.* 1986, Burgman *et al.* 1993). Temporary moves by females between neighboring ewe groups could also provide new habitat knowledge facilitating future range expansion (Geist 1971). Increased fragmentation reduces such possibilities.

Beyond physical barriers to movement, fragmentation also can result from less obvious forms of habitat modification. Increased traffic on roads apparently make bighorn sheep, especially ewes, hesitant to cross these roads (Rubin *et al.* 1998). Animals that do cross suffer an additional risk of mortality from automobile collisions (Turner 1976, McQuivey 1978, Cunningham and deVos 1992, DeForge and Ostermann 1998b, Bighorn Institute 1999), with the result that a group whose range is bisected by a road can have reduced viability in the long term (Cunningham and deVos 1992). Human disturbance along trails can cause sheep to avoid those areas (Papouchis *et al.* 1999), potentially affecting bighorn sheep movement and habitat use, thereby fragmenting bighorn sheep distribution, although the habitat appears to be intact.

Development and human populations along the eastern slope of the Peninsular Ranges continue to grow at a rapid pace at the lower and upper elevational boundaries of Peninsular bighorn sheep habitat. The Coachella Valley Association of Governments anticipates that by the year 2010, the human population in the Coachella Valley will increase from 227,000 to over 497,000, not including 165,000 to 200,000 seasonal residents. Bighorn population declines typically have been most pronounced in ewe groups adjoining the urban interface in the Coachella Valley.

Similar to predation, prolonged drought is a natural factor that can have negative impacts on desert bighorn sheep populations, either by limiting water sources or by affecting forage quality (Rosenzweig 1968, Hansen 1980a, Monson 1980, Douglas and Leslie 1986, Wehausen *et al.* 1987). During drought years, the concentration of bighorn sheep near remaining water sources may increase competition for forage as well as water, thereby limiting population growth through density dependent regulation (Caughley 1977, Gotelli 1995). In addition, increased density potentially renders animals more susceptible to diseases or parasites (Anderson and May 1979, May and Anderson 1979).

Domestic livestock and feral animals can reduce the availability and quality of resources (water and forage) required by bighorn sheep, and can function as potential vectors for diseases such as bluetongue virus (Mullens *et al.* 1986). In portions of the range, water has been pumped from aquifers and diverted away from springs for use by ranches and private residences, reducing and eliminating the water sources upon which bighorn sheep depend (Tevis 1961; Blong 1967; Turner 1976; M. Jorgensen, pers. comm., Anza-Borrego State Park).

In the Peninsular Ranges, the presence of tamarisk (*Tamarix* sp.), also known as saltcedar, represents a serious threat to bighorn sheep. This exotic plant consumes large amounts of water and has rapid reproductive and dispersal rates (Sanchez 1975, Lovich *et al.* 1994), enabling it to out compete native plant species in canyon bottoms and washes. It has the following negative effects on bighorn sheep: 1) it reduces or eliminates the standing water on which bighorn sheep depend, 2) it out competes plant species on which bighorn sheep feed, and 3) it occurs in thick, often impenetrable stands that block access to water sources and provide cover for predators.

Fire suppression can influence the distribution and habitat use patterns of bighorn sheep by causing avoidance of areas with low visibility (Risenhoover and Bailey 1985, Wakelyn 1987, Etchberger *et al.* 1989, Etchberger *et al.* 1990, Krausman 1993, Krausman *et al.* 1996). Long-term fire suppression results in taller, denser stands of vegetation, thereby reducing openness and visibility making bighorn sheep more susceptible to predation (Sierra Nevada Bighorn Sheep Interagency Advisory Group 1997). In addition, Graf (1980) suggested that fire suppression reduces forage conditions in some bighorn sheep ranges. In the Peninsular Ranges, changes in vegetation succession are evident in some portions of bighorn sheep range, primarily in higher elevation chaparral and pinyon-juniper habitats, and have apparently decreased bighorn sheep use of certain canyons and springs (M. Jorgensen, pers. comm.).

Disease problems have periodically caused die-offs of bighorn sheep herds throughout their range, and the Peninsular Ranges have not escaped this problem (DeForge *et al.* 1982, DeForge and Scott 1982, Turner and Payson 1982, Wehausen *et al.* 1987). The most virulent pathogens appear to originate from domestic livestock, and are not endemic to bighorn sheep.

Consequently, bighorns have not evolved with these pathogens and have little resistance compared to domestic livestock. The threat of novel strains of previously experienced pathogens

and entirely new ones is always present. Potential vectors for disease transmission vary from domestic livestock and insects to other native wild ungulates. For example, if the current foot and mouth disease being experienced in Europe eventually reaches North America, then white-tailed deer and mule deer may become infected. This scenario could eventually lead to a serious problem for all North American ungulates. Chronic wasting disease is currently a problem within commercial cervid operations and currently exists within wild cervid populations in the central Rocky Mountains. This disease could potentially spread westward, and its ecosystem level effects could cause major problems for all native wild ungulates.

The number of illegal immigrants entering the U.S. from Mexico continues to increase despite the efforts of the U.S. Border Patrol. Some of these immigrants travel through the Peninsular Ranges and camp at water sources where they may occasionally kill and consume bighorn sheep, or displace them. The Border Patrol is responding by increasing its activity along the border and in the southern Peninsular Ranges. Consequently the level of human disturbance in the area is increasing. This scenario may cause bighorn sheep to avoid areas they once utilized.

Synopsis of Status/Critical Habitat

Since listing in 1998, biennial range-wide surveys have estimated that the Peninsular bighorn sheep population has increased from about 280 adult and yearling sheep to about 700 sheep in 2004 (CDFG unpubl. data). Over this time frame, mountain lion predation has become less pronounced in the Anza-Borrego Desert State Park area compared to predation rates observed in the mid-1990s (Hayes *et al.* 2000). The apparent absence of major disease outbreaks in the same area has benefited recruitment of lambs into the breeding population. This combination of improved adult survivorship and lamb recruitment appear to be the primary factors contributing to population expansion in the southern ranges. In the Santa Rosa Mountains, ewe subpopulations generally have increased as well, though in part for different reasons, since ewe group population dynamics are typically independent from each other (Rubin *et al.* 1998). In the northern Santa Rosa Mountains, the recent population expansion appears largely attributable to completion of a barrier fence that has improved survivorship of adults and lambs by eliminating formerly high levels of urban related mortality, including death from vehicle collisions, strangulation in fences, drowning in swimming pools, ingestion of toxic plants, etc (DeForge and Ostermann 1998). In the San Jacinto Mountains, the population has fluctuated at low numbers (approximately 20-30 adult bighorn) since 1993 (DeForge *et al.* 1997; Bighorn Institute 1998-2004 annual reports). As in the northern Santa Rosas, population augmentation through the release of captive-reared sheep has been an important contributing factor to the maintenance and recovery of the population. Of the 10 ewes currently extant in the San Jacintos, six sheep are captive releases. Incidence of disease has been relatively quiescent in sheep subpopulations in the Coachella Valley, which also has contributed to overall population growth. However, a disease outbreak of unknown cause and origin was documented in the Santa Rosa Mountains in the summer of 2005, and may have reduced the population in the northern Santa Rosa Mountains by about 38 percent (Bighorn Institute, unpubl. data).

The 844,897 acres of designated critical habitat were primarily based on the prior delineation of essential habitat in the Recovery Plan (Service 2000). At the time of listing and preparation of the Recovery Plan, the Peninsular bighorn sheep population was near its historic low point and one of the primary considerations in preparation of the Recovery Plan was protecting sufficient space to support population growth needed to support the recovery objectives of maintaining subpopulations of at least 25 adult ewes within each of nine designated recovery regions of delineated essential habitat and an overall population level of 750 adults and yearlings. The critical habitat designation was intended to maintain connectivity across the nine recovery regions so that the metapopulation dynamics among these subpopulations would be allowed to continue. Within the critical habitat designation, the primary constituent elements included space for the normal behavior of groups and individuals; protection from disturbance; availability of various native desert plant communities found on different topographic slopes, aspects, and landforms, such as steep slopes, rolling foothills, alluvial fans, and canyon bottoms; a range of habitats that provide forage, especially during periods of drought; steep, remote habitat for lambing, rearing of young, and escape from disturbance and/or predation; water sources; and suitable linkages allowing individual bighorn to move freely between ewe groups and maintain connections between subpopulations. These constituent elements were recognized as essential to meet the biological needs of feeding, resting, reproduction and population recruitment, dispersal, connectivity, and isolation from detrimental disturbances.

ENVIRONMENTAL BASELINE

The area affected directly and/or indirectly by the proposed project includes all areas that would be developed or conserved areas on the project site, as well as the adjoining sections 5 and 32, and is hereinafter referred to as the action area.

Two major native vegetation communities occur on the project site (Thomas Olsen Associates, Inc.1994): Sonoran Creosote Bush Scrub and Desert Dry Wash Woodland. These two communities encompass approximately 680 acres or about 75 percent of the project site. The remainder of the project site, 226 acres or about 25 percent, is a cultivated vineyard. Native vegetation community types described below follow Holland (1986).

Sonoran Creosote Bush Scrub: This vegetation community is similar to the Mojave Creosote Bush Scrub but has a greater diversity of plant species and growth forms, likely due to warmer temperatures and a seasonally split rainfall regime. The dominant woody perennial shrub in the project area is creosote bush (*Larrea tridentata*). Other plants found onsite include pencil cholla (*Opuntia ramosissima*), indigo bush (*Psorothamnus fremontii*), sweetbush (*Bebbia* sp.), brittlebush (*Encelia farinosa*), desert lavender (*Hyptis emoryi*), white bursage (*Ambrosia dumosa*), and ocotillo (*Fouquieria splendens*). A variety of annual forbs, which typically flower in late February and March, are also found in the project area. This vegetation community occurs on slopes, fans, and valleys with high soil salinity and winter temperatures usually above freezing.

Desert Dry Wash Woodland: Desert Dry Wash Woodland is associated with sandy or gravelly washes and arroyos of the lower Mojave and Colorado deserts and occurs mainly in frost-free areas. This vegetation community is a drought deciduous, microphyllous xeroriparian thorn scrub woodland dominated by various trees and shrubs of the legume family, including blue palo verde (*Cercidium floridum*), smoke tree (*Psorothamnus spinosus*), sweetbush, desert lavender, brittlebush, and catclaw acacia (*Acacia greggii*). Compared to the Sonoran Creosote Bush Scrub, vegetation in this community is more abundant. During a field survey after summer rains, a desert seep was observed at the confluence of two large ephemeral washes in the narrow linear portion of the property near the southwestern corner of Section 3 (Ecological Ventures California, Inc. 2003).

Existing structures and disturbances on the project site include a cultivated vineyard, groundwater wells, a mobile home compound, and dumping sites (SFC Consultants 1998). These are discussed in greater detail below. Existing roads on the property consist of dirt and gravel tracks in and around the vineyard. Dirt roads or vehicle trails also lead southward toward the Martinez Rockslide, and generally crisscross the site. The vineyard is located entirely outside the boundaries of critical habitat for Peninsular bighorn sheep, where grapes have been cultivated since at least 1981.

Though bighorn sheep in the action area have not been the focus of intensive study, sheep have been documented consistently on the mountain slopes south and west of the project site during annual surveys (Bighorn Institute, unpubl. data). Consistent observations over time of sheep in the same general area typically indicate habitation as part of a home range of one or more sheep. CDFG surveys (K. Brennan, *in litt.*) also have documented sheep use (two rams and one ewe) in alluvial habitat near the vineyard, over 0.5 miles from the closest escape terrain. In addition, data are available for one radio-collared ewe with a GPS unit, which showed regular use in the main canyon draining into the southwestern portion of the project site. Consultants hired by the project proponent also documented sheep sign on the property in this area (S. Delateur, pers. comm., P. Krausman, *in litt.*).

The project site encompasses about 457 acres of designated critical habitat for Peninsular bighorn sheep. Of this about 267 acres would be developed and about 290 acres would be permanently conserved on and off-site in sections 4 and 5. The primary function and particular constituent elements in the action area include foraging habitat and water sources, escape terrain, isolation from human disturbance, and lambing and rearing habitat. Compared to critical habitat areas farther north along the urban interface, critical habitat in the action area is not as heavily disturbed by human activities, and therefore, provides greater sanctuary for the resident sheep population. This relative lack of disturbance and habitat loss is related to the extensive and undeveloped alluvial fan system that has functioned in absorbing and curtailing sources of disturbance beyond the limits of established sheep home ranges largely centered along the bordering mountain sides, and absence of recognized trails and high recreational use levels, to

date. As an apparent result, sheep population levels in this ewe group have been more stable, without the dramatic declines observed in more urbanized areas to the north.

EFFECTS OF THE ACTION

Direct Effects

For the purposes of this analysis, all references to bighorn sheep habitat below also pertain to designated critical habitat for Peninsular bighorn sheep; in other words, loss of lands outside critical habitat were not considered to represent a loss of bighorn sheep habitat because the critical habitat designation in this area was sufficiently robust to capture those areas typically expected to be used by bighorn sheep.

The proposed project would directly eliminate about 267 acres of designated critical habitat for Peninsular bighorn sheep and permanently conserve a minimum of about 290 acres of on-site and off-site critical habitat in sections 4 and 5. The reconfiguration of the project footprint discussed above under the project description was designed to avoid the most biologically valuable portions of the project site and reduce the intrusion of development into bighorn sheep habitat. By scaling back the project along its southern boundaries on the eastern and western sides of the Martinez Rockslide, the revised project boundary now largely avoids the canyon mouths with alluvial fan plant communities (primarily desert dry wash woodland), thereby maintaining a portion of this habitat type available to bighorn sheep in the project area. Radio-collar data indicate that the alluvial habitat avoided in the southwestern corner of the project site occurs within the northernmost portion of a ewe home range that otherwise extends over the rockslide south into Martinez Canyon. Field work by biological contractors of the project proponent also located bighorn sign in this area, as referenced above.

The loss of desert dry wash woodland would primarily affect bighorn sheep by further reducing the seasonal availability of nutritious forage found in this increasingly scarce alluvial fan plant community. However, the extent to which this area has been used by bighorn sheep is not known because of the limited amount of field work on sheep that has been conducted in the project vicinity. CDFG data (K. Brennan, *in litt.*) documented sheep use in the northwestern corner of Section 4, which indicates that sheep occasionally venture far into the fan, well away from the closest escape terrain. Extensive use of alluvial slopes distant from escape terrain also has been documented repeatedly in portions of Anza-Borrego Desert State Park, which suggests that regular use in areas without nearby escape terrain can be expected in remote areas with a general absence of human-related disturbance. Though this loss of foraging habitat represents a reduction in ecological value for bighorn sheep in the general area, redesign of the project configuration, as discussed above, retained about 110 acres of alluvial habitat on-site for the benefit of sheep, which would continue to help meet the nutritional needs of current and future sheep generations inhabiting the project area, provided that cross-country hiking and proliferation of trails are effectively prevented so that bighorn sheep will continue to feel secure

in using these foraging areas more distant from available escape cover (see the *Indirect Effects* section below for more detail).

Travertine's stated off-site habitat conservation strategy of acquiring discontinuous parcels in Section 5 also is designed to protect valuable alluvial foraging habitat, as well as indirectly protecting even more such habitat on intervening parcels by reducing their development potential through fragmentation of land into smaller units with reduced economic development potential. To date, Travertine has acquired over 20 acres of scattered parcels for conservation of bighorn sheep critical habitat and has committed to purchase an additional approximately 100 acres in some of the more developable portions of Section 5. In addition, Travertine has agreed to loan CVAG or CVCC $2 million for additional habitat acquisition in Section 5 if the CVMSHCP is approved. When combined with a recent parcel acquisition by the Friends of the Desert Mountains, BLM and Coachella Valley Mountains Conservancy land acquisition programs, and grant-in-aide funding from the Service through CDFG for acquiring bighorn sheep habitat, the emerging pattern of conservation in Section 5 can be expected to continue. Please see below for expanded discussion on this topic.

Indirect Effects

For the purposes of this analysis, indirect effects are defined as those that are caused by the proposed action and are later in time but still are reasonably certain to occur (50 CFR 402.02). We anticipate three potential types of indirect effects from the proposed project that likely would be minimized and partially avoided by the various conservation measures agreed to by the project proponent: (1) construction/operation-related disturbance, (2) potential maladaptive behaviors associated with bighorn sheep attraction to artificial sources of food and water on the proposed golf course, and (3) inducement of future development on private lands in Section 5 adjoining the project site on the west.

The project reconfiguration discussed above was designed to minimize impacts to sheep use in adjoining habitat. Nonetheless, project construction activities likely would disrupt sheep behavior in surrounding areas by causing sheep to avoid using portions of their home ranges and alluvial fan foraging habitat, on a temporary basis. Avoidance behavior would potentially expose sheep to higher predation risk if sheep movement is restricted to smaller use areas. If dust control measures during construction are not adequate or properly applied, airborne particulates could be inhaled by bighorn sheep and cause adverse pulmonary reactions and health effects. However, the project's construction must comply with the PM 10 regulations controlling all grading activity in the Coachella Valley. Airborne dust from a major construction activity is thought to have led to an all-age die-off of sheep in the Rocky Mountains (Spraker *et al.* 1984). The proposed conservation measures of using passive design features, such as berms, juxtaposition of golf and trail components to prevent off-trail excursions by recreationists, and monitoring/trespass enforcement by golf course marshals should curtail most human disturbance levels in adjoining bighorn sheep habitat, though some harassment of sheep by noncompliant

individuals may be unavoidable. Overall, the proposed project design, including contingency fencing measures, would effectively manage edge effects of the project to a level that would not appreciably detract from sheep use in adjoining habitats, except for a typical pattern of apparent avoidance of disturbance that is evident in the compilation of sheep data along the existing urban interface north of the project site.

The fencing contingency plan also would minimize exposure of bighorn sheep to the hazards associated with artificial sources of food and water on the golf course that fronts adjacent habitat. Though sheep in this ewe group have not generally habituated to urban settings, a bighorn ewe with a rumen full of green grass was recently found drowned in the Coachella Canal adjoining PGA West (CDFG, unpubl. information). Thus, the initially unfenced golf course would pose a risk of habituation and exposure to disease and parasite hazards that have been documented elsewhere (DeForge and Ostermann 1998, as cited in Service 2000). However, we anticipate that if sheep begin to habituate to on-site urban environments, the fencing committee (composed of HOA, CDFG, and Service representatives) would oversee construction of a sheep-proof fence along a predetermined easement with a funding source created prior to project construction, as described in Conservation Measure 5.

A fence also would be constructed if recreational trespass occurs along the Rockslide Access Trail into bighorn sheep habitat in the canyons bordering the east and west edges of the rockslide, or creates spur trails upslope into the canyons west of the project site.

The last and potentially most damaging indirect effect of the project would be the extension of (1) legal access across BLM and BOR lands that connects with an existing 30-foot wide easement along the northern boundary of sections 4 and 5 (Avenue 62), and (2) physical access to a point in Section 4 about 100 yards east of the corner of sections 4, 5, 32, and 33. Currently, there is no all-weather road access into Section 5, without which, development in Section 5 would not be possible. With access provided by the proposed rights-of-way across BLM and BOR lands, the economics of delivering utilities and related infrastructure, and associated effects to projected return on investment, would likely influence, as one of many development considerations, future development patterns in Section 5.

As described above, legal access for Section 5 lies within an existing 30-foot wide public right-of-way easement along the northern border of Section 5. About 100 yards east of the northwestern corner of Section 4, the easement largely lies in the main wash along Avenue 62 where it turns to Jefferson Street. Any future all-weather roadway to City standards within this easement would have to be constructed in the bottom of that wash for about 0.25 mile due west before the wash bends south out of the easement, at which point the access road would have to be graded up the north cut bank of the wash. If a construction design were physically and economically feasible, which may be questionable, given the uneven terrain and hydrological challenges of designing a roadway to City standards in a deeply incised major wash, a Streambed Alteration Agreement with CDFG and a section 404 permit from the U.S. Army Corps of

Engineers would be needed. Among other requirements, CDFG would typically examine the effects on threatened and endangered species and the U.S. Army Corps would require a section 7 consultation with the Service. Moreover, both agencies typically require the loss of desert washes and microphyllous woodland to be mitigated by the acquisition of equivalent value habitat at a 3:1 acreage ratio. Access to individual parcels across the dissected surface of the alluvial fan would require the crossing of numerous other washes as well. Any road construction to the north of this existing easement in Section 32 would require BLM approval, as Section 32 is BLM land. Any road construction to the south of this easement would require approval of the various owners of parcels within Section 5. Travertine owns several of these parcels and has committed to not provide approval for right-of-way access rights outside of the existing easement.

Associated with the potential growth inducement associated with its proposed action, Travertine Corporation assessed the feasibility of residential construction in Section 5 by conducting an investigation into the economic and regulatory logistics of delivering necessary infrastructure to this section (*Section 5 Addendum to the Travertine Biological Assessment*), including roads, water, sewer, electricity, gas, and telephone/cable. Because Travertine has agreed not to provide additional capacity or discretionary hookups to meet potential infrastructural needs in Section 5, any future development would have to tap into utility trunk lines down-slope from Travertine, more than 1.5 miles away, or potentially north of Travertine in the Green Specific Plan area, about 1 mile way. The estimated costs of extending infrastructural capacity from the valley floor, through Travertine, and up to the eastern boundary of Section 5, and of extending Avenue 62 from Section 4 into Section 5 by 1,100 and 2,350 lineal feet, totaled about $8.8 and $11.9 million, respectively. Prorated over a hypothetical 80-unit subdivision, these off-site infrastructural costs added about $148,000 per house. If only 40 units are built, these off-site cost double to nearly $300,000 per lot. This estimate does not include the substantial costs related to development of on-site water retention, water improvements, sewer improvements, off-site drainage and hillside grading. By agreeing not to provide infrastructural capacity for additional development beyond the needs of Travertine itself, the proposed project likely would partially subsidize possible development in Section 5 for transportation (legal and physical access) costs only, but would increase the other development costs, due to the need for re-excavation and installation of greater capacity within utility easements that already would have been installed for the proposed Travertine project.

Whether this partial transportation subsidy would tip the economic balance in favor of development in Section 5, despite the other substantial development costs involved, is arguable. All else being equal, a reduction in transportation-related costs would be an appreciable inducement to development. However, as discussed in the *Section 5 Addendum to the Travertine Biological Assessment*, numerous other substantial economic and regulatory issues would remain. Legal access along the possible extension of Avenue 62 into Section 5 would be constrained to an existing 30-foot wide public right-of-way easement, given Travertine's commitment to not grant access to prospective developers. However, a subdivision would

typically require a collector street (74 feet wide) or a secondary arterial (88 feet wide) (La Quinta Municipal Code 13.24.070 Street Design—Generally, & Table 13.24.060). But since the potential Avenue 62 extension is not a General Plan street, the City typically would not use eminent domain to condemn private property in Section 5 to provide a developer with a right-of-way wide enough to meet City codes. Therefore, assuming a developer could not obtain necessary additional right-of-way width from certain landowners in Section 5, such a developer would likely seek a right-of-way expansion into Section 32 and initiate a grant application with BLM. However, with legal access already provided on private lands in Section 5, BLM would not be under a legal obligation to grant a license on public lands. If BLM were so inclined to grant a right-of-way easement, BLM would be required to consult with the Service under section 7 of the Act. Such consultation likely would incur a variety of minimization, conservation, or compensation measures to offset adverse effects. Thus, the commitment of Travertine to not sell or otherwise provide approval on its lands for an expanded easement, would appear to restrict future development in Section 5 to an unknown but limited number of units that could be safely served under the existing 30-foot wide easement. Considering the extraordinary infrastructural costs needed to meet City codes for residential development, the regulatory delays and cost to comply with CDFG and the Corps requirements, and the strategic conservation acquisitions proposed by Travertine to breakup large blocks of potentially developable lands, any development that might still occur likely would be substantially less than current City zoning.

Regardless, even a few residences if constructed at the mid- to upper elevations of Section 5, would render most or all down-slope habitat largely unusable because bighorn sheep typically avoid areas separated by sources of disturbance from the nearest escape terrain. This avoidance reaction by sheep would also eliminate most or all habitat value on the approximately 120 acres of conserved lands acquired by Travertine for the benefit of sheep in Section 5. Moreover, the urban interface design of the Travertine project that prevents human intrusion into bighorn sheep habitat, and sheep from accessing urban sources of food and water, would prove largely pointless and ineffective if incremental development were permitted in Section 5.

A scenario where exclusive homes on large lots are scattered across the hillsides of Section 5 would extend the familiar pattern found along much of the urban interface to the north, where trails would proliferate off vehicular access points (in this case the extension of Avenue 62), creating an unplanned network up the numerous canyons and ridgelines along the toe of slope, which provide essential lambing, rearing and escape habitat, seasonal/perennial water, and other vital resources for sheep. As a result, sheep home ranges would withdraw upslope as human disturbance dramatically increased along lower elevation canyons and ridgelines, thereby diminishing seasonal/perennial resources essential to sustain stable population levels.

Sheep populations in the Deep Canyon and Martinez Canyon areas have been stable over the known past, in contrast to the ewe groups in the northern Santa Rosa and San Jacinto Mountains that declined to near extinction but were then rescued by release of captive-reared animals. This pattern of population decline in ewe groups where development encroaches to the toe of slope

and consequently results in extensive cross country hiking and trails proliferation, likely would be repeated in this area as well, unless Section 5 is protected with more space for sheep at the lower elevations of their home ranges along the alluvial fan up to the western edge of the Travertine project. As Krausman *et al.* (2003) have observed, "Avoiding extinction for the northern Santa Rosa population and other mountain sheep populations faced with urban expansion will require aggressive management. If encroachment is unavoidable because of political or economic pressures, then every action should be taken to minimize mountain sheep and human encounters.....When development occurs adjacent to and in mountain sheep habitat, the sheep eventually decline and ultimately become extinct. Society is faced with a difficult choice: either restrict suburban expansion and control human activities within sheep habitat or accept the reality that sheep and expanding developments are simply not compatible."

As explained in detail in the *Section 5 Addendum to the Travertine Biological Assessment,* the combined effects of Travertine's targeted conservation acquisitions in Section 5, the high cost to bring road access and utilities up the slope into Section 5 west of Travertine's development boundary, and the numerous regulatory requirements, arguably would not make future development in Section 5 more likely as a result of the Travertine project. Were it not for Travertine's proposed strategic conservation acquisitions, a developer potentially could assemble enough acreage in the areas outside of La Quinta's Hillside Conservation Overlay District over which to spread the costs of development and still leave the project economically viable. Consequently, the development potential of Section 5 has been significantly diminished. Thus, as reconfigured through this section 7 consultation, the Travertine project would minimize the potential growth-inducing effects in Section 5 and potentially accelerate the dynamics for permanent conservation of this area for bighorn sheep.

Summary: All the effects to bighorn sheep described in the above analysis pertain to areas designated as critical habitat. Therefore, the various direct and indirect effects, together with the associated conservation measures in the proposed action that would avoid, minimize, and compensate for adverse effects to bighorn sheep, also pertain to designated critical habitat. Overall, the direct elimination of about 267 acres of critical habitat was designed in a way that retained most of the foraging habitat in close proximity to escape habitat. Thus, the conservation strategy agreed to by the project proponent was to protect those foraging areas used most frequently by bighorn sheep, and to allow the loss of those foraging areas farthest from escape terrain that are used the least by sheep. By reconfiguring the project design in this way, the primary role and function of critical habitat on and adjacent to the project site can be conserved without appreciably diminishing the carrying capacity for bighorn sheep in the project area.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are unrelated to the proposed action and reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

We are aware that CVWD is intending to construct water percolation basins behind the existing dike to the east of the Travertine project site; however, these sites occur outside critical habitat and per our understanding of how they would be constructed and maintained, likely would not adversely affect bighorn sheep.

If the CVMSHCP is approved, any potential development within Section 5 would be regulated under what is termed under the CVMSHCP as the HANS process, which is designed to determine whether all or parts of individual parcels are needed to meet the various conservations goals and objectives of the plan, and to provide an acquisition mechanism for those parcels needed for conservation. For the reasons discussed above, Section 5 west of the proposed Travertine site is essential for the conservation of Peninsular bighorn sheep, and therefore, would need to be conserved under the CVMSHCP.

CONCLUSION

After reviewing the current status and environmental baseline of the species, effects of the proposed action, and cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the Peninsular bighorn sheep, or adversely modify designated critical habitat. This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to reach these conclusions, which are based on the following reasons:

1. The proposed project design has been substantially altered to better protect important habitat features and primary constituent elements of critical habitat on the project site.
2. The numerous conservation measures would (a) minimize human intrusion into adjoining critical habitat, (b) strategically acquire conservation lands to fragment otherwise developable, larger blocks of land in Section 5, thereby temporarily/indirectly protecting additional critical habitat from development until conservation funding becomes available to permanently conserve these intervening private lands, (c) permanently protect 290 acres of critical habitat, and (d) provide funding for bighorn sheep recovery implementation.

3. The proposed project site is located along the edge of designated critical habitat, and consequently would not fragment habitat, disrupt connectivity, or displace individual sheep from current home ranges.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. However, protection of listed plants is provided in that the Act to the extent that removal or reduction to possession of endangered or threatened plants from Federal lands requires a Federal permit. It is unlawful for any person to remove, cut, dig up, damage or destroy a listed plant species in knowing violation of any law or regulation of any state or in the course of any violation of a State criminal trespass law [section 9(a)(2)(B) of the Act].

Sections 4(d) and 9 of the Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of listed species of fish and wildlife without a special exemption. Harm is further defined to include significant habitat degradation or modification that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant.

The measures described below are non-discretionary, and must be undertaken by the BLM and BOR for the exemption in 7(o)(2) to apply. The BLM and BOR have a continuing duty to regulate the activity covered by this incidental take statement. If the BLM and BOR fail to assume and implement the terms and conditions, the protective coverage of 7(o)(2) may lapse. To monitor the impact of the incidental take, the BLM and BOR must report the progress of the action and its impact on species to the Service as specified in this incidental take statement [50 CFR 402.14(i)(3)].

Amount or Extent of Take

Though we do not anticipate that any Peninsular bighorn sheep would be directly injured or killed as a result of the proposed project, we do anticipate that sheep in the vicinity of the project would be harmed as a result of (1) project construction, (2) potential habituation to the initially unfenced golf course, with consequent health and safety effects, and (3) disturbance by recreational trespass from the proposed trail and improved public access to the site. Harm would result from sheep avoiding and withdrawing from these sources of disturbance and noise associated with the project and project-associated recreational-associated disturbance within sheep habitat. Avoidance reactions and habituation to the same stimulus can both occur within a given population of bighorn sheep due to behavioral variances among individuals. The scientific

literature shows that not all bighorn sheep react in the same way to human disturbance, and a portion of the individuals in the same population do not react as strongly and can habituate to certain human activities (see for example Hicks and Elder 1979, Leslie and Douglas 1980, Papouchis *et al.* 2001); therefore it is not possible to quantify to number of individuals that would be affected, but it is reasonable to conclude that it would be at least one. Take is given in acres of disturbed habitat. Two hundred and sixty seven acres containing one or more primary constituent elements of designated critical habitat will be permanently lost or altered due to the proposed project and associated edge effects.

Reasonable and Prudent Measures

This reasonable and prudent measure, with its accompanying term and condition, are necessary and appropriate to minimize the impact of the incidental take associated with the proposed project.

> BLM and BOR shall ensure that the conservation obligations described in the biological opinion are fully implemented over the life of the project.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, BLM and BOR must comply with the following terms and condition, which implements the reasonable and prudent measure described above. This term and condition is non-discretionary and requires that implementation details are subject to the continuing oversight and concurrence of the Service.

> BLM and BOR shall require in all access approvals crossing Federal lands that Travertine Corporation and successors, and/or City of La Quinta, as appropriate (1) implement the project description and conservation measures as described in this biological opinion, and (2) submit all project design drawings, trail alignments, landscape plans, and grading plans along the development: habitat edge, for Service review and approval, and ensure that any Service-required modifications to these plans be incorporated into the final approvals before the beginning of each phase of project construction. BLM and BOR shall immediately notify the Service of any noncompliance with adherence to the project description and conservation measures described in the biological opinion. BLM and BOR shall require corrective measures where direct jurisdiction exists. Where direct BLM and BOR jurisdiction does not exist, BLM and BOR shall direct the City to rectify any compliance issues. If not rectified per the above, noncompliance shall be regarded as new information or a project modification that requires reinitiation of formal consultation under 50 CFR 402.16.

These incidental take measures and conditions are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If during the course of the action, the

level of take is exceeded or the terms and conditions are not complied with, these circumstances would constitute new information requiring reinitiation of consultation and review of the reasonable and prudent measures. BLM and BOR must immediately provide an explanation for the causes of the taking or noncompliance with the terms and conditions and review with the Service the need for possible modification of the reasonable and prudent measures.

REINITIATION NOTICE

This concludes formal consultation on the proposed action. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated may be affected by the action

If you have any questions regarding this biological and conference opinion, please contact Pete Sorensen at (760) 431-9440.

Attachment (Figure 1)

LITERATURE CITED

The literature cited in this biological opinion is available upon request to the Carlsbad Fish and Wildlife Office.

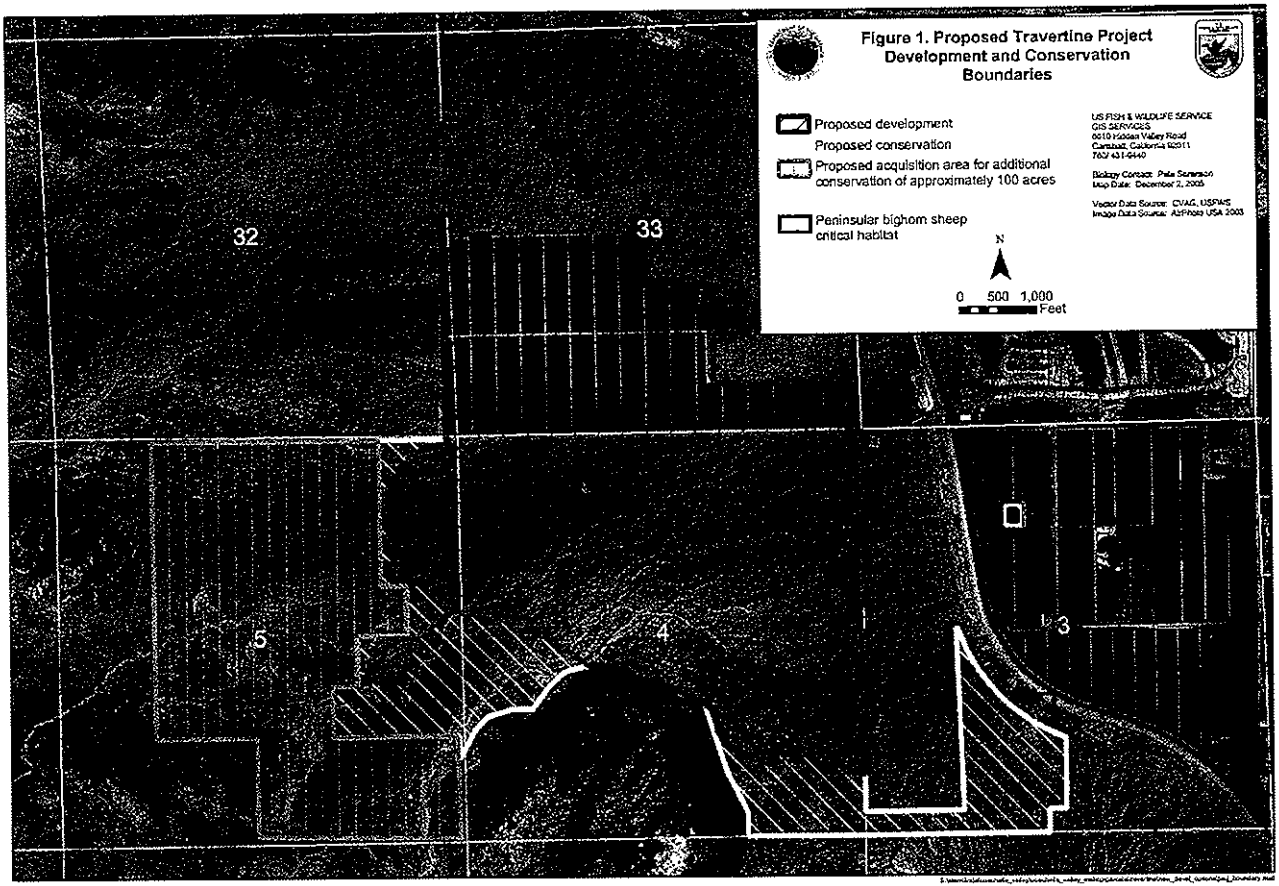


Figure 1. Proposed Travertine Project Development and Conservation Boundaries
Proposed development
Proposed conservation
Proposed acquisition area for additional conservation of approximately 100 acres
Peninsular bighorn sheep critical habitat
US FISH & WILDLIFE SERVICE
GIS SERVICES
6010 Hidden Valley Road
Carlsbad, California 92011
760 431-9440
Biology Contact: Pete Sorenson
Map Date: December 2, 2005
Vector Data Source: CVAG, USFWS
Image Data Source: AirPhoto USA 2003
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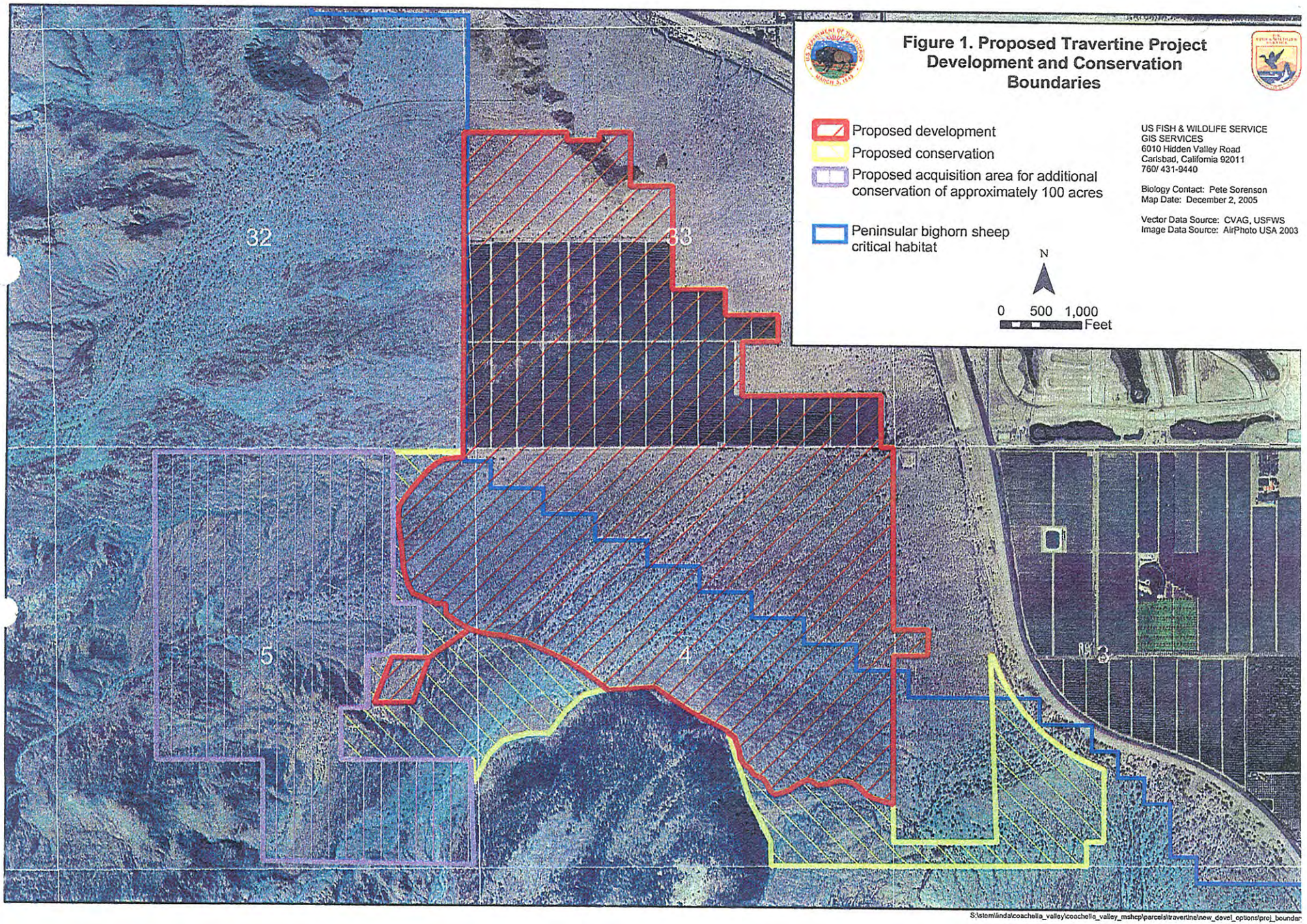
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