Appendix C

Biological Resources Documentation

C.1 Sand Analysis

Effects of the proposed Thousand Palms flood control structures on the supply of sand-sized sediment to the aeolian sand transport system

Draft Final Report Prepared for
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Effects of the proposed Thousand Palms flood control structures on the supply of sand-sized sediment to the aeolian sand transport system

Introduction

The purpose of the studies described in this report is to assess the effects of the proposed flood control structures in the vicinity of Thousand Palms, California on the supply and delivery of sand-sized sediment to the aeolian sand transport system that feeds the dunes and sand sheets that occur in the Coachella Valley Preserve (CVP) and Coachella Valley National Wildlife Refuge (CVNWR).

The proposed flood control structures have the potential to alter the delivery of sand-sized material to the sand dunes in the Coachella Valley Preserve (CVP) and Coachella Valley National Wildlife Refuge (CVNWR) by: (1) physically blocking natural sand transport pathways by water or wind; (2) changing the transport capacity of flood waters so as to change the volume of sand-sized sediment transported by water; and (3) affecting the location(s) of areas where this sediment is deposited, for subsequent entrainment and transport by wind. The physical blocking and immediate effect of the proposed flood control structures on wind transport of sand is addressed in the Phase II, Task 1 report. This report focuses on the broader impact of the proposed flood control structures on sand supply from alluvial sources and its redistribution by wind.

Study Area

The study area (Figures 1,2) is located south of the Indio Hills, CA and encompasses coalescing alluvial fans and areas of sand dunes that lie to the southeast. There are two major alluvial fan systems: (1) the Gravel Pit Wash fan, which lies to the north of the community of Thousand Palms; and (2) the Thousand Palms Canyon Wash fan, which lies east of Thousand Palms. Between these two alluvial fans are several smaller fans. Sediment is deposited on the alluvial fan surface and at the toe of the fans, where northwesterly winds transport sand-sized material to the dune area.

The aeolian sand deposition area largely lies within the CVP and CVNWR and comprises areas of dunes and sand sheets that cover a total area of 5.62 sq. miles. Within this, there are areas of active (mobile, un-vegetated or sparsely vegetated) dunes with an area of 0.9 sq. miles, surrounded by extensive partially vegetated sand sheets. Upwind (NW) of the main dune area is an area of partly vegetated sand sheets interspersed with areas of alluvial deposits (ponded silts and small channels) that extends to the toe of the Indio Hills alluvial fans in the vicinity of

Ramon Road. The dunes are extending to the southeast at rates of 11 – 20 m per year.

The zone that connects the alluvial fan and aeolian sand depositional area was designated as the "wind corridor" by Simons, Li, and Associates (SLA, 1997) – Figure 1. As wind action is not confined to this zone, it is more appropriate to designate the area that extends NW to SE from the toe of the alluvial fans to the dune area as the "sand transport corridor". The sand transport corridor is defined by the presence of sand sheets, coppice dunes (nebkhas), and areas of mobile dunes. In existing conditions, it is confined to the south by development (e.g. Classic Club Golf Course), the interstate highway and railroad corridor and to the southeast by the Sun City development. In historic conditions, the sand transport corridor likely extended to the south as far as the Morongo Wash. The northern margins of the sand transport corridor are defined by the toe of the alluvial fans – the Thousand Palms Canyon Fan to the NE and the Indio Hills fans to the NW. Average width of the sand transport corridor is 5000 feet (1500 m) and the total length is 7.8 miles (13 km) in existing conditions.

Figure 1: Study area in existing conditions.

The proposed flood control structures in the project area comprise four reaches (Figure 2). Reach 1 is located on the upper-mid section of the Indio Hills alluvial fan, north of the city of Thousand Palms and extends in a SE - ESE (138 – 108°) direction for approximately 12600 feet. Reach 2 is located east of the developed area of

Thousand Palms and extends in a SE (138°) direction for approximately 2000'. Reach 3 is located southeast of Thousand Palms and extends in a SE (131°) direction for about 9200' before approximately following the SW boundary of the Coachella Valley Preserve and entering the Classic Club Golf Course. Reach 4 runs from the southern boundary of the Classic Club Golf Course along the southern boundary of the Coachella Valley Preserve at Avenue 38 for approximately 8000' to Washington Street where it joins existing flood control structures.

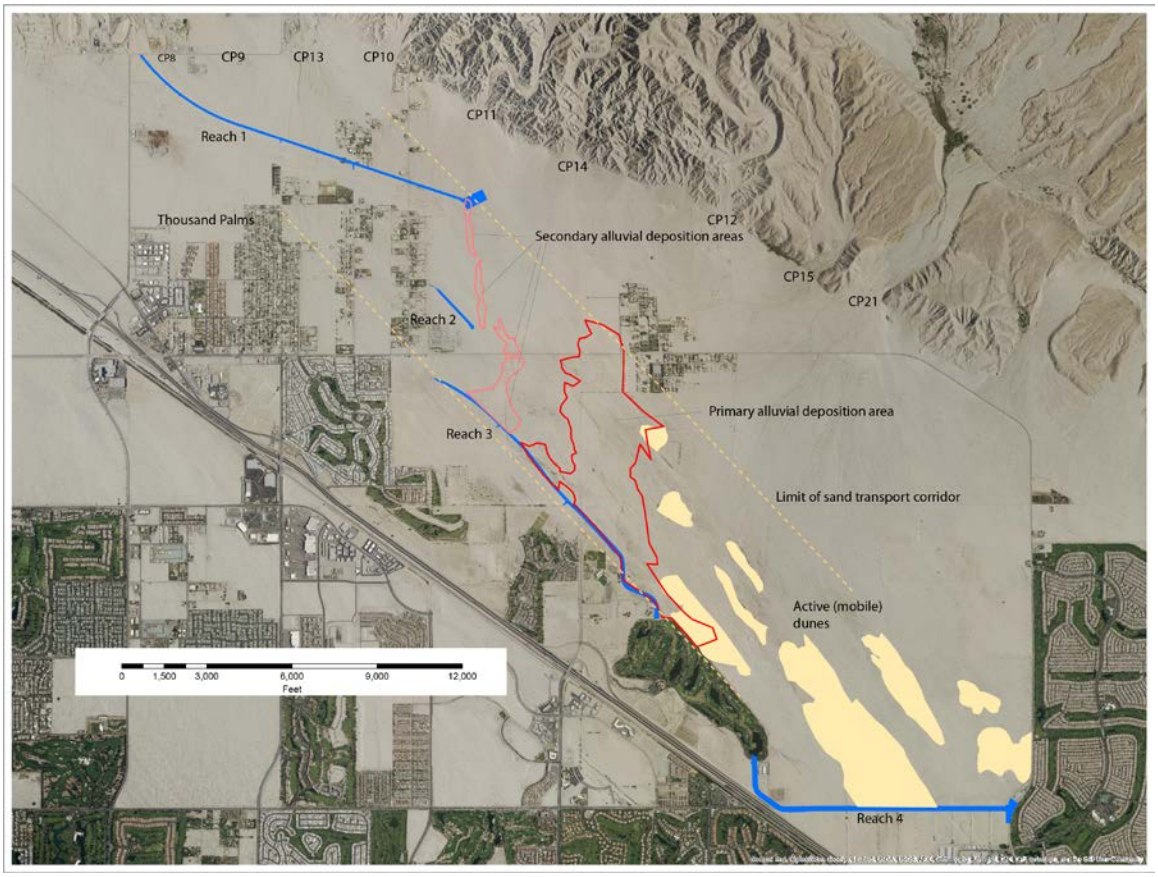

Figure 2: Study area in Project Conditions

Sediment supply

Sediment supply in this context is defined as the production of sediment of a size suitable for wind transport (Kocurek and Lancaster, 1999). The primary source of sediment for wind transport is the series of small washes than drain the Indio Hills, which are comprised of deformed sandstone and fanglomerate of Pleistocene age (Keller et al., 1982). In addition, the Thousand Palms Canyon drainage potentially supplies sand to the sand transport corridor and the CVP and CVNWR area.

Following Griffiths et al. (2002) the fluvial system in the Coachella Valley is comprised of ephemeral channels that deliver sediment from high relief, steeply sloping catchments in the mountains to coalescing alluvial fans (bajadas) downslope

from the mountain front. The majority of sediment transport takes place during short-duration (flash) floods that occur after heavy rains in the mountain areas. Significant flood events that affected the study area have been recognized from historical reports and observations and aerial photographs. Major events occurred in January 1916; September 24, 1939; October 22, 1974; September 10 and 11, 1977; and March 1, 1991 (NHC, 2013).

The majority of sand-sized material is transported by stream flow as wash load, with a sediment concentration of 40% or less by weight (NHC, 2013). During flood events, sediment is entrained from hill slopes and channels in the headwaters of the catchments and transported in channels that pass through the bajadas. In extreme flood events, the water flow exceeds the capacity of the channels, and spreads out on the bajada surface, where sediment is deposited as discontinuous floodplain deposits. Sediment that passes through the bajada in the channelized flows is deposited on low-angle depositional areas at the toe of the bajada and on the valley floor. Most of the sediment transported as wash load is of small gravel to sand size, with a minor silt and clay component (Griffiths et al., 2002).

Several estimates of sediment yield from the Indio Hills and Thousand Palms Canyon have been made. Simons and Li & Associates (SLA) identified six drainage basins in the Indio Hills from US Army Corps of Engineers (USACE) hydrologic studies (Bechtel, 1997) and provided estimates of sediment yields and water discharge. Northwest Hydraulic Consultants (2004) provided a new estimate of sediment yields based on new hydrologic and hydraulic modeling. In 2013, Northwest Hydraulic Consultants updated their hydrologic and hydraulic modeling to use revised estimates of 100-year flood rainfall water depth from the NOAA Atlas 14. Parsons Brinckerhoff (PB 2013) developed an integrated model for alluvial sediment loading and transport. This analysis uses the PB (2013) dataset as it is the most recent available.

Nine watersheds contribute sediment to the Thousand Palms area. From west to east they are designated as CP8, 9, 13, 10, 11, 14, 12, 15, and 21, based on the USACE (2000) nomenclature (Figures 1 and 2). PB (2013) calculated sediment yields at the fan apex using Los Angeles District Corps of Engineers (LADCOE) methods, which were developed specifically for Southern California (Gatwood et al., 2000). Sediment yields are estimated using a multiple regression approach with precipitation, catchment relief and area, fire being the main independent variables and adjusted for local conditions. The PB model was forced using the maximum 1-hour precipitation or the 100-year runoff.

Estimated sediment yields from the PB modeling are given in Table 1.1. Total sediment yield from the watersheds is 601 acre-feet (741,322 cubic meters). The sediment yield results show that the majority (96%) of sediment contributed to the project area comes from two catchments: CP13 (Gravel Pit Wash) and CP21 (Thousand Palms Canyon wash).

Table 1.1: Sediment yield at fan apex (from PB 2013, Table 3)

			Acre feet		Cubic meters	
Catchment		Area sq miles	100-yr debris yield	100-yr flow volume	100-yr debris yield	100-yr flow volume
CP8	Edom Hill	1.39	4.8	108.2	5921	133463
CP9		0.64	2.8	47.8	3454	58960
CP10		0.84	4	62.7	4934	77339
CP11		0.85	3.5	62.1	4317	76599
CP12		0.92	4.5	76	5551	93745
CP13	Gravel Pit Wash	7.33	45.5	574.1	56123	708142
CP14		0.87	3.9	82.5	4811	101762
CP15		1.24	6.5	111	8018	136916
CP21A	TPC	82.7	525.5	6190.7	648195	7636116

Table 1.2 Sediment reaching Project area

	acre feet				
	Reach 1	Reach 2	Reach 3	2-3 area	Reach 4
CP8	4.8				
CP9	0.8				
CP10	1.1				
CP11	0.8				
CP12			1		
CP13	7.7				
CP14				0.2	
CP15			0.2		
CP21A			13.9		6.2
Total	15.2		15.1		0
	cubic meters				
CP8	1233				
CP9	987				
CP10	1357				
CP11	987				
CP12			1233		
CP13	9498				
CP14				247	
CP15			247		
CP21A			17145		0
Total	14062		18626		0

Hydrologic and sediment modeling by NHC (2004, 2013) and Shvidchenko et al., 2006) provides a clear picture of the distribution of floodwaters on the fans and the valley floor, verified by comparing the modeled water flow paths with those depicted on aerial photographs taken immediately after the 1977 flood event. In existing conditions, water and sediment from the western-most watersheds (CP8, 9, 13) is directed down-fan through the community of Thousand Palms towards the Morongo Wash. Water and sediment from watersheds CP10, 11, 12, 14, and 15 is directed south or southwest towards the upwind part of the sand transport corridor in the area of Ramon Road. A distributary channel of the Thousand Palms fan also routes water and sediment southwest to this area, although model results suggest that much of the flow on this fan is directed to the south and southeast, where it enters the dune area. Based on the above, and supplemented by geomorphic mapping (Figure 2), the area south of Ramon Road is designated as the primary sand deposition area for the onward transport of sand to the dune area by wind. This area covers approximately 0.75 sq. miles (1,942,491 m^2).

PB (2013) routed sediment from the fan apex to the project area in existing and project conditions using an integrated hydrological and sediment model and the Laursen (Copeland) routine to simulate flood flows into the area. Because water flow is attenuated and/or spread out on the fan surface, where sediment is deposited, the amount of sediment reaching the distal parts of the alluvial fan is a fraction of that at the fan apex (Table 1.2). The ratio between the sediment yield at the fan apex and the sediment transported to any point down stream (the non-dimensional sediment flux) decreases exponentially with distance from the fan apex (Figure 3).

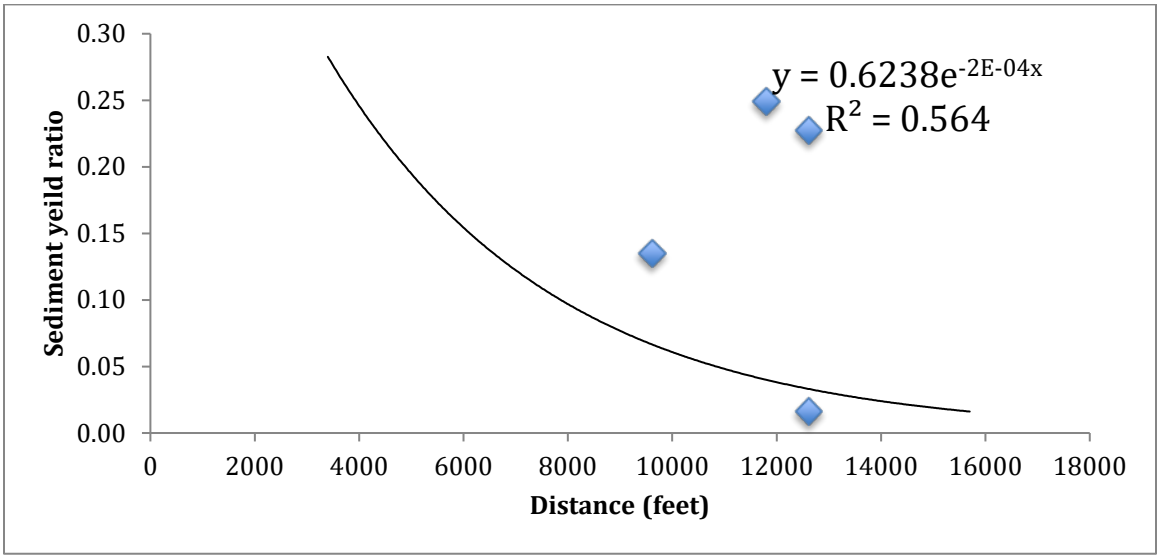

Figure 3: relationship between distance downslope and ratio between sediment yield at fan apex (CP) and sediment loading at any point. Data from PB (2013).

Existing conditions

The data from the PB (2013) modeling indicates that between 15.10 and 7.40 acre-feet (18626 to 9128 cubic meters) of sediment is transported to the primary deposition area in a flood event, based on the estimate of sediment reaching Reach 3 of the proposed project (PB Table 3). The range reflects the amount of sediment contributed from the Thousand Palms Canyon Wash depending on the assumed sediment routing on this fan. Assuming all of this sediment is deposited in the depositional zone, this sets an upper limit on the sediment supply to the wind transport system.

However, in existing conditions, a proportion of the sediment load is transported beyond the deposition area, so that the quantity of deposited sediment can be represented by the difference between the sediment load entering the depositional area and that reaching the location of Reach 3. The input sediment load is calculated from the relationship show in Figure 3. Based on these estimates, in existing conditions between 12.2 and 24.6 acre feet (15048 to 30367 cubic meters) is deposited within the primary depositional area for onward transport by the wind, assuming that PB Scenario A applies. This is equivalent to a layer of sediment 2 to 3 inches (5 – 8 cm) thick over the whole depositional area.

Additional sediment may be supplied for wind transport to the dune area from CP13 (Gravel Pit Wash) as well as CP8, 9, 10 in the area north (upslope) of Thousand Palms, but the aeolian sand transport pathway is blocked by development along Sierra del Sol, Desert Moon Drive, and Via Las Palmas.

Project Conditions

Table 2 shows the sediment budget under Project conditions, based on the PB modeling. The flood control structures on Reach 1 are designed to intercept water and sediment from watersheds CP8, 9, 10, 11, and 13, and divert it along the structure towards the east. As much as 9.2 acre-feet (11348 cubic meters) of sediment is trapped along this Reach, but 6.0 acre-feet of sediment (7401 cubic meters) exits the reach and is transported down fan towards Reach 2. Reach 2 is a zone of sediment deposition, as 6.9 acre-feet of sediment enters the reach and 4.4 acre-feet exits the reach. Approximately 50% of this sediment volume is deposited in the area between Reach 2 and 3, which is the northwestern part of the primary sand deposition area. In Scenario A, Reach 3 also receives substantial sediment input from CP 21 (77 acre-feet), resulting in deposition of sediment along this reach; but minimal amounts (0.8 acre-feet) of sediment under Scenario B.

Based on analysis of the PB (2013) sediment model output, it can be concluded that under Project conditions, an additional 2.2 acre-feet (2714 cubic meters) of sediment will be contributed to the primary deposition area from the washes north of Thousand Palms that are intercepted by Reach 1. This may be augmented by sediment transported by wind along Reach 1 following flood events.

Table 2: Sediment budget under Project conditions. Data from PB (2013).

	Inflow from upstream	Inflow from tributary watersheds	Sediment outflow	Net deposition (erosion)
Reach 1	0	15.2	6	9.2
Reach 1 -2	6	0.1	6.9	-0.8
Reach 2	6.9	0	4.4	2.5
Reach 2 - 3	4.4	0	2.2	2.2
Reach 3 A	2.2	78.2	35.1	45.3
Reach 3 B	2.2	0.8	3	0
In ST corridor				3.9
Reach 1	0	18749	7401	11348
Reach 1 -2	7401	123	8511	-987
Reach 2	8511	0	5427	3084
Reach 2 - 3	5427	0	2714	2714
Reach 3 A	2714	96458	43295	55877
Reach 3 B	2714	987	3700	0

Wind transport of sediment from deposition areas towards dune areas in the sand transport corridor.

Rates and volumes of sand transport by wind

There are no measurements of rates and volumes of sand transport by wind in the vicinity of the Project area. Rates of sand transport by wind have therefore to be estimated from wind data and compared to rates measured or estimated elsewhere in the Coachella Valley.

Short-term (several months) measurements of sand transport were made in the Whitewater River flood plain by Sharp (1964;1980) and analyzed by Williams and Lee (1995). Rates range from 0.26 to 4.4 kg/m/sec x 10^6 (1.0 to 6.5 pounds/foot/second x 10^{-6}). Weaver (1979) estimated rates of sand transport from CALTRANS sand removal records and predicted rates in the range of 1 to 5 cubic yards/foot/year (1.5 to 7.5 tons/foot/year or 2.5 to 12.54 m^3/m/year) for the area of Thousand Palms.

Potential sand transport rates may be calculated from wind speed and direction data using empirical equations for sand transport as a function of wind speed above the threshold for transport. Rates calculated in this way by SLA (1997) range

between 3.52 and 10.52 tons/foot/year (7.25 to 21.72 m^3/m/year) using the Bagnold formula and 5.8 to 22.3 tons/foot/year (11.97 to 46.03 m^3/m/year) using the SLA procedure. The source of the wind data used by SLA in their calculations is not clear. This study utilized wind data from the CIMIS (California Irrigation Management System) stations at Cathedral City and Indio; and the ICAO weather station at Palm Springs Regional Airport. All data were downloaded from the California Climate Data Archive website (http://www.calclim.dri.edu).

Sand transport potential, also termed (sand) drift potential was calculated using the approach of (Fryberger, 1979) as modified by Bullard (1997) for use with wind speeds in meters per second.

$$Q = V^2 (V - V_t)^2 * t$$

Where Q is the sand transport potential in arbitrary units (VU), V is the wind speed, V_t is the threshold wind speed for transport at the height of the wind recorder, and t is the percentage of the time the wind is blowing from a given direction. Values of Q are calculated for each wind speed class and direction and summed to estimate a sand drift potential (DP). A vector sum sand drift potential (RDP) was also calculated. The annual magnitude of sand transport potential returned by the equation as vector units (VU), was converted to a volume per unit width per year using data from Figure 19 in Fryberger (1979) following Bullard (1997).

The sand transport potential (Qp) in cubic meters/meter/year is given by:

$$Qp = 0.0734\ DP(VU)$$

The volumetric sand transport potential was also converted to a mass transport rate using a bulk density of 1.33 tons per cubic meter.

The estimated threshold wind speed for transport was based on prior studies (e.g. Gillies and Lancaster, 2013), which for medium sand indicate a value of 7 m/sec (15.66 mph) at the standard ICAO measurement height of 10 m (32.81 feet).; and 5.8 m/sec at 2 m (6.6 feet) height, which is the height used by CIMIS instrumentation.

Table 3 summarizes the sand transport potential for the stations used. The dominant sand transport direction in all cases is from WNW to NNW (Figure 3) reflecting the strong topographic control on wind direction in the Coachella Valley. As noted by previous studies (e.g. Griffiths et al., 2002; Griffiths et al., 2009), wind strength and therefore sand transport potential decreases eastwards down the Coachella Valley. To estimate sand transport potential in the vicinity of the Project area, a linear decrease in sand transport potential between Cathedral City and Indio was assumed, so that the rate for the Thousand Palms area was estimated as 3.51 m^3/m/year (4.67 tons/m/year). These rates are comparable to those estimated by Weaver (1979), but generally lower than those calculated by SLA (1997).

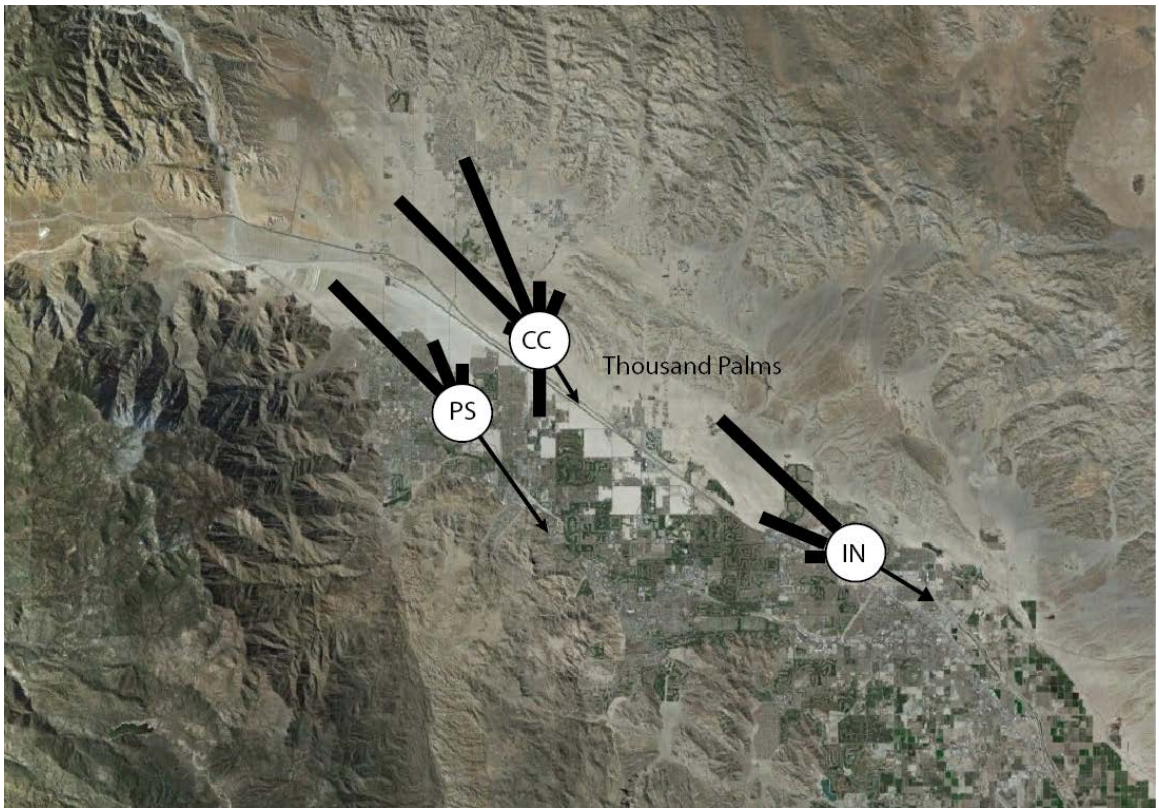

Figure 3: Sand roses for the Coachella Valley area. Length of rose arms is proportional to the percentage of annual potential sand transport *from* that direction. Arrow indicates resultant (vector sum) sand transport direction.

Table 3: Summary of sand transport potential

	DP (VU)	DP (cubic meters/m/yr)	RDP (VU)	RDP (cubic meters/m/yr)	Resultant direction (°)
Palm Springs Regional Airport	125	9.15	104	7.65	145
Cathedral City CIMIS	54	3.96	37	2.72	143
Indio CIMIS	45	3.3	41	2.99	126

Linkages between alluvial and aeolian sand transport systems

Given a width of 1700 m (5577 feet) for the sand transport corridor, and an annual sand transport potential of 3.51 m^3/m/year, a total of 5967 m^3 (7805 cubic yards) or 7936 tons could be transported from the primary fluvial deposition zone towards the dune area. This rate is significantly less than the 28,600 tons estimated by SLA (1997; Table 3.2). Both estimates assume that sand is uniformly available across the transport corridor.

As discussed above, deposition of alluvial sediment in the primary depositional area results in a layer of material 2 – 3 inches (5-8 cm) thick. Following Griffiths et al., 2002) the rate of sediment removal from the deposition area is estimated as:

$$Q_e = A^{0.5} . q_r$$

Where Q_e is the rate of removal, A is the area of entrainment, and q_r is the volumetric sand transport rate.

The time required to remove all of the sediment (T_{ed}) is defined as:

$$T_{ed} = V/Q_e$$

In existing conditions, all sediment deposited in the deposition zone (16 - 24.6 acre-feet (19736- 30367 cubic meters) could be removed in a period of 36 to 74 months at a rate of 3.51 m^3/m/yr.

In Project conditions, with a delivery of an additional 2.2 acre-feet (2714 m^3) of sand-sized sediment to the deposition area, all sediment could be removed in a period of 43 to 81 months.

The above estimates provide a approximation of the timescales required to redistribute material deposited by a 100-year flood event. They confirm that the aeolian sand transport system is supply limited, as proposed by prior studies, e.g. Lancaster et al. (1993), SLA (1996), and Griffiths et al. (2002) and that there is ample wind energy available to transport any and all sand supplied by the alluvial fan system.

Conclusions

Analysis of alluvial and wind sediment transport data indicates that the proposed flood control structures will have a positive effect on sand supply to the dunes and sand sheets that occur in the Coachella Valley Preserve (CVP) and Coachella Valley National Wildlife Refuge (CVNWR). The Project will increase sand supply by 9 – 14%, mainly as a result of the diversion of water and sediment to the east and southeast to the primary sand deposition area by the levee and channel of Reach 1.

Flood control structures in Reaches 2, 3, and 4, will have little or no effect on wind transport of sand, because they lie outside or downwind of the sand transport corridor. Additional sand may also be added to the system by clearing of sand deposited along the flood control structures.

The aeolian sand transport system is currently in a state of sediment supply limitation, so any additional sand supply will be transported downwind to the dunes. Addition of sand as a result of the proposed flood control structures will also increase the length of time taken to deplete the sand deposited by flood events by as much as 9 to 18 months.

The conclusions of this study reinforce those of prior studies of interactions between fluvial and aeolian sand transport processes in the Coachella Valley – that wind energy is more than sufficient to transport all sand that is supplied by fluvial processes.

References Cited

Bullard, J.E., 1997. A note on the use of the "Fryberger method" for evaluating potential sand transport by wind. Journal of Sedimentary Research, 67(3), 499-501.

Fryberger, S.G., 1979. Dune forms and wind regimes. In: E.D. McKee (Ed.), A Study of Global Sand Seas: United States Geological Survey, Professional Paper. U.S.G.S. Professional Paper, pp. 137-140.

Gatwood, E., Pedersen, J., & Casey, K. (February 1992 (updated February 2000)). Debris Method, Los Angeles District Method for Prediction of Debris Yield, Los Angeles District, U.S. Army Corps of Engineers.

Gillies, J.A., Lancaster, N., 2013. Large roughness element effects on sand transport, Oceano Dunes, California. Earth Surface Processes and Landforms, 38(8), 785-792.

Griffiths, P.G., Webb, R.H., Lancaster, N., Kaehler, C.A., Lundstrom, S.C., 2002. Long-term sand supply to Coachella Valley fringe-toed lizard (Uma inornata) habitat in the northern Coachella Valley, California. Water-Resources Investigations Report, 02-4013. United States Geological Survey, Washington DC.

Griffiths, P.G., Webb, R.H., Muth, A., Fisher, M., 2009. Planst and ventifacts delineate late Holocene wind vectors in the Coachella Valley, USA. Aeolian Reseach, 1(1-2), 63-73.

Keller, E.A., Bonkowski, M.S., Korsch, R.J., Shlemon, R.J., 1982. Tectonic geomorphology of the San Andreas fault zone in the southern Indio Hills, Coachella Valley, California. Geological Society of America Bulletin, 93(1), 46-56.

Kocurek, G., Lancaster, N., 1999. Aeolian system sediment state: theory and Mojave Desert Kelso dune field example. Sedimentology, 46, 505 - 515.

Lancaster, N., Miller, J.R., Zonge, L., 1993. Geomorphic Evolution and sediment transport dynamics of eolian terrains in the Coachella Valley Preserve System, south-central California. Desert Research Institute – report to the Nature Conservancy.

Northwest Hydraulic Consultants (NHC), 2004. Whitewater River Sediment Study. Prepared for US Army Corps of Engineers, Los Angeles District.

Northwest Hydraulic Consultants (NHC), 2013. North Cathedral City and Thousand Palms Stormwater Management Plan: Thousand Palms Flood Control Project Hydrology and Hydraulics. Report to the Coachella Valley Water District.

Parsons Brinckhoff (PB), 2013. Technical Memorandum to Coachella Valley Water District.

Sharp, R.P., 1964. Wind-driven sand in Coachella Valley, California. Geological Society of America Bulletin, 75, 785-804.

Sharp, R.P., 1980. Wind driven sand in the Coachella Valley, California: further data. Geological Society of America Bulletin, 91, 724-730.

Shvidchenko, A., Hall, B., Howard, J., Vermeeren, R., Ly, C., 2006. Simulation of flood flow and sediment transport on alluvial fans of Coachella Valley, California, Eighth Federal Interacgency Sedimentation Conference (8th FISC), Reno, NV, pp. 49-56.

Simons, Li, and Associates (SLA), 1997. Sand Migration Impact Evaluation for Thousand Palms Flood Control Project – report prepared for US Army Corps of Engineers.

Weaver, D.C., 1979. Assessment of Effects of Flood Control Alternatives on Blowsand Conditions In the Coachella Valley, Whitewater River Basin; Report for US Army Corps of Engineers, LA District.

Williams, S.H., Lee, J.A., 1995. Aeolian saltation transport rate: an example of the effect of sediment supply. Journal of Arid Environments, 30, 153-160.

C.2 Biological Resources Technical Report

Thousand Palms Flood Control Project
Biological Resources Technical Report

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1.0 EXECUTIVE SUMMARY

This report describes the biological resources present or potentially present on the proposed Thousand Palms Flood Control Project (Project). The Project consists of a series of earthen levees, discrete channels, and energy dissipaters to reduce flooding hazards in and around the community of Thousand Palms.

The Project is located in the central portion of the Coachella Valley, Riverside County, California, and is within the area covered by the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP). The Project would be located partly within the Thousand Palms Conservation Area as identified in the CVMSHCP. The Project also would be partly within designated conservation lands. These areas help to protect a large dune system and its biological resources.

Multiple surveys for biological resources have been conducted on the Project site from 1997 through 2016, and a jurisdictional delineation was performed in 2012. Results of these efforts are detailed in this report and summarized below.

Special-status Biological Resources. Special-status biological resources that were observed or detected in the Project area during field surveys:

- One sensitive habitat type – desert dunes
- Two federally or state-listed species covered by the CVMSHCP
  - Coachella Valley milk-vetch (Astragalus lentiginosus var. coachellae)
  - Coachella Valley fringe-toed lizard (*Uma inornata*)
- Two non-listed special-status species covered by the CVMSHCP
  - Burrowing owl (Athene cunicularia)
  - Palm Springs (=Coachella Valley) round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*)
- Four non-listed special-status species not covered by the CVMSHCP
  - Chaparral sand-verbena (*Abronia villosa* var. *aurita*)
  - Loggerhead shrike (*Lanius ludovicianus*)
  - Bendire's thrasher (*Toxostoma bendirei*)
  - Colorado Valley woodrat (*Neotoma albigula venusta*)

Special-status species that were not observed or detected during surveys, but are known from the vicinity and have potential for occurrence in the Project area:

- Two federally or state-listed or candidate species covered by the CVMSHCP
  - Desert tortoise (*Gopherus agassizii*)
  - Flat-tailed horned lizard (*Phrynosoma mcallii*)
- Three non-listed special-status species covered by the CVMSHCP
  - Coachella Valley giant sand-treader cricket (*Macrobaenetes valgum*)
  - Coachella Valley Jerusalem cricket (*Stenopelmatus cahuilaensis*)
  - Le Conte's thrasher (*Toxostoma lecontei*)
- 20 non-listed special-status species not covered by the CVMSHCP
  - See Tables 5 and 6

Jurisdictional waters. A jurisdictional delineation found no wetlands, but approximately 31.6 acres of state and federal jurisdictional non-wetland waters occur on the Project site. All of the potentially jurisdictional features are characterized as ephemeral desert dry washes.

2.0 INTRODUCTION

This report was prepared to characterize the biological resources that are present or potentially present on the proposed Thousand Palms Flood Control Project (Project) site, formerly known as the Whitewater River Basin Flood Control Project. The Project includes a series of flood control improvements to minimize flooding hazards for developed areas in and around the community of Thousand Palms. These improvements consist of earthen levees, energy dissipaters, and discrete channels. The Project is designed to support continued aeolian (windblown) transport of sand to the Coachella Valley Preserve to maintain habitat for the Coachella Valley fringe-toed lizard and other special-status species.

Biological information was obtained through review of literature, geospatial analysis, field surveys, consultation with local biologists and regional experts, and coordination with regulatory agency staff. This work was conducted by Aspen Environmental Group (Aspen) between 1997 and 2016.

3.0 PROJECT OVERVIEW

The Project is located in the Thousand Palms area of the Coachella Valley in Riverside County, California. The unincorporated community of Thousand Palms is about ten miles east of the City of Palm Springs and immediately north of the City of Palm Desert (Figure 1).

Components of the Project include levees, channels, energy dissipating structures, and soil deposition areas within four discrete reaches. All four reaches are north of the Interstate 10 freeway, and the Project area is bounded by Rio del Sol Road on the west and Washington Street on the east. Total impact area of the permanent project features is approximately 213 acres. Temporary impacts total approximately 36 additional acres; see Table 3. The levees and channels will be comprised of soil cement and the upslope sides of each levee will be armored with soil cement. Soil cement is a compacted, high-density mix of pulverized rock, soil, and cement.

In 2000, the U.S. Army Corps of Engineers (USACE) and Coachella Valley Water District (CVWD) published a Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR; USACE, 2000) for the Whitewater River Basin Flood Control Project. Based on the 2000 EIS/EIR, the USACE approved the Preferred Alternative (identified as Alternative 6); however, due to funding limitations this action was not implemented at that time. In 2012, USACE delegated authority for design of the Project to CVWD, and CVWD has assumed the lead role in design, construction, and environmental compliance for the Project.

3.1 Project Setting

The Project site is near the center of the Coachella Valley. The Coachella Valley is within the Colorado Desert and is defined by the San Jacinto and Santa Rosa Mountains to the southwest and the Little San Bernardino Mountains to the north and northeast. The Coachella Valley slopes gradually from the San Gorgonio Pass at its northwestern end, toward the Salton Sea over a distance of about 40 miles. The climate is characterized by extreme heat and aridity. Annual rainfall in the region averages about four inches, but varies by location and from year to year. The Whitewater River is the main drainage course in the Coachella Valley, originating on the southeastern slopes of the San Bernardino Mountains and flowing southeast through the valley to the Salton Sea. Elevations in the Valley range from about 30 feet above mean sea level (amsl) near Indio to 1,614 feet amsl at Edom Hill near the northwestern end of the Indio Hills.

Portions of the Coachella Valley are urbanized, with the majority of development at the bases of the San Jacinto and Santa Rosa Mountains, extending northward onto the valley floor. Urbanized areas extend from the City of Palm Springs in the west to the Cities of Indio, Coachella, and La Quinta in the southeast.

The only incorporated city on the north side of the Coachella Valley is Desert Hot Springs, located north of Palm Springs.

The project site is on a series of intersecting south-facing alluvial fans originating from the Little San Bernardino Mountains and the Indio Hills. Elevation of the Project site ranges from approximately 100 to 400 feet amsl.

There are several designated conservation lands in the Project vicinity (see Figure 2): the state-owned Coachella Valley Ecological Reserve; the Coachella Valley National Wildlife Refuge (CVNWR), which is mostly owned by the US Fish and Wildlife Service (USFWS) and includes part of the Coachella Valley Ecological Reserve; and the Coachella Valley Preserve which encompasses Bureau of Land Management (BLM) Area of Critical Environmental Concern (ACEC) land as well as the National Wildlife Refuge and privately owned conservation lands. Together these conservation lands help to protect a large dune system and its biological resources. The Project site intersects the southwestern margin of the 15,000-acre Coachella Valley Preserve, including the Coachella Valley National Wildlife Refuge.

The Project site is within the area covered by the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP). The CVMSHCP is intended to conserve sensitive species and their habitats, and allow the incidental take of species covered by the CVMSHCP (CVAG, 2007). CVWD is a CVMSHCP permittee. As a permittee, CVWD has California and federal Endangered Species Act (CESA and ESA, respectively) 'take'[1] authorization for covered species or loss of their habitat, as specified in the CVMSHCP permits, so long as compliance with the requirements of the CVMSHCP is achieved.

The CVMSHCP identifies four conservation areas in the Coachella Valley: Thousand Palms, Whitewater Floodplain, Willow Hole, and Edom Hill. The Project site is adjacent to the Thousand Palms Conservation Area; see Figure 1. According to the CVMSHCP, the Project's levees as they were planned in the 2000 EIS/EIR would define the southern edge of this conservation area. The final Project design and alignment of the levees were expected to cause a minor adjustment of the conservation area boundary such that the levees would not be in the conservation area, but would define the edge of the area (CVMSHCP, page 4-96; CVAG, 2007). However, in the intervening years, the Conservation Area boundaries have been established as shown on Figure 1, and the current Project design has been modified somewhat from that described in the 2000 EIS/EIR. The CVWD, USACE and USFWS are working to resolve consistency of the current Project design with the CVMSHCP and associated Biological Opinion.

The Project site includes USFWS-designated critical habitat for Coachella Valley fringe-toed lizard and Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*) (see Figure 3 and discussions of both species in Sections 5.3.4 and 5.4.3). Critical habitat is defined as the specific areas within the geographical range occupied by the species that possess the physical or biological features essential for the conservation of the species and that may require special management protection. The Coachella Valley fringe-toed lizard requires aeolian sand habitat and the Coachella Valley milk-vetch requires fluvial or aeolian sand habitat. Therefore, the boundary of the designated critical habitat for each species extends beyond the limits of the species' distribution to include the upwind and upstream sand source, which is essential in maintaining fluvial and aeolian sand habitat (USFWS, 1985; USFWS, 2013).

[1] Under the Federal Endangered Species Act, 'take' is defined as, "…to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (USFWS, 2011b). Under Section 86 of the California Fish and Game Code, 'take' is defined as "…hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" (CDFW, 2015d).

4.0 METHODS

The "Project site" is defined as all permanent and temporary impact areas associated with construction and operation and maintenance of the Project. For the most recent (2010 and after) habitat assessments, vegetation mapping, and plant and wildlife surveys (except Coachella fringe-toed lizard surveys), the "Study Area" is defined as the Project site and a surrounding buffer 200 feet wide. For Coachella fringe-toed lizard surveys, the Study Area is defined as the Project site and a surrounding buffer 500 feet wide. Data from surveys prior to 2010 are incorporated into this document, but project design and survey methodology may have varied slightly and is not described herein. For the jurisdictional delineation, the Study Area is defined as the Project site and select areas downstream (south) of the Project site. Field personnel for the 2013 surveys included Aspen biologists Chris Huntley, Jared Varonin, Justin Wood, Jamison Miner, and William Haas.

Weather data were obtained from weather stations near the Study Area: the Indio Fire Station (Station 044259), approximately 6.0 miles southeast of Reach 4, and the Palm Springs weather station (Station 046635), approximately 8.0 miles west of Reach 1.

Information on biological resources was collected through review of literature; reconnaissance, protocol, and focused surveys; consultation with local biologists and regional experts; and coordination with regulatory agencies, including the USFWS, CDFW, and USACE.

Information from the literature review and observations from Aspen's field surveys were used to generate a list of special-status plant and animal species that are present or potentially present within the Study Area and adjacent habitats. For the purposes of this report, special-status species are:

- designated as either rare, threatened, or endangered by CDFW or USFWS, or are protected under the Federal Endangered Species Act (FESA) or the California Endangered Species Act (CESA);
- candidates for listing or proposed for listing under FESA or CESA;
- CDFW Species of Special Concern, Special Animals, and Watch List species;
- California Rare Plant Rank (CRPR) 1, 2, 3, or 4 plant species;
- protected under the California Fish and Game Code; or
- of concern to resource or regulatory agencies or local jurisdictions.

4.1 Literature Search

A preliminary assessment of sensitive biological resources that are present or potentially present in the Study Area was accomplished through a review of literature, including the California Natural Diversity Database (CNDDB; CDFW, 2016). The Study Area is located within the U.S. Geological Survey (USGS) Cathedral City and Myoma 7.5-minute topographic quadrangles, and these quadrangles were included in the CNDDB search. The following nine adjacent topographic quadrangles were also included: Desert Hot Springs, East Deception Canyon, Indio, Keys View, La Quinta, Palm Springs, Rancho Mirage, Seven Palms Valley, and West Berdoo Canyon. The Palm View Peak quadrangle is also adjacent, but represents higher elevations and very different habitats than those present in the Study Area. Therefore, data from this quadrangle was not included in the analysis.

Additional data regarding special-status species and sensitive habitats were obtained from the following sources:

- State and Federally Listed Endangered and Threatened Animals of California (CDFW, 2015a);
- Special Animals List (CDFW, 2015b);

- California Wildlife Habitat Relationships (CDFG, 2010);
- Inventory of Rare and Endangered Vascular Plants of California (CNPS, 2016);
- Consortium of California Herbaria (CCH, 2015);
- Coachella Valley Multiple Species Habitat Conservation Plan (CVAG, 2007); and
- Aerial photographs of Thousand Palms and surrounding areas (1994 to 2014).

4.2 Field Surveys

A number of field surveys have been conducted for the Project prior to and since the publication of the 2000 EIS/EIR. Table 1 summarizes the survey efforts from 1997 through 2016. Survey methodologies are described below.

Surveys were conducted by experienced biologists familiar with the resources in the region and under appropriate conditions to detect and identify plant and wildlife species.

Table 1. Biological Surveys Conducted for the Thousand Palms Flood Control Project

Resource	Dates
Vegetation Mapping	1999 June 29-July 1, 2003 April 29-30, 2010 March 26-28, 2013 May 2013 May 10-12, 2016
Special-status Plants	June 29-July 1, 2003 (survey and habitat assessment for CV milk-vetch; Bloom Biological) April 29-30, 2010 March 26-28, 2013 May 10-12, 2016
Reconnaissance; General and Special-status Wildlife	1997 March 26, 2009 April 29-30, 2010 March 26-28, 2013 July 8-9, 2013 March 31, 2015 May 10-12, 2016
Burrowing Owls	April 29-30, 2010 March 26-28, 2013 May 10-12, 2016
Coachella Valley Fringe-Toed Lizard Habitat Assessment and Surveys	June 29-July 1, 2003 (survey and habitat assessment; Bloom Biological) May 2010 (habitat assessment) June 20, 2010 (survey) March 26-28, 2013 (survey) April 8, 2013 (habitat assessment) May 10-12, 2016 (survey)
Habitat Assessments for Coachella Valley Milk-vetch, Triple-ribbed Milk-vetch, and Desert Tortoise	May 2010
Jurisdictional Delineation	September 25 – 28, 2012

4.3 Vegetation Mapping

Vegetation maps were initially prepared by hand-drawing tentative boundaries of the vegetation types onto high-resolution aerial images. Preliminary mapping was done in 2010; maps were updated and field-verified and updated in May 2013 and May 2016. Maps were then digitized into Global Information Systems (GIS) using ArcGIS (version 10.1) with one-foot pixel aerial imagery on a 22" diagonal flat screen monitor. The smallest mapping unit is approximately 0.25 acre; GIS data for most mapped vegetation boundaries is accurate to within three feet. Vegetation types were classified according to Sawyer et al. (2009).

4.4 Special-status Plant Surveys

Special-status plant surveys were conducted in the spring of 2010, 2013, and 2016. Surveys consisted of walking evenly spaced transects throughout the Study Area with particular attention given to areas of suitable habitat for special-status plants (e.g., desert dunes). All plants observed during the surveys were recorded and identified in the field or collected for later identification. Plants were identified using keys, descriptions, and illustrations in regional references such as Baldwin et al. (2002, 2012).

In conformance with resource agency guidelines (CDFG, 2009; BLM, 2009), surveys (a) were conducted during flowering seasons for the special-status plants known from the area, (b) were floristic in nature, (c) were consistent with conservation ethics, (d) systematically covered all habitat types in the Study Area, and (e) were well documented by this report and by voucher specimens to be deposited at Rancho Santa Ana Botanic Garden. Observations of special-status plants were reported to CDFW for inclusion in the CNDDB.

4.5 Wildlife Surveys

Wildlife surveys consisted of walking evenly spaced transects throughout the Study Area with particular attention given to areas of suitable habitat for special-status animals (e.g., desert dunes and sandy washes). All wildlife species observed or detected during the surveys were recorded.

Vegetation and substrate within the Study Area were searched for terrestrial insects and other invertebrates. Flying insects were noted when observed. Randomly selected areas within appropriate micro-habitats (e.g., wash margins, under shrubs, etc.) were hand-raked or visually inspected to determine the presence or absence of invertebrates. All micro-habitat sites were returned to their original state after inspection.

Surveys for reptiles were performed by methodically walking the Study Area and visually inspecting micro-habitat sites (e.g., basking sites, rock outcrops, shaded shelters (“pallets”), burrow openings, etc.). Reptile surveys were conducted during daylight hours when temperatures were favorable for reptile activity (i.e., between 75 and 95 degrees F).

Surveys for common birds, terrestrial mammals, and bats were conducted concurrently with other surveys. Biologists identified bird species in the Study Area by sight and sound, recorded all animal observations, visually searched for animal sign (e.g., scat, footprints, fur, burrows, etc.), and documented any potential bat roosts.

4.6 Special-status Wildlife Surveys

4.6.1 Burrowing Owl Surveys

Aspen biologists conducted protocol level surveys within the Study Area according to the 1993 California Burrowing Owl Consortium survey protocols (CBOC, 1993) in April 2010, and according to CDFW 2012 guidelines (CDFG, 2012) in March, 2013 and May 2016. Surveys consisted of 10-meter belt transects throughout all four reaches of the Project.

4.6.2 Coachella Valley Fringe-Toed Lizard Habitat Assessment and Surveys

Habitat for Coachella Valley fringe-toed lizards was assessed throughout the Study Area in June-July 2003, May 2010, and March and April 2013, and May 2016. Surveys consisted of 10-meter belt transects within appropriate habitat.

4.6.3 Desert Tortoise

Based on consultation with CDFW, USFWS, and CVAG (Coachella Valley Association of Governments, for Coachella Valley MSHCP), Aspen determined that protocol surveys for desert tortoise were not required. However, all other surveys in the Study Area were conducted by biologists with desert tortoise experience, and any tortoise sign identified during other surveys was noted.

4.7 Jurisdictional Delineation

Aspen biologists conducted a jurisdictional delineation for the Project in September 2012. The Preliminary Jurisdictional Delineation Report is provided in Attachment E and includes the complete methodology.

Jurisdictional waters were delineated using a routine determination according to the methods outlined in the USACE Wetland Delineation Manual (USACE, 1987) and the Arid West Supplement (USACE, 2008) based on three wetland parameters: dominant hydrophytic vegetation, wetland hydrology, and hydric soils. Jurisdictional non-wetland waters of the United States were delineated based on the limits of the ordinary high water mark (OHWM) as determined by physical and biological features, such as bank erosion, deposited vegetation or debris, and vegetation characteristics. CDFW jurisdiction was delineated to the top of the banks of the channel or to the edge of the adjacent riparian canopy/riparian habitat. The CDFW jurisdictional boundary may be equivalent to the OHWM, but may extend beyond it.

5.0 RESULTS

5.1 Weather Data

Rainfall data cited below are from the Western Regional Climate Center (WRCC, 2015; 2016). Average annual precipitation is 3.29 inches at the Indio Fire Station and 5.53 inches at Palm Springs. Rainfall during 2010 was higher than average for the region. Annual precipitation for the 2009-2010 rainfall year (July 1 through June 30) was 5.06 inches at the Indio Fire Station and 7.2 inches at Palm Springs.

Rainfall during the 2012-2013 and 2015-2016 was very sporadic and well below average in some areas. Precipitation in the 2012-2013 rainfall year was 2.02 inches at the Indio Fire Station and 2.44 inches at Palm Springs. Precipitation for the 2015-2016 rainfall year was 1.66 inches at the Indio Fire Station; current data were not available for the Palm Springs station.

In general, cover and diversity of annual plants will be lower in years of below average rainfall and higher in years of above average rainfall. Observed wildlife abundance and diversity will also tend to follow this pattern, but varies with species and other factors.

5.2 Habitat and Land Use

The Study Area is largely undeveloped, with vegetation typical of the western Colorado Desert. Plant communities include allscale scrub, cheesebush scrub, creosote bush scrub, and other shrub-dominated vegetation communities. Desert dunes are found in some portions. Ruderal (weedy) and non-native vegetation and unvegetated areas occur in several locations, such as roads and roadsides, windrows, and land uses such as disused agriculture (a former jojoba farm), development, and landscaping. Representative photographs of the Study Area are included in Attachment A.

Developed areas are found within and adjacent to the Study Area. Development includes single family homes, golf courses, Xavier High School, the Southern California Edison (SCE) utility corridor, a CVWD water tank (Reservoir 4602), sand and gravel mines, and nurseries. There are paved and dirt roads throughout the general area. The Project site is in an urban-wildland interface, and habitat disturbance in the Study Area is primarily from illegal trash dumping, off-highway vehicle (OHV) use, and varying densities of invasive weed infestation.

The Project is divided into four reaches (Figures 1 and 2). Vegetation and habitat within the Project Area is shown on Figures 4a, 4b, and 4c. The following paragraphs provide overviews of the land use and habitat types for each reach.

Reach 1. Reach 1 begins near the corner of Rio del Sol Road and Vista Chino and terminates about 0.5 miles east of Via Las Palmas. It is parallel to and north of the SCE utility corridor. Chain link fences surround multiple parcels along the reach, and a quarry on the north side of Vista Chino generates regular truck traffic along the road adjacent to the northwest end of Reach 1. Most of Reach 1 is within the MSHCP-designated Thousand Palms Conservation Area, and portions of Reach 1 are on or adjacent to Coachella Valley Ecological Reserve lands.

Vegetation and habitat in this reach includes primarily creosote bush mixed scrub, with inclusions of cheesebush scrub along washes, creosote bush-white bursage scrub at the western and eastern portions of the reach, and ruderal and unvegetated areas (Figure 4a). The westernmost portion of the reach includes the largest amount of ruderal habitat, with smaller ruderal areas near development in the central portion of the reach and adjacent to Reservoir 4602. Unvegetated areas in this reach are generally limited to roadways and rural residential development, which also include some non-native vegetation.

In the western portion of the reach, soils are mostly consolidated sandy and rocky alluvium with very little windblown sand on the surface, primarily along road edges and at the bases of larger shrubs. Several stands of non-native athel (*Tamarix aphylla*) are scattered throughout the area. Illegal trash dumping and debris are prevalent across the western portion of Reach 1, especially in areas mapped as ruderal habitat. Compared to other reaches, this reach has the highest level of habitat disturbance.

Some areas support open creosote bush scrub and creosote-white bursage scrub with windblown sand hummocks at the bases of larger shrubs. Weeds, including mustards, occur at varying densities. A few small north-south ephemeral drainages cross the alignment. The eastern portion of Reach 1 is near a small community, and scattered residences, transmission lines, a nursery, and Reservoir 4602 are located within otherwise open creosote bush mixed scrub.

Reach 2. Reach 2 is the shortest reach, and is immediately north of an existing electrical substation. Vegetation along this reach is open creosote bush-white bursage scrub (Figure 4a) with silty soils and no loose windblown sand. Dirt roads cross the area, including roads used to access the power lines associated with the substation. Reach 2 is within the MSHCP-designated Thousand Palms Conservation Area, and the northwestern end of Reach 2 is near Coachella Valley Ecological Reserve lands.

Reach 3. At the western end of Reach 3, vegetation consists of creosote bush scrub with windblown sand hummocks, transitioning to creosote bush-allscale scrub and allscale scrub over the majority of the alignment. There is a large ruderal component in the southeastern portion of the alignment (Figure 4b). Electrical distribution and subtransmission lines are present. Localized areas of cracked soil indicate depressions that experience brief episodes of ponded water after stormflow. There is no wetland vegetation present in these depressions and they are not vernal pools. Soils are hard-packed in some areas, and the western portion of this reach contains complex topography with several incised channels, some over six feet deep. About half of Reach 3 is within the MSHCP-designated Thousand Palms Conservation Area, the northwestern end of Reach 3 is on or adjacent to Coachella Valley Ecological Reserve lands, and a small portion of Reach 3 is within the CVNWR.

The southeastern half of Reach 3 is within or adjacent to the Coachella Valley National Wildlife Refuge. Soils here vary from loose, windblown sand dunes to compacted areas. Weeds are present, including non-native annual grasses and mustards, and a few scattered tamarisk groves are located north and east of Xavier High School. Evidence of bonfires and illegal dumping were observed at the tamarisk groves near the center of the reach. This area has heavy OHV use. Vegetation is sparse creosote-allscale scrub with large open sandy areas nearly devoid of vegetation. Reach 3 crosses a detention basin on the northern portion of the Xavier High School property. Soils in this area are hard-packed, and there is evidence of periodic vegetation clearing and grading. Sand dunes occur to the north of the property, just outside the Study Area.

Reach 4. The west end of Reach 4 crosses a former jojoba farm near the Interstate 10 freeway. This reach is adjacent to the southern boundary of designated conservation lands but it is not located within the Thousand Palms Conservation Area, Coachella Valley Ecological Reserve lands, or the CVNWR Preserve. Soils are sandy, windblown dunes. North-south windrows of tamarisk are regularly spaced from Reach 4 south to Varner Road, and large sandy berms have formed along the windrows. Open sandy flats occur between the berms, supporting creosote bush scrub in the western end of the reach and ruderal vegetation in the eastern half (Figure 4c). To the north of 38th Avenue, in the Refuge, sand dunes are more extensive and less disturbance is evident than on the south side where Reach 4 would be constructed. Trash is scattered throughout the Reach 4 area, and it is heavily infested with Sahara mustard (*Brassica tournefortii*). However, compared to other reaches, this reach has the lowest level of habitat disturbance. Industrial development is located just south of the eastern end of the reach.

Downstream. The area downstream of the Project site consists of interspersed developed and undeveloped areas. Some of the undeveloped habitat is in isolated patches surrounded by development. Development includes housing tracts, golf courses, and industrial facilities. Interstate-10 is located southwest of the Project site (see Figures 1 and 2). Downstream habitat is similar to that in the adjacent reaches. An area of approximately 178 acres south of Reach 4 would be used for storage of spoils from the Project (see Figure 1).

Downwind. The prevailing winds are from the northwest to the southeast and support aeolian sand habitat in the CVNWR. Downwind areas have similar habitat as the adjacent reaches, with large areas of dune and sandfield habitat, particularly near Reach 4.

Floodway. The levees will direct water into the floodway, a 550-acre area between Reaches 1 and 3. Habitat in the floodway is similar to that in the adjacent reaches.

Sand Transport

Sandfields and dune habitat on the Project Site consist of moving sand, which is replenished from upwind and upslope sources. During heavy rain events, sediment is carried by fluvial transport from the surrounding hills and mountains and deposited in the Coachella Valley. The sediment is then available for aeolian (i.e., wind) transport, which carries it toward the southeast, throughout the valley. Sand that has been subject to aeolian transport is often referred to as blowsand, which is generally very fine sand that creates a loose and unstabilized surface. The combined effect of the fluvial and aeolian transport of sand creates a series of sand formations that form dynamic and continuously altering environments. Many plant and wildlife species in the Coachella Valley are uniquely adapted to this habitat. Figure 5 illustrates the sand transport pattern in the Project vicinity.

Sand dunes increase and decrease over time, depending on the amount of sand being deposited and eroded by the wind. If upwind sources of sand are reduced or eliminated, wind deposition of sand will be insufficient to replace sand lost by wind erosion and dunes and hummocks will become depleted. This results in degradation or loss of suitable habitat for Coachella Valley fringe-toed lizard and other special-status species. Maintenance of blowsand processes is therefore essential to sustaining habitat for these species.

Wildlife Movement and Biological Connectivity

Fragmentation and isolation of natural habitat may cause loss of native species diversity in fragmented habitats. Wildlife movement among habitat areas is important to long-term genetic variation and demography. In the short term, wildlife movement may also be important to individual animals' ability to occupy their home ranges, if their ranges extend across a potential movement barrier. These considerations are especially important for rare, threatened, or endangered species, and wide-ranging species such as large mammals, which exist in low population densities.

In landscapes where native habitats exist as partially isolated patches surrounded by other land uses, planning for wildlife movement generally focuses on local "wildlife corridors" to provide animals with access routes among habitat patches. In largely undeveloped areas, wildlife habitat is available in extensive open space areas throughout the region, but specific land uses or linear barriers may impede or prevent movement. In these landscapes, wildlife movement planning focuses on sites where animals can cross linear barriers, but generally need not emphasize corridors among habitat areas. At a larger scale, landscape-level biological connectivity relies on substantial linkages among large open space areas.

Movement and dispersal corridors that connect large blocks of habitat are essential to the long-term viability of plant and wildlife populations. At every scale, planning for biological connectivity must consider species or populations that may travel through a corridor or linkage regularly (perhaps seasonally or even

daily), and other species that may "move" through a corridor or linkage over multiple generations, at a population scale rather than as individual animals.

Movement and dispersal corridors that connect large blocks of habitat are essential to the long-term viability of plant and wildlife populations. The California Essential Habitat Connectivity Project (Connectivity Project) was commissioned by the California Department of Transportation (Caltrans) and CDFW to create a statewide assessment of essential habitat connectivity to be used for conservation and infrastructure planning (Spencer et al., 2010).

One goal of the Connectivity Project was to create the Essential Connectivity Map, which depicts large, relatively natural habitat blocks that support native biodiversity (natural landscape blocks) and areas essential for ecological connectivity between them (essential connectivity areas). This map does not reflect the needs of particular species, but is based on overall biological connectivity and ecological integrity (Spencer et al., 2010).

The California Desert Connectivity Project provided a more detailed analysis of local and regional needs for connectivity and developed linkage designs based on the requirements of individual species (Penrod et al., 2012). In addition, biological connectivity was considered in the design of CVMSHCP reserves and conservation areas (CVAG, 2007).

The Project forms part of the south and southwestern boundary of the Thousand Palms Conservation Area. The CVMSHCP designates all of the Thousand Palms Conservation Area as a movement corridor or linkage that maintains biological connectivity with other conservation areas and Joshua Tree National Park (CVAG, 2007). These linkages with the Thousand Palms Conservation Area are located to the north, east, and west. Connectivity is limited to the south and southwest by urban development and by the Interstate 10 (I-10) freeway. The Essential Connectivity Project identifies an essential connectivity area extending from these linkages across the I-10 to the San Jacinto Mountains, to the north of Palm Springs and well north of the Project site (Spencer et al., 2010). The California Desert Connectivity Project identified potential habitat for several special-status plant and animal species in the Project area, all of which are included in Table 6 of this document, but did not identify any specific linkages (Penrod et al., 2012).

5.3 Vegetation

This section includes descriptions of the vegetation types found within the Study Area, the invasive weeds, and the special-status plants occurring or potentially occurring within the Study Area. Surveys resulted in the documentation of 78 species of native and non-native plants within the Study Area. All plant species observed within the Study Area are listed in Attachment B.

5.3.1 Vegetation Types

The alluvial fans, sand fields, and shallow drainages present in the Study Area support a broad assemblage of native xerophytic[2] vegetation and invasive non-native species. Vegetation mapping of the Project Study Area has been completed several times over the last 15 years, to support the 2000 EIR/EIS and for subsequent Project-related efforts. The conditions in the Study Area fluctuate due to anthropogenic (e.g., development, OHV use, trash dumping, etc.) and natural processes (fluvial and aeolian sand transport and associated shifts in vegetation composition). Vegetation maps were updated in 2013 to reflect current vegetation communities. The vegetation types described in this report use the Sawyer et al. (2009) classification. Table 2 provides a comparison of the Sawyer et al. (2009) vegetation classifications and the Holland (1986) vegetation classifications used in the 2000 EIR/EIS and the CVMSHCP.

[2] Xerophytic plants are adapted to dry conditions.

Table 2. Comparison of Vegetation Communities from Standard Vegetation Manuals	
Vegetation Community Classification	
Biological Resources Technical Report Sawyer et al. (2009)	2000 EIR/EIS and CVMSHCP Holland (1986)
Allscale scrub	Allscale scrub and desert saltbush scrub
Cheesebush scrub	Mojave wash scrub, desert wash, and desert dry wash woodland
Creosote bush scrub	Sonoran creosote bush scrub, creosote hummocks
Creosote bush – allscale scrub	Desert saltbush scrub
Creosote bush – white bursage scrub	Sonoran creosote bush scrub and Sonoran mixed woody and succulent scrub, burro-weed scrub
Creosote bush mixed scrub	Sonoran creosote bush scrub and Sonoran mixed woody and succulent scrub, burro-weed scrub
Desert dunes	Active desert dunes and stabilized and partially stabilized desert dunes, sand fields
Other Cover Types	
Non-native vegetation	
Ruderal	
Unvegetated	

Allscale scrub

Allscale scrub is dominated by cattle saltbush (*Atriplex polycarpa*), also referred to as allscale. It tends to grow in nearly monotypic stands with low species diversity. It best matches the description of *Atriplex polycarpa* Shrubland Alliance (allscale scrub) in Sawyer et al. (2009). It also matches descriptions of desert saltbush scrub in Holland (1986) and alkali desert scrub in Rowlands (1988). It is similar to desert saltbush scrub described in the 2000 EIR/EIS. Allscale scrub is only found within Reach 3 where it grows in low, poorly drained areas with sandy or loamy alkali soils, as well as along the margins of sand fields. The soils within the areas mapped as allscale scrub are playa and stabilized sand fields. Allscale scrub is ranked by CDFW as S4 (apparently secure) and is not a sensitive vegetation type (CDFG, 2010).

Cheesebush scrub

Cheesebush scrub is dominated by cheesebush (*Ambrosia salsola*). Other associated plants include smoke tree (*Psorothamnus spinosus*), desert lavender (*Hyptis emoryi*), and catclaw (*Senegalia greggii*), which occur in limited numbers. This vegetation corresponds to *Ambrosia salsola* Shrubland Alliance (cheesebush scrub) in Sawyer et al. (2009), Holland's (1986) description of Mojave wash scrub, and desert wash as described by Laudenslayer (1988). This vegetation is similar to desert wash described in the 2000 EIR/EIS. Cheesebush scrub is found in the sandy washes crossed by Reach 1, which are subjected to scour by intermittent storm flows. Cheesebush scrub is ranked by CDFW as S4 (apparently secure) and is not a sensitive vegetation type (CDFG, 2010).

Creosote bush scrub

Creosote bush scrub is dominated by creosote bush (*Larrea tridentata*), which tends to form nearly monotypic stands. There is a limited number of other shrubs present; some of these include burrobush (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), and dyebush (*Psorothamnus emoryi*), as well as seasonal annuals such as birdcage evening primrose (*Oenothera deltoides*) and desert palafox (*Palafoxia arida*). This vegetation best matches the description of *Larrea tridentata* Shrubland Alliance (creosote bush scrub) in Sawyer et al. (2009), Sonoran creosote bush scrub in Holland (1986), and desert scrub in Laudenslayer and Boggs (1988). It is similar to creosote hummocks described in the 2000 EIR/EIS. The western portions of Reaches 3 and 4 are the only portions of the Study Area that support creosote bush scrub. Where creosote bush occurs with other dominant shrub species, the stands are classified as

different vegetation types, described below. The soils within the areas mapped as creosote bush scrub are primarily stabilized sand fields. Creosote bush scrub is ranked by CDFW as S5 (demonstrably secure) and is not a sensitive vegetation type (CDFG, 2010).

Creosote bush – allscale scrub

Creosote bush – allscale scrub is characterized by co-dominant cattle saltbush and creosote bush. It is similar to allscale scrub as described above, with a larger proportion of creosote bush. This vegetation best matches the description of *Larrea tridentata-Atriplex polycarpa* Association of *Larrea tridentata* Shrubland Alliance (creosote bush scrub) in Sawyer et al. (2009), desert saltbush scrub in Holland (1986), and desert scrub in Laudenslayer and Boggs (1988). It is similar to desert saltbush scrub described in the 2000 EIR/EIS. Creosote bush – allscale scrub is only found within Reach 3 of the Study Area. It occurs at the margins of low-lying, poorly drained areas and at the transition from these areas to adjacent stabilized sand fields. The soils within the areas mapped as creosote bush – allscale scrub are composed of playa and stabilized sand fields. Creosote bush-allscale scrub is ranked by CDFW as S5 (demonstrably secure) and is not a sensitive vegetation type (CDFG, 2010).

Creosote bush – white bursage scrub

Creosote bush – white bursage scrub is characterized by co-dominant creosote bush and burrobush, also called white bursage. Other shrubs occur less commonly, including Schott's dalea (*Psorothamnus schottii*) and cheesebush. Creosote bush – white bursage scrub is similar to creosote bush scrub, but burrobush is much more abundant. Some common annuals observed within this vegetation include pincushions (*Chaenactis* spp.), hairy desert sunflower (*Geraea canescens*), and brittle spineflower (*Chorizanthe brevicornu*). It best matches the description of *Larrea tridentata – Ambrosia dumosa* Shrubland Alliance (creosote bush – white bursage scrub) in Sawyer et al. (2009), Sonoran creosote bush scrub in Holland (1986), and desert scrub in Laudenslayer and Boggs (1988). It is similar to burro-weed scrub described in the 2000 EIR/EIS. This vegetation type covers portions of Reach 1 and all of Reach 2. The soils within the areas mapped as creosote bush – white bursage scrub are primarily rocky and sandy bajada. Creosote bush-white bursage scrub is ranked by CDFW as S5 (demonstrably secure) and is not a sensitive vegetation type (CDFG, 2010).

Creosote bush mixed scrub

Creosote bush mixed scrub is characterized by creosote bush co-occurring with Schott's dalea, Wiggin's cholla (*Cylindropuntia echinocarpa*), beavertail cactus (*Opuntia basilaris*), burrobush, and cheesebush. It is the only community in the Study Area with a substantial proportion of cacti and other stem succulents. It is similar to creosote bush scrub, but more varied in composition and usually with a higher plant density. It best matches the description of *Larrea tridentata-Ambrosia dumosa-Psorothamnus schottii* Association of *Larrea tridentata-Ambrosia dumosa* Shrubland Alliance (creosote bush – white bursage scrub) in Sawyer et al. (2009), Sonoran creosote bush scrub and Sonoran mixed woody and succulent scrub in Holland (1986), and desert scrub in Laudenslayer and Boggs (1988). It is similar to burro-weed scrub described in the 2000 EIR/EIS. This vegetation covers the majority of Reach 1. The soils within the areas mapped as creosote bush mixed scrub are primarily rocky and sandy bajada. Creosote bush mixed scrub is ranked by CDFW as S5 (demonstrably secure) and is not a sensitive vegetation type (CDFG, 2010).

Desert dunes

Several portions of the Study Area are covered by active and inactive desert dunes that are largely unvegetated. In years of good rainfall, the dunes have a high cover of native annuals such as desert twinbugs (*Dicoria canescens*), desert sand verbena (*Abronia villosa* var. *villosa*), milk-vetch (*Astragalus* ssp.), hairy desert sunflower, pincushion, and birdcage evening primrose. There are a few cattle saltbush

and burrobush shrubs in the dunes, but many of these are dead or dying because of the shifting sands. This vegetation best matches the description of *Dicoria canescens-Abronia villosa* Sparsely Vegetated Alliance (desert dunes) in Sawyer et al. (2009), active desert dunes and stabilized and partially stabilized desert dunes in Holland (1986), and desert scrub in Laudenslayer and Boggs (1988). It matches the areas mapped as stabilized and partially stabilized sand fields and dunes in the 2000 EIR/EIS. The only desert dunes habitat mapped in the Study Area is in Reach 4. Desert dunes is ranked by CDFW as S2 (endangered) and is a sensitive vegetation type (CDFG, 2010).

Non-native vegetation

Non-native vegetation in the Study Area is largely associated with residential and agricultural areas. There are several private residences with ornamental trees and shrubs in or adjacent to the Study Area in Reaches 1 and 3. At the western end of Reach 4, there is a fallow agricultural field that was previously used as a jojoba farm; most of the jojoba shrubs are now dead. Golf courses between Reaches 3 and 4 and adjacent to the eastern end of Reach 4 are covered in ornamental landscaping. Reaches 3 and 4 also contain several old windrows of tamarisk that were likely planted to catch drifting sand. These windrows match the description of *Tamarix* spp. Semi-natural Shrubland Stands (Tamarisk thickets) in Sawyer et al. (2009). Note that one tamarisk species (*Tamarix aphylla*, called saltcedar or athel) is widely planted as windrows and shade trees throughout the region, but it apparently is not invasive; several other species, especially *T. ramissosima*, are invasive in desert washes and riparian areas, including a few scattered occurrences in the Study Area). Most of these areas best match the description of urban by McBride and Reid (1988). The non-native vegetation found in the Study Area is not ranked by CDFW, with the exception of tamarisk thickets (S4 – apparently secure), and is not a sensitive vegetation type (CDFG, 2010).

Ruderal

Several areas are mapped as ruderal vegetation. Most of these areas have been disturbed or cleared in the past and support little vegetation. However, the density of ruderal vegetation in these areas is strongly linked to annual rainfall. The sparse vegetation present is composed of weedy non-native annuals such as Sahara mustard and Mediterranean grass (*Schismus* sp.). The vegetation in these areas partially matches the description of upland mustards as described by Sawyer et al. (2009). Most of these areas best match the description of urban by McBride and Reid (1988). These areas were not distinguished from the surrounding vegetation types in the 2000 EIR/EIS. Ruderal vegetation was mapped in Reaches 1, 3, and 4. Ruderal vegetation is not ranked by CDFW and is not a sensitive vegetation type (CDFG, 2010).

Unvegetated

The remainder of the Study Area consists of roads, graded areas, and residential and commercial developments that generally do not support vegetation. These areas were mapped as developed in the 2000 EIR/EIS.

Vegetation Impacts

Table 3 provides the vegetation and cover types on the Project site and the estimated acreages of temporary and permanent Project impacts. Adverse effects to vegetation and habitat would occur during project construction and operations and maintenance. These effects may be temporary or permanent. Permanent impacts would preclude most natural vegetation and habitat function throughout the life of the Project, or longer. Examples of permanent impacts are removal of vegetation for levees and channels.

Temporary impacts to vegetation and habitat would occur where vegetation is removed for temporary work areas, without long-term land use conversion, so that vegetation may return to a more natural condition, or may be actively revegetated or enhanced. Temporary impacts include vegetation removal for staging areas.

However, characterization of permanent and temporary impacts must reflect slow vegetation recovery rates in the desert. Natural recovery rates vary according to the vegetation type and the nature and severity of the impact. For example, some vegetation may recover naturally within a few years after crushing by heavy vehicles (Gibson et al., 2004), whereas more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years for partial recovery, and complete ecosystem recovery may require much longer (Lovich and Bainbridge, 1999).

Table 3. Vegetation and Cover Types in Disturbance Areas (acres)

Vegetation type	Reach 1		Reach 2		Reach 3		Reach 4		Cumulative Total	
	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.
Allscale scrub	0.00	0.00	0.00	0.00	17.18	2.22	0.00	0.00	17.18	2.22
Cheesebush scrub	1.21	0.23	0.00	0.00	0.00	0.00	0.00	0.00	1.21	0.23
Creosote bush scrub	0.00	0.00	0.00	0.00	0.83	0.28	69.18	0.48	70.01	0.75
Creosote bush-allscale scrub	0.00	0.00	0.00	0.00	14.96	2.43	0.00	0.00	14.96	2.43
Creosote bush-white bursage scrub	12.24	5.99	4.66	0.97	0.00	0.00	0.00	0.00	16.90	6.96
Creosote bush mixed scrub	18.30	5.33	0.00	0.00	0.00	0.00	0.00	0.00	18.30	5.33
Desert dune	0.00	0.00	0.00	0.00	0.00	0.00	22.00	2.08	22.00	2.08
Non-native vegetation	1.49	0.79	0.00	0.00	1.03	0.25	4.95	0.42	7.47	1.46
Ruderal	4.79	2.45	0.00	0.00	5.39	0.72	17.03	1.50	27.21	4.67
Unvegetated	4.99	3.18	0.00	0.00	1.11	0.29	11.28	6.24	17.39	9.71
Total	43.03	17.98	4.66	0.97	40.51	6.20	124.45	10.72	212.65	35.86

5.3.2 Invasive Weeds

The term “noxious weeds” includes all plants formally designated as such by the Secretary of Agriculture or other responsible State official. These species usually possess one or more of the following characteristics: “aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being non-native or new to or not common to the United States or parts thereof” (USDA, 1995). For purposes of this report, “weeds” includes designated noxious weeds, as well as any other weeds or pest plants identified on weed lists of the California Department of Food and Agriculture or the California Invasive Plant Council.

Noxious and invasive weeds compete with native species for space, nutrients, and water. The spread of non-native invasive plants destroys wildlife habitat and forage, threatens native and special-status plants, and increases soil erosion and groundwater loss. Invasion of Sahara mustard in aeolian sand habitat is of particular concern as it causes dune stabilization and reduction in native annuals and associated plant-eating arthropods. This results in reduced habitat suitability for endemic dune plants and animals, such as Coachella Valley milk-vetch and Coachella Valley fringe-toed lizard (Barrows and Murphy, 2010).

Surveys within the Study Area identified 20 non-native plant species. Several of these are invasive weeds. Table 4 lists the invasive plant species that were identified in the Study Area during surveys.

Table 4. Noxious and Invasive Plant Species Identified in the Study Area

Scientific Name	Common Name	Threat Level*
Brassica tournefortii	Sahara mustard	High
Cynodon dactylon	Bermuda grass	Moderate
Erodium cicutarium	Red-stemmed filaree	Limited
Eucalyptus sp.	Eucalyptus, gum	Limited or none, depending on species
Salsola tragus	Russian thistle	Limited
Schismus arabicus	Mediterranean schismus	Limited
Schismus barbatus	Mediterranean schismus	Limited
Sisymbrium irio	London rocket	Moderate
Tamarix aphylla	Athel	Limited
Tamarix ramosissima	Tamarisk	High

* Source: Cal-IPC, 2015. High - severe ecological impacts, moderate to high rates of dispersal and establishment, widely distributed. Moderate – substantial but generally not severe ecological impacts, moderate to high rates of dispersal but establishment dependent on ecological disturbance, distribution ranges from limited to widespread. Limited – minor ecological impacts, low to moderately invasive, distribution limited but may be locally problematic.

5.3.3 Special-status Plants

Table 5 lists the special-status plant species that are known from the region or may occur in the Study Area. Figure 6 illustrates the locations of special-status plants occurring in or near the Study Area as documented in the CNDDB (CDFW, 2016a). Two special-status plants, Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*) and chaparral sand verbena (*Abronia villosa* var. *aurita*), were observed within the Study Area and are described below. Species having a moderate or high potential to occur are described in Attachment D.

Each of these species was assessed for their potential to occur within the Study Area based on the following criteria:

- Present: Observed within the Study Area during surveys or presence there has been acknowledged by CDFW, USFWS, or local experts.
- High: Documented recent record (within 10 years) in the Study Area or vicinity (within 5 miles) *and* environmental conditions (including soil type) associated with the species are present within the Study Area.
- Moderate: Documented recent record (within 10 years) in the Study Area or vicinity (within 5 miles) *and* environmental conditions associated with the species are marginal or limited within the Study Area, *or* the Study Area is within the known current range of the species and environmental conditions associated with the species are present within the Study Area.
- Low: Historical record (over 10 years old) in the Study Area or general vicinity (within 10 miles) *and* environmental conditions associated with species are marginal or limited within the Study Area.
- Not Likely to Occur: Species or sign not observed in the Study Area, *and* Study Area is outside of the known geographical or elevational range, *and* conditions in the Study Area are unsuitable for occurrence.
- Habitat conditions include soil type, elevation range, vegetation, and other factors relevant to each species. The criteria are general guidelines and a species' potential for occurrence may be modified based on biological analysis of habitat quality, isolation, and other factors. In this context, species refers to a taxonomic entity and can include recognized subspecies, varieties, or other genetically or geographically distinct units.

Table 5. Special-status Plants: Potential for Occurrence in the Study Area

Species	Status	Habitat and Distribution, Flowering Period	Potential for Occurrence
Federal or State Endangered or Threatened Species			
Astragalus lentiginosus var. coachellae Coachella Valley milk-vetch	FE, CVMSHCP, CRPR 1B.2	Annual/perennial herb; desert dunes, Sonoran desert scrub; sandy areas; 40-665 m; Feb – May.	Present. Single individual observed within Reach 4 during 2010 surveys; suitable habitat in Reaches 3 and 4.
Astragalus tricarinatus Triple-ribbed milk-vetch	FE, CVMSHCP, CRPR 1B.2	Perennial herb; Joshua tree woodland, Sonoran desert scrub; sandy or gravelly soils; 450-1190 m; Feb – May.	Not Likely to Occur. Minimally suitable habitat in Reaches 1 and 2; no known populations upstream of these reaches; outside known elevational range.
Dodecahema leptoceras Slender-horned spineflower	FE, SE, CRPR 1B.1	Annual; open, sandy alluvial benches in valleys and canyons; San Fernando Valley, Santa Ana River Valley, western Riverside Co.; about 600-2500 ft. elev. Apr-Jun (local NDDB record apparently erroneous)	Not Likely to Occur. Well outside known geographic range.
Erigeron parishii Parish's daisy	FT, CRPR 1B.1	Low perennial herb; mountain slopes, upper bajadas, washes; carbonate soils; San Bern Mts and Joshua Tree Nat Park; 800-2000 m; May – Aug.	Not Likely to Occur. No suitable habitat; outside known geographic and elevational range.
Locally Sensitive and CRPR Species			
Abronia villosa var. aurita Chaparral sand-verbena	CRPR 1B.1	Annual or perennial herb; sand, about 75-1615 m; San Jacinto Mtns, Inland Empire, adj. Colorado Des, Orange & San Diego cos; mostly alluvial fans and benches in w Riverside Co; dunes in deserts. Jan – Sep.	Present. Several individuals observed within Reach 4 during 2010 surveys.
Acmispon haydonii Pygmy lotus	CRPR 1B.3	Perennial herb; rocky, pinyon and juniper woodland, Sonoran Desert scrub; about 500-1200 m; SE Peninsular ranges, SW Sonoran Desert, Baja California. Jan – Sep.	Not Likely to Occur. Outside known geographic and elevational range.
Allium atrorubens var. cristatum Inyo onion	CRPR 4.3	Perennial herb; sandy or rocky soils in Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland; 1200–2560 m; Apr–Jun.	Not Likely to Occur. Outside known geographic and elevational range.
Aloysia wrightii Wright's beebrush	CRPR 4.3	Evergreen shrub; rocky, often carbonate soils in Joshua tree woodland, pinyon juniper woodland; 900–1600 m; Apr–Oct.	Not Likely to Occur. Outside known geographic and elevational range.
Ambrosia monogyra Singlewhorl burrobrush	CRPR 2B.2	Shrub or small tree; desert and inland cismontane flats, washes, alluvial fans; San Bernardino Valley; San Diego Co., east to Texas and mainland Mexico; 10-500 m. Aug – Nov.	Not Likely to Occur. Minimally suitable habitat; known from a single historical location in vicinity; not observed.
Astragalus bernardinus San Bernardino milk-vetch	CRPR 1B.2	Perennial herb; Joshua tree woodland, pinyon juniper woodland, often on granitic or carbonate soils; San Bernardino Mts, desert mts; 900-2300 m. Apr – Jun.	Not Likely to Occur. Outside known geographic and elevational range.
Astragalus lentiginosus var. borreganus Borrego milk-vetch	CRPR 4.3	Annual; desert dunes, Sonoran and Mojavean desert scrub; sandy areas; 30-320 m. Feb – May.	Moderate. Suitable habitat present; not observed.
Astragalus preussii var. laxiflorus Lancaster milk-vetch	CRPR 1B.1	Saltbush scrub on alkaline flats; only known California occurrences near Lancaster, extremely rare; also disjunct in Colorado Riv. Valley (AZ, Nev.); 700 m. Mar – May.	Not Likely to Occur. Outside known geographic and elevational range.

Table 5. Special-status Plants: Potential for Occurrence in the Study Area

Species	Status	Habitat and Distribution, Flowering Period	Potential for Occurrence
Astragalus sabulonum Gravel milk-vetch	CRPR 2B.2	Annual/perennial herb; Mojavean desert scrub, Sonoran desert scrub; desert dunes, sandy areas, sometimes gravelly areas; flats, washes, and roadsides; -60-930 m. Feb – Jun.	Low. Suitable habitat in all four reaches; no recent records from the Project vicinity; not observed.
Atriplex parishii Parish's brittlescale	CRPR 1B.1	Annual; alkali sink, saltbush scrub; western Riverside Co. (extant), Palm Springs and Big Bear Valley areas (historic); Baja Calif.; 25-1900 m. Jun – Oct.	Not Likely to Occur. No suitable habitat.
Ayenia compacta California ayenia	CRPR 2B.3	Perennial herb; rocky canyons and slopes with desert shrubland; W low desert margins, Chuckwalla Valley, and E Mojave; also Baja and Sonora (Mexico); 150-1095 m. Mar–Apr.	Not Likely to Occur. No suitable habitat; not known from the Coachella Valley.
Calochortus palmeri var. munzii San Jacinto mariposa-lily	CRPR 1B.2	Meadows and other vernal wetlands, about 3900-7200 ft. elev.; San Jacinto Mtns, may also be in San Bernardinos. May-Jul. Jun (local NDDB record apparently erroneous).	Not Likely to Occur. No suitable habitat, outside geographic and elevational range.
Caulanthus simulans Payson's jewel-flower	CRPR 4.2	Annual; mountains and foothills, esp. desert-facing slopes; pinyon woodland, shrublands, etc; Riverside and San Diego cos; 90-2200 m. Apr – Jun.	Not Likely to Occur. No suitable habitat; outside known geographic range.
Chorizanthe leptotheca Peninsular spineflower	CRPR 4.2	Annual; alluvial fan, granitic soils in chaparral, coastal scrub, lower montane coniferous forest; 300 – 1900 m; May–Aug.	Not Likely to Occur. No suitable habitat; northeast of known geographic range.
Chorizanthe parryi var. parryi Parry's spineflower	CRPR 1B.1	Annual; shrublands; open sandy places on alluvial slopes; Inland Empire and also coastal LA Co., Banning Pass, Cajon Pass; 275-1220 m. Apr – Jun.	Not Likely to Occur. No suitable habitat; outside known geographic range.
Chorizanthe xanti var. leucotheca White-bracted spineflower	CRPR 1B.2	Annual; sandy soil, desert shrubland, pinyon-juniper woodland; mountains and foothills, Cajon Pass and Banning Pass areas; also reported from Liebre Mtns.; 300-1200 m. Apr – Jun.	Not Likely to Occur. Minimal suitable habitat; east of known geographic range.
Cryptantha costata Ribbed cryptantha	CRPR 4.3	Annual; sandy soils; sand dunes; Sonoran and Mojavean scrub; 60- 500 m. Feb – May.	High. Suitable habitat; observed in Project vicinity.
Cryptantha holoptera Winged cryptantha	CRPR 4.3	Annual; Mojavean desert scrub, Sonoran desert scrub; 100-1690 m; Mar–Apr.	Low. Suitable habitat in all four reaches; no records within 5 miles; not observed.
Cuscuta californica var. apiculata Pointed dodder	CRPR 3	Annual parasitic vine; sandy soils; Sonoran and Mojavean scrub; 0–500 m; Feb–Aug.	Not Likely to Occur. Well outside geographic range.
Ditaxis claryana Glandular ditaxis	CRPR 2B.2	Perennial herb; Mojavean desert scrub, Sonoran desert scrub; sandy soils; 0-465 m. Oct – Mar.	Low. Suitable habitat in all four reaches; no recent records from the Project vicinity; not observed.
Ditaxis serrata var. californica California ditaxis	CRPR 3.2	Perennial herb; washes and canyons, low desert and adjacent mountains; La Quinta E to Desert Center, also Anza Borrego; about 30–1000 m. Mar–Dec.	Low. Marginally suitable habitat; nearest known records roughly 5 miles to the south; not observed.
Eremothera boothii ssp. boothii Booth's evening-primrose	CRPR 2B.3	Annual herb; Joshua tree woodland, pinyon juniper woodland; east of Sierra Nevada to Washington, NW Arizona; 815-2400 m. Apr – Sep.	Not Likely to Occur. No suitable habitat; below known elevational range.

Table 5. Special-status Plants: Potential for Occurrence in the Study Area

Species	Status	Habitat and Distribution, Flowering Period	Potential for Occurrence
Eriastrum harwoodii Harwood's eriastrum	CRPR 1B.2	Annual; desert dunes; 125–915 m; Mar–Jun.	Not Likely to Occur. Well outside geographic range.
Eschscholzia androuxii Joshua Tree poppy	CRPR 4.3	Annual; desert washes, flats, and slopes; sandy, gravelly, or rocky soils in Joshua tree woodland, Mojavean desert scrub; 585–1685 m; Feb–Jun.	Moderate. Suitable habitat present in all four reaches; Project site is just below elevational range; not observed.
Euphorbia (Chamaesyce) abramsiana Abrams' spurge	CRPR 2B.2	Annual herb; Mojavean desert scrub, Sonoran desert scrub; sandy areas; -5-915 m. Sep – Nov.	Moderate. Suitable habitat; not observed.
Euphorbia (Chamaesyce) arizonica Arizona spurge	CRPR 2B.3	Perennial herb; sandy flats; Borrego & Coachella Vals are only Calif. sites; S and E to Texas, mainl. Mexico, central Baja; 50-300 m. Mar – Apr.	Moderate. Suitable habitat; not observed.
Euphorbia misera Cliff spurge	CRPR 2B.2	Low perennial shrub; coastal bluffs (Orange and San Diego cos) and rocky desert slopes (Whitewater area, Riv. Co.); 10-500 m. Dec – Oct.	Not Likely to Occur. No suitable habitat; outside known geographic and elevational range.
Euphorbia (Chamaesyce) platysperma Flat-seeded spurge	CRPR 1B.2	Annual herb; desert dunes, Sonoran desert scrub; sandy areas; 65-100 m. Feb – Sep.	Moderate. Suitable habitat in Reaches 3 & 4; not observed.
Galium angustifolium ssp. gracillimum Slender bedstraw	CRPR 4.2	Perennial herb; granitic, rocky soils in Joshua tree woodland, Sonoran desert scrub; 130 – 1550 m; Apr–Jun.	Low. Suitable habitat in Reaches 1 & 2; not known within 5 miles; not observed.
Heuchera hirsutissima Shaggy-haired alumroot	CRPR 1B.3	Perennial rhizomatous herb; subalpine and upper montane coniferous forest; Peninsular ranges; rocky, granitic soils; 1520-3500 m. May – Jul.	Not Likely to Occur. No suitable habitat; outside known geographic and well below elevational range.
Imperata brevifolia California satintail	CRPR 2B.1	Perennial grass; meadows, riparian scrub, or mesic sites; desert and cismontane S Calif. to Utah and Mexico; 0-1215 m. Sep – May.	Not Likely to Occur. No suitable habitat; outside known geographic range.
Juncus acutus ssp. leopoldii Southwest spiny rush	CRPR 4.2	Perennial rhizomatous herb; meadows, seeps, marshes; mainly coastal S Calif.; 3- 90 m. Mar–Jun.	Not Likely to Occur. No suitable habitat.
Lilium parryi Lemon lily	CRPR 1B.2	Bulb; meadows and streambanks; mtns of S Calif. and SE Arizona; 1220-2745 m. Jul – Aug.	Not Likely to Occur. No suitable habitat; outside known geographic and well below elevational range.
Linanthus jaegeri San Jacinto linanthus	CRPR 1B.2	Perennial herb; subalpine and upper montane coniferous forest; San Jacinto Mts; rocky, granitic soils; 2195-3050 m. Jul – Sep.	Not Likely to Occur. No suitable habitat; outside known geographic and well below elevational range.
Linanthus maculatus Little San Bernardino Mountains linanthus	CVMSHCP, CRPR 1B.2	Annual herb; desert dunes, Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub; sandy soils; 195-2075 m. Mar – May.	Low. Suitable habitat in all four reaches; just below elevational range; not observed.
Marina orcuttii var. orcuttii California marina	CRPR 1B.3	Perennial herb; chaparral, pinyon juniper woodland, Sonoran desert scrub; rocky soils; e Peninsular Ranges, Baja; 1050-1160 m. May – Oct.	Not Likely to Occur. Minimally suitable habitat; outside of known geographic and elevational range.

Table 5. Special-status Plants: Potential for Occurrence in the Study Area

Species	Status	Habitat and Distribution, Flowering Period	Potential for Occurrence
Matelea parvifolia Spear-leaf matelea	CRPR: 2B.3	Low twining vine; rocky sites in desert shrublands, central and eastern deserts and Anza-Borrego State Park; S Nevada, Texas, and Baja; 440-1095 m. Mar–May.	Not Likely to Occur. Minimally suitable habitat; below elevational range.
Mentzelia tricuspis Spiny-hair blazing star	CRPR 2B.1	Annual herb; sandy, gravelly slopes and washes; Mojavean desert scrub; s Mojave Desert, sw Sonoran Desert, to Utah, Arizona; 150-1280 m. Mar – May.	Not Likely to Occur. Well outside of known geographic range.
Mentzelia tridentata Creamy blazing star	CRPR 1B.3	Annual; rocky, gravelly, sandy soils in Mojavean desert scrub; 700 – 1175 m; Mar–May.	Not Likely to Occur. Outside of elevational range; not known within 30 miles.
Mimulus diffusus Palomar monkeyflower	CRPR 4.3	Annual; sandy or gravelly soils in chaparral, lower montane coniferous forest; 1220 – 1830 m; Apr–Jun.	Not Likely to Occur. No suitable habitat; outside of geographic and elevational range.
Monardella robisonii Robison's monardella	CRPR 1B.3	Subshrub or perennial herb; desert shrubland and pinyon-juniper woodland; Little San Bernardino Mtns and (possibly) Baja; 610-1500 m. Feb – Oct	Not Likely to Occur. South of known geographic and below elevational range.
Nemacaulis denudata var. gracilis Slender cottonheads	CRPR 2B.2	Annual herb; coastal dunes, desert dunes, Sonoran desert scrub; -50-400 m. Apr – May.	Moderate. Suitable habitat in Reach 4; not observed.
Nemacladus gracilis Slender nemacladus	CRPR 4.3	Annual; sandy or gravelly soils in cismontane woodland, valley and foothill grassland; 120 – 1900 m; Mar–May.	Not Likely to Occur. No suitable habitat; known from more than 20 miles from the Project site.
Penstemon clevelandii var. connatus San Jacinto beardtongue	CRPR 4.3	Perennial herb; rocky soils in chaparral, pinyon juniper woodland, Sonoran desert scrub; 400 – 1500 m; Mar–May.	Not Likely to Occur. Outside of the known geographic and elevational range.
Pseudorontium cyathiferum Deep Canyon snapdragon	CRPR 2B.3	Annual herb; washes & rocky places, desert shrublands; only Calif. records from Deep Cyn area (Santa Rosa Mtns.); ranges to Ariz., Baja, mainl, Mexico; 0-800 m. Feb – Apr.	Not Likely to Occur. Minimally suitable habitat; known from single location 10 miles southeast of Project site.
Saltugilia latimeri Latimer's woodland-gilia	CRPR 1B.2	Annual; chaparral and desert shrublands, arid mountains and foothills; desert margins, Riv. Co to Inyo Co; 400-1900 m. Mar – Jun.	Not Likely to Occur. Minimally suitable habitat; outside known geographic range.
Selaginella eremophila Desert spike-moss	CRPR: 2B.2	Perennial herb; mountainous or hillside rock outcrops and crevices; lower desert-facing slopes of San Jacintos and adjacent desert, to Texas and Baja; 200-900 m.	Not Likely to Occur. No suitable habitat.
Senna covesii Cove's cassia	CRPR: 2B.2	Low, mostly herbaceous perennial; desert washes; Colorado Desert to Nevada, Arizona and Baja;305-1070 m. Apr–Jun.	Not Likely to Occur. Minimally suitable habitat; 12 miles north of nearest known occurrence; just below elevational range.
Stemodia durantifolia Purple stemodia	CRPR 2B.1	Perennial herb; moist canyons; desert slopes of San Jacinto Mtns, San Diego area, Arizona, tropical Mexico; 180-300 m. Jan – Dec.	Not Likely to Occur. No suitable habitat.

Table 5. Special-status Plants: Potential for Occurrence in the Study Area			
Species	Status	Habitat and Distribution, Flowering Period	Potential for Occurrence
Streptanthus campestris Southern jewel-flower	CRPR 1B.3	Perennial herb; chaparral, pinyon juniper woodland, lower montane coniferous forest; rocky soils; Transverse and Peninsular Ranges, N Baja; 900-2300 m. Apr – Jul.	Not Likely to Occur. No suitable habitat; outside known geographic and below elevational range.
Thelypteris puberula var. sonorensis Sonoran maiden fern	CRPR 2B.2	Perennial herb; seeps and streambanks, gen. below about 2000 ft. elev.; coastal foothills of the Santa Monica, San Gabriel, San Bernardino Mtns, desert foothills of San Jacinto Mtns; to Arizona and Baja. Jan-Sep.	Not Likely to Occur. No suitable habitat.
Thysanocarpus rigidus Rigid fringepod	CRPR 1B.2	Annual; dry rocky slopes in pinyon juniper woodland; 600 – 2200 m; Feb–May.	Not Likely to Occur. No suitable habitat; well outside the geographic and elevational range.
Xylorhiza cognata Mecca-aster	CVMSHCP, CRPR 1B.2	Herbaceous perennial; desert shrublands, arid canyons; locally endemic around Indio Hills and Mecca Hills, Riv Co; 20-400 m. Jan – Jun.	Low. Minimal suitable habitat; just west of geographic range. Records from hills 3.5 miles NE. Not likely to occur on the valley floor or bajada, low potential for waifs to wash down from the hills.

Conservation Status

Federal Designations:

FE: Federally listed, endangered.
FT: Federally listed, threatened.

***State Designations*:**

SE: State listed, endangered.
ST: State listed, threatened.

Coachella Valley Multi Species Habitat Conservation Plan (CVMSHCP) Covered Species:

Species for which take authorization is provided through the permits issued in conjunction with the CVMSHCP implementing agreement.

California Rare Plant Rank (CRPR) designations:

1A: Plants presumed extinct in California.
1B: Plants rare and endangered in California and throughout their range.
2A: Plants presumed extirpated in California but occur elsewhere in their range.
2B: Plants rare, threatened, or endangered in California but more common elsewhere in their range.
3: Plants about which we need more information; a review list.
4: Plants of limited distribution; a watch list.

California Rare Plant Rank threat designations:

0.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 Fairly endangered in California (20-80% occurrences threatened)
0.3 Not very endangered in California (<20% of occurrences threatened or no current threats known)

5.3.4 Special-status Plants – Species Accounts

Federal and State-listed Plant Species

One federally listed endangered plant, Coachella Valley milk-vetch, was observed within the Study Area and is described below. No other listed plant species have the potential to be found in the Study Area. Other listed threatened or endangered plant species of the region (e.g., triple-ribbed milk-vetch, Parish's daisy, and Mojave tarplant) are found either in habitats that are not present on the Study Area, in geographic areas that are north or west of the Study Area, or in higher elevations than are present in the Study Area.

Coachella Valley milk-vetch

Status: Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*) is federally endangered, has a CRPR 1B.2, and is covered under the CVMSHCP.

General Distribution: Colorado Desert within the Coachella Valley.

Distribution in the Study Area: During 2010 surveys, a single individual was observed within Reach 4 of the Study Area, on the north side of Avenue 38. It was not found at this location in 2013 or 2016, but this may have been due to poor rainfall. Reaches 3 and 4 provide suitable habitat for this species, generally in areas mapped as high or moderate suitability for Coachella Valley fringe-toed lizard (see Figures 3.6-10 and 3.6-11).

Portions of the Study Area are within designated critical habitat for Coachella Valley milk-vetch (see Figure 3.6-3), although these areas are not expected to support the plants themselves. Sand in the Thousand Palms area originates in alluvial deposits at the base of the Indio Hills, including lands along Reach 1 of the Project. Large flooding events, if not interrupted by intervening land uses, can carry the sand into fluvial deposition areas where the sand can be moved and sorted by wind. The designated critical habitat area along Reach 1 of the Project site consists of accumulated alluvial sand deposits which may be transported downstream or downwind to occupied Coachella Valley milk-vetch habitat, where it would replenish the windblown sand habitat (USFWS, 2013). Based on CNDDB records (see Figure 6), the Critical Habitat designation (USFWS, 2013), and field surveys conducted for the Project, this portion of the designated critical habitat is not occupied by Coachella Valley milk-vetch.

Habitat and Habitat Associations: This species grows primarily on loose aeolian or fluvial sands, on dunes or flats, and along disturbed margins of sandy washes.

Natural History: The Coachella valley milk-vetch is an annual or short-lived perennial herb. Depending on weather, plants may persist through the summer dry season to the following growing season. It may flower as early as February or as late as May (Wojciechowski and Spellenberg, 2012), depending on rainfall and temperature. During drought years, its seed may not germinate and established perennial plants may not survive. Occupied habitat is re-established from dormant seed during subsequent years of greater rainfall. It reportedly requires at least one winter storm producing an inch or more of rain to sprout (L. LaPre, USDI Bureau of Land Management, personal communication).

Threats: Vehicles and development (CNPS, 2016).

Other Special-status Plant Species

In addition to the FESA and CESA, several public agencies and private entities maintain lists of plants and animals of conservation concern. CDFW and CNPS jointly manage the effort to compile and rank these species and CDFW lists the rankings as CRPR 1A, 1B, 2A, 2B, 3, or 4 in its compendium of "Special Plants" (CDFW, 2015d). CRPR 1A species are presumed extirpated or extinct; CRPR 1B, 2A, 2B, 3, and 4, as well as species covered by the CVMSHCP are treated here as "special-status species." See the footnote to Table 5 for an explanation of the rankings. One of these species, chaparral sand-verbena was recorded within Reach 4 and is described below. Seven of these species have a moderate or high potential for occurrence in the Study Area and are described in Attachment D. Seven of the special-status plants known from the region have a low potential for occurrence in the Study Area, and 36 are not likely to occur. These species are not addressed further in this report; see Table 5.

Chaparral sand-verbena

Status: Chaparral sand-verbena *(Abronia villosa* var. *aurita)* has a CRPR of 1B.1. It is not covered by the CVMSHCP.

General Distribution: Its distribution and identification are unclear in published reference works, including Murdock (2012), CNPS (2016), and CNDDB (CDFW, 2016). The conservation concern is primarily for chaparral sand-verbena occurrences in western Riverside County and other locations outside the desert where the variety is rare (Roberts et al. 2004).

Distribution in the Study Area: This species was observed along Reach 4. Several plants were observed growing within the Study Area during surveys done in 2009 and 2010. The plants were not found at this location in 2013 or 2016, but this may be due to poor rainfall.

Habitat and Habitat Associations: Chaparral sand verbena's geographic distribution includes the western Sonoran Desert, the San Jacinto Mountains, and the coastal sides of southern California mountains (Murdock, 2012; CNPS, 2016; Roberts et al., 2004). In the desert, it is found in desert shrublands on dunes, sandfields, and sandy washes. In the San Jacinto Mountains, it is common in the Garner Valley area, in yellow pine forest and sagebrush shrublands on sandy alluvial soils. In western Riverside County, it is limited to a few alluvial river washes, including the San Jacinto River wash near Hemet and sandy flats near Murrieta Creek, usually in chaparral, live oak woodlands, or alluvial shrublands.

Natural History: Chaparral sand-verbena is an annual or perennial herb, closely related to the common desert sand-verbena (*A. villosa* var. *villosa)*. In the mountains and western Riverside County, it is perennial, spreading widely across the ground, and dying back to the rootstock during summer. In the desert it may be a facultative annual, flowering and setting seed during its first year, and, depending on weather, persisting through the summer dry season to the following growing season.

Threats: In western Riverside County, flood control projects and land use conversion to agriculture and development have eliminated much of the former alluvial plain and riverwash habitat, and remaining occurrences may be at risk from further development. In the mountains and deserts, it is more widespread and much of its habitat is on public or preserve land. In some cases, the desert and mountain occurrences may be at risk from local land use changes, but overall desert and mountain populations do not appear to be threatened.

5.4 Wildlife

Wildlife surveys covered all proposed temporary and permanent disturbance areas within the Study Area. Surveys consisted of walking evenly spaced transects throughout all proposed impact areas with particular attention given to areas of suitable habitat for special-status animals (i.e. desert dunes and sandy washes). All wildlife species observed or detected during the surveys are listed in Attachment C.

5.4.1 Common Wildlife Species

The distribution of wildlife in the Study Area varies depending on location, vegetation community, and disturbance level. There is no aquatic habitat in the Study Area and no fish or amphibians were observed or are expected to occur.

Invertebrates

Habitat in the Study Area provides a suite of microhabitat conditions for terrestrial and other invertebrates. Some of the orders identified in the Study Area include Hemiptera (true bugs), Coleoptera (beetles), and Diptera (flies), but common invertebrates were not identified to species. Although not detected during surveys several species of air breathing land snails including shoulderband snails are known from desert regions of San Bernardino and Riverside counties. Southern California shoulderband snail (*Helminthoglypta tudiculata*) is known from the region and the Coachella Valley Jerusalem cricket (*Stenopelmatus cahuilaensis*) may be present on the Project alignment.

Reptiles

Common reptiles observed in the Study Area in both disturbed and natural areas include desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), western whiptail (*Aspidoscelis tigris tigris*), sidewinder (*Crotalus* cerastes), desert spiny lizard (*Sceloporus magister uniformis*), and side-blotched lizard (*Uta stansburiana*).

Although not observed, several other common reptiles are likely to occur in the Study Area. Most reptile species, even if present in an area, are difficult to detect because they are cryptic and their life history characteristics (i.e., foraging and thermoregulatory behavior) limit biologists' ability to observe them during most surveys. Further, many species are active only within relatively narrow thermal limits, avoiding both cold and hot conditions, and most take refuge in microhabitats that are not directly visible to the casual observer, such as rodent burrows, in crevices, under rocks and boards, and in dense vegetation where they are protected from unsuitable environmental conditions and predators. In some cases they are only observed when flushed from their refugia.

Birds

Common bird species detected within or in the immediate vicinity of the Study Area include verdin (*Auriparus flaviceps*), common raven (*Corvus corax*), greater roadrunner (*Geococcyx californianus*), great horned owl (*Bubo virginianus*), turkey vulture (*Cathartes aura*), Say's phoebe (*Sayornis saya*), northern rough-winged swallow (*Stelgidopteryx serripennis*), house finch (*Haemorhous mexicanus*), Costa's hummingbird (*Calypte costae*), American kestrel (*Falco sparverius*), lesser nighthawk (*Chordeiles acutepennis*), killdeer (*Charadrius vociferous*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), Cassin's kingbirds (*Tyrannus vociferans*), western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), cactus wren (*Campylorhynchus brunneicapillus*), cliff swallow (*Petrochelidon pyrrhonota*), house sparrow (*Passer domesticus*), and Gambel's quail (*Callipepla gambelii*).

Nesting red-tailed hawks (*Buteo jamaicensis*) and verdins were observed during surveys. Many other bird species may use the site either as wintering or seasonal breeding habitat; migrants may use the site as temporary resting or foraging habitat.

Mammals

The distribution of mammals in the Study Area is associated with the presence of such factors as access to perennial water, topographical and structural components (i.e., rock piles, and vegetation) that provide cover and support prey base, and the presence of suitable soils for burrowing mammals. Common mammals or their sign observed during surveys include white-tailed antelope squirrel (*Ammospermophilus leucurus*), black-tailed jackrabbit (*Lepus californicus deserticola*), desert cottontail (*Sylvilagus audubonii*), and coyote (*Canis latrans*).

5.4.2 Special-status Wildlife Species

Figure 7 illustrates the locations of special-status wildlife occurring within or near the Study Area as documented in the CNDDB (CDFW, 2016). Six special-status wildlife species were detected within the Study Area during focused and general surveys, and are described in Section 5.4.3. These species are Coachella Valley fringe-toed lizard (*Uma inornata*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), Bendire's thrasher (*Toxostoma bendirei*), Colorado Valley woodrat (*Neotoma albigula venusta*), and Palm Springs round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*).

The specific habitat requirements and the locations of known occurrences of special-status wildlife species were the principal criteria used for inclusion in the list of species potentially occurring within

the Study Area. There are 41 special-status wildlife species documented within the general region of the Study Area; see Table 6.

Two species of particular interest in this area are desert tortoise (*Gopherus agassizii*) and flat-tailed horned lizard (*Phrynosoma mcallii*). Neither species was observed during surveys. However, unoccupied potential desert tortoise burrows were found in the Study Area, and the flat-tailed horned lizard is found in the Thousand Palms Conservation Area adjacent to Reaches 2, 3, and 4 (CVCC, 2013). Desert tortoise is only rarely observed in the Project vicinity. It has a moderate potential for occurrence in the Study Area although only rarely and in very low numbers. The flat-tailed horned lizard has a high potential for occurrence. These species are described in Section 5.4.3. Other special-status wildlife species having a moderate or high potential to occur in the Study Area are described in Attachment D.

Each of these species was assessed for potential to occur within the Study Area based on the following criteria:

- Present: Species (or sign) was observed in the Study Area during recent surveys, or a population has been acknowledged by U.S. Forest Service, CDFW, USFWS, or local experts.
- High: Habitat (including soils) for the species occurs on site and a known occurrence occurs within the Study Area or adjacent areas (within 5 miles of the site) within the past 20 years; however, these species were not detected during recent surveys.
- Moderate: Habitat (including soils) for the species occurs on site and a known regional record occurs within the database search, but not within 5 miles of the site or within the past 20 years; or, a known occurrence occurs within 5 miles of the site and within the past 20 years and marginal or limited amounts of habitat occurs on site; or, the species' range includes the geographic area and suitable habitat exists.
- Low: Limited habitat for the species occurs on site and no known occurrences were found within the database search and the species' range includes the geographic area.
- Not Likely to Occur: Species or sign not observed on the site, outside of the species' known range, and conditions are not suitable for occurrence.
- Habitat conditions include soil type, elevation range, vegetation, and other factors relevant to each species. The criteria are general guidelines and a species' potential for occurrence may be modified based on biological analysis of habitat quality, isolation, and other factors. In this context, species refers to a taxonomic entity and can include recognized subspecies, population segments, or other genetically or geographically distinct units.

Table 6. Special-Status Wildlife: Potential for Occurrence in the Study Area

Species	Status	Habitat and Distribution	Potential for Occurrence
Federal or State Endangered or Threatened or Candidate Species			
Invertebrates			
Dinocoma caseyi Casey's June beetle	FE	Found only in two small populations in southern Palm Springs; sandy soils	Not Likely to Occur. Outside of known geographic range.
Fish			
Cyprinodon macularius Desert pupfish	FE, SE, CVMSHCP	San Felipe Ck and Salt Ck (Imperial Co.); also several refugia populations and in irrigation canals near Salton Sea; a few locns in Arizona and Mexico	Not Likely to Occur. No suitable aquatic habitat.

Table 6. Special-Status Wildlife: Potential for Occurrence in the Study Area			
Species	Status	Habitat and Distribution	Potential for Occurrence
Amphibians			
Rana draytonii California red-legged frog	FT, SSC	Ponds or pools in foothill and valley streams below about 4000 ft. elev.; Coast Ranges and W Sierra Nevada to N Baja; nearly extinct S of Ventura Co (extant at Santa Rosa Plateau).	Not Likely to Occur. No suitable aquatic habitat; outside of known geographic range.
Rana muscosa Southern mountain (Sierra Madre) yellow-legged frog	FE, SE, SSC	Perennial mountain streams above about 3000 ft. elev.; closely associated with streams; diurnal; endemic to mtns of S Calif.; extinct in much of range.	Not Likely to Occur. No suitable aquatic habitat; outside of known geographic range.
Reptiles			
Gopherus agassizii Desert tortoise	FT, ST, CVMSHCP	Desert scrub, desert wash, Joshua tree habitats; prefers creosote bush scrub habitat; requires friable soils for burrow and nest construction.	Moderate. Suitable habitat for very low-density population present in all reaches; known from just east of the Study Area. Unoccupied potential burrows observed in Study Area.
Phrynosoma mcallii Flat-tailed horned lizard	SCan, SSC, CVMSHCP	Restricted to desert washes and desert flats in central Riverside, eastern San Diego, and Imperial Counties; prefers fine sands for burial; requires adequate vegetative cover.	High. Suitable dune habitat; species known from the Coachella Valley Preserve, immediately adjacent to Reaches 3 and 4.
Uma inornata Coachella Valley fringe-toed lizard	FT, SE, CVMSHCP	Limited to sandy areas in the Coachella Valley; requires fine, loose, windblown sand interspersed with hardpan and widely spaced desert shrubs for burrowing.	Present. Observed in Reaches 3 & 4 during 2010 and in Reach 4 during 2015, also observed in 1997 and 2003; suitable habitat in Reaches 3 and 4.
Birds			
Empidonax traillii extimus Southwestern willow flycatcher	FE, SE, CVMSHCP	Breeds in dense riparian habitats, esp. in willows; scattered locations in Calif. and Baja; near sea level to about 8000 ft. elev; winters in Cent. Amer.	Not Likely to Occur. No suitable riparian habitat.
Polioptila californica californica Coastal California gnatcatcher	FT, SSC	Coastal sage scrub; SW Calif. (Moorpark area, Palos Verdes Penins., Orange, Riverside, San Bern., & San Diego Cos.) and N Baja Calif.; not migratory. Local NNB report apparently a vagrant.	Not Likely to Occur. No suitable habitat, outside known geographic range.
Vireo bellii pusillus Least Bell's vireo	FE, SE, CVMSHCP	Riparian woodland and shrubland; breeds in S Calif. and N Baja, sea level to 1500-2000 ft. elev (one report at 2800 ft.); winters in Baja; endangered by habitat loss and cowbird parasitism.	Not Likely to Occur. No suitable riparian habitat.
Mammals			
Corynorhinus townsendii Townsend's big-eared bat	SCan, SSC	Roosts in caves, mines, structures, hollow trees; all but alpine and subalpine habitats; most abundant in mesic habitats.	Low. Low potential to forage on site; not likely to roost on site (no potential roosting habitat).
Ovis canadensis nelsoni DPS Peninsular bighorn sheep	FE, ST, FP, CVMSHCP	Desert shrublands to conifer forest, gen. remote mountains; scattered populations in Peninsular Ranges, Riverside Co. to N Baja Calif.	Not Likely to Occur. The DPS is not known to travel north of the Banning Pass, only protected to the south of the Study Area.

Table 6. Special-Status Wildlife: Potential for Occurrence in the Study Area

Species	Status	Habitat and Distribution	Potential for Occurrence
Non-listed Special-status Species			
Invertebrates			
Bombus crotchii Crotch bumble bee	SA	Colonial insect; open grassland and scrub; underground colonies, often in old rodent burrows. Food plants include *Asclepias, Chaenactis, Lupinus, Medicago, Phacelia, Salvia, Antirrhinum, Clarkia, Dendromecon, Eschscholzia, Eriogonum*. Southern and central CA, parts of N CA, SW Nevada and Baja.	Low. Suitable habitat probably lacking, margin of geographic range; single historic record from the Palm Springs area dates to 1958.
Calileptoneta oasa Andreas Canyon leptonetid spider	SA	Mojavean desert scrub, known only from the type locality, Andreas Canyon, Palm Springs, Riverside County.	Not Likely to Occur. Outside of known geographic range.
Macrobaenetes valgum Coachella Valley giant sand-treader cricket	SA, CVMSHCP	Sand dune ridges in the vicinity of Coachella Valley.	Moderate. Suitable dune habitat in Reaches 3 and 4; historically known from Project vicinity. The Coachella Valley Preserve adjacent to most of the Study Area is mapped as habitat in the CVMSHCP.
Oliarces clara Cheeseweed owlfly (cheeseweed moth lacewing)	SA	Generally associated with creosote bush; steep, shaded canyons in deserts with intermittent streams.	Not Likely to Occur. No suitable habitat.
Stenopelmatus cahuilaensis Coachella Valley Jerusalem cricket	SA, CVMSHCP	Inhabits small segment of the sand and dune areas of the Coachella Valley, in the vicinity of Palm Springs and Cathedral Canyon.	Moderate. Suitable dune habitat in Reaches 3 and 4; historic records from south of the Study Area.
Reptiles			
Crotalus ruber Red-diamond rattlesnake	SSC	Chaparral, woodland, grassland, desert areas; prefers rocky areas with dense vegetation; Coastal CA east to Whitewater Canyon.	Not Likely to Occur. Outside of known geographic range.
Phrynosoma blainvillii Coast horned lizard	SSC	Lowlands along sandy washes with scattered low bushes; Coastal CA east to Whitewater Canyon.	Not Likely to Occur. Outside of known geographic range.
Birds			
Aimophila ruficeps canescens Southern California rufous-crowned sparrow	WL	Coastal sage scrub, open chaparral; S Calif. and NW Baja Calif.; not migratory.	Not Likely to Occur. No suitable sage scrub or chaparral habitats.
Aquila chrysaetos Golden eagle	BGEPA, FP, WL	Nests in remote trees and cliffs; forages over shrublands and grasslands; breeds throughout W N America, winters to E coast.	Moderate. Suitable foraging habitat only, no suitable nesting habitat.
Athene cunicularia Burrowing owl	SSC, CVMSHCP	Nests in rodent burrows in open, dry annual or perennial grassland, desert, scrubland; low-growing vegetation.	Present. Observed during 2010 and 2013 surveys; no breeding activities or active burrows detected.
Buteo regalis Ferruginous hawk	WL	Forages over grassland and shrubland; winters in W and SW N Amer, breeds in Great Basin and N plains.	Low. Wintering and migration only, suitable foraging habitat present, does not nest in region.

Table 6. Special-Status Wildlife: Potential for Occurrence in the Study Area			
Species	Status	Habitat and Distribution	Potential for Occurrence
Cypseloides niger Black swift	SSC	Breeds on cliffs, often at waterfalls.	Not Likely to Occur. No suitable cliff habitat.
Falco mexicanus Prairie falcon	WL	Inhabits dry, open terrain; nests on high cliffs; forages in a variety of open habitats.	High. Suitable foraging habitat in all reaches; known from several records in Project vicinity.
Lanius ludovicianus Loggerhead shrike	SSC	Pinyon-juniper, Joshua tree, riparian woodland, desert oases, scrub, and washes; prefers open areas with scattered perch sites and fairly dense shrubs and brush for nesting.	Present. Observed in the Study Area during several surveys; suitable habitat in all reaches.
Polioptila melanura Black-tailed gnatcatcher	SA	Desert shrublands, gen. nests in shrub thickets along washes; occas. in open scrub (esp. in winter).	High. Suitable habitat in all reaches; known from the immediate Project vicinity.
Pyrocephalus rubinus Vermilion flycatcher	SSC	Inhabits desert riparian adjacent to irrigated fields, irrigation ditches, pastures during nesting; nests in cottonwood, willow, mesquite, and other large desert riparian trees.	Moderate. No suitable nesting habitat in Study Area, may utilize the adjacent golf courses.
Toxostoma bendirei Bendire's thrasher	SSC	Local spring and summer resident; breeds in flat areas of desert succulent shrub and Joshua tree habitats in Mojave Desert area.	Present. Detected in the Study Area during 2013.
Toxostoma crissale Crissal thrasher	SSC, CVMSHCP	Desert riparian and desert wash habitats in southeastern deserts; nests in dense vegetation along streams and washes.	Low. Study Area supports marginal habitat; lacks dense thickets required for nesting; known from roughly 5 miles to the southeast.
Toxostoma lecontei Le Conte's thrasher	SSC (San Joaquin population only), CVMSHCP	Desert resident; primarily open desert wash, desert scrub, alkali desert scrub, desert succulent scrub; nests in dense, spiny shrubs or densely branched cacti.	High. Suitable habitat throughout, known from the Project vicinity. Nearest record is 0.8 miles west of Reach 1.
Mammals			
Chaetodipus fallax pallidus Pallid San Diego pocket mouse	SSC	Desert scrub, desert succulent scrub, pinyon and juniper woodland; prefers sandy, herbaceous areas, usually in association with boulders, rocks or coarse gravel.	Low. Marginally suitable habitat in Reaches 1 and 2. Known primarily from desert canyons in surrounding mountains.
Dipodomys merriami collinus Earthquake Merriam's kangaroo rat	SA	Interior mtns and valleys near W desert margin (Aguanga, San Felipe Val, etc.), sage scrub, chaparral, and grassland vegetation in adjacent upland areas, sandy-loam soils.	High. Suitable habitat present; known from immediate vicinity of Reach 4.
Eumops perotis californicus Western mastiff bat	SSC	Lowlands (with rare exceptions); central and S Calif, S Arizona, NM, SW Texas, N Mexico; roost in deep rock crevices, forage over wide area.	High. Likely to forage on site; low potential for roosting (minimal potential roosting habitat).
Lasiurus xanthinus Western yellow bat	SSC	Valley foothill riparian forest, desert riparian, desert wash, palm oasis; roosts in trees, particularly palms; forages over water and among trees.	High. Likely to forage on site; low potential for roosting (minimal potential roosting habitat).
Neotoma albigula venusta Colorado Valley woodrat	SA	Desert shrublands; SE Calif., SW Ariz., adj. Mexico, and southernmost Nevada; closely associated with beavertail or mesquite thickets.	Present. Sign of this species was detected on the Project.

Table 6. Special-Status Wildlife: Potential for Occurrence in the Study Area

Species	Status	Habitat and Distribution	Potential for Occurrence
Nyctinomops femerosaccus Pocketed free-tailed bat	SSC	Pine/juniper woodland, desert scrub, palm oasis, desert wash, desert riparian; roost in rocky areas with high cliffs.	High. Likely to forage on site; no potential for roosting.
Nyctinomops macrotis (Tadarida molossa) Big free-tailed bat	SSC	Roosts in crevices of rocky cliffs, scattered localities in W N America through Central America; ranges widely from roost sites; often forages over water.	High. Likely to forage on site; no potential for roosting.
Ovis canadensis nelsoni Nelson's bighorn sheep	FP	Open shrublands and conifer forest, remote mountains; scattered populations in desert mountains and surrounding ranges, incl. Transverse and Peninsular ranges.	Low. Suitable foraging habitat; known from the Indio Hills to the northeast of the Study Area.
Perognathus longimembris bangsi Palm Springs pocket mouse	SSC, CVMSHCP	Desert riparian, desert scrub, desert wash, sagebrush; most common in creosote-dominated desert scrub.	High. Suitable habitat in all reaches; not observed; recorded in immediate Project vicinity. Areas of the Coachella valley Preserve adjacent to and near the Project are mapped as habitat in the CVMSHCP.
Taxidea taxus American badger	SSC	Most abundant in drier, open stages of shrub, forest, and herbaceous habitats; requires friable soils and open uncultivated ground for burrowing.	High. Suitable habitat in all reaches; no sign observed.
Vulpes macrotis arsipus Desert kit fox	PFM	Arid areas with grasslands, agricultural lands, or scrub areas with scattered shrubby vegetation. Requires open, level areas with loose-textured, sandy loamy soils for digging dens. Arid portions of the southwestern United States and northern and central Mexico.	High. Suitable vegetation in all reaches, but friable soil is limited to Reaches 1 through 3; no sign observed.
Xerospermophilus tereticaudus chlorus Palm Springs (=Coachella Valley) round-tailed ground squirrel	SSC, CVMSHCP	Restricted to Coachella Valley; desert succulent scrub, desert wash, desert scrub, alkali scrub, and levees; prefers open, flat, grassy areas in fine-textured, sandy soils.	Present. Observed during 2010 survey at Edom Hill and during 2013 survey in Reach 1; primarily associated with scattered braided channels throughout area.

Conservation Status

Federal (Fed.) Designations:

FE: Federally listed, endangered.
FT: Federally listed, threatened.
BGEPA: Bald and Golden Eagle Protection Act

***State (Calif.) Designations*:**

SE: State listed, endangered.
ST: State listed, threatened.
SCan: State candidate for listing
SSC: State species of special concern
FP: Fully Protected Species
PFM: Protected fur-bearing mammal.

Coachella Valley Multi Species Habitat Conservation Plan (CVMSHCP) Covered Species.

Species for which take authorization is provided through the permits issued in conjunction with the CVMSHCP implementing agreement.

5.4.3 Special-status Wildlife – Species Accounts

Federal and State-listed Wildlife Species

One federally listed threatened and state-listed endangered wildlife species, Coachella Valley fringe-toed lizard, was observed within the Study Area, and is described below. Desert tortoise and flat-tailed horned lizard were not observed during surveys, but are of particular interest in this area, and are described below. Seven of the listed wildlife species known from the region are not likely to occur in the Study Area, and one has a low potential for occurrence. These species are not addressed further in this report; see Table 6.

Coachella Valley fringe-toed lizard

Status: The Coachella Valley fringe-toed lizard (*Uma inornata*; CVFTL) is a federally listed threatened species and a state-listed endangered species. It is also covered under the CVMSHCP. Unless otherwise indicated, information on CVFTL biology and population status presented below is summarized from USFWS (2010a).

General Distribution: CVFTL is found only in the Coachella Valley in blowsand habitat and in sandy inter-dune areas of aeolian sand hummock habitat. It is highly adapted to "swim" through sand, and will burrow into loose sand to escape predators and also to seek relief from high temperatures at the surface. CVFTL prefers fine sands with low compaction and deeper sand deposits with topographic relief. Implementation of the CVMSHCP created four conservation areas in the Coachella Valley that support CVFTL habitat: Thousand Palms, Whitewater Floodplain, Willow Hole, and Edom Hill. The Project site is adjacent to the Thousand Palms Conservation Area.

Distribution in the Study Area: The California Natural Diversity Data Base reports numerous CVFTL occurrences in the vicinity of each Project Reach (see Figure 7). Moderate to high suitability habitat for the CVFTL is found in and around windblown sand located in Reaches 3 and 4 (see Figures 8a, 8b, and 8c). Reaches 1 and 2 are considered low suitability for CVFTL due to lack of windblown sand habitat, and there we no reports of CVFTL in the vicinity of these reaches during monitoring for the adjacent transmission line project (SCE, 2013). Apparently, windblown sand habitat formerly in this area has shifted toward the southeast in the years since the observations reported in the CNDDB were made (see discussion sand movement, above). The highest suitability habitat is in the large dunes located in Reach 4 and portions of Reach 3. Surveys conducted for this Project detected several CVFTL within Reach 4 and the adjacent sand deposition area as recently as 2013.

Portions of the Project site are within designated critical habitat for Coachella Valley fringe-toed lizard (USFWS, 1985; see Figure 3). Portions of the designated critical habitat, including the habitat in Reaches 1 and 2, are not expected to support CVFTL. Instead, these areas were designated as critical habitat due to their role as a sand source, to supply occupied habitat farther downwind (USFWS, 1985; USFWS, 2013).. Based on field surveys and habitat assessments conducted for the Project, this portion of the designated critical habitat is not expected to be occupied by CVFTL.

Habitat and Habitat Associations: This species is strongly associated with blowsand habitats such as active dunes and sand hummocks. It is often found in sandy inter-dune areas consisting of aeolian sand hummock habitat, although these areas likely function as foraging habitat and as connections between dunes or blowsand areas that would otherwise be isolated.

Natural History: CVFTL is generally active from March through mid-November, with most activity from April through October. This lizard eats leaves, flowers, ants, and other insects. Vegetation in high CVFTL use areas includes four-winged saltbush (*Atriplex canescens*), Russian thistle (*Salsola tragus*), and twinbugs (*Dicoria* sp.).

The Thousand Palms Conservation Area contains the largest amount of remaining contiguous habitat for CVFTL and probably the most robust population of the species. Within this conservation area, 901 acres of lands are designated as critical habitat. Total CVFTL habitat in this conservation area is approximately 1,850 acres.

There are several CNDDB records of CVFTL in and near the Thousand Palms Conservation Area. Results of monitoring in the conservation area suggest that populations of CVFTL fluctuate with annual precipitation. During droughts, population numbers fall to near zero, but rebound during years of average rainfall.

Threats: Threats to CVFTL are construction of windbreaks and resulting obstruction of sand transport systems, urban and agricultural growth, non-native invasive plants, and OHV use.

Desert tortoise

Status: The desert tortoise (*Gopherus agassizii*) is federally and state-listed as threatened and is covered by the CVMSHCP.

General Distribution: The desert tortoise is an herbivorous reptile that occurs in the Mojave and Sonoran Deserts in southern California, southern Nevada, Arizona, and the southwestern tip of Utah, as well as Sonora and northern Sinaloa in Mexico. The designated Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS, 2011a). Desert tortoises east and south of the Colorado River are now recognized as a distinct species, Morafka's desert tortoise (*G. morafkai*).

Distribution in the Study Area: The Study Area lies within the known range of the desert tortoise, although desert tortoises are very uncommon on the floor of the Coachella Valley, including the Project site and surrounding area. The CVMSHCP habitat models for desert tortoise do not include the Project site. Suitable habitat occurs in all the reaches, although much of this habitat is only marginally suitable due to fine sandy soil that will not support burrows, proximity to development and roads, and OHV use. The nearest documented occurrence of desert tortoise is just east of the Study Area, within the Thousand Palms Conservation Area, where they have been observed infrequently (CDFW, 2016a; see Figure 7). Protocol surveys for desert tortoise were not conducted for the Project (see Methods, Section 4.5). However, all other surveys in the Study Area were conducted by biologists with desert tortoise experience, and any tortoise sign identified were noted. Several burrows which may have been unoccupied desert tortoise burrows but could not be definitively attributed to desert tortoise, were found in the Reach 1 portion of the Study Area during reconnaissance surveys. No live tortoises, carcasses, scat, tracks, eggshell fragments, or other tortoise sign was observed. Desert tortoise has a moderate potential for occurrence in the Study Area, although, if present, it would be found only in low numbers.

Habitat and Habitat Associations: The desert tortoise occupies a variety of habitats from flats and slopes, typically characterized by creosote bush scrub at lower elevations, to rocky slopes in blackbrush scrub and juniper woodland ecotones (transition zones) at higher elevations. Throughout most of the Mojave Desert, tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and where there is are herbaceous (non-woody) plants and sparse cover of low-growing shrubs. However, surveys at the Nevada Test Site revealed that tortoise sign (e.g., scat, burrows, tracks, shells) was more abundant on upper alluvial fans and lower mountain slopes than on the valley bottom. Soils must be friable (easily crumbled) enough for digging burrows, but firm enough so that burrows do not collapse.

Natural History: During the winter, tortoises will opportunistically use burrows of various lengths, deep caves, rock and caliche crevices, or overhangs for cover. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter; these burrows are often shallowly excavated and run parallel to the surface of the ground (USFWS, 2011a).

Threats: Threats to the desert tortoise include degradation and loss of habitat (including through the spread of nonnative invasive plants), disease, coyote or feral dog predation, raven predation on juvenile tortoises, collection for the pet trade, and direct mortality and crushing of burrows by off-highway vehicles.

Flat-tailed horned lizard

Status: The flat-tailed horned lizard (*Phrynosoma mcallii*) is a candidate for state listing as endangered and a CDFW Species of Special Concern, and is covered by the CVMSHCP. It has been proposed for federal listing but those proposals have been withdrawn because threats to the species are not as significant as earlier believed (USFWS, 2011c).

General Distribution: The flat-tailed horned lizard's historic range extends throughout much of southeastern California, southwestern Arizona, northwestern Sonora and northeastern Baja California, Mexico. Populations are becoming isolated from one another by development.

Distribution in the Study Area: The only remaining populations of flat-tailed horned lizards in the Coachella Valley are on the Coachella Valley Preserve and CVNWR, and much further south at the Dos Palmas Preserve (Barrows et al. 2008). The Study Area provides suitable habitat for flat-tailed horned lizard in Reaches 3 and 4. The closest record is immediately adjacent to Reaches 3 and 4 (CNDDB 2016; see Figure 7). The flat-tailed horned lizard has a high potential for occurrence in the Study Area.

Habitat and Habitat Associations: The flat-tailed horned lizard occurs in low elevation desert, generally with high temperatures as well as low rainfall and humidity (CVAG, 2007). It often is found in windblown sand habitat, but also may be found in washes and on sandy bajadas.

Natural History: The flat-tailed horned lizard is a medium sized, flat-bodied lizard with a wide, oval-shaped body and scattered enlarged pointed scales on the upper body and tail. Flat-tailed horned lizards lay one to two clutches of 3 to 10 eggs per clutch from May through early July (Nafis, 2015). They primarily eat native harvester ants (*Pogonmyrmex* spp.), which are estimated to comprise about 98 percent of their diet (CVAG, 2007). The flat-tailed horned lizard digs burrows to escape the heat and for winter hibernation. Defense tactics used by this species include remaining motionless to utilize its cryptic appearance (CVAG, 2007).

Threats: Threats to this species include increased mortality and loss of habitat. These are generally the result of agricultural development, urban development, expansion of utility corridors, and OHV use. Additional threats are from increased predation by household pets, as well as native avian predators that take advantage of artificial perch sites (e.g., utility poles, fence posts) created by development (CVAG, 2007).

Other Special-status Wildlife Species

Five non-listed special-status wildlife species were observed in the Study Area, and are described below. Sixteen non-listed special-status wildlife species were not observed during surveys, but have a high or moderate potential for occurrence in the Study Area. These species are described in Attachment D. Six of the non-listed special-status wildlife species known from the region are not likely to occur in the Study Area, and three have a low potential for occurrence. These species are not addressed further in this report; see Table 6. Other listed wildlife species that have a medium or high potential to occur within the Survey Area are described in Attachment D.

Burrowing owl

Status: The burrowing owl (*Athene cunicularia*) is a CDFW Species of Special Concern and is covered by the CVMSHCP. It is not federally or State listed as threatened or endangered.

General Distribution: The burrowing owl breeds from western Canada, south through portions of the western, central, and southeastern U.S., and south to central Mexico. The western subspecies, western burrowing owl, occurs throughout North and Central America west of the eastern edge of the Great Plains south to Panama. The winter range of the western burrowing owl is much the same as the breeding range, except that most individuals apparently vacate the northern areas of the Great Plains and the Great Basin.

Distribution in the Study Area: Suitable habitat is present throughout the Study Area. Individual burrowing owls have been detected in the Reach 1 portion of the Study Area (CNDDB 2016; see figure 3.6-8) and during field surveys for the Project. Burrowing owls are generally uncommon in the region during winter, and scarce during breeding season. Occupied burrows could occur in the Study Area at any time of year, especially in the vicinity of Reaches 1 and 2, where stable soil structure would support burrows. They are less likely to be found in the sandy areas of Reaches 3 and 4. Burrowing owls, if present in the area, would be more likely during winter than during the spring or summer breeding season.

Habitat and Habitat Associations: In California, western burrowing owls are yearlong residents of flat, open, dry grassland and desert habitats at lower elevations (Bates, 2006). They primarily inhabit annual and perennial grasslands and scrublands characterized by low-growing vegetation and also may occur in areas that include scattered trees and shrubs if the cover is less than 30 percent (Bates, 2006). Although western burrowing owls prefer large, contiguous areas of treeless grasslands, they have also been observed in fallow agriculture fields, golf courses, cemeteries, road shoulders, airports, vacant lots in residential areas and university campuses, and fairgrounds when nest burrows are present (Bates 2006). The availability of numerous small mammal burrows, such as those of California ground squirrel (*Spermophilus beecheyi*), is a major factor in determining whether an area with apparently suitable habitat supports western burrowing owls (Coulombe, 1971).

Natural History: The majority of western burrowing owls that breed in Canada and the northern United States are believed to migrate south during September and October and north during March and April, and into the first week of May. These individuals winter within the breeding habitat of more southern-located populations. Thus, winter observations may include both the migrant individuals as well as the resident population. Western burrowing owls breeding in southern California are predominantly non-migratory (Thomsen, 1971). Western burrowing owls breeding in northern California are believed to migrate (Coulombe, 1971). In many parts of the United States, the western burrowing owl's breeding range has been reduced and it has been extirpated from certain areas (Bates, 2006).

Western burrowing owls are opportunistic feeders, primarily feeding on arthropods, small mammals, and birds, and often need short grass, mowed pastures, or overgrazed pastures for foraging. Western burrowing owls are primarily crepuscular in their foraging habits but hunting has been observed throughout the day (Thomsen, 1971; Marti, 1974). Insects are often taken during daylight, whereas small mammals are taken more often after dark.

Threats: Factors related to declines in western burrowing owl populations include the loss of natural habitat due to urban development and agriculture; other habitat destruction; predators, including domestic dogs; collisions with vehicles; and toxins such as agricultural pesticides and rodenticides used for poisoning of ground squirrels (Grinnell and Miller, 1944; Zarn, 1974; Remsen, 1978). A ranking of the most important threats to the species included loss of habitat, reduced burrow availability due to rodent control, and pesticides (James and Espie, 1997).

Loggerhead shrike

Status: The loggerhead shrike (*Lanius ludovicianus*) is a CDFW Species of Special Concern. It is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: The loggerhead shrike is found in southern Canada through Mexico, and breeds through most of its range. (Cornell, 2015)

Distribution in the Study Area: Loggerhead shrike was observed within the Study Area. The Study Area is located within the known geographic range for this species and suitable foraging habitat occurs throughout the Study Area; suitable breeding habitat is present throughout the Study Area. Loggerhead shrike is expected to occur occasionally throughout the Project site.

Habitat and Habitat Associations: Loggerhead shrikes are generally found in open habitats with scattered shrubs and trees (Cornell, 2015).

Natural History: Loggerhead shrikes often build nests in thick and thorny vegetation, including piles of tumbleweeds. These shrikes are generally insectivores, but are known to hunt larger prey, and may impale the prey on thorns and fences (Cornell, 2015).

Threats: The primary threat to loggerhead shrike is habitat loss.

Bendire's thrasher

Status: Bendire's thrasher (*Toxostoma bendirei*) is a CDFW Species of Special Concern. It is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: Generally throughout much of Arizona and Sonora (Mexico), with scattered occurrences west through much of southern California. Within California, primarily found in Colorado Desert east of the Project site, but also occurs westward nearer the coast. California and northern Arizona populations are migratory, though Bendire's thrasher is found throughout the year in in southern Arizona and adjacent parts of Mexico.

Distribution in the Study Area: This species was detected within the Study Area in March 2013. Suitable habitat is present on site. The Project site is west of its primary geographic distribution, and Bendire's thrasher is expected to occur in the area only occasionally and in low numbers.

Habitat and Habitat Associations: Its habitat requirements are poorly understood, but it is generally associated with *Yucca* (e.g., Joshua tree) and *Opuntia* or *Cylindropuntia* (e.g., cholla cacti) species on gently sloping terrain. Soil texture is apparently important to habitat suitability. Hard rocky soils (e.g., desert pavement) and loose sands (e.g., dry wash sands) are apparently less suitable than firmly packed, fine-textured soils.

Natural History: Bendire's thrasher eats mainly ground-dwelling insects, but also forages for seeds and berries. It actively forages on the ground by poking and probing through plant litter, and digs in the soil with its bill (Cornell, 2015).

Threats: Threats to this species are not well understood, although populations appear to be undergoing a rapid decline. Threats may include habitat destruction and degradation resulting from expansion of agriculture and development (IUCN, 2015).

Colorado Valley woodrat

Status: The Colorado valley woodrat (*Neotoma albigula venusta*) is a CDFW Special Animal. It is not federally or State listed, and is not covered by the CVMSHCP.

General Distribution: Colorado Valley woodrats are found from the southeastern corners of Nevada and California, southern Utah, Arizona, southwestern Colorado, western Texas, and south to central Mexico. The Colorado valley woodrat is found within the Colorado River valley in western Arizona, south to Sonora and Baja California, Mexico (Ulev, 2008).

Distribution in the Study Area: Evidence of this species (an active burrow) was detected within the Study Area. Suitable habitat is found in scattered locations of all project reaches, where mesquite or other shrubs of the legume family (palo verde or catclaw acacia) provide food and cover. Colorado Valley woodrat could occur in and around these area throughout the Project site.

Habitat and Habitat Associations: In California, Colorado Valley woodrat is found in mesquite-creosote bush shrublands.

Natural History: This woodrat is generally associated with creosote bush, mesquite, cacti, catclaw acacia, and paloverde, which are the primary source of both food and cover. It uses locally available material to build middens (piles of sticks and other debris used as a shelter), with a strong preference for cacti. Primarily herbivorous, it also occasionally eats insects such as beetles and ants (Ulev, 2008)

Threats: Habitat loss resulting from livestock grazing is considered a threat to this species, as well as the use of herbicides, and climate change (Ulev, 2008).

Palm Springs round-tailed ground squirrel

Status: Palm Springs round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*; also called Coachella Valley round-tailed ground squirrel) is a CDFW Species of Special Concern, and is covered by the CVMSHCP. It was a candidate for federal listing as threatened or endangered prior to 2010, when it was removed from the list of candidates (USFWS, 2010b). Based on research that indicated a larger range and broader habitat requirements than previously known; the protected habitat in Death Valley National Park; and ongoing conservation efforts in the Coachella Valley, the USFWS concluded that the species no longer warranted candidate status.

General Distribution Until recently, it was believed to be limited in range to the Coachella Valley region. Recent research indicates that its range is substantially larger, extending at least 150 miles northward to Hinkley Valley and Death Valley.

Distribution in the Study Area: This species was detected within the Reaches 1 and 2 of the Study Area in March 2013. Active burrows for this species were also detected within Reach 1 in 2013. Suitable habitat is present within all reaches of the Study Area.

Habitat and Habitat Associations: This species' primary habitat is honey mesquite (*Prosopis glandulosa*) hummocks and associated sand dunes and, to a lesser extent, dunes and hummocks associated with creosote bush or other vegetation.

Threats: The primary threats to its habitat are land use changes and groundwater pumping, both of which have eliminated much of the honey mesquite from the Coachella Valley area. These effects are important within the Coachella Valley, but less so throughout the remainder of the species' range.

5.5 Jurisdictional Delineation

Approximately 31.55 acres of potentially jurisdictional waters were identified within the Study Area. All of the jurisdictional features mapped within the Study Area are characterized as ephemeral desert dry washes. These washes meet criteria as non-wetland waters of the United States and CDFW jurisdictional waters of the State. See the *Preliminary Jurisdictional Waters/Wetlands Delineation Report* for the Project (Attachment E) for a detailed description of delineation methodology and results.

6.0 REFERENCES

Arjo, W.M., T.J. Bennett, and A.J. Kozlowski. 2003. Characteristics of Current and Historical Kit Fox (*Vulpes macrotis*) Dens in the Great Basin Desert. *Canadian Journal of Zoology* 81:96–102.

Audubon. 2015. Online Guide to North American Birds. Online: http://www.audubon.org/field-guide/bird/

Baldwin, B.G., S. Boyd, B.J. Ertter, R.W. Patterson, T.J. Rosatti, D. Wilken, and M. Wetherwax (eds.). 2002. The Jepson Desert Manual: Vascular Plants of Southeastern California. University of California Press, Berkeley, California. 624 pp.

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, D.H. Wilken (eds.) 2012. The Jepson Manual: Vascular Plants of California, 2nd ed. University Press, Berkeley, California.

Barrows C.W., K.L. Preston, J.T. Rotenberry, M.F. Allen. 2008. Using occurrence records to model historic distributions and estimate habitat losses for two psammophilic lizards. Biological Conservation 141:1885-1893.

Barrows, C.W. and Murphy, M. 2010. Sahara Mustard in the Desert Southwest: Impacts to Biodiversity. California Invasive Plant Council 2010 Symposium — Weeds and Wildlife: Impacts and Interactions. Online: http://www.cal-ipc.org/symposia/archive/pdf/2010/5Murphy.pdf

Bates, C. 2006. "Burrowing Owl (*Athene cunicularia*)." in *The Draft Desert Bird Conservation Plan*: A Strategy for Reversing the Decline of Desert-Associated Birds in California. California Partners in Flight. Online: http://www.prbo.org/calpif/htmldocs/desert.htm

Bureau of Land Management (BLM). 2009. Survey protocols required for NEPA/ESA compliance for BLM special-status plant species. California State Office, Sacramento.

Cal-IPC (California Invasive Plant Council). 2015. Invasive Plant Inventory, online. Accessed July 2015. Online: http://www.cal-ipc.org/paf/

CBOC (California Burrowing Owl Consortium). 1993. Burrowing owl survey protocol and mitigation guidelines. Alviso, California. 13 pp.

CDFG (California Department of Fish and Game). 2009. Protocols for surveying and evaluating impacts to special-status native plant populations and natural communities. CDFG, Sacramento, Calif., 7 pp. Online: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/Protocols_for_Surveying_and_Evaluating_Impacts.pdf

_____. 2010. Hierarchical List of Natural Communities with Holland Types. Vegetation Classification and Mapping Program, CDFG, Sacramento. September. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=24716&inline=1

_____. 2012. Staff Report on Burrowing Owl Mitigation. Online: http://www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf

CDFW (California Department of Fish and Wildlife). 2015a. State and Federally Listed Endangered and Threatened Animals of California. July. Online: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/teanimals.pdf

_____. 2015b. Special Animals List. July. Online: https://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf

_____. 2015c. State Laws, Regulations, and Policy for the Incidental Take of State Listed Species under the California Endangered Species Act (CESA). Accessed July 16, 2015. https://www.wildlife.ca.gov/Conservation/CESA/Code-Regulations

_____. 2015d. Special Vascular Plants, Bryophytes, and Lichens List. July. Online: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spplants.pdf

_____. 2016. California Natural Diversity Database (CNDDB), Rarefind, Version 3.1.1. Heritage section, CDFG, Sacramento. July.

CNPS (California Native Plant Society). 2016. Inventory of rare and endangered plants. California Native Plant Society. Sacramento. Accessed October 2016. Online: http://www.cnps.org/inventory.

CVAG (Coachella Valley Association of Governments). 2007. Final Recirculated Coachella Valley Multiple Species Habitat Conservation Plan. Online: http://www.cvmshcp.org/Plan_Documents.htm

CCH (Consortium of California Herbaria). 2015. Botanical specimen data provided by the participants of the Consortium of California Herbaria. Accessed July 2015. Online: http://ucjeps.berkeley.edu/consortium/

Cornell (Cornell Laboratory of Ornithology). 2015. All About Birds. Accessed July 2015. http://www.allaboutbirds.org/page.aspx?pid=1189

Coulombe, H.N. 1971. Behavior and Population Ecology of the Burrowing Owl, *Speotyto cunicularia*, in the Imperial Valley of California. *Condor* 73:162–176.

CVCC (Coachella Valley Conservation Commission). 2013. Coachella Valley Multiple Species Habitat Conservation Plan & Natural Community Conservation Plan, Biological Monitoring Program, Draft 2012-2013 Year-End Report. Prepared by the University of California Riverside's Center for Conservation Biology for the Coachella Valley Conservation Commission. June 30.

Dixon, J. B. 1937. The golden eagle in San Diego County, California. Condor 39:49-56.

Erikson, R.A. and M.A. Patten. 1999. Identification and distribution of spiny pocket mice (*Chaetodipus*) in cismontane southern California. Bulletin of Southern California Academy of Sciences 98:57-65.

Garrett, K., and J. Dunn. 1981. Birds of Southern California. Los Angeles Audubon Society. 408pp.

Gibson. A. C., M. R. Sharifi and P. W. Rundel. 2004. Resprout characteristics of creosote bush (*Larrea tridentata*) when subjected to repeated vehicle damage. Journal of Arid Environments 57: 411-429.

Grinnell, J., and A.H. Miller. 1944. The Distribution of the Birds of California. Pacific Coast Avifauna Number 27. Berkeley, California: Copper Ornithological Club. Reprinted in Lee Vining, California: Artemisia Press. April 1986.

Hall, E.R. 1981. The Mammals of North America. 2 Vol. New York, New York: John Wiley and Sons, Inc.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished report, Non-game Heritage Program, California Department of Fish and Game, Sacramento. 156 pp.

IUCN (International Union for Conservation of Nature). 2015. IUCN Red List of threatened species: *Toxostoma bendirei* (Bendire's thrasher). Accessed July 2015. http://www.iucnredlist.org/details/22711108/0

James, P.C. and R.H.M. Espie. 1997. Current status of the burrowing owl in North America: An agency survey. J. Raptor Res. Rep. 9:3-5.

Johnsgard, P. A. 1990. Hawks, eagles and falcons of North America: biology and natural history. Smithsonian Institution Press, Washington and London. 403 pp.

Kearney, T.H. and R.H. Peebles. 1951. Arizona flora. Second edition with supplement by J.T. Howell, E. McClintock and collaborators. 1960. University of California Press. Berkeley, California. pp. 463.

Laudenslayer, W.F., Jr. 1988. Desert wash. Pages 112-113 in K.E. Mayer & W.F. Laudenslayer (eds.), A guide to wildlife habitats of California. California Dept. of Forestry and Fire Protection, Sacramento, Calif. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67378&inline=1

Laudenslayer, W.F., Jr. and J.R. Boggs. 1988. Desert scrub. Pages 114-115 in K.E. Mayer & W.F. Laudenslayer (eds.), A guide to wildlife habitats of California. California Dept. of Forestry and Fire Protection, Sacramento, Calif. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67380&inline=1

Lindzey, F.G. 1978. Movement patterns of badgers in Northwestern Utah. Journal of Wildlife Management 42:418–422.

Long, C.A. 1973. *Taxidea taxus*. Mammalian Species 26: 1-4. Published by the American Society of Mammalogists.

Lovich, J. E., and D. Bainbridge. 1999. Anthropogenic Degradation of the Southern California Desert Ecosystem and Prospects for Natural Recovery and Restoration. Environmental Management Vol. 24, No. 3, pp. 309–326.

McBride, J.R. and C. Reid. 1988. Urban. Pages 142-143 in K.E. Mayer & W.F. Laudenslayer (eds.). A guide to wildlife habitats of California. California Dept. of Forestry and Fire Protection, Sacramento, Calif. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67420&inline=1

McGrew, J.C. 1979. *Vulpes macrotis*. Mammalian Species 123:1–6. American Society of Mammalogists.

Marti, C.D. 1974. Feeding ecology of four sympatric owls. Condor 76:45-61.

Messick, J.P. and M.G. Hornocker. 1981. Ecology of the badger in southwestern Idaho. Wildlife Monographs 76: 1-53.

Murdock, A. 2012. *Abronia*. Pages 917-918 in B.G. Baldwin, D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, D.H. Wilken, eds., The Jepson Manual: Vascular Plants of California, 2nd ed. University Press, Berkeley, California. 1568 pp.

Nafis, G. 2015. A Guide to the Amphibians and Reptiles of California: flat-tailed horned lizard. Accessed July 2015. Online: http://www.californiaherps.com/lizards/pages/p.mcallii.html

O'Farrell, T.P and L. Gilbertson 1986. Ecology of the Desert Kit Fox in the Mojave Desert. Bulletin of the Southern California Academy of the Sciences. 85:1-15.

Penrod, K., P. Beier, E. Garding, and C. Cabañero. 2012. A Linkage Network for the California Deserts. Produced for the Bureau of Land Management and The Wildlands Conservancy. Produced by Science and Collaboration for Connected Wildlands, Fair Oaks, CA and Northern Arizona University, Flagstaff, Arizona. Online: http://www.scwildlands.org/reports/ALinkageNetworkForTheCaliforniaDeserts.pdf

Remsen, J.V. 1978. Bird species of Special Concern in California, an Annotated List of Declining or Vulnerable Bird Species. California Dept. of Fish and Game, Nongame Wildlife Investigation Project PR W-54-R-9, Report No. 78-1. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=10283

Roberts, F.M., S.D. White, A.C. Sanders, D.E. Bramlet, and S. Boyd. 2004. Vascular Plants of Western Riverside County, California: An annotated checklist. F.M. Roberts Publications, San Luis Rey, California.

Rowlands, P.G. 1988. Alkali desert scrub. Pages 116-117 in K.E. Mayer & W.F. Laudenslayer (eds.). A guide to wildlife habitats of California. California Dept. of Forestry and Fire Protection, Sacramento, Calif. Online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67382&inline=1

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. Manual of California Vegetation, 2nd ed. California Native Plant Society, Sacramento, California. 1300 pp.

Shreve, F. & I. L. Wiggins, 1964. Vegetation and flora of the Sonoran Desert, 2 vols. Stanford Univ. Press, Stanford, California.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration. Online: http://www.dfg.ca.gov/habcon/connectivity/

Stephenson, J.R.; Calcarone, G.M. 1999. Southern California mountains and foothills assessment: Habitat and species conservation issues. General Technical Report GTR-PSW-175. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Tannerfeldt, M., A. Moehrenschlager, and A. Angerbjörn. 2003. Den Ecology of the Swift, Kit, and Artic Foxes: A Review. In Ecology and Conservation of Swift Foxes in a Changing World. Edited by M.A. Sovada and L.N. Carbyn, 167–181. Regina, Sask.: Canadian Plains Research Center.

Thelander, C. G. 1974. Nesting territory utilization by golden eagles (Aquila chrysaetos) in California during 1974. Spec. Wild. Investigations. California Department of Fish and Game, Sacramento.

Thomsen, L. 1971. Behavior and Ecology of Burrowing Owls on the Oakland Municipal Airport. *Condor* 73:177–192.

Ulev, E. 2008. *Neotoma albigula*. In Fire Effects Information System [online]. U.S. Department of Agriculture Forest Service: Rocky Mountain Research Station Fire Sciences Laboratory. Accessed July 2015. Online: http://www.fs.fed.us/database/feis/animals/mammal/neal/all.html

USACE (U.S. Army Corps of Engineers). 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. Noble. ERDC/EL TR-08-28. U.S. Army Engineer Research and Development Center. Vicksburg, MS.

_____. 2000. Whitewater River Basin (Thousand Palms) Flood Control Project. Final Environmental Impact Statement / Environmental Impact Report. September.

_____. 1987. Wetlands Delineation Manual. Wetlands Research Program Technical Report Y-87-1. January. Online: http://www.swl.usace.army.mil/Portals/50/docs/regulatory/wlman87.pdf

USDA (U.S. Department of Agriculture). 2011. Invasive Species Management. Forest Service Manual: FSM 2900. Online: http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2900!..

USFWS (U. S. Fish and Wildlife Service). 2013. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Astragalus lentiginosus var. coachellae* (Coachella Valley Milk-Vetch). Federal Register 78(30): 10450-10497. Online: http://www.gpo.gov/fdsys/pkg/FR-2013-02-13/pdf/2013-03109.pdf

_____. 2011a. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Region 8, Pacific Southwest Region, Sacramento, California. May 6. Online:

http://ecos.fws.gov/docs/recovery_plan/RRP%20for%20the%20Mojave%20Desert%20Tortoise%20-%20May%202011_1.pdf

_____. 2011b. Habitat Conservation Plans under the Endangered Species Act. https://www.fws.gov/endangered/esa-library/pdf/hcp.pdf

_____. 2011c. Endangered and Threatened Wildlife and Plants; Withdrawal of Proposed Rule to List the Flat-Tailed Horned Lizard as Threatened. Federal Register 76 FR 14209, page 14209 -14268. Online: https://federalregister.gov/a/2011-5411

_____. 2010a. Coachella Valley fringe-toed lizard 5-year review. Online: http://ecos.fws.gov/docs/five_year_review/doc3562.pdf

_____. 2010b. Palm Springs ground squirrel in Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions. Federal Register. Vol. 75, No. 217. November 10, 2010. Online: http://www.gpo.gov/fdsys/pkg/FR-2010-11-10/pdf/2010-27686.pdf#page=2

_____. 1985. Coachella Valley Fringe-toed Lizard Recovery Plan. Online: http://ecos.fws.gov/docs/recovery_plan/850911b.pdf

Wehausen, J.D. 1998. Nelson Bighorn Sheep Ovis canadensis nelsoni. Published by the BLM. Online: http://www.blm.gov/ca/pdfs/cdd_pdfs/Bighorn1.PDF

WBWG (Western Bat Working Group). 2015. Western Bat Working Group Species Accounts. Online: www.wbwg.org. Accessed April 2015.

Western Regional Climate Center (WRCC). 2015. Palm Springs (Station No. 046635), California. Accessed May 2015. Online: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caplms+sca

_____. 2016. Indio Fire Station (Station No. 044259), California. Accessed Oct 2016. Online: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca4259

White, P.J., K. Ralls, and R.A. Garrott. 1994. Coyote–Kit Fox Interactions as Revealed by Telemetry. Abstract. Canadian Journal of Zoology 72:1831–1836.

White, P.J., K. Ralls, and C.A. Vanderbilt White. 1995. Overlap in Habitat and Food Use between Coyotes and San Joaquin Kit Foxes. Southwestern Naturalist 40:342–349.

Williams, D.F. 1986. Mammalian species of concern in California. California Department of Fish and Game Report 86-91. Sacramento, CA: California Department of Fish and Game.

Wojciechowski, M.F., and R. Spellenberg. 2012. Astragalus: Coachella Valley milk-vetch. Pp. 744. In: Baldwin, B.G, D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (eds.). The Jepson manual – vascular plants of California, second edition. University of California Press, Berkeley.

Zarn, M. 1974. Burrowing Owl (*Speotyto cunicularia hypugaea*). Habitat Management Series for Unique or Endangered Species, Report No.11, T-N-250, Bureau of Land Management, Denver, Colorado. 25 pp.

Zeiner, D.C.; Laudenslayer, W.F., Jr.; Mayer, K.E.; White, M., eds. 1990a. California's Wildlife: Volume II: Birds. California Statewide Wildlife Habitat Relationship System. State of California, the Resources Agency, CDFW. Sacramento, CA.

_____. 1990b. California's Wildlife. Volume III, Mammals. California Statewide Wildlife Habitat Relationship System. State of California, the Resources Agency, CDFW. Sacramento, CA.

Figures

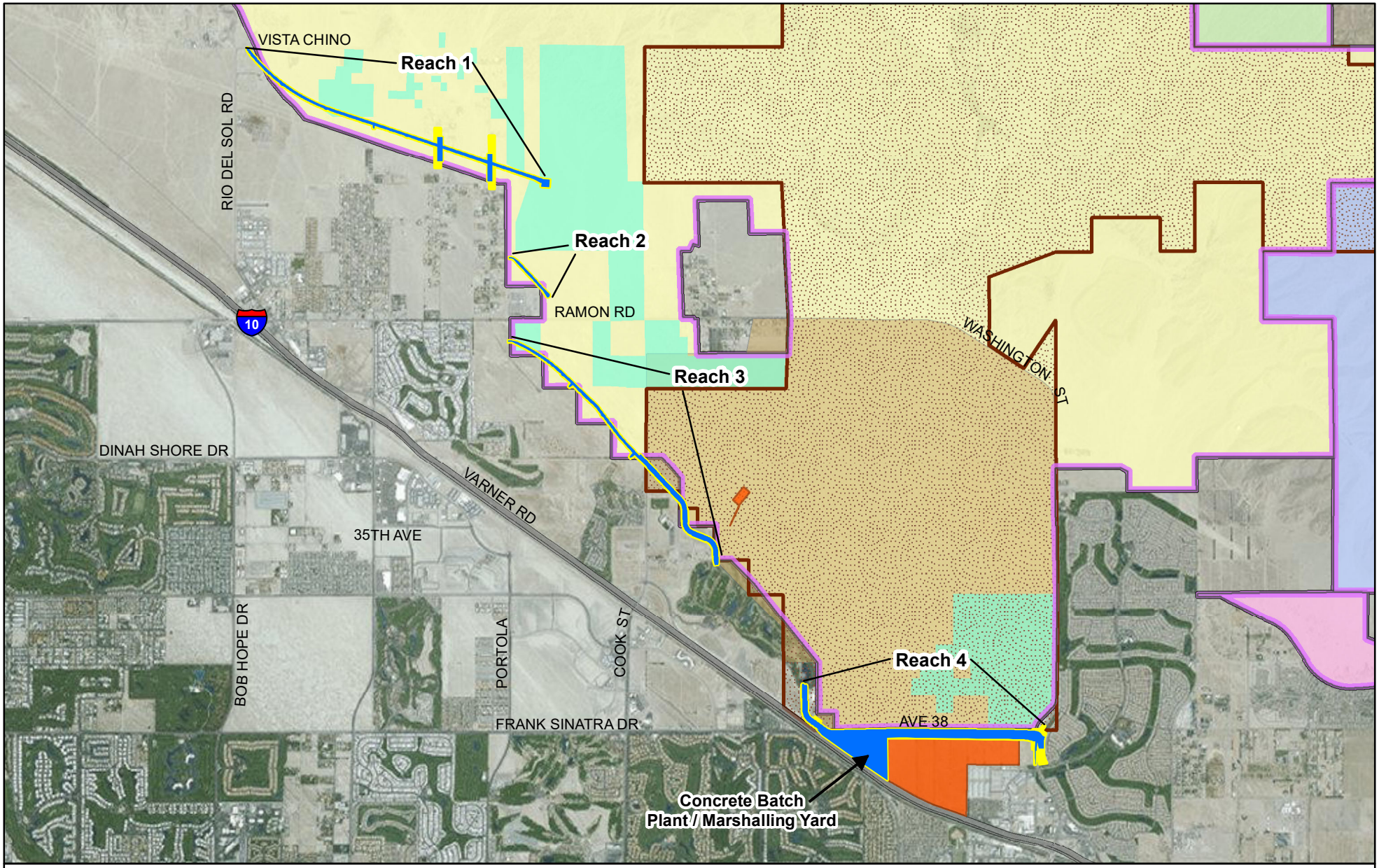


Figure 1

Proposed Project Alignment

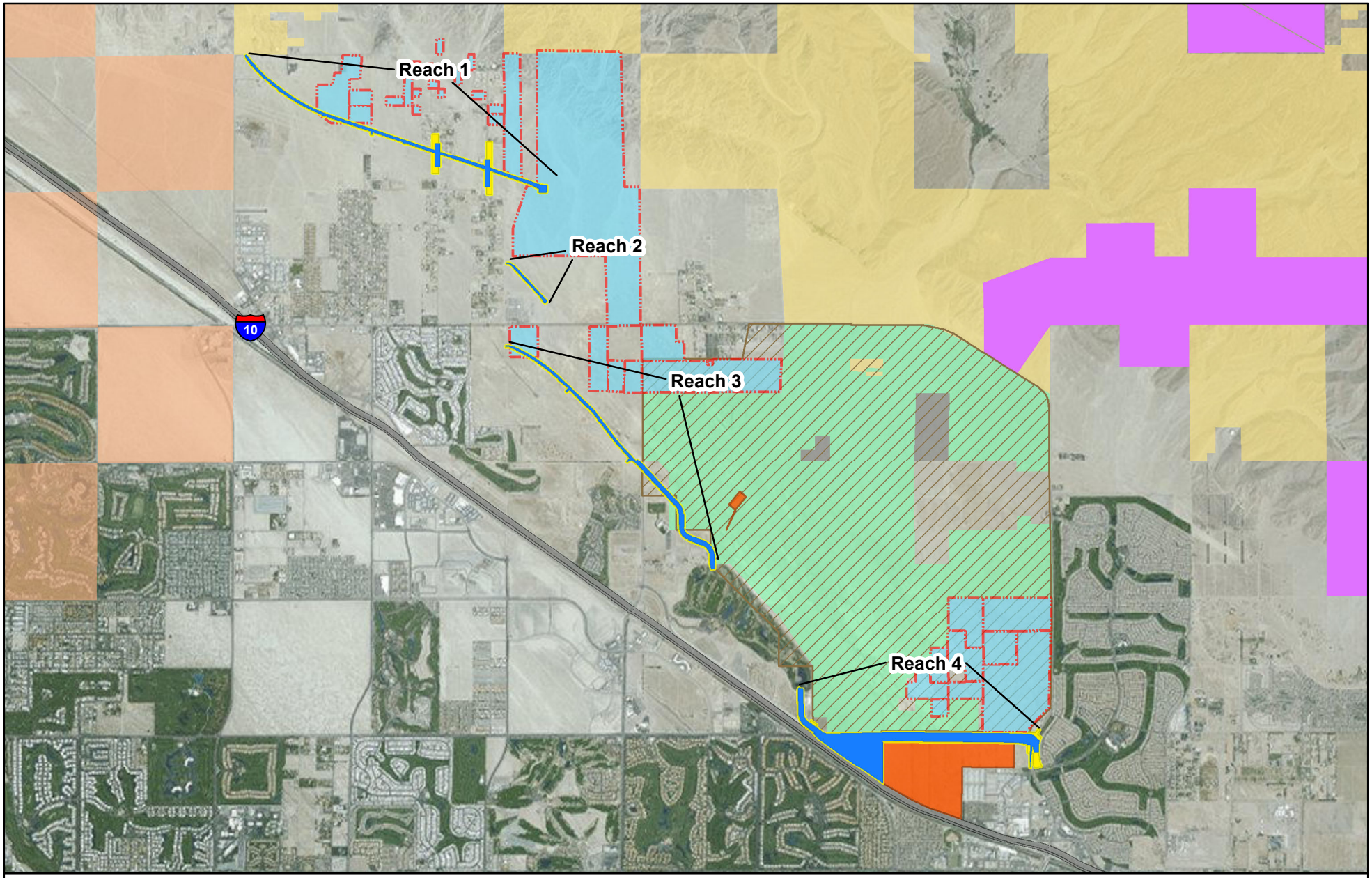


Figure 2

Land Ownership

Proposed Project Alignment

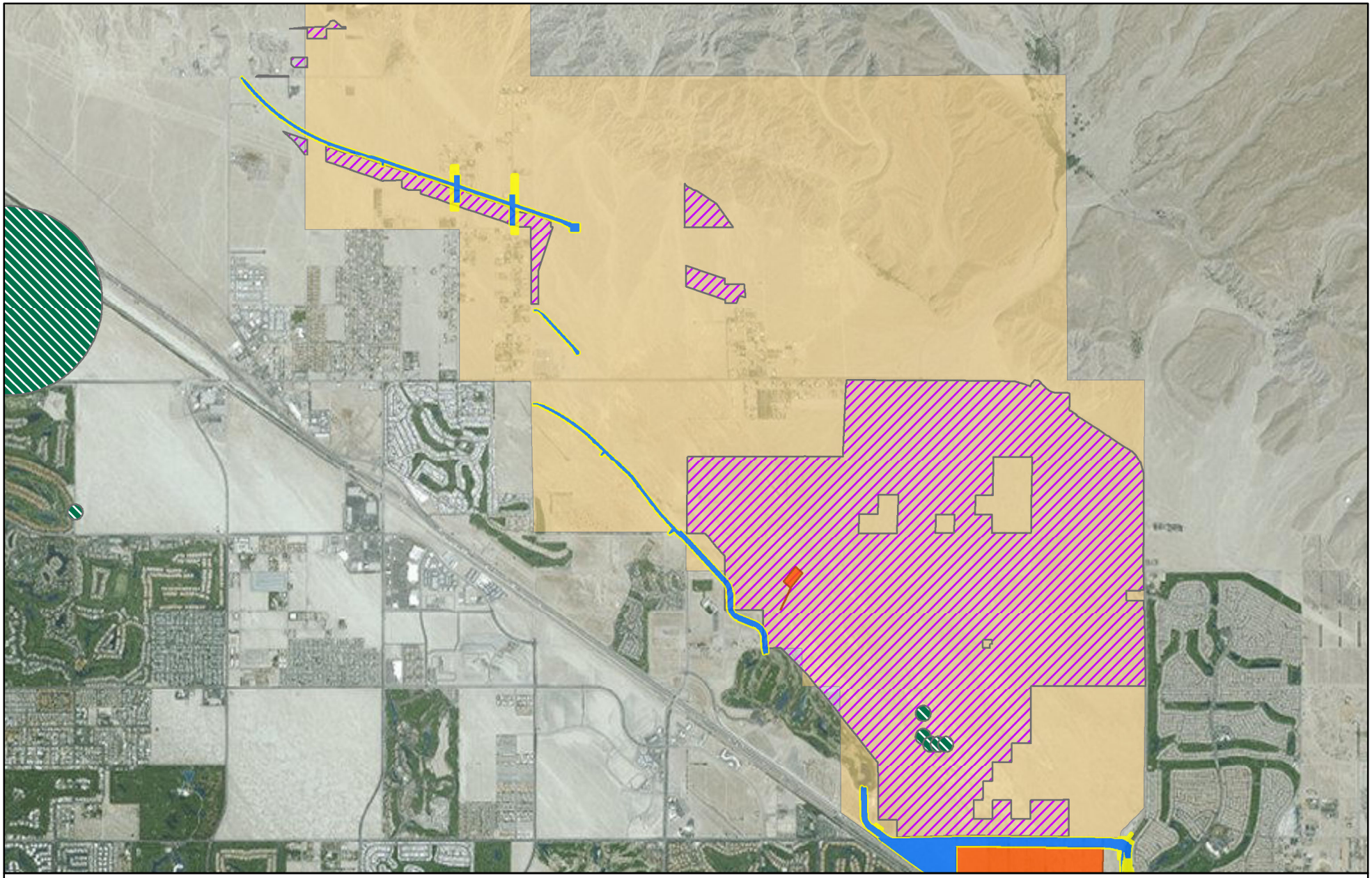
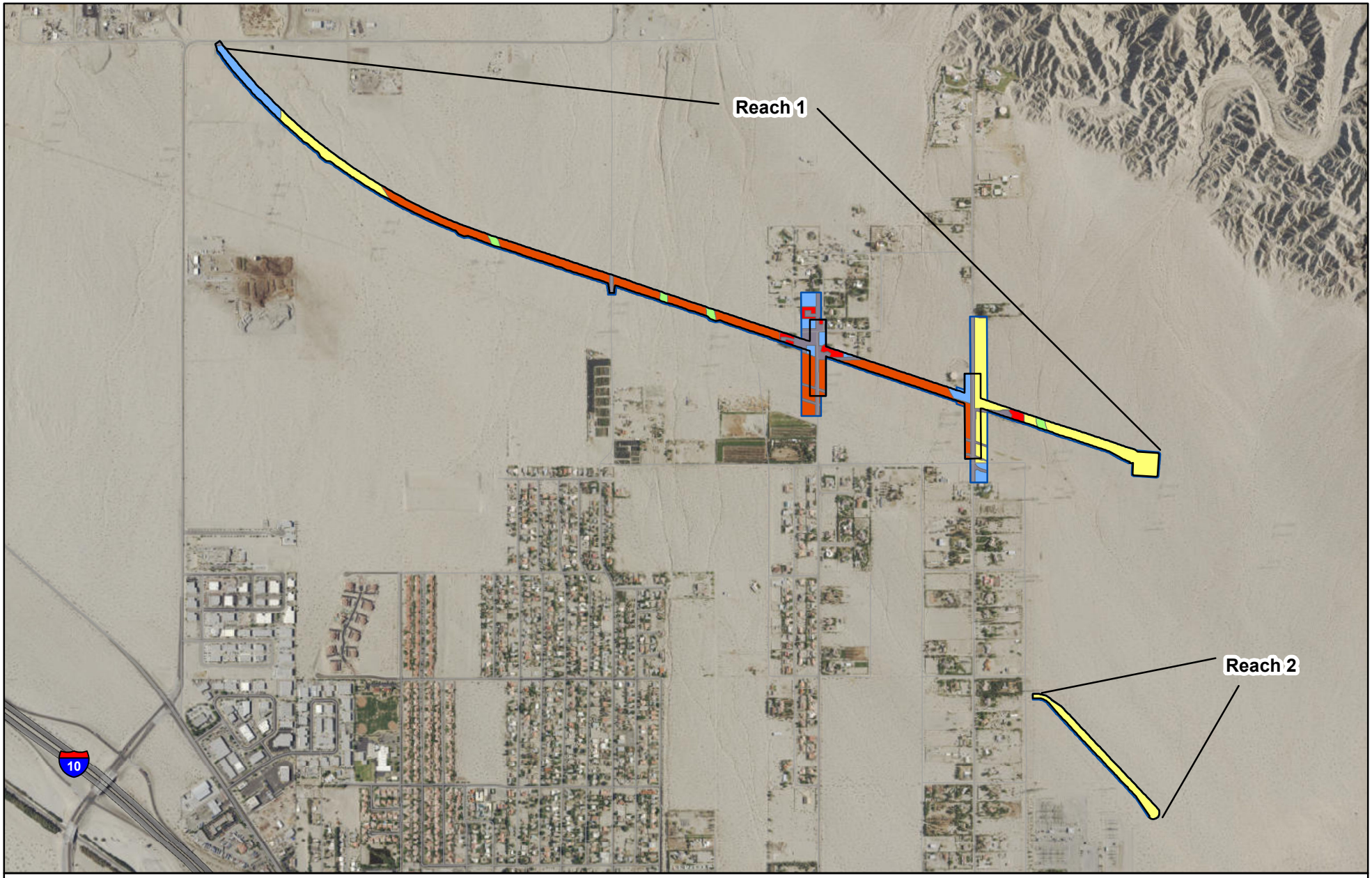


Figure 3

Critical Habitat



0 0.2 0.4 Miles

Permanent Disturbance Area

Temporary Disturbance Area

Vegetation / Cover Type

Cheesebush (CS)

Creosote Bush - White Bursage Scrub (CBWS)

Creosote Bush Mixed Scrub (CBMS)

Non-Native Vegetation (NNV)

Ruderal (RUD)

Unvegetated (UV)

Figure 4a

Vegetation
Reach 1 and 2 Alignments

0 0.2 0.4 Miles

Permanent Disturbance Area
Temporary Disturbance Area
Soil Disposal Area

Vegetation / Cover Type

Allscale Scrub (AS)
Creosote Bush Scrub (CBS)
Creosote bush - Allscale Scrub (CBAS)
Non-Native Vegetation (NNV)
Ruderal (RUD)
Unvegetated (UV)

Figure 4b

Vegetation
Reach 3 Alignment

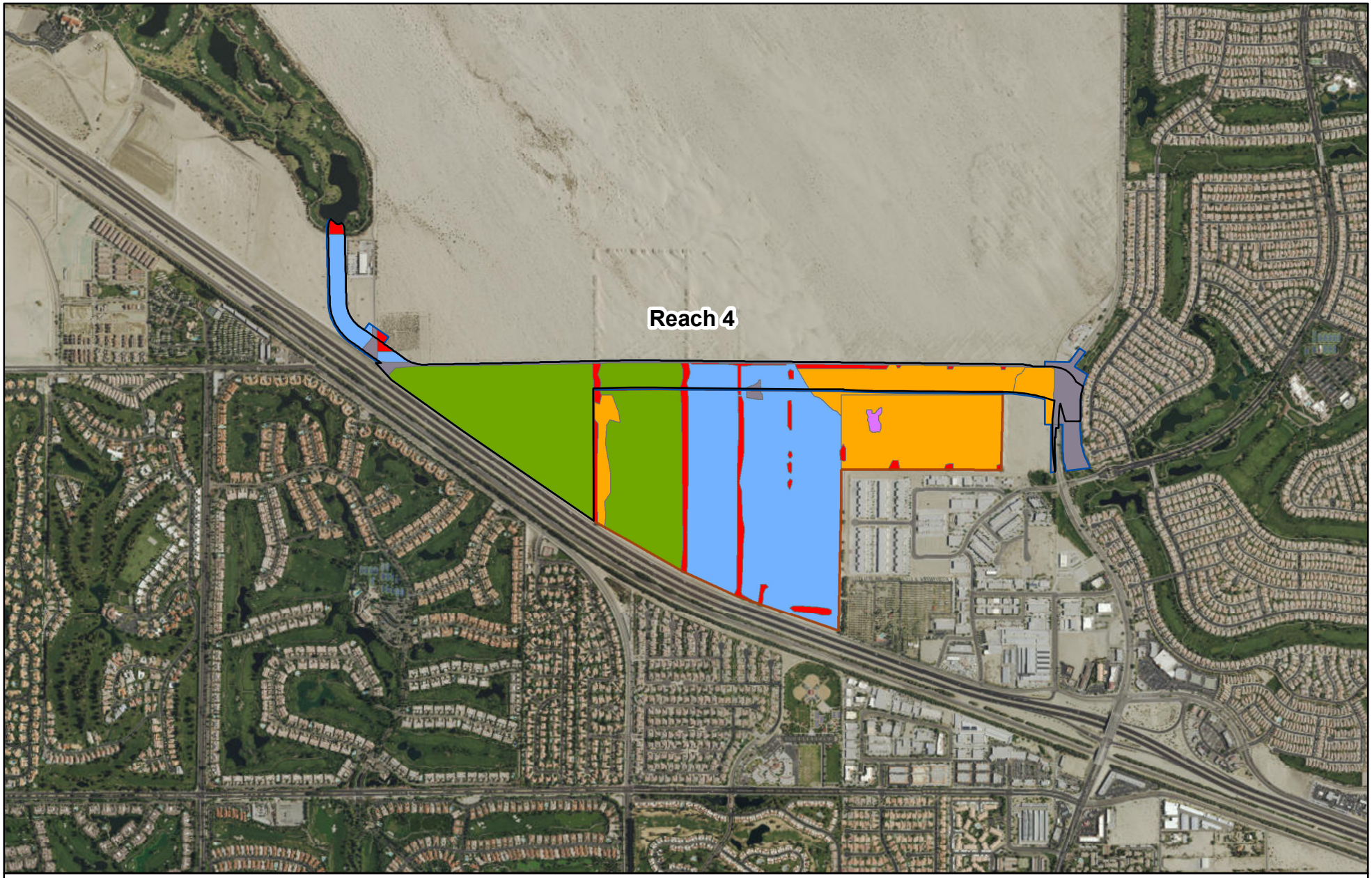
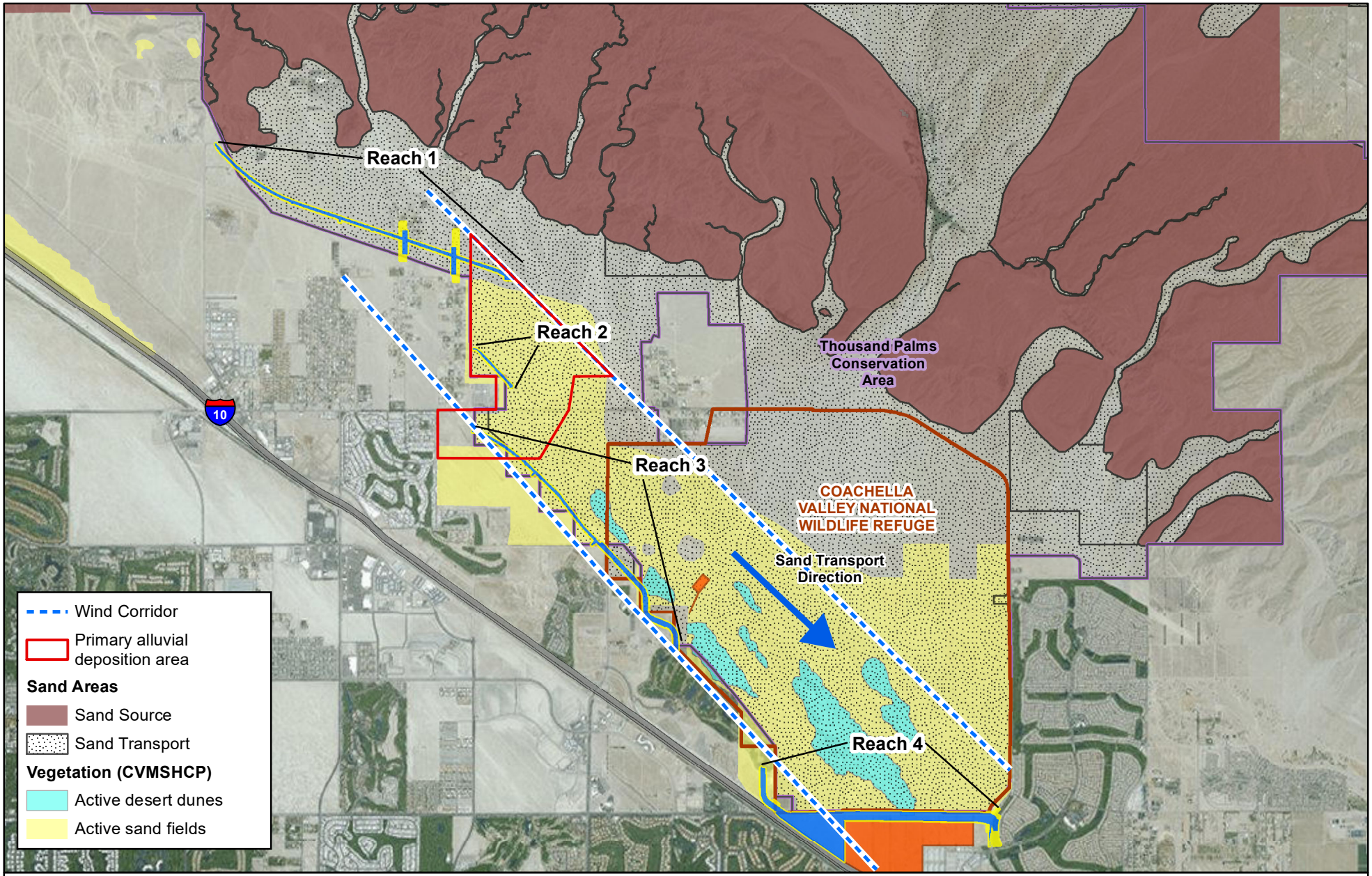


Figure 4c

Vegetation
Reach 4 Alignment



Source: Lancaster 2015; CVMSHCP 2008; CDFW 2016

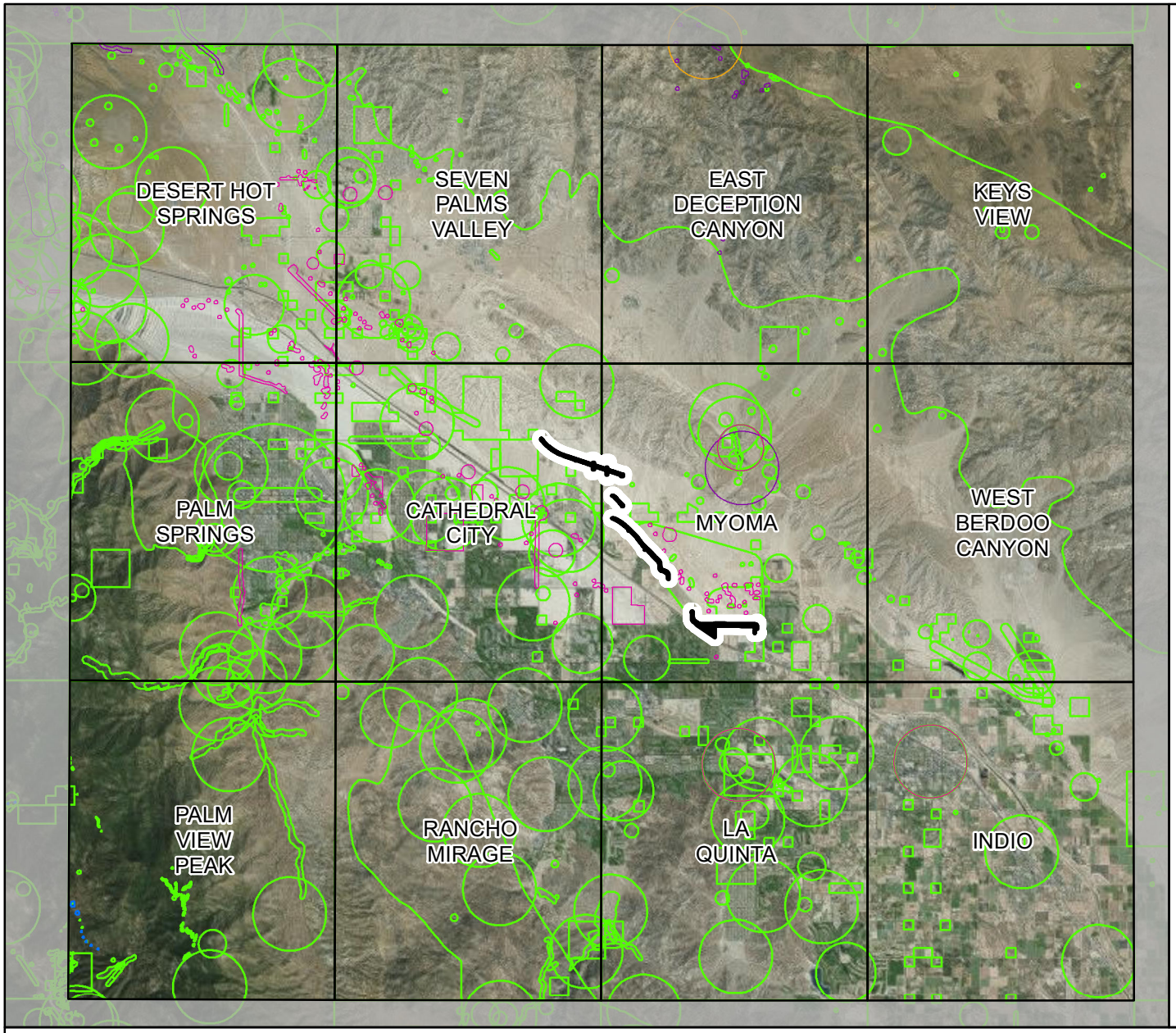
0 0.5 1 Miles

Permanent Disturbance Area
Temporary Disturbance Area
Soil Disposal Area

CVMSHCP Conservation Area Boundary
Coachella Valley National Wildlife Refuge

Figure 5

Sand Source and Transport Areas



Special-Status Species Occurrences

CNDDB Sensitive Plant Records

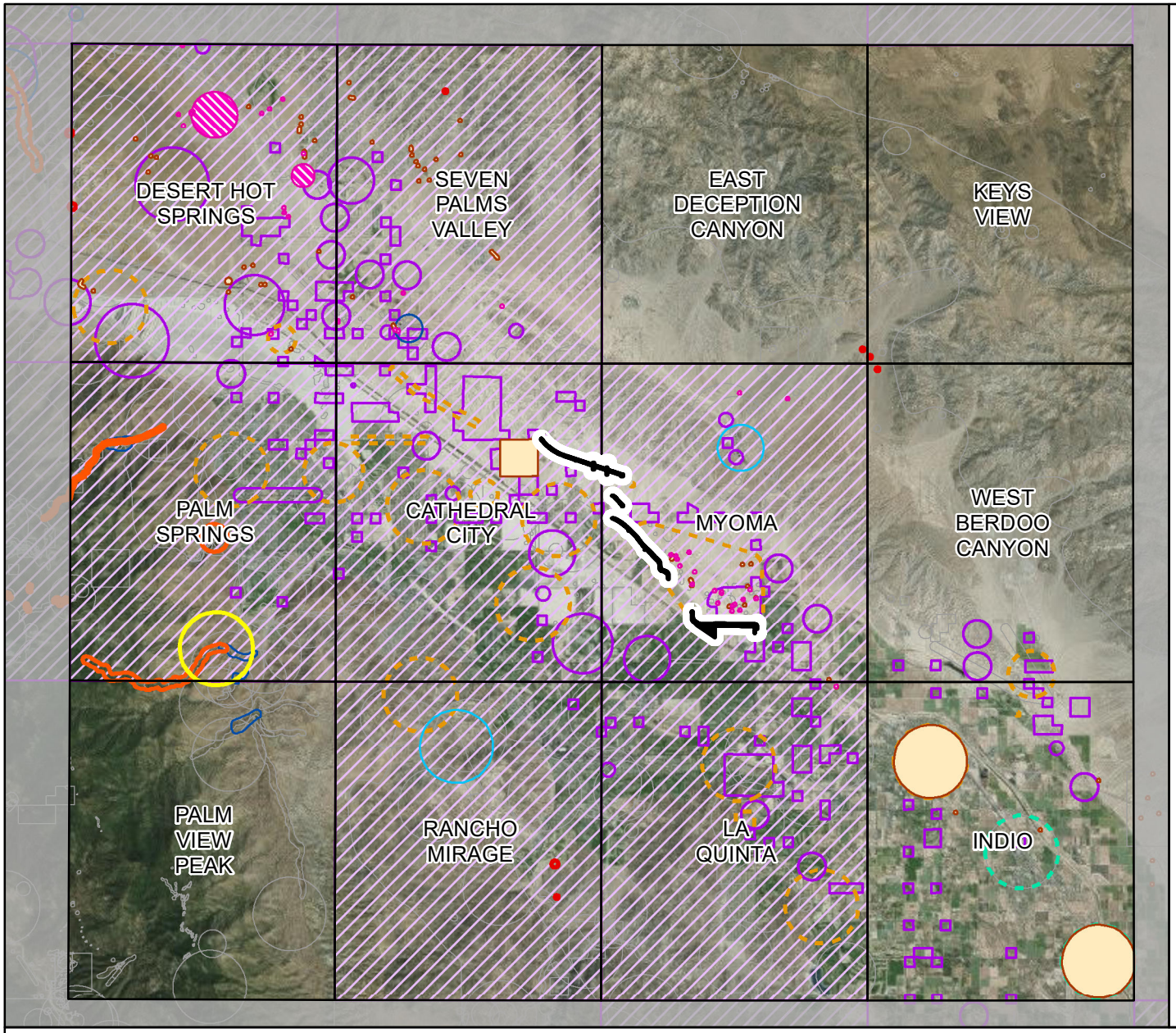
- Other plant species
- Astragalus lentiginosus var. coachellae
- Astragalus tricarinatus
- Deinandra mohavensis
- Erigeron parishii

2 0 2 Miles

- Project Site
- USGS 7.5-minute quadrangle

Figure 6

Special-Status Plant Species



Special-Status Species Occurrences

CNDDB Sensitive Animal Records

- Other animal species
- Athene cunicularia
- Empidonax traillii extimus
- Falco mexicanus
- Gopherus agassizii
- Ovis canadensis nelsoni DPS
- Phrynosoma mcallii
- Rana draytonii
- Rana muscosa
- Toxostoma crissale
- Uma inornata
- Vireo bellii pusillus

USFWS Carlsbad Office Species Occurrence

- Burrowing owl

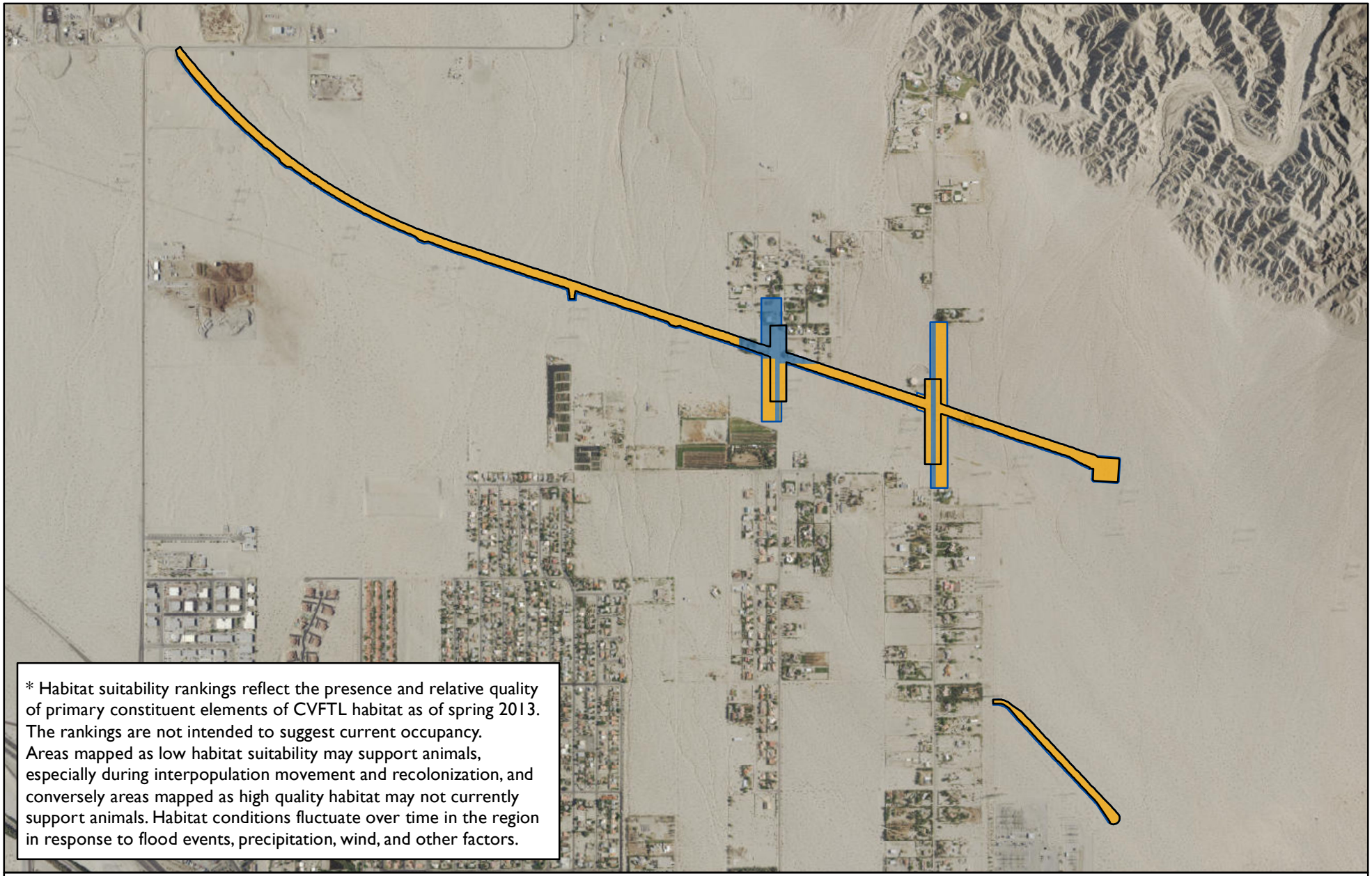
Project Site

USGS 7.5-minute quadrangle

2 0 2 Miles

Figure 7

Special-Status Wildlife Species



* Habitat suitability rankings reflect the presence and relative quality of primary constituent elements of CVFTL habitat as of spring 2013. The rankings are not intended to suggest current occupancy. Areas mapped as low habitat suitability may support animals, especially during interpopulation movement and recolonization, and conversely areas mapped as high quality habitat may not currently support animals. Habitat conditions fluctuate over time in the region in response to flood events, precipitation, wind, and other factors.

Permanent Disturbance Area
Temporary Disturbance Area
Soil Disposal Area

CVFTL Habitat Suitability*
Low
Unlikely

0 0.2 0.4 Miles

Figure 8a
Coachella Valley
Fringe-Toed Lizard Habitat
Reach 1 and 2 Alignments

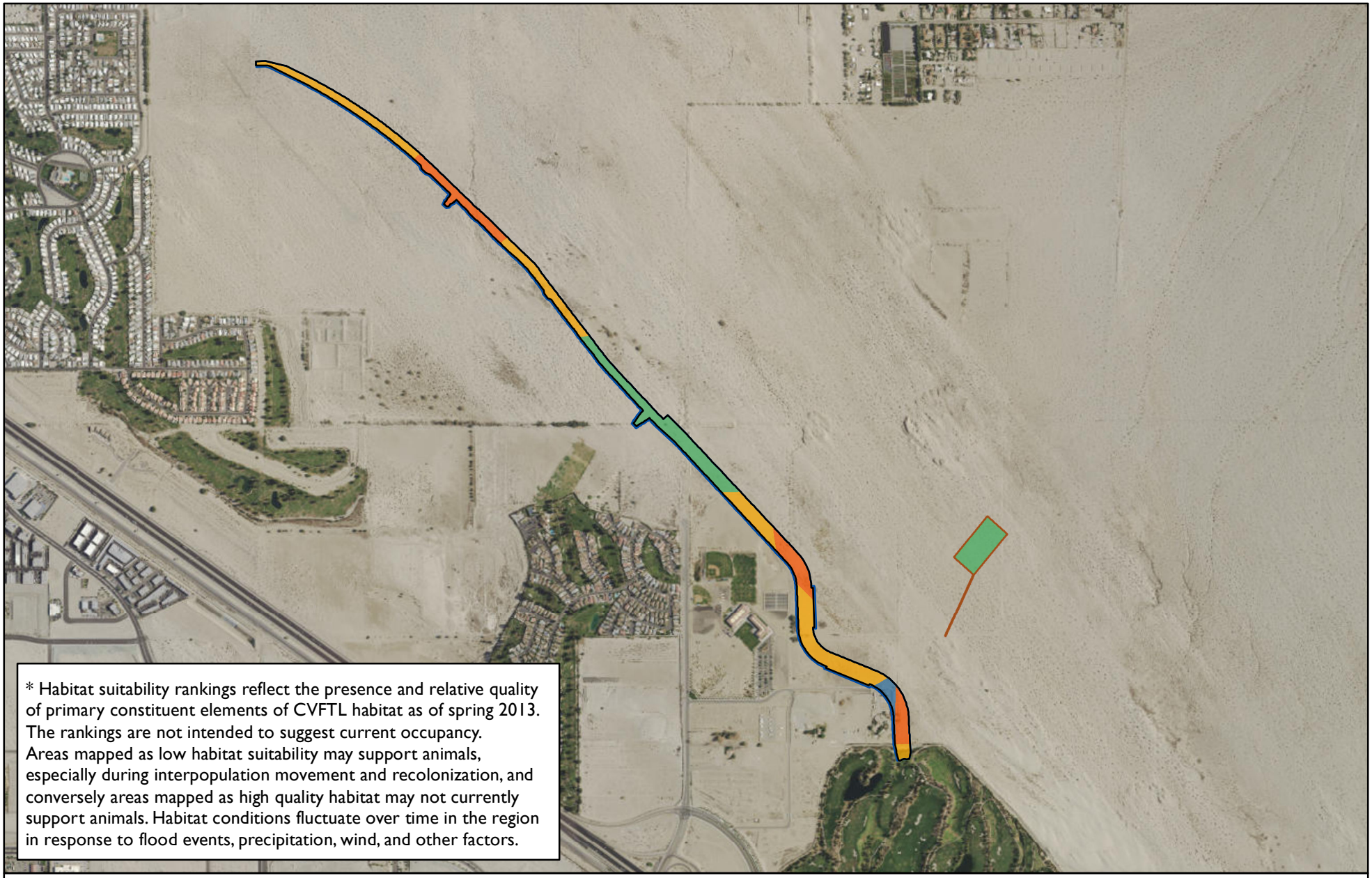


Figure 8b
Coachella Valley
Fringe-Toed Lizard Habitat
Reach 3 Alignment

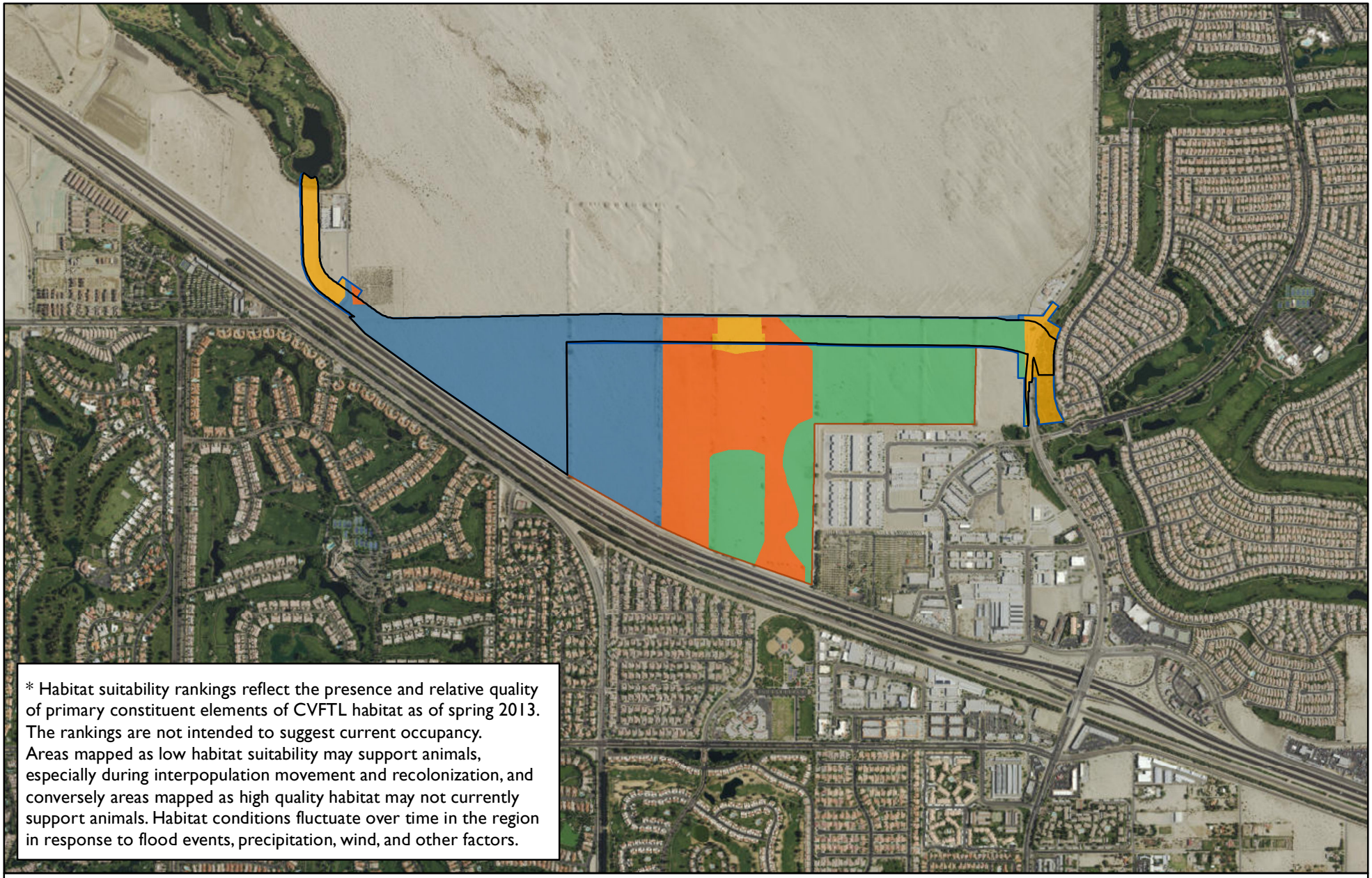


Figure 8c
Coachella Valley Fringe-Toed Lizard Habitat
Reach 4 Alignment

Attachment A: Representative Site Photographs

Allscale scrub, Reach 3

Creosote bush - white bursage scrub, Reach 1

Creosote bush mixed scrub, Reach 1

Desert dunes, Reach 4

Ruderal, Reach 3

Sahara mustard stands, 2010

Attachment B:
Plant Species
Observed in the Study Area

Plant Species Observed Within the Study Area	
FAMILY ***Latin Name***	**FAMILY** **Common Name**
AMARANTHACEAE	AMARANTH FAMILY
Amaranthus sp.	Unid. pigweed
APOCYNACEAE	DOGBANE FAMILY
Asclepias subulata	Rush milkweed
ASTERACEAE	ASTER FAMILY
Ambrosia dumosa	White bursage, burrobush
Ambrosia salsola (Hymenoclea salsola)	Cheesebush
Baileya pauciradiata	Desert-marigold
Chaenactis carphoclinia	Pebble pincushion
Chaenactis fremontii	Fremont pincushion
Chaenactis sp.	Pincushion
Dicoria canescens	Desert twinbugs
Encelia farinosa	Brittlebush
Geraea canescens	Desert sunflower
Malacothrix glabrata	Desert dandelion
Palafoxia arida	Spanish needles
Perityle emoryi	Emory's rock daisy
Pluchea sericea	Arrow weed
Pseudognaphalium beneolens	Cudweed
Rafinesquia neomexicana	Desert chicory
* *Sonchus asper ssp. asper*	Prickly sow thistle
Stephanomeria exigua	Small wreath-plant
Stephanomeria virgata	Tall stephanomeria
* *Taraxacum officinale*	Common dandelion
BORAGINACEAE	BORAGE FAMILY
Cryptantha angustifolia	Narrowleaf cryptantha
Cryptantha barbigera	Bearded cryptantha
Cryptantha maritima	White hair cryptantha
Phacelia crenulata	Heliotrope phacelia
Tiquilia palmeri (Coldenia palmeri)	Palmer tiquilia
BRASSICACEAE	MUSTARD FAMILY
* *Brassica tournefortii*	Sahara mustard
* *Lepidium didymum*	Lesser swine cress
* *Sisymbrium irio*	London rocket
* *Sisymbrium sp.*	Tumble mustard
CACTACEAE	CACTUS FAMILY
Cylindropuntia echinocarpa	Silver cholla
Opuntia basilaris var. basilaris	Beavertail
CHENOPODIACEAE	GOOSEFOOT FAMILY
Atriplex canescens	Four-wing saltbush
Atriplex hymenelytra	Desert holly
Atriplex polycarpa	Cattle saltbush, allscale
* *Chenopodium murale*	Nettleleaf goosefoot

Plant Species Observed Within the Study Area	
FAMILY ***Latin Name***	**FAMILY** **Common Name**
Chenopodium sp.	Chenopodium
* *Salsola tragus*	Russian thistle
EUPHORBIACEAE	SPURGE FAMILY
Croton californicus	California croton
Euphorbia (Chamaesyce) polycarpa ssp. hirtella	Sand mat
Stillingia spinulosa	Annual stillingia
FABACEAE	PEA FAMILY
Acmispon strigosus (L.s. var. tomentellus)	Desert lotus
Astragalus aridus	Milk-vetch
Astragalus didymocarpus	Two-seeded milk-vetch
** *Astragalus lentiginosus var. coachellae*	Coachella Valley milk-vetch
* *Caesalpinia gilliesii*	Bird-of-paradise
Lupinus arizonicus	Arizona lupine
* *Melilotus indicus*	Annual yellow sweetclover
* *Prosopis sp.*	Screwbean (non-native)
Psorothamnus emoryi (Dalea emoryi)	Emory indigo-bush, dye-weed
Psorothamnus schottii (Dalea schottii)	Indigo-bush
Psorothamnus spinosus (Dalea spinosa)	Smoke tree
GERANIACEAE	GERANIUM FAMILY
* *Erodium cicutarium*	Red-stemmed filaree
LAMIACEAE	MINT FAMILY
Salvia columbariae	Chia
LOASACEAE	STICK-LEAF FAMILY
Mentzelia involucrata	Sand blazing star
Petalonyx thurberi	Sandpaper plant
MALVACEAE	MALLOW FAMILY
Eremalche exilis	Trailing mallow
* *Malva parviflora*	Cheeseweed
MYRTACEAE	MYRTLE FAMILY
* *Eucalyptus sp.*	Eucalyptus
NYCTAGINACEAE	FOUR O'CLOCK FAMILY
** *Abronia villosa var. aurita*	Chaparral sand-verbena
Abronia villosa var. villosa	Sand-verbena
ONAGRACEAE	EVENING PRIMROSE FAMILY
Chylismia brevipes (Camissonia brevipes)	Desert primrose
Chylismia claviformis (Camissonia claviformis)	Clavate evening primrose
Chylismia claviformis ssp. aurantiaca (Camissonia claviformis ssp. aurantiaca)	Clavate evening primrose

Plant Species Observed Within the Study Area	
FAMILY ***Latin Name***	**FAMILY** **Common Name**
Eulobus californicus *(Camissonia californica)*	California false mustard
Oenothera deltoides ssp. deltoides	Dune evening-primrose
PAPAVERACEAE	POPPY FAMILY
Eschscholzia minutiflora	Small-flowered poppy
PLANTAGINACEAE	PLANTAIN FAMILY
Plantago ovata	Desert plantain
POLEMONIACEAE	PHLOX FAMILY
Loeseliastrum schottii *(Langloisia schottii)*	Schott's langloisia
POLYGONACEAE	BUCKWHEAT FAMILY
Chorizanthe brevicornu	Brittle spine-flower
Eriogonum inflatum	Desert trumpet
TAMARICACEAE	TAMARISK FAMILY
* *Tamarix aphylla*	Athel
* *Tamarix ramosissima*	Tamarisk
ZYGOPHYLLACEAE	CALTROP FAMILY
Larrea tridentata	Creosote bush
* *Tribulus terrestris*	Puncture vine
POACEAE	GRASS FAMILY
* *Cynodon dactylon*	Bermuda grass
* *Schismus arabicus*	Mediterranean schismus
* *Schismus barbatus*	Mediterranean schismus

*** non-native species**
**** special-status species**

Attachment C: Wildlife Species Observed in the Study Area

Wildlife Observed in the Study Area	
Common Name	Latin Name
INVERTEBRATES	
True bugs	Order Hemiptera
Beetles	Order Coleoptera
Flies	Order Diptera
REPTILES	
Coachella fringe-toed lizard	*Uma inornata*
Desert horned lizard	*Phrynosoma platyrhinos*
Desert iguana	*Dipsosaurus dorsalis*
Desert spiny lizard	*Sceloporus magister uniformis*
Gopher snake	*Pituophis catenifer*
Night snake (tracks)	*Hypsiglena torquata*
Side-blotched lizard	*Uta stansburiana*
Sidewinder	*Crotalus cerastes*
Western whiptail	*Aspidoscelis tigris*
Zebra-tailed lizard	*Callisaurus draconoides*
BIRDS	
American kestrel	*Falco sparverius*
Bendire's thrasher	*Toxostoma bendirei*
Burrowing owl	*Athene cunicularia*
Cactus wren	*Campylorhynchus brunneicapillus*
Cassin's kingbird	*Tyrannus vociferans*
Cliff swallow	*Petrochelidon pyrrhonota*
Common raven	*Corvus corax*
Costa's hummingbird	*Calypte costae*
Gambel's quail	*Callipepla gambelii*
Great horned owl	*Bubo virginianus*
Greater roadrunner	*Geococcyx californianus*
House finch	*Haemorhous mexicanus*
House sparrow	*Passer domesticus*
Killdeer	*Charadrius vociferous*
Lesser nighthawk	*Chordeiles acutipennis*
Loggerhead shrike	*Lanius ludovicianus*
Mourning dove	*Zenaida macroura*
Northern mockingbird	*Mimus polyglottos*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Red-tailed hawk	*Buteo jamaicensis*
Rock dove	*Columba livia*
Say's phoebe	*Sayornis saya*
Turkey vulture	*Cathartes aura*
Verdin	*Auriparus flaviceps*
Western kingbird	*Tyrannus verticalis*
MAMMALS	

Wildlife Observed in the Study Area	
Common Name	Latin Name
Black-tailed jackrabbit	*Lepus californicus*
Colorado Valley woodrat	*Neotoma albigula venusta*
Deer mouse sp. (active burrows)	*Peromyscus* sp.
Desert cottontail	*Sylvilagus audubonii*
Coyote	*Canis latrans*
Domestic dog	*Canis familiaris*
Domestic goat	*Capra hircus*
Domestic horse	*Equus caballus*
Kangaroo rat	*Dipodomys* sp.
Palm Springs round-tailed ground squirrel	*Spermophilus tereticaudus chlorus*
Round-tailed ground squirrel sp. (burrows)	*Xerospermophilus* sp.
White-throated woodrat	*Neotoma albigula (venusta)*
White-tailed antelope squirrel	*Ammnospermophilus leucurus*

Attachment D:
Species Accounts

Species Accounts

PLANTS

Abrams' spurge

Status: Abrams' spurge (*Euphorbia* [*Chamaesyce*] *abramsiana*) is a CRPR 2B.2. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This flower is found in southeastern California into Baja California (Mexico) and western Arizona.

Distribution in the Study Area: This species was not documented within the Study Area, but suitable habitat was observed.

Habitat and Habitat Associations: This species is associated with creosote bush scrub.

Natural History: Abrams' spurge is a hot season annual that grows in low mats that spread along the ground. It is found in a variety of sandy soils in the Sonoran Desert.

Threats: There are no identified threats to this species.

Arizona spurge

Status: Arizona spurge (*Euphorbia* [*Chamaesyce*] *arizonica*) is a CRPR 2B.3. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This flower is found in southeastern California and is known from the Coachella Valley and Anza Borrego areas. Outside California, this species ranges south into Baja California (Mexico), east to Texas, and southeast into Sonora (Mexico).

Distribution in the Study Area: This species was not documented within the Study Area, but suitable habitat was observed.

Habitat and Habitat Associations: This species is associated with creosote bush scrub.

Natural History: Arizona spurge is an annual herb that is typically found on gravelly or sandy substrates usually in arroyos or on slopes (CDFW, 2015a). This species flowers from March through April.

Threats: There are no identified threats to this species.

Borrego milk-vetch

Status: Borrego milk-vetch (*Astragalus lentiginosus var. borreganus*) is a CRPR 4.3. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This plant is found in the deserts of southeastern California to northwestern Mexico.

Distribution in the Study Area: This species was not documented within the Study Area, but suitable habitat was observed.

Habitat and Habitat Associations: This species is associated with creosote bush scrub.

Natural History: Borrego milk-vetch is an annual or short-lived perennial herb that blooms between March and May.

Threats: There are no identified threats to this species.

Flat-seeded spurge

Status: Flat-seeded spurge (*Euphorbia* [*Chamaesyce*] *platysperma*) is a CRPR 1B.2. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This plant is known from four or possibly five locations in California; one at Superstition Mountain in Imperial County; two in the Coachella Valley in Riverside County; one in Little Blair Valley in Anza Borrego State Park; and one unverified report near Old Woman Springs in San Bernardino County (Kearney and Peebles, 1951; Shreve and Wiggins, 1964; CCH, 2015; CNPS, 2015; CDFW, 2015a). It is much more common to the east in Arizona (CDFW, 2015a).

Distribution in the Study Area: This species was not documented within the Study Area, but suitable habitat was observed in Reaches 3 and 4.

Habitat and Habitat Associations: This species is associated with creosote bush scrub and dunes.

Natural History: Flat-seeded spurge is an annual herb that blooms from February through September.

Threats: There are no identified threats to this species.

Ribbed cryptantha

Status: Ribbed cryptantha (*Cryptantha costata*) is a CRPR 4.3. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This plant is found in southeastern California into southern Nevada, Arizona, and Baja California.

Distribution in the Study Area: This species was not documented within the Study Area, but suitable habitat was observed in Reaches 3 and 4. There are known occurrences in the immediate vicinity of the Study Area (CCH, 2015).

Habitat and Habitat Associations: This species is associated with creosote bush scrub.

Natural History: Ribbed cryptantha is an annual herb that grows in sandy soils in scattered locations throughout the deserts of California.

Threats: There are no identified threats to this species.

Slender cottonheads

Status: Slender cottonheads (*Nemacaulis denudata var. gracilis*) is a CRPR 2B.2. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This plant is found in southwestern California, the Sonoran Desert, Arizona, and northwestern Mexico.

Distribution in the Study Area: This species was not documented within the Study Area, but suitable habitat was observed in Reaches 3 and 4. There are numerous historic collections throughout the Coachella Valley (CCH, 2015; CDFW, 2015a).

Habitat and Habitat Associations: This species is associated with coastal strand, creosote bush scrub, and dunes.

Natural History: This species is known in California from sand dunes throughout much of the desert and along the coast. It blooms from April through May.

Threats: There are no identified threats to this species.

WILDLIFE
Invertebrates

Coachella Valley giant sand-treader cricket

Status: The Coachella Valley giant sand-treader cricket (*Macrobaenetes valgum*) is a CDFW Special Animal and is covered by the CVMSHCP. This species is not federally or State listed as threatened or endangered.

General Distribution: This species occurs exclusively in active sand hummocks and dunes of the Coachella Valley (CVAG, 2007).

Distribution in the Study Area: Suitable habitat occurs within Reaches 3 and 4 of the Study Area.

Habitat and Habitat Associations: Active sand hummocks and dunes of the Coachella Valley.

Threats: Habitat loss.

Coachella Valley Jerusalem cricket

Status: The Coachella Valley Jerusalem cricket (*Stenopelmatus cahuilaensis)* is a CDFW Special Animal and is covered by the CVMSHCP. This species is not federally or State listed as threatened or endangered.

General Distribution: This species is limited to the Coachella Valley (CVAG, 2007).

Distribution in the Study Area: Suitable habitat occurs within Reaches 3 and 4 of the Study Area.

Habitat and Habitat Associations: This species occurs in sandy to somewhat gravelly soils, and prefers microhabitats that are cool and moist, relative to ambient conditions (CVAG, 2007).

Threats: Habitat fragmentation and disturbance from OHVs.

Birds

Golden eagle

Status: The golden eagle (*Aquila chrysaetos*) is on the CDFW Watch List and is a California Fully Protected species. It is also protected by the federal Bald and Golden Eagle Protection Act. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: In North America, this species breeds locally from northern Alaska eastward to Labrador and southward to northern Baja California and northern Mexico. The species winters from

southern Alaska and southern Canada southward through the breeding range. The golden eagle ranges from sea level up to 11,500 feet elevation (Grinnell and Miller, 1944).

Distribution in the Study Area: This species is known to occur in the Coachella Valley, and suitable foraging habitat is present within the Study Area. Suitable nesting habitat is located outside the Study Area in the mountains to the north.

Natural History: Golden eagle habitat includes rolling foothills, mountainous terrain, wide arid plateaus deeply cut by streams and canyons, and open mountain slopes and cliffs (Zeiner et al., 1990a). Nest construction in southern California occurs in fall and continues through winter (Dixon, 1937). This species nests on cliffs with canyons and escarpments and in large trees (generally occurring in open habitats) and is primarily restricted to rugged, mountainous country (Garrett and Dunn, 1981; Johnsgard, 1990). Nests are large platforms composed of sticks, twigs, and greenery that are often 10 feet across and three feet high. It is common for the golden eagle to reuse old nests (Zeiner et al., 1990a).

Threats: A major threat to this species is habitat loss as well as human development adjacent to golden eagle habitat. Accidental deaths attributed to increased development include collisions with vehicles, power lines, and other structures; electrocution; hunting; and poisoning (Cornell, 2015). Golden eagles avoid developed areas, and the golden eagle population in California has undergone a decline within the past century due to a decrease in open habitats (Grinnell and Miller, 1944). Human disturbance of nests, from nest building through early incubation, will typically result in nest abandonment (Thelander, 1974), thereby threatening reproductive success.

Prairie falcon

Status: The prairie falcon (*Falco mexicanus*) is a CDFW Watch List species. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: Prairie falcons range from southern Canada through the western United States into Mexico, and breed throughout most of their range (Cornell, 2015).

Distribution in the Study Area: Suitable habitat occurs throughout the entire Study Area, and there are several known occurrences of this species within the vicinity of the Project.

Habitat and Habitat Associations: This species is known to inhabit grasslands, shrub-steppe, deserts, and other open habitats of the West up to approximately 10,000 feet elevation.

Natural History: Prairie falcons are aerial hunters, and commonly hunt ground squirrels and small birds (Cornell, 2015). This species is a cliff nester (Cornell, 2015), but is also known to nest on power and utility poles. This species will have one clutch per year of up to eight eggs.

Threats: The primary threat is habitat loss.

Vermilion flycatcher

Status: The vermilion flycatcher (*Pyrocephalus rubinus*) is a CDFW Species of Special Concern. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: The vermilion flycatcher is found in the southwestern U.S. through Mexico and into South America (Cornell, 2015).

Distribution in the Study Area: The Study Area does not provide suitable nesting habitat for this species, however this species may occur on the adjacent golf courses, and may forage within the Study Area.

Habitat and Habitat Associations: The vermillion flycatcher is found in open desert scrubland, agricultural areas, and desert riparian. Inhabits desert riparian adjacent to irrigated fields, irrigation ditches, and pastures during nesting. This species nests in cottonwood, willow, mesquite, and other large desert riparian trees.

Natural History: This species eats insects and other arthropods. The male is known to perform a spectacular display for females during the nesting season (Cornell, 2015).

Threats: A major threat to this species throughout its range is habitat destruction. Human water use and land development have caused drastic declines in populations, particularly in the lower Colorado River Valley (Cornell, 2015).

Black-tailed gnatcatcher

Status: The black-tailed gnatcatcher (*Polioptila melanura*) is a CDFW Special Animal. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: The black-tailed gnatcatcher is found in the southwestern United States in California, southern Nevada, Arizona, New Mexico, western Texas, and into Mexico and Baja California.

Distribution in the Study Area: Suitable habitat is present throughout the Study Area. This species is known to occur in the immediate vicinity of the Project.

Habitat and Habitat Associations: This species is found in desert shrublands and open scrub, and generally nests in shrub thickets along washes.

Natural History: The black-tailed gnatcatcher is non-migratory, and forages for insects by moving through shrubs and low trees. This species has an average clutch of four eggs, and both parents care for the young. Pairs may remain together throughout the year (Audubon, 2015).

Threats: Habitat loss.

Le Conte's thrasher

Status: The Le Conte's thrasher (*Toxostoma lecontei*; San Joaquin population) is a California Species of Special Concern and the entire species (all populations) is covered by the CVMSHCP. This species is not federally or State listed as threatened or endangered.

General Distribution: The Le Conte's thrasher is found throughout the southwestern United States and northwestern Mexico.

Distribution in the Study Area: Suitable habitat is present throughout the Study Area, with the closest record occurring within one mile of Reach 1.

Habitat and Habitat Associations: Sparse desert scrub such as creosote bush, Joshua tree, saltbush scrub, and cholla. Nests in dense, spiny shrubs or densely branched cactus in desert wash habitat.

Natural History: The Le Conte's thrasher forages on the ground for insects and spiders, as well as some seeds and berries.

Threats: In some parts of its range, the Le Conte's thrasher has lost extensive habitat to development. Irrigated lawns, groves, and fields are not compatible with its need for desert vegetation.

Mammals

Earthquake Merriam's kangaroo rat

Status: The Earthquake Merriam's kangaroo rat (*Dipodomys merriami collinus)* is a CDFW Special Animal. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This species is found in the arid regions of the southwestern United States, south into Mexico.

Distribution in the Study Area: This species was not observed during surveys within the Study Area, however suitable habitat is present and there are records within the immediate vicinity of Reach 4.

Habitat and Habitat Associations: This species is found in sandy upland valleys in the Peninsular ranges in San Diego County and southernmost Riverside County. Associated with sage scrub and chaparral, and grassland vegetation in adjacent upland areas.

Natural History: This species eats mostly seeds, usually of mesquite, creosote bush, ocotillo, purslane, and grama grass. The diet is known to vary seasonally, and it may eat insects on occasion.

Threats: Habitat loss from agriculture, urbanization, and infrastructure.

Western mastiff bat

Status: The western mastiff bat (*Eumops perotis californicus)* is a California Species of Special Concern. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: Lowlands of central and southern California, southern Arizona, New Mexico, southwestern Texas into northern Mexico.

Distribution in the Study Area: This species was not observed during surveys within the Study Area, but suitable foraging habitat is present. Few suitable potential roosting locations were observed.

Habitat and Habitat Associations: In California, this species is found in broad open areas, and forages in dry desert washes, flood plains, chaparral, oak woodlands, open ponderosa pine forest, grassland, and agricultural areas (WBWG, 2015).

Natural History: This species roosts in deep rock crevices, and forages over wide open areas. Mastiff bats primarily eat moths, but may also take beetles, crickets, and katydids. Young are generally born in early July, but this can vary within populations. This species is not known to have an extensive migration, and appears to move relatively short distances seasonally (WBWG, 2015).

Threats: Habitat loss and pesticides. This species roosts in rock crevices and rock climbing may cause disturbance to roost sites (WBWG, 2015).

Western yellow bat

Status: The western yellow bat (*Lasiurus xanthinus)* is a California Species of Special Concern. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: Occurs in northern Mexico, western Arizona, southern California, southern Nevada, and southwestern New Mexico (WBWG, 2015).

Distribution in the Study Area: This species was not observed during surveys within the Study Area, but suitable foraging habitat is present. The Study Area provides limited potential roost sites.

Habitat and Habitat Associations: This species is associated with valley foothill riparian forest, desert riparian, desert wash, and palm oasis habitats.

Natural History: This species is known to roost in trees, particularly in palms. It forages among trees and over water. The yellow bat is insectivorous. It does not hibernate. Young are generally born from June through July (WBWG, 2015).

Threats: Cosmetic trimming of palm fronds, and the use of pesticides in date palm and other orchards causing a loss of roosting and foraging habitats (WBWG, 2015).

San Diego desert woodrat

Status: The San Diego desert woodrat (*Neotoma lepida intermedia)* is a California Species of Special Concern. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: The San Diego desert woodrat is found in coastal and desert scrub habitats throughout much of southern California (CDFW, 2015a).

Distribution in the Study Area: This species was not observed during surveys within the Study Area, but suitable habitat is present.

Habitat and Habitat Associations: This species is found in shrublands and chaparral.

Natural History: This species frequently builds large middens (piles of sticks arranged to form a shelter) in rock outcrops or around the bases of shrubs.

Threats: No threats have been identified for this species.

Pocketed free-tailed bat

Status: The pocketed free-tailed bat (*Nyctinomops femerosaccus)* is a California Species of Special Concern. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This species is found in southern California, central Arizona, southern New Mexico, and western Texas, south into Mexico and Baja California (WBWG, 2015).

Distribution in the Study Area: This species was not observed during surveys within the Study Area, but suitable foraging habitat is present.

Habitat and Habitat Associations: This species is associated with pinyon juniper woodland, desert scrub, palm oasis, desert wash, and desert riparian habitats.

Natural History: This species roosts in rocky areas in high cliffs, usually in large colonies. It is also known to roost in buildings, caves, and under roof tiles. This species will form maternity colonies and female will each bear a single offspring between late June and July. The pocketed free-tailed bat forages primarily on moths, but will consume a variety of insects (WBWG, 2015).

Threats: Loss of roosting habitat and disturbance of roost sites (WBWG, 2015).

Big free-tailed bat

Status: The big free-tailed bat (*Nyctinomops macrotis)* is a California Species of Special Concern. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: This species is found in the southwestern U.S., including southern California, south into Mexico and South America (WBWG, 2015).

Distribution in the Study Area: This species was not observed during surveys within the Study Area, but suitable foraging habitat is present.

Habitat and Habitat Associations: This species is associated with desert scrub, woodlands, and evergreen forests.

Natural History: This species is a seasonal migrant. It roosts mainly in rock crevices in cliffs, but may also roost in buildings, caves, and tree cavities. This species will form maternity colonies and female will each bear a single offspring in late spring or early summer. The big free-tailed bat forages primarily on moths, but will also consume a variety of other insects (WBWG, 2015).

Threats: No known threats have been identified, but could include impacts to foraging habitat from grazing or pesticides and disturbance of roost sites (WBWG, 2015).

Palm Springs pocket mouse

Status: The Palm Springs pocket mouse (*Perognathus longimembris bangsi)* is a California Species of Special Concern and is covered by the CVMSHCP. This species is not federally or State listed as threatened or endangered.

General Distribution: This species occurs in the lower Sonoran Desert from the San Gorgonio Pass area east to the Little San Bernardino Mountains and south along the eastern edge of the Peninsular Range to Borrego Valley and the east side of San Felipe Narrows.

Distribution in the Study Area: This species was not observed during surveys within the Study Area, but suitable habitat is present in all reaches. This species has been documented in the immediate vicinity of the Project.

Habitat and Habitat Associations: This species is associated with desert riparian, desert scrub, desert wash, and sagebrush habitats. It is most commonly found in creosote-dominated desert scrub.

Natural History: Its habitat is level to gently sloping topography, with moderate vegetation cover and loosely packed or sandy soils. The Palm Springs pocket mouse is nocturnal and remains in its burrow during the day. Other subspecies of *Perognathus longimembris* are known to hibernate in winter, and although it has not been demonstrated, it is likely that *P.l. bangsi* does as well.

Threats: The primary threat to this species is habitat loss and degradation from development and OHV use.

American badger

Status: The American badger (*Taxidea taxus*) is a California Species of Special Concern. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: The vast geographic range of the American badger extends as far north as Alberta, Canada and as far south as central Mexico (Hall, 1981). This species occurs in suitable habitat throughout

California with the exception of humid coastal forests of the northwest (Williams, 1986). The elevation range for this species is from sea level to high mountains (Long, 1973).

Distribution in the Study Area: There are no known records for this species in the Study Area, but it is within the known geographic range for this species. There is suitable habitat in portions of the Study Area.

Habitat and Habitat Associations: American badgers exploit a wide variety of open, arid habitats, but are most commonly found in grasslands, savannas, mountain meadows, and open areas of desert scrub (Stephenson and Calcarone, 1999). Basic requirements are available food, friable soils, and relatively open, uncultivated ground (Williams, 1986).

Natural History: The American badger is generally solitary. It is primarily nocturnal, but may occasionally forage and disperse during the day (Lindzey, 1978; Messick and Hornocker, 1981). This species is active year-round except at higher elevations and latitudes, where winter torpidity is common. During winter, individuals at lower elevations will exhibit reduced surface activity and may remain in a single burrow for days or even weeks (Long, 1973; Messick and Hornocker, 1981). This species is an opportunistic predator feeding on rodents, rabbits, reptiles, insects, birds, eggs, and carrion (Williams, 1986; Zeiner et al., 1990b). American badgers mate in the summer and early autumn with young born in March and early April (Long, 1973).

Threats: This species has experienced large population declines in many areas of southern California, and has been steadily decreasing throughout the state over the last century (Williams, 1986). The major cause of mortality to adult badgers is vehicular accidents. Other common threats include habitat conversion to urban and agricultural uses, farming operations, shooting and trapping, poisoning, and reduction of prey base as a result of rodent control activities (Williams, 1986).

Desert kit fox

Status: The desert kit fox (*Vulpes macrotis arsipus*) is a California Protected Furbearing Mammal. This species is not federally or State listed as threatened or endangered, and is not covered by the CVMSHCP.

General Distribution: The desert kit fox is found in the southwestern deserts of California, southern Nevada, the lower elevations of western and southern Arizona, and northern Mexico.

Distribution in the Study Area: The Study Area is within the known geographic range for this species. There is suitable habitat in all reaches, but friable soil (for digging dens) is limited to Reaches 1 through 3 of the Study Area.

Habitat and Habitat Associations: Desert kit fox habitat includes open, arid scrublands, grasslands, and agricultural lands. Creosote bush scrub is the most common habitat association for desert kit fox in California (McGrew, 1979). Desert kit fox require friable soils for digging dens. Dens are used for cover, protection from predators and heat, and pup rearing. Suitable soil for dens may be a limited resource for kit fox distribution (Arjo et al., 2003).

Natural History: The desert kit fox is active mainly at night. Primary food sources are rodents and rabbits. (Tannerfeldt et al., 2003). Kit foxes are typically monogamous. The reproductive period is generally December to late May, but may vary (O'Farrell and Gilbertson, 1986).

Threats: Threats include habitat degradation, loss and fragmentation from development, roads, recreation, and grazing. Coyotes are both predators of kit foxes and direct competitors for food (White et al., 1994, 1995). Habitat and land use changes that attract coyotes therefore would likely have an adverse effect on

desert kit foxes. Canine distemper outbreaks have been a recent concern. Other threats are vehicle strikes, shooting, rodenticide poisoning, and den collapse from OHV activity.

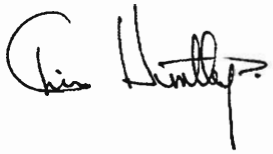
C.3 Biological Assessment

THOUSAND PALMS FLOOD CONTROL PROJECT
BIOLOGICAL ASSESSMENT

RIVERSIDE COUNTY
CALIFORNIA

COACHELLA VALLEY WATER DISTRICT
U.S. ARMY CORPS OF ENGINEERS

December 2021



PREPARED BY: _____ DATE: 9 Dec 2021
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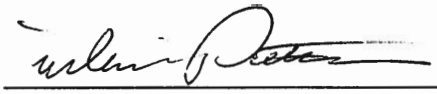

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Appendices

Appendix A: Coachella Valley Conservation Commission Consistency Determination Letter

1. Introduction

This Biological Assessment (BA) was prepared to support the Clean Water Act Section 404 permit review and approval process for the construction, operation, and maintenance of the proposed Thousand Palms Flood Control Project (Project or Proposed Action) located in Riverside County, California. The Coachella Valley Water District (CVWD) proposes to construct and operate the Project, formerly known as the Whitewater River Basin Flood Control Project, which includes a series of flood control structures to minimize flooding hazards in and near Thousand Palms, California and enhance sand transport to the Coachella Valley Fringe Toed Lizard (CVFTL) Preserve/Coachella Valley National Wildlife Refuge (CVNWR, Refuge) (see Figure 1: Proposed Project Vicinity and Action Area). Because the project will affect waters of the U.S., a 404 permit is required from the U.S. Army Corps of Engineers (USACE), the federal lead agency for this Project.

The purpose of this BA is to review the proposed Project in sufficient detail to determine to what extent the USACE permitting action may affect any threatened, endangered, proposed, and candidate (TE) wildlife, fish, and plant species of record and their associated critical habitat (if any) within the scope of USACE's proposed Action. This BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (c)), to streamline federal to federal consultation.

This BA describes impacts from the proposed Action on private and federal lands. Impacts to listed species on private lands are covered through participation in the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (CVMSHCP/NCCP) (CVAG 2007a). The CVWD is a CVMSHCP/NCCP permittee and has take authorization for impacts to covered species and their habitat. This coverage is authorized provided CVWD complies with and implements the requirements of the CVMSHCP/NCCP. As described in Section 7.0 (Take Authorization for Covered Activities and Term of Permit) of the MSHCP/NCCP, take authorized as part of the Plan applies only to non-federal lands (CVAG, 2007b). Therefore, this BA analyzes impacts to and provides mitigation for effects to listed species on federal lands.

Summary of Impacts. Implementation of the proposed Action will result in approximately 175.47 acres of permanent and approximately 286.35 acres of temporary disturbance. Of these impacts:

- 168.51 acres of permanent and 285.68 acres of temporary disturbance occur on private lands which are covered by the CVMSCHP/NCCP.
- 9.96 acres of permanent impacts to federal lands would occur on the Refuge. This includes 8.38 acres of permanent and 0.67 acres of temporary during construction and 1.42 acres of refuge land that would be isolated by the physical presence of Reach 3. These impacts require take authorization from the USFWS through a Biological Opinion.
- The Project would result in direct impacts to 14.32 acres of designated critical habitat for the Coachella Valley milk-vetch (CVMV) and 109.49 acres for the Coachella Valley Fringe-toed lizard (CVFTL). Of these, 7.09 acres of CVMV critical habitat and 8.08 acres of CVFTL critical habitat will be disturbed on federal lands at Reach 3.

Summary of Mitigation. On private lands, Project impacts are covered through participation in the CVMSHCP/NCCP, the acquisition and preservation of a 550-acre floodway, and where applicable, targeted minimization measures required by the CVMSHCP/NCCP. On federal lands, Project impacts would be reduced through the implementation of mitigation and avoidance measures specifically developed for listed species including the Coachella Valley fringe-toed lizard (*Uma inornata*), desert tortoise (*Gopherus*

agassizii), and Coachella Valley milk-vetch *(Astragalus lentiginosus var. coachellae*). Mitigation for the proposed Action would include:

- The acquisition and preservation of a 550-acre floodway within the Thousand Palms Conservation Area (see Figure 2a: Land Ownership on Proposed Project Alignment).
- The acquisition of 24.9 acres of private lands located near Reach 3 that will be transferred to the USFWS to offset 8.81 acres of impacts that would occur to federal lands on the Refuge.
- The preservation of 32 acres of aeolian sand habitat to mitigate impacts to the National Wildlife Refuge. The acquisition of the 24.9 acres would be considered part of the 32-acre requirement.
- Mitigation and avoidance measures that would be applied to federal and private lands.

All relevant Environmental Commitments and Mitigation Measures are specified in Section 2.4 below.

Coordination with regulatory and resource agency personnel, field surveys, consultation with technical experts, and review of pertinent biological and management literature occurred as part of the analysis. The federally listed threatened, endangered, and candidate species considered in this document are identified below in Table 1.

Table 1. Species Considered for Analysis in This BA

Common Name	Scientific Name	Status	Critical Habitat	Effect Determination
Plants				
Coachella Valley milk-vetch	*Astragalus lentiginosus var. coachellae*	T	Designated	May Affect
Triple-ribbed milk-vetch	*Astragalus tricarinatus*	E	None	No Effect
Parish's daisy	*Erigeron parishii*	T	None	No Effect
Invertebrates				
Casey's June beetle	*Dinocoma caseyi*	E	Designated	No Effect
Fish				
Desert pupfish	*Cyprinodon macularius*	E	Designated	No Effect
Reptiles				
Desert tortoise	*Gopherus agassizii*	T	Designated	May Affect
Coachella Valley fringe-toed lizard	*Uma inornata*	T	Designated	May Affect
Birds				
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E	Designated	No Effect
Least Bell's Vireo	*Vireo bellii pusillus*	E	Designated	No Effect
Mammals				
Peninsular bighorn sheep	*Ovis canadensis nelsoni* DPS	E	Designated	No Effect
Critical Habitat				
Coachella Valley milk-vetch			Unit 4 Designated	May Affect
Coachella Valley fringe-toed lizard			Designated	May Affect

Three federally listed species are present or have the potential to occur in the Action Area. These include desert tortoise, Coachella Valley fringe-toed lizard (CVFTL), and Coachella Valley milk-vetch (CVMV). These

species are described in Section 5 (Effects of the Proposed Action and Determination Statements). Designated critical habitat for two species (CVFTL and CVMV) occur in the Action Area. The remaining species identified above have not been carried forward for analysis because they are not expected to occur within the Action Area. No critical habitat for these species is located in the Action Area.

1.1 Project Sponsor

The United States Army Corps of Engineers, Los Angeles District Regulatory Division (USACE) is the Lead Agency under the National Environmental Policy Act (NEPA), and the Coachella Valley Water District (CVWD) is the Lead Agency under the California Environmental Quality Act (CEQA). For the purposes of this BA, USACE is the Federal Action Agency for Consultation under the Endangered Species Act (ESA). The federal action triggering this consultation is the issuance of a Clean Water Act Section 404 permit. In addition, the Sonny Bono Salton Sea National Wildlife Refuge Complex will be administering federal lands within the Action Area and is acting as a cooperating agency under the NEPA.

1.2 Agency Coordination

Agency coordination has been ongoing and includes biological resource staff from the CVWD, California Department of Fish and Wildlife (CDFW), and USFWS. The USACE and USFWS have consulted extensively on the Project. The USFWS completed a Fish and Wildlife Coordination Act Report in 2000 (USFWS, 2000a), which included several recommendations. In 2000, the USACE and USFWS completed Section 7 consultation for the Project (then known as the Whitewater River Basin Flood Control Project) as described in the 2000 Environmental Impact Statement/Environmental Impact Report (EIS/EIR), and a No Jeopardy determination was made in the Biological Opinion (BO; USFWS, 2000b). Subsequent to the BO, the Whitewater River Basin Flood Control Project was identified as a covered activity under the CVMSHCP/NCCP, subject to terms and conditions of the 2000 USFWS Section 7 consultation (CVMSHCP/NCCP, page 7-29; CVAG, 2007). However, due to modifications of Project design and delay in Project implementation the USFWS indicated the BO would not be applicable and the current Project should be re-evaluated to reflect current conditions in the Action Area.

Pursuant to the CVMSHCP/NCCP, the CVMV, desert tortoise, and CVFTL are covered species and impacts to these species are considered a covered activity on designated lands within the Preserve and mitigated through participation in the CVMSHCP/NCCP. In August 2021, CVAG determined that the proposed Action as modified retains its status as a Covered Action within the CVMSHCP (see Appendix A: Coachella Valley Conservation Commission Consistency Determination). Therefore, all Project-related actions that occur within private lands are covered activities and are considered mitigated through participation in the CVMSHCP/NCCP. The CVMSHCP/NCCP does not specify avoidance and minimization requirements for CVMV that would apply to the proposed Action on private lands; however, mitigation measures have been identified to reduce affects to this species and its habitat on federal lands. The CVMSHCP/NCCP, and the Project's relationship to it, are described further in Section 1.3, below.

On federal lands the CVMV, desert tortoise, and CVFTL are not authorized for take under CVMSHCP/NCCP section 10a permit and would require project-specific take authorization from the USFWS (CVAG 2007b). The USACE must obtain a "no jeopardy" opinion from the USFWS if the Project would result in an adverse modification to CVMV or CVFTL designated critical habitat, or may adversely affect CVMV, desert tortoise, and CVFTL. This BA analyzes impacts to federally listed species and their designated critical habitat that occur on federally owned lands (Coachella Valley National Wildlife Refuge) within the proposed Action disturbance area.

1.3 Coachella Valley Multiple Species Habitat Conservation Plan

The CVMSHCP/NCCP provides long-term conservation and habitat protection for the 27 species of special-status plants and animals that are covered under the plan, including desert tortoise, CVFTL, and CVMV. It provides ESA and California Endangered Species Act (CESA) 'take'[1] authorization for these covered species for conforming projects, subject to the plan's administrative and mitigation requirements and USFWS and California Department of Fish and Wildlife (CDFW) take authorizations (CVAG, 2007). The CVMSHCP/NCCP is managed by the Coachella Valley Conservation Commission (CVCC), a joint powers authority of elected representatives, and funded through a combination of development impact fees, open space trust funds, and funding from permittees for infrastructure projects (CVAG, 2007a).

The Project site is within the CVMSHCP/NCCP plan area and the CVWD is a CVMSHCP/NCCP permittee. As a permittee, CVWD has a section 10a incidental take authorization for covered species (Appendix A) on private lands as specified in the CVMSHCP/NCCP permits, so long as compliance with the requirements of the CVMSHCP/NCCP is achieved.

The CVMSHCP/NCCP identifies twenty-one distinct conservation areas in the Coachella Valley also referred to as reserve management units (RMU): The Project site is partially within the Thousand Palms Conservation Area. According to the CVMSHCP/NCCP, the Project's levees, as they were planned in the 2000 EIS/EIR, would define the southern edge of this Conservation Area. The final Project design and alignment of the levees were expected to cause a minor adjustment of the Conservation Area boundary such that the levees would not be within the Conservation Area but would define the edge of the area (CVMSHCP/NCCP, page 4-96; CVAG, 2007a). In the intervening years, the Conservation Area was established as shown in Appendix A, and the current Project design has been modified somewhat from that described in the 2000 EIS/EIR. In August 2021 CVAG conducted an analysis of the proposed Action and determined the design of the Project and Conservation Area boundary adjustment do not conflict with the goals of the CVMSHCP/NCCP a (see Appendix A). Based on this analysis the levee footprint does not occur within the Conservation area. The current design, including changes in design from that described in the 2000 EIS/EIR and BO are assessed in the context of this BA.

For CVWD flood control facilities, covered operations, and maintenance (O&M) activities are defined in the CVMSHCP/NCCP (Table 7-6, page 7-29):

- The removal of sand, silt, sediment, debris, rubbish, woody, and herbaceous vegetation in existing flood control facilities to maintain design capacity of the facility and/or compliance with local fire regulations.
- Control of weeds and vegetation by non-chemical means, and control of debris on all access roads and CVWD rights-of-way.
- The repair or replacement of constructed flood control facilities, such as channels, basins, drop structures, and levees, as necessary to maintain the structural integrity and hydraulic capacity of the facility.

The CVMSHCP/NCCP identifies specific avoidance and minimization requirements for certain species in particular conservation areas. The species with avoidance and minimization requirements applicable to

[1] Under the Federal Endangered Species Act, 'take' is defined as, "…to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (USFWS, 2011b). Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (USFWS, 2008). Under Section 86 of the California Fish and Game Code, 'take' is defined as "…hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" (CDFW, 2015d).

the proposed Project (such as Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, burrowing owl, crissal thrasher, and Le Conte's thrasher) do not include any federally listed or candidate species. However, the CVMSHCP/NCCP identifies specific conservation objectives for Sections 7 and 8 (i.e., the location of Project Reach 1) to limit development in the sand transport corridor that supports downwind habitat for CVFTL and CVMV.

The CVMSHCP/NCCP requires a Joint Project Review Process for all projects under a permittee's jurisdiction within a Conservation Area that would result in disturbance to habitat, natural communities, biological corridors, or essential ecological processes. This process is designed to ensure consistent implementation and oversight of the CVMSHCP/NCCP and involves the CVCC, the permittee (CVWD in this case), and wildlife agencies (USFWS and CDFW). During the process, the CVCC conducts an analysis of the proposed Project's potential impact to Conservation Objectives for the Conservation Area, CVMSHCP/NCCP Required Measures for the Conservation Area, Covered Species' Goals and Objectives, and maintenance of Rough Step in the Conservation Area (Rough Step analysis is done to ensure that CVMSHCP/NCCP objectives are being met). If the analysis identifies inconsistencies between the proposed Project and CVMSHCP/NCCP objectives and requirements, the permittee and CVCC staff meet and confer to identify requirements necessary to achieve compliance (CVAG, 2007).

In August 2021, CVCC determined that the proposed Action is consistent with the CVMSHCP and constitutes a Covered Action under Section 7.3.1 (see Appendix A). Therefore, CVWD has "take" authorization for covered species and their habitats within lands managed by the CVMSHCP, including portions of the Thousand Palms Conservation Area that overlap with the proposed Action. The proposed 2021 alignment Project alignment will result in an approximately 1.16 percent (301 acres) change to the existing Thousand Palms Conservation Area. Reaches 1, 2, and 3 will redefine portions of the western boundary of the Conservation Area and Reach 4 will establish a physical barrier to the existing southern boundary of the Conservation Area. No permanent impacts to Thousand Palms Conservation Area lands will occur. Minor temporary impacts (approximately 9.49 acres) near Reach 1 associated with widening existing access roads will occur (see Section 2.4).

1.4 Management for Conservation Lands

There are several designated conservation lands in the Project vicinity (see Figure 2a): the state-owned Reserve; the CVNWR, which is primarily federal land managed by the USFWS and includes part of the Reserve; and the Coachella Valley Preserve (Preserve), as well as privately-owned conservation lands that contribute to the conservation of the covered species authorized for take under the with the CVMSHCP (see Appendix A). Together these conservation lands help to protect a large dune system, the only remaining undeveloped sand dune ecosystem within the Coachella Valley, and its biological resources. Disturbance areas for the proposed Project will include portions of the Reserve, CVNWR, and CVFTL Preserve (see Table 2). Designated Critical Habitat is described for each species in Section 4 (Federally Listed Species and Critical Habitat). Impacts to the Thousand Palms Conservation Area, are discussed in Section 1.3 and in Appendix A.

Table 2. Project Disturbance Area

	Temporary	Permanent	Total
Total Project Disturbance Area			
Reach 1	17.98	43.04	**61.02**
Reach 2	0.97	4.66	**5.63**
Reach 3	6.19	40.51	**46.7**

Table 2. Project Disturbance Area			
	Temporary	**Permanent**	**Total**
Reach 4	10.77	87.26	**98.03**
New Soil Deposition Site	213.40	0.00	**213.40**
Concrete Batch Plant/ Marshaling Yard	37.04	0.00	**37.04**
Grand Total	**286.35**	**175.47**	**461.82**
Coachella Valley National Wildlife Refuge (USFWS)[1,2]			
Reach 1	0.00	0.00	**0.00**
Reach 2	0.00	0.00	**0.00**
Reach 3	0.67	8.14	**8.81**
Reach 4	0.00	0.00	**0.00**
New Soil Deposition Site	0.00	0.00	**0.00**
Subtotal	**0.67**	**8.14**	**8.81**
Coachella Valley Ecological Reserve (State lands)			
Reach 1	1.03	6.88	**7.91**
Reach 2	0.00	0.00	**0.00**
Reach 3	0.46	2.32	**2.78**
Reach 4	0.00	0.00	**0.00**
New Soil Deposition Site	0.00	0.00	**0.00**
Subtotal	**1.49**	**9.20**	**10.69**
Coachella Valley Preserve[1]			
Reach 1	15.02	40.35	**55.37**
Reach 2	8.60	4.40	**13.00**
Reach 3	3.54	23.19	**26.73**
Reach 4	0.00	0.00	**0.00**
New Soil Deposition Site	0.00	0.00	**0.00**
Subtotal	**27.16**	**67.94**	**95.10**

1 - Federal lands: Impacts are not additive as they occur within the greater Coachella Valley Preserve.
2 - Permanent Impacts to National Wildlife Refuge includes 6.72 acres of direct impacts and 1.42 acres of indirect, but permanent, impacts associated with the construction of Reach 3.

Coachella Valley National Wildlife Refuge. The approximately 3,600-acre CVNWR was established in 1985 and is administered by USFWS as part of the Sonny Bono Salton Sea National Wildlife Refuge Complex. The Refuge is located within the greater boundary of the Coachella Valley Preserve. The CVMSHCP describes the refuge as being operated consistently with the CVMSHCP goals and objectives (CVMSHCP 4.1.1). The management of the refuge is guided by a Comprehensive Conservation Plan (USFWS, 2014), which identifies goals, objectives, and strategies to conserve endangered or threatened plants and wildlife and protect blowsand habitat and natural sand transport processes in the CVNWR. These objectives include:

- Maintain and protect high quality desert dune habitat and adjacent creosote bush scrub to support CVFTL. Manage desert dune habitat to maximize areas of active sandy substrate to support CVMV.
- Reduce the total coverage of Sahara mustard (*Brassica tournefortii*) and other invasive, non-native plants within habitat for CVFTL and CVMV.
- Conserve and enhance aeolian sand communities, including active and stabilized dunes.

- Implement a long-term strategy for monitoring, assessing, and addressing the effects of climate change on habitat and listed and sensitive species.
- Coordinated management for conservation lands within the Valley Floor Reserve Management Unit of the CVMSHCP/NCCP planning area.

The proposed Action is anticipated to directly disturb approximately 7.63 acres of the Coachella Valley National Wildlife Refuge. All disturbance to the Refuge will occur due to the construction of Reach 3 and will comprise approximately 6.96 acres of permanent impacts and 0.67 acres of temporary impacts (Table 2). In addition, 1.42 acres of Refuge lands would be cut off from the Refuge on the west side Reach 3 (see Figure 2b: Impacts to Federal Lands). Direct and temporary impacts to the Refuge would occur from the construction of the 5,300-foot incised trapezoidal channel lined with soil cement. Refer to Section 2.4 Project Description for further information.

In addition to the acquisition and preservation of the 550-acre floodway CVWD will acquire four parcels totaling 24.9 acres that would be deeded to the USFWS as a land swap to offset the direct and indirect impacts to Refuge (see Figure 2b). These lands are required to be of equal or greater acreage than those disturbed due to construction and be comprised of ecologically equivalent habitat to support sensitive species. Four parcels were identified as acquisition parcels:

- APN 695-030-013: 0.28 acres
- APN 695-030-014: 17.20 acres
- APN 695-070-011: 4.88 acres
- Parcel 695-070-015: 2.54 acres

All four parcels are located adjacent to the Refuge and are comprised of ecologically similar habitat to those impacted by proposed Action. A Habitat Conservation Plan will be prepared to describe all mitigation land acquisition, management, and compensation actions (see MM BIO- 6).

Coachella Valley Ecological Reserve. The 1,900-acre Reserve is state-owned land managed by CDFW. It was designated as an ecological reserve by the Fish and Game Commission in 1983. The Reserve was acquired to preserve blowsand habitat and the native plants and wildlife dependent upon it, including CVFTL. A land management plan for the Reserve has not been completed (CDFW, 2016a; 2016b). The CVMSHCP describes the reserve as being operated consistently with the CVMSHCP goals and Objectives (CVMSHCP 4.1.1). The proposed Action is anticipated to disturb approximately 10.69 total acres of the Coachella Valley Ecological Reserve, all in proximity to the development of Reach 1 and Reach 3 (Table 2). Approximately 6.88 acres of permanent impacts and 1.03 acres of temporary impacts will occur due to the construction of Reach 1, and approximately 2.32 acres of permanent impacts and 0.46 acres of temporary impacts will occur due to the construction of Reach 3 (see Figure 2a). Construction activities associated with Reach 2 will not overlap with Reserve lands. Reach 4 was designed to follow adjacent to, and not impact, the existing southern boundary of the Coachella Valley Ecological Reserve, Coachella Valley National Wildlife Refuge, and the greater Coachella Valley Preserve.

Coachella Valley Preserve. The Preserve is privately held land cooperatively managed by the California Department of Parks and Recreation, Nature Conservancy, BLM, CDFW, USFWS, and the Center for Natural Lands Management (CNLM). The CVMSHCP describes the preserve as managed per an MOU as part of the CVFTL Preserve, incorporated into the MSHCP, and management of State Parks' lands consistent with the Conservation Area and Covered Species Goals and Objectives of the CVMSHCP. State Parks is a Permittee under the CVMSHCP and has management and monitoring obligations of approximately 6,800 acres within the Conservation Areas (CVMSHCP 4.1.1). Management of the Preserve is guided by a Management Plan (CNLM, 2000) that identifies ecological goals and objectives, including:

- Maintain sufficient acreage of aeolian habitat to support viable populations of CVFTL.

- Protect the natural processes that maintain the dune ecosystem.
- Control exotic species that negatively impact CVFTL or their habitat quality.
- Protect and maintain a desert ecosystem that surrounds, supports, and buffers CVFTL habitat.

The proposed Action is anticipated to disturb approximately 95.10 total acres of the Coachella Valley Preserve, all within proximity to Reaches 1, 2, and 3 (Table 2). Approximately 40.35 acres of permanent impacts and 15.02 acres of temporary impacts will occur due to the construction of Reach 1, approximately 4.4 acres of permanent impacts and 8.6 acres of temporary impacts will occur due to the construction of Reach 2, and approximately 23.19 acres of permanent impacts and 3.54 acres of temporary impacts will occur due to the construction of Reach 3 (Figure 2a). Reach 4 was designed to follow adjacent to, and not impact, the existing southern boundary of the Coachella Valley Preserve.

2. Background

The purpose for the proposed Project is to provide flood hazard protection to the community of Thousand Palms (see Figure 1), while avoiding adverse effects to wildlife and habitat within the Preserve and CVNWR. The community of Thousand Palms is without flood protection and is therefore subject to flooding during large rain events. The Federal Emergency Management Agency (FEMA) Flood Hazard Area designation indicates that this area would be inundated by stormwater flows associated with the 100-year storm event, or the magnitude storm with a one percent chance of occurring during any given year.

In September 2014, flash flooding associated with rainfall and runoff from Hurricane Norbert resulted in floodwaters as deep as five feet in some areas, including roadways in Thousand Palms. More recent storms have also resulted in localized flooding. Multiple emergency rescue incidents were required in response to the flooding. Total cost of the clean-up and repair effort has not been quantified, but is on the order of millions (CBS, 2014). The proposed Project is designed to protect this area from flooding hazards associated with large storm events.

Development in the Thousand Palms area continues to expand despite the current lack of flood protection. The proposed Project has been studied in various forms since the 1990s, with the current Project design and alignment influenced by development that has continued to occur in the area since the need for flood protection was originally recognized.

The Project consists of construction and operation of flood control structures that would reduce flooding hazards in and near the community of Thousand Palms, in the area between the Indio Hills (to the north) and Interstate 10 (I-10) (to the south). The Project would be designed to support aeolian (wind-driven) and fluvial (water-driven) transport of sand to the Preserve and CVNWR to maintain habitat for CVFTL, CVMV, and other sensitive sand-dwelling species (see Figure 2c: Sand Source and Transport Areas).

2.1 Project Location

The proposed Project is located in the unincorporated community of Thousand Palms, Riverside County, California (see Figure 1). Thousand Palms is located within the Coachella Valley, about ten miles east of the City of Palm Springs and immediately north of the City of Palm Desert, and north of I-10. The Project site is near the center of the Coachella Valley on a broad alluvial fan near the base of the Indio Hills. It is located north of the I-10 freeway, bounded by Rio del Sol Road on the west and Washington Street on the east (see Figure 2a). This area is characterized as a rural urban interface supporting residential, commercial, and industrial developments, plant nurseries, educational facilities, golf courses, utility corridors, and open space, including lands managed for the preservation of sensitive plants and wildlife.

2.2 Definition of Action Area

The implementing regulations to Section 7(a)(2) of the federal ESA describe the Action Area to be all areas affected directly or indirectly by the federal action and not merely the immediate area affected by the proposed Project (50 CFR §402.02). The "Project site" is defined as all permanent and temporary impact areas associated with construction and O&M of the Project. The Action Area includes the Project site, the floodway, existing sand deposition area and access road, and habitat in areas immediately downwind or downstream of the Project site (see Figure 1).

Biological resource field surveys were conducted on the Project site and a surrounding buffer, collectively referred to as the Project Study Area. For habitat assessments, vegetation mapping, and surveys for most species, the Study Area is defined as the Project site with a 200-foot buffer. For CVFTL surveys, the Study Area is defined as the Project site and a 500-foot buffer.

2.3 Project Environmental Commitments and Mitigation Measures

The EIR/EIS identifies Project Environmental Commitments (ECs) that will be applied to each phase of the Project to reduce or avoid impacts to biological resources. In addition, the EIR/EIS identifies Mitigation Measures to augment or enhance existing ECs to ensure impacts to listed biological resources are minimized and supersede existing ECs as needed. ECs and Mitigation Measures will be implemented through each phase of the Project including construction and O&M except where specifically noted below. For example, on private lands the CVMV, desert tortoise, and CVFTL are authorized for take under the CVMSHCP/NCCP Section 10(a) permit. Direct impacts to these species and their habitat are considered a covered activity and mitigated through participation in the CVMSHCP/NCCP. Mitigation measures will only be applied on private lands for species not covered by the MSHCP/NCCP or when the MSHCP/NCCP identifies specific avoidance and minimization requirements. On federal lands, the project will implement the Mitigation Measures identified below.

MM SM-1 **Minimize Sand Impacts.** This mitigation measure shall apply to the construction and O&M phases of the Project on federal lands. CVWD shall develop and implement best management practices (BMPs) to avoid and minimize impacts to sand and sand transport. BMPs shall include, but not be limited to, the following:

- Fencing or other temporary or permanent barriers shall be designed, oriented, and installed to minimize impacts to sand and sand transport.
- Construction activities that would create temporary or permanent barriers shall be avoided and minimized to the extent feasible.
- Application of water to control dust shall be minimized to the extent necessary to meet air quality and other Project requirements. Water sources (e.g., hydrants, tanks, etc.) shall be checked periodically by biological monitors to ensure they are not impacting sand mobility (e.g., by leaking or consistently overfilling trucks, causing wet ground where sand is immobile).
- Areas of active dunes shall be avoided. If active dunes cannot be avoided, disturbance to the dune sand shall be minimized.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. This measure is only relevant to the portion of the project on federal lands.

MM SM-2 **Prepare and Implement a Sand Migration Management Plan.** This measure augments EC SM-2 (Adaptive Management Plan) and requires CVWD to prepare and implement a Sand Migration Management Plan (SMMP) for federal lands to guide the management of the sand resource during the construction and O&M phases of the Project. The Adaptive Management Plan required by EC SM-2 may be included as a component of the SMMP.

The SMMP shall be prepared and submitted to USACE, USFWS, and CDFW for review and comment at least 60 days prior to initiation of construction on the Project. CVWD shall ensure that personnel involved in sand removal and other activities that impact sand and sand transport are familiar with the requirements and guidelines in the SMMP.

The SMMP shall include EC SM-1 (Sand Removal and Distribution or Disposal) and specific guidance on the implementation of EC SM-1, including but not limited to:

- Inspection schedules for accumulation of sand in all Project levees and channels, including inspections after precipitation events.
- Requirements for pre-activity biological surveys for sand removal, including surveys of sand removal areas and areas of associated disturbance, sand distribution sites and access roads, and biological monitoring of sand removal and distribution activities. Based on the results of pre-activity surveys, CVWD or its contractor shall observe no-disturbance buffer areas or other access or activity restrictions to minimize potential impacts to any sensitive resources or special-status species.
- Guidelines on determining if removed sand is suitable for placement in a sand distribution site. The guidelines shall include specific parameters that define suitable versus unsuitable sand. Procedures for conducting sampling and analysis of sand shall be included, as applicable. Cleanup requirements for trash abatement, and accidental spills.
- Procedures and guidelines for the distribution of sand, including parameters for selection of sand distribution sites, appropriate placement of sand (as described in EC SM-1), and procedures for disposal of unsuitable material.
- Maps showing the locations of the sand distribution site(s), including approved access routes and turn-around areas. Disturbance areas at sand distribution sites shall be the minimum size necessary. Maps will clearly indicate the boundaries of sand distribution sites, including GPS points and any physical landmarks, and will be updated as needed. Traffic cones, traffic delineators, staking and flagging or other markers will be put in place for the duration of each sand distribution event to clearly mark these boundaries on the ground. Markers will be completely removed at the end of the sand distribution event. The SMMP shall also include the requirement for all Project-related activities to remain within the marked boundaries and on the approved access route and turn-arounds.
- The SMMP shall include the BMPs identified or developed under Mitigation Measure SM-1.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. This measure is only relevant to the portion of the Project on federal lands.

MM BIO-1 **Conduct Pre-construction Biological Resources Surveys.** This mitigation measure shall apply to the pre-construction and construction phases of the Project on private and federal lands.

Lead Biologist: CVWD shall assign a contact representative (Lead Biologist, MM BIO-2) in coordination with the USACE who will be responsible for overseeing compliance with all biological resource measures, including measures required by USFWS. The contact representative will serve as primary point of contact with the USFWS. In addition, CVWD shall assign Authorized/Acceptable Biologists to perform pre-construction biological surveys at each Project work area and access route, and in the 200-foot area surrounding each work site. See MM BIO-9 through 12 for additional required species-specific authorizations.

USFWS Authorized Biologist/CVMSHCP Acceptable Biologist: CVWD shall appoint at least one Authorized Biologist/Acceptable Biologist to conduct pre-construction surveys and monitor construction and O&M activities (see additional responsibility descriptions below and MM BIO-7). An Authorized Biologist is approved by USFWS and is responsible for being aware of the latest information on USFWS protocols and guidelines for the desert tortoise, as well as handling desert tortoise (see MM BIO-12 for additional responsibility information). An Acceptable Biologist is a biologist whose name is on a list maintained by the CVCC of biologists who are acceptable to Coachella Valley Conservation Commission (CVCC), CDFW, and USFWS for the purposes of conducting surveys of Covered Species as defined in the CVMSHCP. On federal lands, the Acceptable Biologist is required to have the appropriate authorizations (desert tortoise, CVFTL, CVMV) as further described in MM BIO-9 through 12.

CVWD will submit a resume for each proposed Authorized Biologist/Acceptable Biologist, with at least three references and contact information, to the appropriate authorized officer for confirmation that the applicant meets the minimum qualifications.

The Authorized Biologist/Acceptable Biologist(s) must meet the following minimum qualifications:

- Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field.
- Thorough and current knowledge of special-status wildlife species behavior, natural history, ecology, and physiology, and demonstrate substantial field experience and training to safely and successfully conduct their required duties, especially for desert tortoise.
- Three years of experience in field biology.
- At least 1 year of field experience with biological resources found in or near the Project area.
- Meet the USFWS's current Authorized Biologist qualifications criteria (USFWS, 2009a), demonstrate familiarity with protocols and guidelines for the desert tortoise, and be approved by the Service.

Pre-construction surveys shall be planned and implemented to identify locations of special-status plants and wildlife and nesting birds occurring at work areas, staging areas, and other Project-related disturbance area, and in adjacent buffer areas. Specific pre-

construction survey methods or protocols will vary according to the resources which may be present at any given site, and according to season. At minimum, CVWD shall complete pre-construction surveys 10 days prior to beginning work in any given area and repeat the surveys if the work site remains inactive for a period of 10 days or more. During nesting season, an Authorized/Acceptable Biologist shall complete nesting bird surveys no more than four days prior to beginning work at any given area and repeat the surveys regularly so long as work continues at the site during the nesting season.

Pre-construction survey reports shall document survey methodology and results. Each pre-construction survey report shall include a list of biological resources detected at each site during the pre-construction survey along with any relevant additional details of sightings of special-status species (e.g., size, gender, apparent health, reproductive status, etc.).

CVWD also shall conduct pre-construction "sweeps" of each work site immediately prior to beginning construction or disturbance work, to ensure that any special-status resources present have been identified, and to note any vulnerable wildlife that may have entered the site. Based on the results of pre-construction surveys and sweeps, CVWD or its contractor shall observe species-specific no-disturbance buffer areas or other access or activity restrictions to minimize potential impacts to the resources, such as lizard-specific exclusionary fencing along the northern side of Avenue 38 to prevent CVFTL from accessing the Project area.

CVMSHCP/NCCP: This measure is required for private and federal lands.

MM BIO-2 **Conduct Biological Monitoring and Reporting.** This measure supersedes EC B-2 (Biological Monitoring and Relocation of Sensitive Species) as described in the EIR/EIS for the proposed Project. This measure applies to the construction phase of the Project on private and federal lands. Refer to MM BIO-7 for additional information on biological monitoring during the O&M phase of the Project. Roles of biologists conducting biological surveying and monitoring will include a Lead Biologist (that is also an Authorized Biologist/Acceptable Biologist as described in MM BIO-1), a Designated Desert Tortoise Biologist (see MM BIO-12), and at least one or more Authorized/Acceptable Biologist(s).

Lead Biologist: CVWD shall appoint a lead biologist in coordination with the USACE, no less than 60 days prior to the start of any ground-disturbing activities, including those occurring prior to site mobilization (e.g., geotechnical borings, etc.). This lead biologist may be the same lead biologist as described in MM BIO-1. The lead biologist will hold a bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field; have at least three years of experience in field biology and at least one year of direct field experience with biological resources found in or near the Project area. The lead biologist shall possess the appropriate education and experience to successfully accomplish the assigned biological resources tasks.

The lead biologist will be CVWD's primary point of contact to CDFW and USFWS and other agencies regarding any biological resource issues and implementation of related mitigation measures and permit conditions throughout Project construction and post-construction restoration work. In addition, the lead biologist will be responsible for supervising and training biological monitors and preparing monitoring reports and documentation (below).

Biological Monitors (Authorized Biologist(s)/Acceptable Biologist(s): CVWD shall assign qualified biological monitors that are Authorized Biologist(s)/Acceptable Biologist(s) to the Project to monitor all work activities during the construction phase (see MM BIO-1). A Designated Desert Tortoise Biologist will also be present to conduct desert tortoise specific surveying and monitoring (see MM BIO-12).

Monitors are responsible for ensuring that impacts to special-status species, native vegetation, wildlife habitat, and sensitive or unique biological resources, including desert dune and sand field habitat, are avoided or minimized to the fullest extent safely possible. Monitors are also responsible to ensure that work activities are conducted in compliance with ECs, Mitigation Measures, permit conditions, and other Project requirements.

CVWD shall provide training to biological monitors, in addition to WEAP (see Mitigation Measure BIO-3) and prior to the monitor commencing field duties, on biological resources present or potentially present on the Project, as well as ECs, mitigation measures, permit requirements, Project protocols, and the duties and responsibilities of a biological monitor.

Biological monitors shall inform construction crews daily of any environmentally sensitive areas (ESAs), nest buffers, or other resource issues or restrictions that affect the work sites for that day. Biological monitors shall communicate with construction supervisors and crews as needed (e.g., at daily tailgate safety meetings ("tailboards"), by telephone, text message, or email) to provide guidance to maintain compliance with ECs, mitigation measures, and permit conditions. CVWD shall ensure that adequate numbers of monitors are assigned to effectively monitor work activities and that communications from biological monitors are promptly directed to crews at each work site for incorporation into daily work activities. If biological monitors are unavailable for a tailboard meeting, the construction supervisors shall communicate all ESAs, nest buffers, or other resource restrictions to crews during the meeting. CVWD shall ensure that biological monitors are provided with an accurate daily construction work schedule as well as updated information on any alterations to the daily construction work schedule. CVWD shall ensure that biological monitors are provided with up-to-date biological resource maps and construction maps in hardcopy or digital format.

Monitors shall be familiar with the biological resources present or potentially present, ESAs, nest buffers, and any other resource issues at the site(s) they are monitoring, as well as the applicable ECs, Mitigation Measures, and permit requirements. Monitors shall exhibit diligence in their monitoring duties and refrain from any conduct or potential conflict of interest that may compromise their ability to effectively carry out their monitoring duties.

Biological monitor duties and responsibilities: Throughout the duration of construction, Authorized/Acceptable Biologist(s) shall conduct biological monitoring of all work activities in the Project area, including work sites, staging areas, access roads, and any area subject to Project disturbance. All pre-construction activities (e.g., for geotechnical borings, etc.) and post-construction restoration (if any) shall also be monitored by a biological monitor or lead biologist. Refer to MM BIO-7 for a description of biological monitor duties and responsibilities during the O&M phase of the Project.

Each day, prior to work activities at each site, a biological monitor shall conduct clearance surveys ("sweeps") for sensitive plant or wildlife resources that may be located within or

adjacent to the construction areas. If sensitive resources are found, the biological monitor shall take appropriate action as defined in all ECs, mitigation measures, and permit conditions. Work activities shall not commence at any work site until the clearance survey has been completed and the biological monitor communicates to the contractor that work may begin.

Biological monitors shall clearly mark sensitive biological resource areas with staking, flagging, or other appropriate materials that are readily visible and durable. The monitors will inform work crews of these areas and the requirements for avoidance and will inspect these areas at appropriate intervals for compliance with regulatory terms and conditions. The biological monitors shall ensure that work activities are contained within approved disturbance area boundaries at all times.

Biological monitors shall have the authority and responsibility to halt any Project activities that are not in compliance with applicable mitigation measures, ECs, permit conditions, or other Project requirements, or will have an unauthorized adverse effect on biological resources.

Handling, relocation, release from entrapment, or other interaction with wildlife shall be performed consistent with mitigation measures, safety protocols, permits (including CDFW and USFWS permits), and other Project requirements (and only done by an Authorized Biologist approved by USFWS, as described in MM BIO-1 and MM BIO-12).

Biological monitors shall use handling measures that are safe, practicable, and consistent with mitigation measures and permit conditions, to actively or passively relocate wildlife out of harm's way. On a daily basis, biological monitors shall inspect construction areas where animals may have become trapped, including equipment covered with bird exclusion netting (if any), and release any trapped animals. Daily inspections shall also include areas with high vehicle activity (e.g., staging areas), to locate animals in harm's way and relocate them if necessary. If safety or other considerations prevent biological monitors from aiding trapped wildlife or wildlife in harm's way, CVWD shall consult with the construction contractor, CDFW, wildlife rehabilitator, or other appropriate party to obtain aid for the animal, consistent with applicable mitigation measures.

At the end of each workday, biological monitors shall verify that all excavations, open tanks, trenches, pits, or similar wildlife entrapment hazards have been covered or have ramps installed to prevent wildlife entrapment, and communicate with work crews to ensure these structures are installed and functioning properly.

Biological monitors shall inspect any wildlife exclusion fencing daily to ensure that it remains intact and functional. Any need for repairs to exclusion fencing shall be immediately communicated to the responsible party, and repairs shall be carried out in a timely manner, generally within one workday.

CVWD shall prepare and implement a procedure for communication among biological monitors and construction crews, to ensure timely notification (i.e., daily or sooner, as needed) to crews of any resource issues or restrictions.

Monitoring activities shall be thoroughly and accurately documented on a daily basis. CVWD shall develop protocols for documentation of monitoring prior to the initiation of construction to include:

- All special status species observations, including location of observation, location and description of Project activities in the vicinity, and any avoidance or other measures taken to avoid the species. In addition, all special-status species observations shall be reported to the California Natural Diversity Database (CNDDB).
- All non-compliance incidents, including nest buffer incursions, with resolution or remedial actions taken.
- Bird nesting activities and buffers established.
- Final post-construction compilation of permanent and temporary impact acreages by habitat.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. However, to ensure the protection of non-covered sensitive species this measure is required for private and federal lands.

MM BIO-3 **Prepare and Implement a Worker Environmental Awareness Program (WEAP).** This mitigation measure shall apply to the construction and O&M phases of the Project on private and federal lands.

CVWD shall prepare and implement a Project-specific Worker Environmental Awareness Program (WEAP) to educate on-site workers about the Project's sensitive environmental issues. Contents of the WEAP will be coordinated with the USFWS prior to finalizing it. The WEAP shall be administered by the lead biologist or a biological monitor to all personnel on-site during the construction phase, including but not limited to surveyors, engineers, inspectors, contractors, subcontractors, supervisors, employees, monitors, visitors, and delivery drivers. If the WEAP presentation is recorded on video, it may be administered by any competent Project personnel. Throughout the duration of construction, CVWD shall be responsible for ensuring that all on-site Project personnel receive this training prior to beginning work. A construction worker may work in the field along with a WEAP-trained crew for up to five days prior to attending the WEAP. CVWD shall maintain a list of all personnel who have completed the WEAP training. Employees will sign a statement indicating that they have completed the education program and understand fully its provisions and the specific measures, terms, and conditions included in the EIR/EIS and Biological Opinion.

The WEAP shall consist of a training presentation, with supporting written materials provided to all participants.

The WEAP training shall include, at minimum:

- Overview of the Project, the jurisdictions the Project route passes through or adjacent to (e.g., CVMSHCP/NCCP, Coachella Valley Preserve) and any special requirements of those jurisdictions.
- Overview of the federal and State Endangered Species Acts, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, including the definition of "take," and the consequences of non-compliance with these acts including potential penalties (up to $25,000 in fines and 6 months in prison) for taking a federally listed threatened species. Review of the take permit authorized for the project and applicable locations
- Overview of the Project mitigation in the final EIS and biological permit requirements included in the Biological Assessment, the Biological Opinion, and any other resource agency agreements or authorizations, as well as the consequences of non-compliance

with these requirements. They would also be informed of the environmental commitments, specific measures, terms and (when delivered).

- Sensitive biological resources and potential for impacts to them on the Project site and adjacent areas, including nesting birds, listed species (Coachella Valley milk-vetch, CVFTL, desert tortoise) and other special-status plants and wildlife, and sensitive habitats known or likely to occur on the Project site, Project requirements for protecting these resources, and the consequences of non-compliance. Review of the take permit authorized for the project and applicable locations.
- Sand habitats and sand transport, Project requirements for protecting these resources, and the consequences of non-compliance.
- Construction restrictions such as limited operating periods, environmentally sensitive areas (ESAs), and buffers.
- Avoidance of invasive weed introductions onto the Project site and surrounding areas, and description of the Project's Integrated Weed Management Plan (see MM BIO-8) and associated compliance requirements for workers on the site.
- Function, responsibilities, and authority of biological and environmental monitors and how they interact with construction crews.
- Requirement to remain within authorized work areas and on approved roads, with examples of the flagging and signage used to designate these areas and roads, and the consequences of non-compliance.
- Procedure for obtaining clearance from a biological monitor to enter a work site and begin work (including moving or mobilizing equipment), and the requirement to wait for that clearance.
- One-hour hold (or other method CVWD will use to halt work when necessary to maintain compliance) and the requirement for compliance.
- ESAs and associated restrictions, and other restrictions such as no grading areas, flagging or signage designations, and consequences of non-compliance.
- Nest buffers and associated restrictions and the consequences of non-compliance. Procedure and time frame for halting work and removing equipment when a new buffer is established. Discussion of nest deterrents when no active nests are found during surveys.
- Explanation that wildlife must not be harmed or harassed. Procedures for covering pipes, securing excavations, and installing ramps to prevent wildlife entrapment. What to do and who to contact if dead, injured, or entrapped animals are encountered.
- General safety protocols such as hazardous substance spill prevention, containment, and cleanup measures; fire prevention and protection measures; designated smoking areas (if any) and cigarette disposal; safety hazards that may be caused by plants and animals; and procedure for dealing with rattlesnakes in or near work areas or access roads.
- Printed training materials, including photographs and brief descriptions of all special-status plants and animals that may be encountered on the Project, including behavior,

ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures.

- Contact information for CVWD, construction management, and contractor environmental personnel, and who to contact with questions.
- Training acknowledgment form to be signed by each worker indicating that they understand and will abide by the guidelines, and a hardhat sticker so WEAP attendance may be easily verified in the field.

Focused WEAP. An abbreviated version of WEAP training ("focused WEAP") may be used for individuals who are exclusively delivery drivers or visitors to the Project site, and will be provided by a qualified Project biologist, biological monitor, or environmental field staff prior to those individuals entering or working on the Project. Short-term visitors (total of five days or less per year) to the Project site who will be riding with and in the company of WEAP-trained Project personnel for the entire duration of their visit(s) are not required to attend WEAP or focused WEAP training.

WEAP lite training will provide sufficient information for the individual to understand and maintain compliance with Project mitigation measures and permit conditions. WEAP lite presentations will be tailored to the situation and emphasize Project requirements that are relevant to that situation (e.g., dust control, speed limits, and staying within Project roads and work areas for delivery drivers).

A training acknowledgment form will be signed by each participant indicating that they understand and will abide by the guidelines, and a hardhat sticker will be provided so WEAP lite attendance may be easily verified in the field. CVWD will maintain a list of personnel who have completed WEAP lite training.

WEAP Refreshers. Biological monitors or environmental field staff will periodically present brief WEAP refresher presentations at tailboards to help construction crews and other personnel maintain awareness of environmental sensitivities and requirements. A 5- to 10-minute informal talk will be presented at each of the Project's main contractor/ subcontractor tailboards at least once a week.

When a contractor or subcontractor resumes work after a long break (more than six (6) consecutive calendar days with no substantial work on Project construction in the field), a biological monitor or environmental field staff will provide an extended WEAP refresher presentation (10-20 minutes) at each of the contractor/subcontractor tailboards on the first day back to work.

The monitor will note the date, contractor or subcontractor, tailboard location and time, and topic(s) discussed during the WEAP refresher and include this information in their daily monitoring log.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. However, to ensure the protection of non-covered sensitive species this measure is required for private and federal lands.

MM BIO-4 **Minimize Native Vegetation and Habitat Loss.** This mitigation measure shall apply to the construction phase of the Project on private and federal lands. Final engineering of the Project shall minimize the extent of disturbance and removal of native vegetation and habitat, including sand habitat, to the extent safe and feasible.

To the extent feasible, vegetation removal within work areas will be minimized and construction activities will implement mowing or drive and crush access and site preparation rather than grading. To the extent feasible, stockpiling of spoils and salvaged topsoil will be located in previously disturbed areas, and will avoid native vegetation and habitat, including sand habitat and be stored in way to avoid attracting wildlife.

Prior to any construction equipment or crew mobilization at each work site, work areas will be marked with staking or flagging to identify the limits of work and will be verified by Project environmental staff. Staking and flagging will clearly indicate the work area boundaries. Where staking cannot be used, traffic cones, traffic delineators, or other markers will be used. Staking and flagging or other markers will be in place during construction activities at each work site and will be refreshed as needed. Coded flagging colors or color combinations will be consistent and uniform across the Project. All work activities, vehicles, and equipment will be confined to approved roads and staked and flagged or marked work areas.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. However, to ensure the protection of non-covered sensitive species this measure is required for private and federal lands.

MM BIO-5 **Utilize Native Species for Revegetation of Temporary Disturbance Areas.** This mitigation measure shall apply to the construction phases of the Project on federal lands. Given the slow recovery rates of desert vegetation, it is unlikely that ecological restoration techniques can dependably establish a trend toward restoration of habitat values within a five (5) year period unless vegetation disturbance was limited to mowing. Therefore, habitat impacts (excluding impacts to sand habitat) in temporary disturbance areas will be considered permanent habitat loss and mitigated as described Mitigation Measure BIO-6.

If revegetation is necessary as determined by CVWD, revegetation in temporary disturbance areas (e.g., for erosion control or to prevent the spread of weeds or mitigation of visual impacts, etc.) shall utilize only native species appropriate for the area and habitat type. No non-native species will be planted.

Within appropriate habitat, native plants that provide foraging opportunities for Coachella Valley fringe-toed lizard and desert tortoise shall be included in seed mixes, as determined by a qualified biologist. These species may include, but are not limited to, bugseed (*Dicoria canescens*), globe mallow (*Sphaeralcea ambigua*), and dwarf white milk-vetch (*Astragalus didymocarpus*).

CVWD will coordinate all restoration activities within the federally owned Coachella National Wildlife Refuge lands with Refuge managers to ensure that the restoration activities align with Refuge-specific guidelines and management objectives.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. This measure is only required for federal lands.

MM BIO-6 **Compensate for Habitat Loss.** The CVWD will acquire and protect approximately 550 acres of floodway lands as habitat for special-status plants and wildlife, located within the Thousand Palms Conservation Area. The floodway lands will be transferred to the CVCC for conservation and management under the CVMSHCP in support of the goals and objectives of the CVMSHCP. CVWD will ensure acquisition and protection of approximately 32 acres of aeolian sand habitat that contribute to the recovery of Coachella Valley fringe-toed lizard and suitable for other aeolian sand dependent species. Habitat compensation

will be accomplished by acquisition of mitigation land or conservation easements or by providing funding for specific land acquisition, endowment, restoration, and management actions.

CVWD shall be responsible for the acquisition, initial protection and habitat improvement, of compensation lands. Alternatively, CVWD may provide funding to CVAG for the acquisition of mitigation lands. The compensation lands will be placed under conservation management to be funded through the terms described herein. The requirements of this mitigation measure shall be fully accomplished within five years from the completion of Project construction.

Compensation Land Selection Criteria. Criteria for the acquisition, initial protection and habitat improvement, and long-term maintenance and management of compensation lands for impacts to biological resources shall include all of the following:

- Compensation lands shall provide habitat value that is equal to or better than the quality and function of the habitat impacted by the Project, taking into consideration soils, vegetation, topography, human-related disturbance, wildlife movement opportunity, proximity to other protected lands, management feasibility, sand source and sand transport, and other habitat values;
- To the extent that proposed compensation habitat may have been degraded by previous uses or activities, the site quality and nature of degradation must support the expectation that it will regenerate naturally when disturbances are removed;
- Be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;
- Not have a history of intensive recreational use or other disturbance that might cause future erosion or other habitat damage, and make habitat recovery and restoration infeasible;
- Invasive species that might jeopardize habitat recovery and restoration, either on or immediately adjacent to the parcels under consideration, must not occur at higher density than found on the lands affected directly and indirectly by the proposed Project;
- Not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat;
- Must provide wildlife movement value equal to that on the Project site, based on topography, presence and nature of movement barriers or crossing points, location in relationship to other habitat areas, management feasibility, and other habitat values;
- Have water and mineral rights included as part of the acquisition, unless CDFW and USFWS agree in writing to the acceptability of land without these rights.

Review and Approval of Compensation Lands Prior to Acquisition. Prior to the initiation of construction, CVWD will prepare and implement a Habitat Compensation Plan in coordination with USFWS and CDFW, identifying the proposed compensation lands and detailing all proposed improvement, management, protection activities. This Plan shall discuss the suitability of the proposed parcel(s) as compensation lands in relation to the selection criteria listed above.

CVMSCHP/NCCP: The Project is covered under the CVMSHCP/NCCP. This measure is only relevant to the portion of the project on federal lands.

I**MM BIO-7** **Prepare and Implement an Operations and Maintenance Plan.** This mitigation measure shall apply to the O&M phase of the Project for private and federal lands. CVWD, in coordination with the USACE, shall implement their existing Operations and Maintenance Plan (O&M Plan) for the Project or create a new O&M Plan, and submit it to USFWS and CDFW for review prior to the start of construction of the Project. As described in the CVMSHCP/NCCP (page 7-29), this plan will minimize impacts to CVMSHCP/NCCP covered species and natural communities and protect non-covered special status species. Additionally, the O&M Plan will also minimize impacts to species and native habitat that are not covered by the CVMSHCP/NCCP, including sand habitat.

The O&M Plan shall include, but is not limited to:

- **Pre-maintenance biological surveys and monitoring.** The O&M Plan shall specify the types of O&M activities (e.g., clearing of accumulated sand, deposition of sand, vegetation clearing, etc.) requiring pre-maintenance biological surveys. Depending on the results of the survey, biological monitoring during the O&M activity may be required to avoid or minimize impacts to special-status species and native habitat. The O&M Plan shall integrate the relevant portions of Mitigation Measures BIO-1 and BIO-2.
- **Minimize impacts.** The O&M Plan shall incorporate Mitigation Measures BIO-2 and BIO-3.
- **Weed control.** The O&M Plan shall incorporate the Integrated Weed Management Plan (Mitigation Measure BIO-8) and Mitigation Measure BIO-4.
- **Nesting birds.** The O&M Plan shall incorporate the Nesting Bird Management Plan (Mitigation Measure BIO-15).
- **Restrict OHV access.** The O&M Plan shall include methods to restrict unauthorized use of the Project facilities, with emphasis on restricting OHV access, to avoid and minimize impacts to sensitive habitats, including sand habitats, and special-status species. Any OHV restrictions (e.g., fencing) will be designed to minimize OHV access while maintaining biological connectivity and wildlife movement and sand transport.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. However, to ensure the protection of non-covered sensitive species this measure is required for private and federal lands. In addition, any O&M activities that occur within the indirect permanently impacted Coachella Valley Wildlife Refuge lands (see Sections 1 and 1.4) will be covered under the CVMSHCP/NCCP.

MM BIO-8 **Prepare and Implement an Integrated Weed Management Plan.** This mitigation measure shall apply to the construction and O&M phase of the Project on federal lands and will augment EC B-1 (Weed Abatement Program).

CVWD, in coordination with the USACE, shall prepare and implement an Integrated Weed Management Plan (IWMP) describing the proposed methods of preventing or controlling Project-related spread of weeds or new weed infestations. No pre-construction activities (e.g., for geotechnical borings, etc.), construction, equipment or crew mobilization, or Project-related ground-disturbing activity shall proceed until the IWMP is completed and

implemented. The IWMP will be incorporated into the O&M Plan (Mitigation Measure BIO-7).

For the purposes of the IWMP, "weeds" shall include designated noxious weeds, as well as any other non-native weeds or pest plants identified on the weed lists of the California Department of Food and Agriculture or the California Invasive Plant Council. The IWMP shall be implemented throughout Project construction and O&M. The IWMP shall include the information listed in the following paragraphs.

Background. The background section shall provide an assessment of the Project's potential to cause spread of invasive non-native weeds into new areas, or to introduce new non-native invasive weeds into the Project site. This section must list known and potential non-native and invasive weeds occurring on the Project site and in the Project region, and identify threat rankings and potential consequences of Project-related occurrence or spread for each species. This assessment shall include, but is not limited to, weeds that (1) are rated high or moderate for negative ecological impact in the California Invasive Plant Inventory Database (Cal-IPC, 2020), and (2) aid and promote the spread of wildfires (such as cheatgrass, Sahara mustard, and medusa head), and (3) stabilize sand dunes and fields (such as Sahara mustard). This section shall identify goals for control of each species (e.g., eradication, suppression, or containment) likely to be found within the Project area.

Pre-construction weed inventory. CVWD shall inventory the entire Project site, including all areas subject to ground-disturbing activity, including, but not limited to, construction work sites, staging areas, and any potential new or improved access roads. Weed occurrences shall be mapped and described according to density and area covered. The map shall be updated at least once a year during the construction phase.

Pre-construction weed treatment. Weed infestations identified in the pre-construction weed inventory shall be evaluated to identify potential for Project-related spread. The IWMP shall identify any infestations to be controlled or eradicated prior to Project construction, or other site-specific weed management requirements (e.g., avoidance of soil transport and site-specific vehicle washing where threat or spread potential is high). Control and follow-up monitoring of pre-construction weed treatment sites will follow methods identified in appropriate sections of the IWMP.

Prevention. The IWMP shall specify methods to minimize potential transport of weed seeds onto the Project site, or from one section of the Project site to another. The Project site may be divided into "weed zones," based on known or likely invasive weeds in any portion of the Project site. The IWMP will specify inspection procedures for construction materials and equipment entering the Project area. Vehicles and equipment may be inspected and cleaned at entry points to specified portions of the Project site, and before leaving work sites where weed occurrences must be contained locally. Construction equipment shall be cleaned of dirt and mud that could contain weed seeds, roots, or rhizomes. Equipment shall be inspected to ensure it is free of any dirt or mud that could contain weed seeds, and the tracks, outriggers, tires, and undercarriage will be carefully washed, if needed, with special attention being paid to axles, frame, cross members, motor mounts, underneath steps, running boards, and front bumper/brush guard assemblies. Other construction vehicles (e.g., pick-up trucks) that will be frequently entering and exiting the site will be inspected and washed on an as-needed basis. Tools such as chainsaws, hand clippers, pruners, etc., shall be cleaned of dirt and mud before entering Project work areas.

All vehicles shall be washed off-site when possible. If off-site washing is infeasible, on-site cleaning stations will be set up at specified locations to clean equipment before it enters the work area. Wash stations shall be located away from native habitat or special-status species occurrences. Wastewater from cleaning stations will not be allowed to run off the cleaning station site. When vehicles and equipment are washed, a daily log shall be kept stating the location, date and time, types of equipment, methods used, and personnel present.

Erosion control materials (e.g., straw wattles, hay bales) must be certified free of weed seed before they are brought onto the site. The IWMP must prohibit on-site storage or disposal of mulch or green waste that may contain weed material. Mulch or green waste shall be removed from the site in a covered vehicle to prevent seed dispersal, and transported to a licensed landfill or composting facility.

The IWMP shall specify guidelines for any soil, sand, gravel, mulch, or fill material to be imported into the Project area, transported from site to site within the Project area, or transported from the Project area to an off-site location, to prevent the introduction or spread of weeds to or from the Project area.

Monitoring. The IWMP shall specify methods to survey for weeds during construction and O&M; and shall specify qualifications of botanists responsible for weed monitoring and identification. It must include a monitoring schedule to ensure timely detection and immediate control of weed infestations to prevent further spread. Surveying and monitoring for weed infestations shall occur at least two times per year, to coincide with the early detection period for early season and late season weeds (i.e., species germinating in winter and flowering in late winter or spring, and species germinating later in the season and flowering in summer or fall). It also must include methods for marking invasive weeds on the Project site, and recording and communicating these locations to weed control staff. The map of weed locations (discussed above) shall be updated at least once a year. The monitoring section shall also describe methods for post-eradication monitoring to evaluate success of control efforts and any need for follow-up control.

Control. The IWMP must specify manual and chemical weed control methods to be employed. The IWMP shall include only weed control measures with a demonstrated record of success for target weeds, based on the best available information. The plan shall describe proposed methods for promptly scheduling and implementing control activity when any weed infestation is located, to ensure effective and timely weed control. Weed infestations must be controlled or eradicated as soon as possible upon discovery, and before they go to seed, to prevent further spread. All proposed weed control methods must minimize the extent of any disturbance to native vegetation, limit ingress and egress to defined routes, and avoid damage from herbicide use or other control methods to any environmentally sensitive areas identified within or adjacent to the Project site.

Weed infestations shall be treated at a minimum of once annually until eradication, suppression, or containment goals are met. For eradication, when no new seedlings or resprouts are observed for three consecutive, normal rainfall years, the weed occurrence can be considered eradicated and weed control efforts may cease for the site.

Manual control shall specify well-timed removal of weeds or their seed heads with hand tools; seed heads and plants must be disposed of in accordance with guidelines from the Riverside County Agricultural Commissioner, if such guidelines are available.

The chemical control section must include specific and detailed plans for any herbicide use. It must indicate where herbicides will be used, which herbicides will be used, and specify techniques to be used to avoid drift or residual toxicity to native vegetation or special-status plants and wildlife. Only state-approved herbicides may be used. Herbicide treatment will be implemented by a Licensed Qualified Applicator. Herbicides shall not be applied during or within 72 hours of predicted rain. Only water-safe herbicides shall be used in riparian areas or within channels (engineered or not) where they could run off into downstream areas. Herbicides shall not be applied when wind velocities exceed six (6) mph. All herbicide applications will follow U.S. Environmental Protection Agency label instructions and will be in accordance with federal, state, and local laws and regulations.

Reporting schedule and contents. The IWMP shall specify a reporting schedule and contents of each report that shall be prepared by CVWD to document weed control efforts.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. This measure is required for federal lands.

MM BIO-9 **Minimize and Mitigate Impacts to Special-status Plants.** This mitigation measure will be applied to the construction and O&M phases of the Project on private and federal lands. This mitigation measure enhances EC B-3 (Avoid Impacts to Sensitive Species).

Pre-construction survey. CVWD shall conduct focused pre-construction surveys for federal- and State-listed and other special-status plants. All special-status plant species (including listed threatened or endangered species, and all CRPR 1A, 1B, 2, 3, and 4 ranked species) impacted by Project activities shall be documented in pre-construction survey reports. Surveys shall be conducted during the appropriate season in all suitable habitat located within the Project disturbance areas and access roads and within 200 feet of disturbance areas. Surveys shall be conducted by a qualified botanist. The field surveys and reporting must conform to current CDFW botanical field survey protocol (CDFG, 2009) or more recent updates, if available. The results will be submitted to USFWS within 30 days of completing the surveys. The reports shall describe any conditions that may have prevented target species from being located or identified, even if they are present as dormant seed or below-ground rootstock (e.g., poor rainfall, recent grazing, or wildfire). In some cases, follow-up surveys may be necessary to adequately evaluate impacts. Pre-construction field survey reports shall include maps showing locations of survey areas and special-status plants.

Mitigation. CVWD shall mitigate impacts to any state or federally listed plants or CRPR 1 or 2 ranked plants on federal lands or species that are not covered by the MSHCP that may be located on the Project disturbance areas where direct or indirect effects to soils, vegetation, or sand transport could affect special-status plants through one or a combination of the following strategies.

- **Avoidance of special-status plants** is the preferred strategy wherever feasible. Where avoidance is not feasible, and the Project would directly or indirectly affect more than 10 percent of a local occurrence on federal lands or to non-covered species,[2] by either number of plants or extent of occupied habitat, CVWD shall prepare and implement a

[2] An occurrence for a plant is defined as any population or group of nearby populations located more than 0.25 miles from any other population (CNPS, 2010).

mitigation plan to consist of off-site compensation, salvage or horticultural propagation, and off-site introduction (see MM BIO-5 and MM BIO-7).

- **Avoidance.** Where feasible, Project work areas shall be located to avoid or minimize impacts to special-status plants. Effective avoidance through Project design shall include a buffer area surrounding each avoided occurrence, where no Project activities will take place. The buffer area shall be clearly staked, flagged, and signed for avoidance prior to the beginning of ground-disturbing activities, and maintained throughout the construction phase. The buffer zone shall be of sufficient size to prevent direct or indirect disturbance to the plants from construction activities, erosion, inundation, or dust. The size of the buffer will depend upon the proposed use of the immediately adjacent lands and the plant's ecological requirements (e.g., sunlight, moisture, shade tolerance, water availability, edaphic physical and chemical characteristics), to be specified by a qualified biologist or botanist. At minimum, the buffer for tree or shrub species shall be equal to twice the drip line (i.e., two times the distance from the trunk to the canopy edge) to protect and preserve the root systems. The buffer for herbaceous species shall be a minimum of 50 feet from the perimeter of the occupied habitat or the individual. If a smaller buffer is necessary due to other Project constraints, CVWD, in coordination with the USACE, shall develop and implement site-specific monitoring and put other measures in place to avoid the take of the species if possible, in consultation with USFWS and CDFW.
- **Off-site compensation.** CVWD shall provide compensation lands for impacts to federal lands or for non-covered species consisting of habitat occupied by the impacted CRPR 1 or 2 ranked plants at a 1:1 ratio of acreage and number of plants for any occupied habitat affected by the Project. Occupied habitat will be calculated on the Project site and on the compensation lands as including each special-status plant occurrence and a surrounding 100-foot buffer area. Off-site compensation shall be incorporated into the Project's Habitat Compensation Plan (Mitigation Measure BIO-6). Compensation acreage for special-status plants may be included ("nested" or "layered" within the 550-acre floodway) in compensation land also designated to offset other impacts such as habitat loss for special-status wildlife.
- **Salvage.** CVWD shall consult with horticulturists at a qualified institution, such as Rancho Santa Ana Botanic Garden, regarding the feasibility and likely success of salvage efforts for each species. If salvage is deemed to be feasible, then CVWD shall prepare and implement a Special-status Plant Salvage and Relocation Plan (Plan) to be reviewed by CDFW and USFWS, prior to direct or indirect disturbance of any occupied habitat. The goal shall be establishment of a new viable occurrence, equal or greater in extent and numbers to the affected occurrence. The Plan shall include at minimum: (a) species and locations of plants identified for salvage; (b) criteria for determining whether an individual plant is appropriate for salvage; (c) the appropriate season for salvage; (d) equipment and methods for collection, transport, and re-planting plants or seed banks, to retain intact soil conditions and maximize success; for shrubs, cacti, and yucca, a requirement to mark each plant to identify the north-facing side prior to transport, and replant it in the same orientation; (f) details regarding storage of plants or seed banks for each species; (g) location of the proposed recipient site, and detailed site preparation and plant introduction techniques for top soil storage, as applicable; (h) a descrip-

tion of the irrigation, weed control, and other maintenance activities; (i) success criteria, including specific timeframe for survivorship and reproduction of each species; and (j) a detailed monitoring program, commensurate with the Plan's goals.

Annual monitoring and documentation of salvaged plants shall include, but not be limited to, details of plants salvaged, stored, and transplanted (salvage and transplanting locations, species, number, size, condition, etc.); adaptive management efforts implemented (date, location, type of treatment, results, etc.); and evaluation of success of transplantation.

- **Horticultural propagation and off-site introduction.** If salvage and relocation is not believed to be feasible for special-status plants, then CVWD shall consult with Rancho Santa Ana Botanic Garden, or another qualified entity, to develop an appropriate experimental propagation and relocation strategy, based on the life history of the species affected. The Plan shall include at minimum: (a) collection and salvage measures for plant materials (e.g., cuttings), seed, or seed banks, to maximize success likelihood; (b) details regarding storage of plant, plant materials, or seed banks; (c) location of the proposed propagation facility, and proposed methods; (d); time of year that the salvage and other practices will occur (e) success criteria; and (f) a detailed monitoring program, commensurate with the Plan's goals.

CVMSHCP/NCCP: Impacts to covered special-status plants on private land are covered under the CVMSHCP/NCCP. This measure is required for impacts to special-status plants not covered under the CVMSHCP/NCCP and for plants located on federal land.

MM BIO-10 **Ensure Wildlife Impact Avoidance and Minimization and Prepare a Wildlife Protection and Relocation Plan.** CVWD shall undertake the following measures during the construction and O&M phases of the Project on private and federal lands to avoid or minimize impacts to wildlife resources. This mitigation measure enhances EC B-3 (Avoid Impacts to Sensitive Species). A Wildlife Protection and Relocation Plan (WPRP) will be prepared to provide guidance and protocols when avoiding or handling sensitive species that are located within the proposed Project area. The following section summarizes some of the guidelines to be included within the WPRP. The WPRP will be prepared in coordination with representatives from the different Conservation Areas as described in Sections 1.3 and 1.4, above.

Impacts to nesting birds are addressed separately in Mitigation Measure BIO-15 (Prepare and Implement a Nesting Bird Management Plan). Additionally, permanent wildlife ramps shall be incorporated into the Project design and maintained during the O&M phase, as described below.

- **Minimize traffic impacts.** CVWD shall specify and enforce a maximum 15 mile per hour vehicle speed limit on access roads within the Project and vicinity, not including public roadways. Scrapers may need to operate at higher speeds while excavating soils. No Project-related pedestrian or vehicle traffic shall be permitted outside defined work site boundaries (as marked on the site according to Mitigation Measure BIO-4 (Minimize Native Vegetation and Habitat Loss).
- **Minimize impacts to nocturnal wildlife.** CVWD shall restrict work to daylight hours, as feasible, in order to avoid nighttime activities that may impact nocturnal species. Exceptions may be made during the application of slurry or concrete during periods of

high heat. Night lighting, if and when used, shall be designed, installed, and maintained to prevent side casting of light towards surrounding habitat.

- **Avoid use of toxic substances.** Soil bonding and weighting agents used for dust suppression on unpaved surfaces shall be non-toxic to wildlife and plants.
- **Minimize noise and vibration impacts.** To minimize disturbance to wildlife nesting or breeding activities in surrounding habitat, unnecessary noise and vibration (e.g., blaring radios, etc.) shall be avoided.
- **Water.** Potable and non-potable water sources such as tanks, ponds, and pipes shall be covered or otherwise secured to prevent animals (including birds) from entering. Prevention methods may include storing all water within closed tanks, covering open storage ponds or tanks with 2-centimeter netting, or other means, as applicable. Water applied to dirt roads and construction areas for dust abatement shall use the minimal amount needed to meet safety and air quality standards and avoid puddling. Water sources (e.g., hydrants, tanks, etc.) shall be checked periodically by biological monitors to ensure they are not creating open water sources by leaking or consistently overfilling trucks.
- **Worker guidelines.** All trash and food-related waste shall be contained in vehicles or covered trash containers and removed from the site regularly. Workers shall not feed wildlife or bring pets to the Project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons.
- **Wildlife netting or exclusion fencing.** CVWD may install temporary or permanent netting or fencing around equipment, work areas, or Project facilities to prevent wildlife exposure to hazards such as toxic materials or vehicle strikes or prevent birds from nesting on equipment or facilities. Bird deterrent netting shall be maintained free of large holes and be deployed and secured on the equipment in a manner that, insofar as possible, prevents wildlife from becoming trapped inside the netted area or within the excess netting. The biological monitor shall inspect netting (if installed) daily. The biological monitor shall inspect exclusion fences (if installed) weekly and shall inform CVWD of any needed repairs; CVWD shall promptly repair any damage to the exclusion fencing.
- **Wildlife entrapment.** Project-related excavations greater than 6 inches deep shall be secured to prevent wildlife entry and entrapment. Holes and trenches shall be back-filled, securely covered, or fenced. Excavations that cannot be fully secured shall incorporate appropriate wildlife ramp(s) at a slope of no more than a 3:1 ratio (horizontal: vertical, equivalent to a 33.3 percent or 18.4-degree slope), or other means to allow trapped animals to escape. Biological monitors shall provide guidance to construction crews to ensure that wildlife ramps or other means are sufficient to allow trapped animals to escape. At the end of each workday, a biological monitor shall document that excavations have been secured or provided with appropriate means for wildlife escape.
- Project structures that pose a wildlife entrapment hazard and have sides with a slope steeper than 1:1, including but not limited to channels and basins, shall incorporate permanent wildlife ramps into the structure design. Structures with a slope of 1:1 or less steep do not require wildlife ramps. For structures that require wildlife ramps, at least one ramp shall be provided for each channel, basin, or other structure. Channels shall

have one or more ramps for every half-mile of contiguous channel length. Basins or similar structures shall have one or more ramps for every one-half acre of area. A biologist shall review the wildlife ramp design prior to implementation to ensure that it is sufficient to allow trapped animals to escape. Wildlife ramps installed in permanent structures shall be maintained during the O&M phase to ensure continued functionality.

All pipes or other construction materials or supplies shall be covered or capped in storage or laydown areas. No pipes or tubing shall be left open either temporarily or permanently, except during use or installation. Any construction pipe, culvert, or other hollow materials shall be inspected for wildlife before it is moved, buried, or capped.

- **Dead animals.** Dead animals of non-special-status species found on Project roads or work areas shall be reported to the appropriate local animal control agency within 24 hours. A biological monitor shall safely move the carcass out of the road or work area as needed. Dead animals of special-status species found on Project roads or work areas shall be reported to CDFW within one workday and the carcass handled as directed by CDFW.
- **Injured wildlife.** CVWD shall create and implement guidelines for dealing with injured or entrapped wildlife found on or near Project roads or work areas, whether or not the injuries are Project-related, and provide these guidelines to all biological monitors. CVWD shall ensure that one or more qualified biological monitors receive training in the safe and proper handling and transport of injured wildlife and are provided with the appropriate equipment. These trained and equipped monitors shall be available to capture and transport injured wildlife to a local wildlife rehabilitator or veterinarian as needed. If an animal is entrapped, a qualified biological monitor shall free the animal if feasible, or work with construction crews to free the animal, in compliance with applicable safety regulations and Project requirements. If biological monitors cannot free the animal or the animal is too large or dangerous for monitors to handle, CVWD shall contact and work with a local wildlife rehabilitator, animal control, CDFW, or other qualified party to obtain assistance for the animal as soon as possible. CVWD shall bear the costs of veterinary treatment and rehabilitation for any injured wildlife found on or near Project roads or work areas and any wildlife injured by Project-related activities. Additionally, any entrapped or injured special-status species found on Project roads or work areas shall be reported to the appropriate resource agency within one workday.
- **Sidewinders, rattlesnakes, and other snake guidelines.** Prior to the start of construction, CVWD shall prepare and implement guidelines within a Wildlife Protection and Relocation Plan for handling sidewinders, rattlesnakes, or other snakes found in or near Project work areas and access roads and provide these guidelines to all biological monitors, safety staff, and other personnel. Killing or harming rattlesnakes or other wildlife is not authorized. In the Wildlife Protection and Relocation Plan, CVWD will coordinate with Refuge managers to develop protocol aligned with any National Wildlife Refuge-specific guidelines for handling or relocation wildlife while working within Refuge lands.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. However, to ensure the protection of non-covered sensitive species this measure is required for private and federal lands.

MM BIO-11 **Conduct Coachella Valley Fringe-toed Lizard and Flat-tailed Horned Lizard Surveys, Monitoring, and Avoidance.** This mitigation measure enhances the surveying and monitoring requirements as described in MM BIO-2 and MM BIO-7, and will be applied to the pre-construction, construction, and O&M phases of the proposed Project as needed.

Surveys for Coachella Valley fringe-toed lizard and flat-tailed horned lizard shall be conducted during the appropriate seasons (May 1 through the end of summer) and conditions for species identification on federal lands. The duration of the surveys shall coincide with the duration of construction activities in potential habitat for these species during the summer season. Surveys shall be conducted in appropriate habitat in all Project disturbance areas and within 500 feet of these areas on federal lands, and as required by Mitigation Measure BIO-1. Results of the surveys shall be submitted to USFWS within 30 days of completion.

Biological monitoring will occur as specified in Mitigation Measure BIO-2. The monitor shall be a qualified biologist with the appropriate experience and permits (as needed) to recognize and handle Coachella Valley fringe-toed lizard and flat-tailed horned lizard, as further outlined in the WPRP (MM BIO-10).

In work areas within ranked as high suitable habitat, exclusionary fencing that does not allow lizards to enter the work areas shall be constructed around the perimeter of each of the work areas if required by the USFWS. Any lizards found within the barrier shall be relocated to appropriate habitat outside of the work areas by the qualified biologist. The fence or barrier will be maintained as needed to ensure its effectiveness.

To the extent feasible, all construction activities within suitable habitat will be conducted during the active season, between April 1 and October 31. Construction activities in suitable habitat may be extended beyond the active season in consultation with the USFWS.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. This measure is required for federal lands.

MM BIO-12 **Conduct Desert Tortoise Surveys, Monitoring, and Avoidance and Prepare a Desert Tortoise Relocation Plan.** The CVWD will assign a USFWS-approved Designated Desert Tortoise Biologist who will oversee all pre-construction, construction, and O&M activities that could result in take of desert tortoise. The biologist will be available to accompany each work crew to ensure that tortoises, burrows, and habitat are not disturbed during these activities to the extent possible. Desert tortoise shall be handled only by a USFWS/CDFW permitted and authorized biologist (Authorized Biologist), who is also an Acceptable Biologist (see MM BIO-1 and MM BIO-2), following appropriate USFWS protocols and in compliance with appropriate regulatory permits. If a live tortoise is in imminent danger of harm, and an Authorized Biologist is not readily available, a crew member will need to notify the Authorized Biologist (MM BIO-3). A biological monitor, who is also an Authorized Biologist and an Acceptable Biologist, shall monitor construction activities in all areas with the potential to support desert tortoise.

Methods for clearance surveys, exclusion fence specification and installation (if any), tortoise handling, artificial burrow construction, egg handling, and other procedures shall be consistent with those described in the USFWS (2009) *Desert Tortoise Field Manual* or more current guidance provided by CDFW and USFWS.

Within suitable habitat for desert tortoise, an Acceptable Biologist shall survey the Project area for desert tortoise burrows and pallets within five (5) days preceding the initial start of construction on private and federal lands. Follow-up surveys shall also be conducted within fourteen (14) days preceding additional construction after a gap in significant construction activities of 60 calendar days or more. Surveys shall include 100 percent of the area to be disturbed and a surrounding buffer of 200 feet.

Subject to authorization by CDFW and USFWS, tortoise burrows and pallets encountered within the disturbance area (if any) shall be conspicuously flagged by the surveying biologist(s) and avoided during construction activities. A Desert Tortoise Relocation Plan will outline approved protocol for excavating burrows and relocating any desert tortoise found within the Project site in accordance with the *Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidance* (June 2020).

Project personnel shall inspect for desert tortoises under parked vehicles or equipment prior to moving same. If a desert tortoise is found beneath a vehicle or equipment, the vehicle or equipment shall not be moved or started until the tortoise has voluntarily moved to a safe distance away. If the tortoise does not move on its own accord after 20 minutes, the tortoise may be moved by an Authorized and Acceptable Biologist, subject to authorization by CDFW and USFWS.

If a desert tortoise is found in a work area, the tortoise shall be allowed to passively traverse the site while construction in the immediate area is halted. If the tortoise does not move out of harm's way after 20 minutes, the tortoise may be moved by an Authorized and Acceptable Biologist, subject to conditions and authorization by CDFW and USFWS.

Subject to authorization by CDFW and USFWS, desert tortoises shall be moved the minimum distance possible within appropriate habitat (less than 300 m). A Desert Tortoise Relocation Plan will describe all protocols In general, desert tortoise will be moved a distance of less than 300 m (*Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidance, June 2020*). Desert tortoises that are moved shall be placed in the shade of a shrub or in a natural unoccupied burrow similar to the hibernaculum in which it was found or in an artificially constructed burrow following the protocol provided by the Fish and Wildlife Service. After being moved, the desert tortoise shall be monitored to ensure its safety. Any time a tortoise is handled, the Authorized Biologist shall take photographs and record pertinent data in their daily monitoring log. Tortoises showing symptoms of Upper Respiratory Disease Syndrome will be, at the discretion of the Corps: (1) provided to research or translocation projects approved and permitted by the Fish and Wildlife Service; (2) provided to educational facilities holding appropriate State and Federal permits; or (3) made available for adoption.

Subject to authorization by CDFW and USFWS, a desert tortoise removed from its burrow shall be placed in an unoccupied burrow of approximately the same size and orientation. If an existing burrow is unavailable, the Authorized Biologist will construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original burrow. Desert tortoises moved during inactive periods will be monitored for at least two days after placement in the new burrow to ensure their safety.

Subject to authorization by CDFW and USFWS, if a desert tortoise is moved at a time of the day when ambient temperatures are unfavorable (less than 40 degrees F or greater

than 90 degrees F), it shall be held overnight in a clean cardboard box. The desert tortoise shall be kept in the care of the Authorized Biologist under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes will be appropriately discarded after one use.

CVMSHCP/NCCP: Desert tortoise is a covered species under the CVMSHCP/NCCP, however the CVMSHCP/NCCP provides specific requirements for the protection of this species. This measure aligns with most USFWS guidelines for desert tortoise and is required on private and federal lands.

MM BIO-13 **Prepare and Implement Raven Monitoring, Management, and Reporting Plan.** In coordination with USACE and in consultation with USFWS and CDFW, CVWD shall prepare and implement a Raven Monitoring, Management, and Reporting Plan (Raven Plan) consistent with USFWS raven management guidelines. The purpose of the Raven Plan shall be to minimize Project-related predator subsidies and prevent any increases in raven numbers or activity within desert tortoise habitat during construction and O&M phases. The Plan shall address all Project components and their potential effects on raven numbers and activity. If monitoring leads to any documented raven predation on tortoises, based on occurrence of tortoise remains beneath active raven nests in or adjacent to the project site, the CVWD will report that information to the USFWS immediately. The CVWD will not implement raven control (i.e., destroy ravens or their nests). Regardless of raven monitoring results, CVWD shall be responsible for all other aspects of raven management described in the Raven Plan, such as avoidance and minimization of Project-related trash, water sources, or perch/roost/nest sites that could contribute to increased raven numbers. In addition, to offset the cumulative contributions of the Project to desert tortoise impacts from increased raven numbers, CVWD shall contribute to the USFWS Regional Raven Management Program. CVWD shall:

1. **Prepare and Implement a Raven Monitoring, Management, and Reporting Plan** that shall include, but not be limited to, the following components. The Plan shall be reviewed and approved by USFWS and CDFW prior to the start of construction activities.

    a. Identify all potential Project activities, structures, components, and other effects that could provide predator subsidies or attractants, including potential sources of food and water, and nesting materials, as well as nest or perch sites. These will include, but will not be limited to: waste food material; road-killed animals; water storage; potential pooling from leaks, dust control, or waste water; debris from brush clearing; and perch or roost sites on Project facilities.

    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities.

    c. Appoint a qualified biologist and specify a program, including monitoring schedule, field methods, and reporting procedure to monitor raven presence in the Project vicinity and detect any evidence of raven predation on tortoises.

2. **Contribute to the USFWS Regional Raven Management Program.** No later than 30 days prior to the start of construction, CVWD shall contribute to the USFWS Regional Raven Management Program by making a one-time payment of $105 per acre of long-term or permanent Project disturbance to the national Fish and Wildlife Federation Renewable Energy Action Team raven control account.

CVMSHCP/NCCP: The Project is covered under the CVMSHCP/NCCP. This measure is only relevant to the portion of the project on federal lands.

2.4 Proposed Action

Project Description

The Project consists of four segments referred to as Reaches 1 through 4. Each reach is composed of a levee or channel and associated structures. Reach 3 is a levee at the west end transitioning to a channel at the east end. The Project is generally located on the northern and eastern margins of the community of Thousand Palms between Rio Del Sol Road and Washington Street (see Figures 1 and 2a). The Project would connect to existing stormwater conveyance facilities at the Classic Club Golf Course and the Del Webb/Sun City residential development. Reaches 1 and 2 would convey storm flows towards Reach 3. Reach 3 would convey flow into the floodway at the Classic Club Golf Course and Reach 4 would convey storm flows through the existing channel in the Del Webb/Sun City residential development located on the east side of Washington Street.

The Proposed Action consists of the following components:

- Construction of levees and channels for Reaches 1 through 4.
- Construction of a conveyance system to direct stormwater flows under Washington Street and into an existing stormwater conveyance system.
- Acquisition of an approximate 550-acre floodway located along the levees and in the active wind corridor between Reach 1 and Reach 3 (Figure 2a). Development would be prohibited in this floodway to protect the wind corridor and limit disruptions to sand migration. During O&M of the proposed Project, suitable material (e.g., fine sands) that accumulate along the levees and channels would be excavated and distributed in the floodway area for natural distribution onto the Preserve or placed in the proposed USFWS sediment disposal area.
- Placement of and blow sand on an existing USFWS sand augmentation area to provide fine grain sands to the Refuge/Preserve near Reach 3 (see SM-2 in Section 2.3 and Figure 1). This action would be done in coordination with the Sonny Bono Salton Sea National Wildlife Refuge Complex and Coachella Valley National Wildlife Refuge managers.
- Operations and maintenance of the Project.

The proposed Project includes levees, channels, culverts, and a sediment basin (at the east end of Reach 1), as shown in Figure 2a and Table 3. Figure 4 provides a cross-section view of the levee and channel designs, access roads, and maintenance/patrol roads. Soils generated by the proposed Project would either be used to construct the levees or disposed of off-site.

All levees would have an underground “toe” (levee toe) extending to a depth of approximately 15 feet. The top, upstream/northern sides and the toe of the levees would be covered with soil cement, while the southern/downstream side would be comprised of earthen materials (soil). Soil cement is a compacted high-density mix of pulverized native rocks and soils bonded with cement and water that is highly resistant to erosion while maintaining an earthen color. The channels would also be fully lined with soil cement to protect the structures during large flow events.

Reach 1

Reach 1 (see Figure 2a) is comprised of an approximately 12,700-foot-long (2.4-mile) levee (Levee 1). Water and sediment from the Indio Hills would flow naturally toward Reach 1 and be diverted to the 550-acre floodway located at the terminus of Reach 1 (described below). The height of Levee 1 would vary from 5 feet to 14 feet depending on topography and ground slope and be designed to accommodate a 100-year flood event. A minimum 12-foot access (patrol) road would be constructed on the top of the levee and an unpaved access road would be located on the downstream (west side) of the levee to support operations and maintenance (O&M) activities. Levee 1 would range from 75 to 100 feet in width and initiate approximately 0.1 mile to the east of the intersection of 28th Avenue and Rio del Sol Road, on the south side of 28th Avenue, and extend in an east-southeasterly direction. The levee would generally run parallel and north of an existing Southern California Edison (SCE) utility corridor. Levee 1 would cross Sierra del Sol, Desert Moon Drive, and Via Las Palmas. Culverts and road crossings of the levee would be constructed at Desert Moon Drive and Via Las Palmas.

The proposed alignment of Reach 1 would cross 37 non-residential properties and 7 residential properties, as shown in Figure 2a. These properties would need to be obtained by the CVWD for this reach to be constructed. The limits of land acquisition depend on the percent of the parcel crossed by the final Project alignment and the temporary construction access needs. If the existing use of any parcel impacted by the Project cannot be maintained, the entire parcel may be acquired.

Sediment Basin. A sediment basin would be installed at the downstream end of Reach 1 to trap sediment, slow the velocity of stormwater flow across the Preserve, and avoid adverse effects associated with erosion or channel migration (Figure 2a). The sediment basin would be approximately 2.1 acres in size and would consist of an excavated basin with riprap protection on the upstream side. The sediment basin would also induce deposition of fluvially-transported sediment on the wind corridor for natural transport onto the Preserve. Storm water directed by Reach 1 would flow through the sediment basin, overland in a southeast direction towards Reaches 2 and 3, described below.

Table 3. Permanent Project Features and Dimensions

Project Component	Excavate; (Fill) (cu.yd.)	Soil Cement (cu.yd.)	Height (ft.)	Length (ft.)	Width (ft.)	Surface Area (acres)
Reach 1						
Levee Toe	165,000; (142,000)	(132,000)[1]	—	12,700	15–16	4.5
Levee Embankment	(117,000)[1]		5-14	12,700	35–56	12
Sediment Basin	5,000[1]	—	—	220	220	1.1
Reach 2						
Levee Toe	21,000; (17,000) [2]	(14,000)	—	1,700	21	0.6
Levee Embankment	3,000		5	1,700	25	1.2
Reach 3						
Levee Toe	85,000; (70,000)	(65,000)[3]	—	6,500	15–18	2.3
Levee Embankment	42,000[3]		5-14	6,500	22–57	6.0
Channel	401,000[4]	(120,000)	—	5,300	132–145	17
Reach 4						
Channel	1,154,000[5]	(292,000)	—	10,300	166–176	40

Table 3. Permanent Project Features and Dimensions						
Project Component	**Excavate; (Fill) (cu.yd.)**	**Soil Cement (cu.yd.)**	**Height (ft.)**	**Length (ft.)**	**Width (ft.)**	**Surface Area (acres)**
Reach 1						
Reach 4 Washington St. Crossing	9,000[5]	—	—	624	180–325	13
Washington St. Widening	—	—	—	500	30	0.04
Avenue 38 (south of Reach 4)	—	—	—	7,600	76	13
Floodway	—	—	—	See Figure 2a		550
Soil Disposal Area (South of Avenue 38)	(726,000)	—	2	1,200–2,700	3,000–5,000	250
Sand Disposal Area (Preserve)	(100,000)	—	8	660	330	5.0

Notes: All quantities are based on preliminary engineering estimates and may change as part of final engineering.

1 - Reach 1 Levee embankment includes 89,000 cubic yards (CY) imported from the Reach 3 Channel excavation, with the remainder coming from the excavated material for the Reach 1 toe and sediment basin. Soil cement for Reach 1 consists of soil excavated from the Reach 4 Channel mixed with cement from a batch plant.

2 - Reach 2 would generate a net surplus of approximately 1,000 CY of soil, which is within the range of calculation error and has been ignored in subsequent calculations. Soil cement for Reach 2 would consist of soil excavated from the Reach 4 Channel.

3 - Reach 3 Levee embankment includes remaining 15,000 CY from Reach 3 levee toe excavation and import of 27,000 CY from Reach 3 Channel excavation. Soil cement for Reach 3 consists of soil excavated from the Reach 4 Channel.

4 - Excavated materials from the Reach 3 Channel would be exported to Reach 1 Levee (89,000 CY), Reach 3 Levee (27,000 CY), Coachella Valley Preserve/sand disposal area (100,000 CY), and the soil disposal site south of Avenue 38 (66,000 CY).

5 - Excavated materials from the Reach 4 Channel and the Washington Street Crossing would be used for soil cement on Reach 1 (132,000 CY), Reach 2 (14,000 CY), and Reach 3 (65,000 CY), and the Reach 4 Channel (292,000 CY). Remaining would be placed on the soil disposal site south of Avenue 38 (660,000 CY).

Road Crossing. Roads would be constructed over the Reach 1 levee at Via Las Palmas and at Desert Moon Drive to maintain access between the communities north and south of Levee 1. The road crossings would generally match the width of the existing roadways and be consistent with Riverside County standards. The design speed is 35 miles per hour (mph) at Via Las Palmas and 25 mph at Desert Moon Drive. The road crossings are designed to have the smallest permanent footprint to minimize impacts to sand migration. Stormwater directed by Reach 1 would flow through the sediment basin, overland in a southeast direction towards Reaches 2 and 3, described below.

Reservoir 4602. Reservoir 4602 is an existing above ground water tank owned and operated by CVWD. The reservoir is located west of Via Las Palmas and north of the proposed Reach 1 alignment. The reservoir is protected by a small berm with established vegetation and would be protected and maintained in-place during construction of the proposed Project. Additional flood protection may be provided in the future to ensure the integrity of the structure after the construction of Reach 1.

Reach 2

Reach 2 (see Figure 2a) is comprised of an approximately 1,700-foot long (0.32 mile) levee (Levee 2) with a height of approximately 5 feet. The levee would range from 12 to 135 feet in width and is positioned in the mid-alluvial fan just northeast of SCE's Mirage Substation to protect the substation and to facilitate the diversion of water in a southeasterly direction. A minimum 12-foot access (patrol) road would be constructed on the top of the levee and an unpaved access road would be located on the downstream (west side) of the levee to support O&M activities. Levee 2 is aligned in the direction of the prevailing wind to avoid interference with Aeolian transport in this area (see Figure 2c). Reach 2 would capture large storm events from Reach 1 and direct flow towards Reach 3.

Reach 3

Reach 3 (see Figure 2a) is comprised of an approximately 6,500-foot long (1.2 miles) levee (Levee 3) and a 5,300-foot long (1.0 mile) incised trapezoidal channel lined with soil cement (Reach 3 Channel). A minimum 12-foot-wide access road would be located on top of the levee and an unpaved access road would occur on the downstream (west side) of the levee. Levee 3 would vary from approximately 5 feet to 14 feet in height depending upon the topography and ground slope to accommodate the volume and velocity of water associated with the 100-year flood event. Levee 3 would range from 12 to 200 feet in width and initiate 1,000 feet south of E. Ramon Road and approximately 2,000 feet southwest of the downstream end of Levee 2. Reach 3 would cross natural lands, private lands owned by Xavier College Preparatory High School, portions of the Preserve/Refuge, and the Pegasus Riding Academy. As noted above, the limits of land acquisition depend on the percent of the parcel crossed by the final Project alignment and the temporary construction access needs. If the existing use of any parcel impacted by the Project cannot be maintained, the entire parcel may be acquired. Although not constructed, new residential developments have been proposed south of Reach 3; however, the Project alignment is not expected to interfere with these developments should they occur.

An existing earthen berm located approximately one-half mile north of Xavier High School would also be crossed by Reach 3. This berm would be crossed where the reach transitions from a levee to a channel configuration. At the terminus of Reach 3 the channel would divert flows into an existing storm water conveyance system located on the Classic Club Golf Course before connecting to Reach 4. The transition of Reach 3 to a channel configuration is intended to minimize land use conflicts with athletic fields located at Xavier College Preparatory High School and to minimize the disruption to aeolian sand transport patterns. The channel configuration would curve around the athletic fields, whereas a levee would need to maintain a straighter alignment through the high school property to maintain storm conveyance. As described in Section 1.2 (Project History and Previous Studies), the Project was previously designed and assessed by the Corps Planning Division (Los Angeles District). During that planning process, the Corps communicated with Xavier College Preparatory High School regarding the design of Reach 3 and the high school property. The design of Reach 3 was selected because it minimizes disruptions to the high school property while providing flood protection and preserving sand migration on to the Preserve/Refuge.

The curved channel configuration would minimize disruptions to sand migration onto the Preserve/Refuge because, in comparison to a levee design, the channel would not create a vertical obstruction to sand migration (except for a short length of the Reach 3 Channel where the embankment would be approximately 3 feet high). Sand that blows into the channel or is deposited during storm events would be removed from the channel and placed on the active wind corridor for natural migration onto the Preserve/Refuge (see Section 2.2.3, Operations and Maintenance).

Storm flows leaving Reach 3 would flow into the existing stormwater conveyance system located within the Classic Club Golf Course. Section 1.2 (Project History and Previous Studies) describes the previous coordination undertaken regarding flood conveyance through the Classic Club Golf Course. It was determined that with or without the proposed Project's flood control system, the Classic Club Golf Course system has sufficient capacity to safely convey on-site and off-site flows (Tettemer & Associates, 2004). Since the time of that determination substantial development has occurred throughout the Project area. However, the flows that would be conveyed by the Project through the Classic Club Golf Course system are the same as those considered in the 2004 analysis. Sand that blows into the channel or is deposited during storm events would be removed from the channel and placed on the active wind corridor for natural migration onto the Preserve/CVNWR. This action would be done in coordination with the Sonny Bono Salton Sea National Wildlife Refuge Complex and Coachella Valley National Wildlife Refuge managers (see Operations and Maintenance, below, and SM-2 in Section 2.3).

Reach 4

Reach 4 (see Figure 2a) is comprised of an approximately 10,300-foot long (2.0-mile) incised trapezoidal channel (Reach 4 Channel). The Reach 4 Channel would range from 200 to 350 feet in width and convey stormwater flows from the southeast end of the Classic Club Golf Course and continue south then east, adjacent to the south of the existing alignment of Avenue 38. The channel would span a fallow jojoba farm and be immediately adjacent to, but not overlap with, the Preserve/CVNWR.

Avenue 38 Realignment

The Riverside County Board of Supervisors previously approved the realignment of Avenue 38 as a county project which would move Avenue 38 adjacent and south of the proposed Reach 4 Channel. Realignment of the road would occur as a component of the proposed Project, where CVWD would build two of the four proposed lanes, including shoulders and gutters. The Reach 4 Channel would terminate at Washington Street and tie into existing stormwater conveyance facilities located in the Del Webb/Sun City development (see Washington Street Crossing, below).

Washington Street Crossing

At Washington Street, the Project would include a new conveyance system to direct stormwater flows under Washington Street and into an existing stormwater conveyance system with the capacity to transmit Project-related flows (see Figure 2a). The maximum area that could be affected by this crossing is estimated to be five acres, accounting for any road realignment that may be necessary. On the downstream side of the Washington Street crossing, an existing stormwater basin (Sun City Collection Basin) would be deepened (excavate approximately 9,000 cubic yards [CY]) to accommodate flows diverted by the Project. This basin is currently landscaped and would be fully restored to conditions agreed to by the Sun City development following completion of the Project. The southbound side of Washington Street, south of the realigned Avenue 38 and just north of Las Montanas Road/Del Webb Blvd., where the current road is three lanes (one southbound and two northbound), would be widened as part of the Project to provide safe access to the relocated Avenue 38.

Floodway

The Project includes acquisition of an approximate 550-acre floodway located along the levees and in the active wind corridor between Reach 1 and Reach 3 (see Figure 2a). Development would be prohibited in this floodway to protect the wind corridor and limit disruptions to sand migration (see Figure 2c). During O&M, suitable material (e.g., fine sands) that accumulate along the levees and channels would be excavated and distributed in the floodway area for natural distribution onto the Preserve or placed in the proposed USFWS sediment disposal area.

Construction

Biological Surveys and Monitoring

Mitigation measures for the Project include pre-construction surveys, monitoring, and avoidance measures for special-status plants and wildlife. These measures would be implemented during construction and O&M phases of the Project. Under the Project ECs and MMs (see Section 2.3), CVWD would conduct pre-construction surveys and establish exclusion areas or implement other avoidance measures before beginning construction or O&M activities that have the potential to impact sensitive biological resources, including desert tortoise, CVFTL, and CVMV, and their habitat.

Invasive weeds. Noxious and invasive weeds compete with native species for space, nutrients, and water. The spread of non-native invasive plants destroys wildlife habitat and forage, threatens native and special-status plants, and increases soil erosion and groundwater loss. Invasion of Sahara mustard in aeolian sand habitat is a concern as it causes dune stabilization and reduction in native annuals and associated plant-eating arthropods. This results in reduced habitat suitability for endemic dune plants and animals, such as CVMV and CVFTL (Barrows and Murphy, 2010).

EC B-1 (Weed Abatement Program) requires implementation of a weed abatement program and Project mitigation measures would further require development of an Integrated Weed Management Plan (IWMP) to be implemented during construction and O&M phases of the Project. The IWMP would specify weed inventory and monitoring, pre-construction weed treatments, preventative measures, and control methods.

Construction Overview

Construction of the Project includes trenching and excavation to build the levees and channels, road construction and paving, relocation of sewer facilities at Avenue 38, and constructing tie-ins to existing stormwater conveyance systems.

To construct the Reach 4 Channel and Washington Street Crossing approximately 871,000 CY of material would be removed. Some of this material would be used to create soil cement for the Reach 1, 2, and 3 levees (211,000 CY), and the remainder (660,000) would be placed in sand disposal areas (described below). Additional material to construct the other levees would be provided by using native materials in the Project footprint and borrowed material from the Reach 3 Channel. Surplus material from Reach 3 Channel excavation would also be placed in sand disposal areas (66,000 CY). Cement for soil cement and concrete would be obtained from a Project batch plant to be located south of Avenue 38 or may be locally sourced by the contractor. Approximately 68 acre-feet of water would be needed to prepare the soil cement.

Asphalt and other materials would be provided by the contractor, likely from the nearest supplier. Cleared and grubbed materials, stumps, trash, and other items not suitable for fill or levee construction would be transported to the appropriate local landfill. Silt fencing or other suitable fencing would be placed around active construction areas to prevent species, including CVFTL, from entering areas where heavy equipment and machinery would be used. This temporary fencing would be removed at the end of construction.

Sand Disposal Areas. Material excavated from the Project footprint area that is not used for construction of the levees would be placed within two existing USFWS sand disposal areas (see Figure 2a and Figure 5: Proposed Sand Disposal Areas). The placement of suitable blowsand within the two sand disposal areas will occur in coordination with Sonny Bono Salton Sea National Wildlife Refuge Complex and Coachella Valley National Wildlife Refuge managers. Suitable blowsand material (approximately 100,000 CY) would be salvaged and placed at a blowsand augmentation area on the CVNWR identified by the USFWS (see Figures 2a and 5). The placement of approximately 100,000 CY of blowsand in this area would result in an approximately 8-foot sand dune. Material from this location would then be transported by wind back onto the Preserve/CVNWR to replace sand lost through wind driven erosion. See Operation and Maintenance, below, for additional information on distribution of blowsand to the Preserve/CVNWR.

Disturbance Areas. Temporary disturbance areas associated with construction of the proposed Project would be limited to those areas south of the permanent Project footprint (see Figures 2a, 3a, 3b, and 3c). Disturbance on the upstream sides (bordering the Preserve/CVNWR) would be limited to the Project's

permanent footprint extending to the limit of soil cement trench excavation (right-of-way limit), which includes a 20-foot work area for future O&M activities (see Operation and Maintenance, below).

Construction of the proposed Project would result in approximately 175.47 acres of permanent disturbance and 286.35 acres of temporary disturbance, where temporary disturbance areas are any that are beyond the permanent impact areas.

Access. During construction, existing roadways in the area would be utilized for access of personnel, vehicles, and equipment. These roads include Varner Road, Rio Del Sol Road, Sierra Del Sol, Desert Moon Drive, Via Las Palmas, East Ramon Road, Shadow Valley Drive, Avenue 38, and Washington Street, as well as local connector roads. To support operations and maintenances activities, a 12-foot patrol road will be constructed at the top of the levee and an approximate 20-foot access road will be constructed along the westside of the levees at Reach 1, 2, and 3 (see Figure 4: Levee and Channel Construction Cross-Sections). Any improvements to existing recreational-use access roads such as equestrian and hiking trails along the right-of-way within the Refuge, will be conducted in coordination with Wildlife Complex and Refuge managers.

Construction Schedule

Construction is anticipated to occur in two phases for a duration of approximately 27 months. Except as otherwise required for the safety or protection of persons or property, all construction work would be performed Monday through Friday between 7:00 a.m. and 3:30 p.m. No work would occur at night or on Saturday, Sunday, or holidays without CVWD's written consent. Construction would occur year-round.

Construction of the channels and levees would occur in phases beginning at the downstream end of the Project at the Reach 4 Channel and ending with the construction of Reach 1. Phasing is required to ensure that any storm flows that may occur during construction may flow into existing conveyance facilities. In addition, the phasing of construction would provide materials needed to create the upstream levees and soil cement.

Phase One. This initial construction phase would require approximately one year to complete and includes these major features.

- **Washington Street Crossing.** The Washington Street crossing would consist of a multi-barrel culvert under Washington Street. This would be built to direct flows from the Reach 4 Channel into existing stormwater conveyance facilities located in the Del Webb/Sun City development.
- **Stormwater Collection Basin.** The existing stormwater collection basin located at the east/downstream end of Washington Street would be deepened by up to 3 feet, to accommodate concentrated flows diverted by the proposed Project. This basin would be restored to conditions agreed to by the Sun City development concurrent with the development of other reaches.
- **Connector Facilities.** Connector facilities on the downstream end of Reach 3 would be implemented to direct flows from the Reach 3 Channel into the Classic Club Golf Course conveyance system. This would include the acquisition and redevelopment of property located adjacent and to the north of the golf course. Connector facilities would also be constructed on the upstream end of Reach 4, directing flows out of the Classic Club Golf Course conveyance system and into the Reach 4 Channel.
- **Road Improvements.** Avenue 38 would be realigned as part of the initial construction effort to avoid having to cross the Reach 4 Channel and to provide flood protection to Avenue 38. In addition, road crossings over the Reach 1 Levee at Desert Moon Drive and at Via Las Palmas would begin. The road crossings on Reach 1 would be constructed before the completion of the Reach 1 Levee.

- **Sewer Line Modifications.** Realignment of Avenue 38 would require modifications to the sewer line located within the current road alignment. Such modifications may include crossing beneath the Reach 4 Channel from Varner Road to Avenue 38 or the installation of a new sewer line situated within the realigned Avenue 38. Depending upon the alternative selected, a sewage pump station may be required.

Phase Two. The second phase of construction would require approximately one year to complete and would include the construction of the levees and channels of Reaches 1 through 3. Construction would commence at Reach 3. This would allow for excavated material from Reach 4 to be used in creating soil cement for Reaches 1 through 3. This material would be staged in the Project's temporary disturbance area prior to the creation of soil cement. All staged materials would be protected against erosion and measures would be applied to reduce impacts to CVFTL, CVMV, and other sensitive resources. A soil cement mill would be staged onsite or within the immediate Project vicinity to create soil cement for constructing the levees.

Construction Workforce and Equipment

Construction of the proposed Project would include various inspectors and management staff throughout the duration of construction, as well as construction personnel to operate the construction equipment. Equipment and methods used during excavation and other construction activities varies with soil conditions, trench depth, terrain, and contractor preference. Typical construction equipment for the construction tasks are provided in Table 4. In addition, a temporary concrete batch plant (electric) would be constructed to support Project construction south of Avenue 38 (see Figure 2a). The cement batch plant would include a set of hoppers (containers) to hold cement and sand, mixing system, water tank, fan (for ventilation), ductwork to a baghouse (to limit dust emissions), and a bin vent filter to control emissions during pneumatic loading.

Table 4. Construction Equipment by Task

Task	Equipment
Site Preparation (staking, install BMPs, soil cement batch plant, relocate utilities and fencing)	pickups, medium-size trucks, flatbed trucks, water trucks/pulls, backhoes, excavators, compactors, loaders, graders, dozers
Washington Street Crossing	pickups, medium-size trucks, flatbed trucks, dump trucks, concrete trucks, water trucks/pulls, backhoes, excavators, compactors, loaders, graders, dozers, asphalt pavers,
Classic Club Golf Course Culvert	pickups, medium-size trucks, dump trucks, concrete trucks, water truck/pulls, backhoes, excavators, loaders, dozers, compactors, graders, asphalt pavers
Via Las Palmas Culvert	pickups, medium-size trucks, dump trucks, concrete trucks, water trucks/pulls, backhoes, excavators, loaders, dozers, compactors, graders, asphalt pavers
Desert Moon Drive Culvert	pickups, medium-size trucks, dump trucks, concrete trucks, water trucks/pulls, backhoes, excavators, loaders, dozers, compactors, graders
Reach 4 Channel	pickup trucks, medium-size trucks, dump trucks, concrete trucks, water trucks/pulls, backhoes, loaders, dozers, scrapers, compactors, graders
Reach 3 Channel	pickup trucks, medium-size trucks, dump trucks, concrete trucks, water trucks/pulls, backhoes, loaders, dozers, scrapers, compactors, graders
Reach 3 Levee	pickup trucks, flatbed trucks, dump trucks, water trucks/pulls, loaders, dozers, scrapers, compactors, graders
Reach 2 Levee	pickup trucks, flatbed trucks, dump trucks, water trucks/pulls, loaders, dozers, scrapers, compactors, graders
Reach 1 Levee Downstream of Desert Moon	pickup trucks, flatbed trucks, dump trucks, water trucks/pulls, loaders, dozers, scrapers, compactors, graders

Table 4. Construction Equipment by Task	
Task	**Equipment**
Reach 1 Levee Upstream of Desert Moon	pickup trucks, flatbed trucks, dump trucks, water trucks/pulls, loaders, dozers, scrapers, compactors, graders
Avenue 38 Relocation	pickup trucks, medium-size trucks, flatbed trucks, dump trucks, concrete trucks, water trucks/pulls, backhoes, loaders, dozers, scrapers, compactors, graders, asphalt pavers
Washington Street Widening	pickup trucks, medium-size trucks, flatbed trucks, dump trucks, concrete trucks, water trucks/pulls, backhoes, loaders, dozers, scrapers, compactors, graders, asphalt pavers

Construction Materials

The proposed Project would require approximately 14,000 CY of concrete, 1,200 tons of reinforced steel, 93,000 tons of cement (for soil cement), 12,000 tons of asphalt cement (pavement material), and 13,000 tons of aggregate base to construct the levees and channels. Approximately 650 acre-feet of water would be needed to support construction, dust control (assuming ½-inch of water applied to active work area daily), soil moisture conditioning, and preparation of the soil cement. Additional water would be needed for structural concrete, which would be supplied by the batch plant, and is not included in the estimated water use noted above.

At this time, it is assumed that non-hazardous construction debris would be sent to Desert Recycling (27105 Sierra Del Sol, Thousand Palms, near Reach 1).

Restoration

Given the slow recovery rates of desert vegetation, it is unlikely that ecological restoration techniques can dependably establish a trend toward restoration of habitat values within the typical five-year monitoring period. Therefore, under Project mitigation measures, habitat impacts in temporary disturbance areas, as well as permanent disturbance areas, would be considered permanent habitat loss and mitigated through acquisition and protection and management in perpetuity of compensation lands, primarily in the floodway.

Temporary disturbance areas to vegetated communities on federal lands would be revegetated for erosion control and mitigation of visual impacts using native species appropriate for the area and habitat type. As stated in MM BIO-5, all restoration activities on federal lands will be conducted in coordination with Sonny Bono Salton Sea National Wildlife Refuge Complex and Coachella Valley National Wildlife Refuge managers.

Operations and Maintenance

Biological Surveys and Monitoring

As described in Section 2.4 (Proposed Action: Construction), mitigation measures for the proposed Project include pre-construction surveys, monitoring, and avoidance measures for sensitive biological resources, including desert tortoise, CVMFTL, and CVMV, and their habitat. An IWMP would specify weed inventory and monitoring, pre-construction weed treatments, preventative measures, and control methods. Mitigation measures would apply during the O&M phase of the Project, as well as the construction phase. No O&M access or activities will occur on Refuge or other federal lands.

O&M Activities

O&M activities include:

- Sand removal, distribution, or disposal;
- Adaptive management;
- Facility repair; and
- Vegetation removal.

Sand Removal, Distribution, or Disposal. To ensure that sand migration through the existing wind corridor is not disrupted and that sand dune habitat in the Preserve/CVNWR continues to be replenished, O&M activities would include the removal of excess sand which collects along the Project levees and within the Project channels. All sand removal and disposal activities will occur in coordination with Sonny Bono Salton Sea National Wildlife Refuge Complex and Coachella Valley National Wildlife Refuge managers on use of existing sediment disposal site to provide fine grain sands to the Refuge/Preserve near Reach 3 (see Section 2.3 and Figure 1).

Two types of sand removal activities would occur:

- Sand that accumulates along the levees would be removed approximately once per year and after major flood events (inspections would occur after major storm events to determine whether sediments have accumulated along the facilities).
- Sand removal from the channels will vary based on the accumulation of sand and other debris. Sand removal may be daily or periodic, such as occurring one week each month, depending upon the actual rate of sand accumulation and the frequency preferred by the CVWD or their sand removal contractor. It is anticipated that approximately 0.5 feet of sand would accumulate per year in Reach 3 and one foot per year in Reach 4. Inspections would be performed to determine the necessary frequency of sand removal activities for Project channels.

The County of Riverside currently removes sand that accumulates along Avenue 38 several times per year depending on weather conditions and storm frequency (which determine how quickly sand accumulates). The frequency of sand removal activities associated with the proposed Project would vary for levees versus channels because sand is expected to accumulate within the channels more quickly than along the levees, where most of sand would continue to be blown downwind. All Project facilities would be regularly inspected to assess the rate of sand accumulation, and sand would be regularly removed to maintain flow capacity. To maintain the Project's flow capacity, the levee and channel facilities would be cleared of accumulated sand or other material prior to major storm events and inspected immediately following large storms.

In addition to maintaining flood capacity, the regular removal of accumulated sand is important to reduce the likelihood that CVFTL colonize portions of the channels and levees. The presence of colonizing wildlife like CVFTL could hinder Project O&M activities. Sand removed from the channel would be spread within the wind corridor for aeolian transport onto the Preserve. Material deemed unsuitable for redistribution would be disposed of in an approved area or facility.

Adaptive Management. An adaptive management plan would be enacted to maximize the amount of aeolian sand transport into the Preserve (see Section 2.3, Environmental Commitments). Preserve management would continue to monitor habitat functions and dune characteristics. Resource agencies would meet with the CVWD, as needed, to assess habitat quality on the Preserve and determine if any changes to the manual transport system are required.

Facility Repair. O&M activities may include occasional excavation to rebuild or reinforce levee toe(s), and placement of new fill material or soil cement to repair damage, particularly after large storm events. Fill material required during O&M may be obtained from an existing sand and gravel mine (commercial source) near the northwest end of the Project.

Vegetation Removal. The earthen/soil portions of the levees located on the downstream/southern sides of the levee would be periodically sprayed/treated with a dust palliative (soil stabilizer) consisting of a high purity grade co-polymer emulsion to reduce wind-driven erosion and prevent the colonization of vegetation or weeds on the levees. Vegetation can degrade the structural integrity of the levee due to root penetration and is not allowed to become established on earthen flood control structures. Maintenance activities may include removal of vegetation along Project levees to provide reliable access to and along the flood control structure, and to comply with federal levee requirements. Maintenance may also include selective removal of non-native vegetation within the Project right-of-way.

Restoration

O&M impacts in temporary disturbance areas, as well as permanent disturbance areas, would be mitigated through acquisition, protection, and management in perpetuity of compensation lands, primarily in the floodway. Temporary disturbance to areas supporting native vegetation on federal lands may be revegetated for erosion control and to reduce the spread of non-native plants using only native species appropriate for the area and habitat type.

3. Affected Environment

Regulations implementing the Endangered Species Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all federal, state, or private actions and other human activities in the Action Area. Also included in the environmental baseline are the anticipated impacts of all proposed federal projects in the Action Area that have undergone Section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress. This section describes the biological resources that occur in the Action Area. It includes a general description of federally listed and candidate species of plants and wildlife, followed by an assessment of potential effects to these resources. Information used in preparing this section was derived from the following data sources:

- State and Federally Listed Endangered and Threatened Animals of California (CDFW, 2020b);
- Special Animals List (CDFW, 2020c);
- California Natural Communities (CDFG, 2010);
- Inventory of Rare and Endangered Vascular Plants of California (CNPS, 2020);
- Consortium of California Herbaria (CCH, 2020);
- Coachella Valley fringe-toed lizard (*Uma inornata*) 5-Year Review: Summary and Evaluation (USFWS 2010);
- Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan Annual Monitoring Program Reports;
- Monitoring data compiled by Southern California Edison and submitted to California Public Utilities Commission during surveys and construction for the Devers to Palo Verde II Transmission Line (SCE, 2013).

- Coachella Valley Multiple Species Habitat Conservation Plan (CVAG, 2007); and
- Aerial images of Thousand Palms and surrounding areas (1994 to 2014).

3.1 Past USFWS Consultations in the Action Area

The USACE and USFWS have consulted extensively on the Project from the late 1990s through the present (2016); see Section 1.2 (Agency Coordination). In addition, the USFWS has conducted ESA consultations for the following projects located in or near the Project Action Area:

- Coachella Valley Multiple Species Habitat Conservation Plan (USFWS, 2008),
- Devers–Palo Verde No. 2 Transmission Line Project (USFWS, 2011c),
- Establishment of a Sand Relocation Site at the Coachella National Wildlife Refuge (USFWS, 2013b), and
- The Amendment to the Memo Establishment of a Sand Relocation Site at the Coachella National Wildlife Refuge (USFWS, 2017b).

3.2 Ecological Setting

3.2.1 General Description

The Project site is located near the center of the Coachella Valley and consists primarily of intersecting alluvial fans and a portion of the Indio Hills. The alluvial fans which cover most of this area were formed by sediment washing down from the Little San Bernardino Mountains and the Indio Hills. Elevations within the region range from 1,614 feet above mean sea level at Edom Hill near the northwestern end of the Indio Hills, to about 30 feet above mean sea level at the southern end near Indio.

The Coachella Valley is defined by the San Jacinto and Santa Rosa Mountains to the southwest and the Little San Bernardino Mountains to the north and northeast. The Coachella Valley slopes gradually from the San Gorgonio Pass toward the Salton Sea for about 40 miles. The Whitewater River is the main drainage course in the Coachella Valley, originating on the southern slopes of the San Bernardino Mountains and flowing in a southeasterly direction through the valley to the Salton Sea (USACE, 2000). The Coachella Valley is within the Colorado Desert (part of the larger Sonoran Desert) and the climate is hot and dry. Annual rainfall averages four inches but varies by location and from year to year. Common habitat types in the Coachella Valley include, but are not limited to, creosote bush scrub, desert saltbush scrub, desert wash, and sand dunes and sand fields (CVAG, 2007).

The Coachella Valley is influenced by infrequent seasonal heavy rains, and prevalent northwest winds (SLA, 1997). During rain events, sand and sediment is carried by flowing water (fluvial transport) from the surrounding hills and mountains and deposited in the Coachella Valley. The sand that has been deposited fluvially is often carried by the wind (aeolian transport) and deposited toward the southeast, throughout the valley. Sand that has been subject to aeolian transport is often referred to as blowsand, which is generally very fine sand that creates a loose and unstabilized surface (SLA, 1996). The combined effect of the fluvial and aeolian transport of sand creates a series of sand formations that form dynamic and continuously altering environments. These sand formations include hummocks (mounds), dunes, and sandy plains. Many plant and wildlife species in the Coachella Valley are uniquely adapted to this type of habitat.

There are four main sand transport systems in the Coachella Valley that maintain blowsand habitat. These include the Thousand Palms, Whitewater Floodplain, Willow Hole, and Snow Creek systems. Each system

is composed of sand source areas, fluvial transport zones, fluvial deposition/aeolian erosion areas, wind transport corridors, and aeolian sand deposition areas. The Project site is located within the Thousand Palms system. Sand erodes from canyons and hillsides and is deposited onto alluvial plains. Strong winds blow through the Coachella Valley from the west and pick up the sand particles. Shrubs, structures, and topographic features slow the winds near the ground surface and the sand particles drop out and accumulate into dunes and hummocks.

3.2.2 Vegetation and Landforms

The alluvial fans, sand fields, and shallow drainages present in the Study Area support a broad assemblage of native xerophytic[3] vegetation and invasive non-native species. Vegetation mapping of the Study Area has been completed several times over the last 15 years, to support the 2000 EIR/EIS and for subsequent Project-related efforts. The conditions in the Study Area fluctuate due to anthropogenic disturbances (e.g., development, off-highway vehicle [OHV] use, trash dumping, etc.) and natural processes (e.g., fluvial and aeolian sand deposition and associated shifts in vegetation composition). Vegetation maps were updated in 2013 to reflect current vegetation communities. The vegetation types described in this report use the Sawyer et al. (2009) classification. Other commonly used vegetation classification manuals may use different names for similar vegetation types or define them somewhat differently. To facilitate a comparison of information in various project-related documents, Table 5 provides a list of the Sawyer et al. (2009) vegetation community names used in the EIR/EIS and the roughly equivalent Holland (1986) vegetation community names used in the 2000 EIR/EIS and the CVMSHCP/NCCP. See Figures 3a through 3c for vegetation and cover types found within the Study Area.

Reach 1

Reach 1 begins near the corner of Rio del Sol Road and Vista Chino and terminates about 0.5 miles east of Via Las Palmas. It is parallel to and north of the SCE utility corridor. Chain link fences surround multiple parcels along the reach, and a quarry on the north side of Vista Chino generates regular truck traffic along the road adjacent to the northwest end of Reach 1. Most of Reach 1 is within the CVMSHCP/NCCP-designated Thousand Palms Conservation Area, and portions of Reach 1 are on or adjacent to Reserve lands.

[3] Xerophytic plants are adapted to dry conditions.

Table 5. Vegetation and Cover Types in Disturbance Areas (acres)

Vegetation Type	Reach 1		Reach 2		Reach 3		Reach 4		New Soil Deposition Site[1]	Concrete Batch Plant/ Marshaling Yard	Total	
	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Temp	Temp	Perm	Temp
Abandoned Agriculture	0.00	0.00	0.00	0.00	0.00	0.00	5.12	0.65	35.99	0.00	**5.12**	**36.64**
Active Sand Dune/ Stabilized Sand Field (Desert dunes)	0.00	0.00	0.00	0.00	0.00	0.00	26.78	2.57	46.08	0.00	**26.78**	**48.65**
Asian Mustard Stand (Non-native vegetation)	0.58	0.25	0.00	0.00	17.66	1.90	7.12	0.74	0.00	0.00	**25.36**	**2.89**
Cheesebush scrub	0.00	0.00	0.00	0.00	3.62	0.84	0.00	0.00	0.00	0.00	**3.62**	**0.84**
Creosote Hummocks	0.00	0.00	0.00	0.00	0.00	0.00	32.53	0.52	51.83	37.04	**32.53**	**89.39**
Creosote Scrub	32.28	13.63	4.66	0.97	13.64	2.48	4.31	0.02	0.00	0.00	**54.89**	**17.10**
Disturbed/Developed (Ruderal)	10.18	4.10	0.00	0.00	5.59	0.97	11.40	6.27	79.50	0.00	**27.17**	**90.84**
Total	**43.04**	**17.98**	**4.66**	**0.97**	**40.51**	**6.19**	**87.26**	**10.77**	**213.40**	**37.04**	**175.47**	**286.35**

1 - No permanent impacts anticipated at the soil deposition site

.

Reach 1 is located on a broad alluvial fan dominated by sparse creosote scrub and developed or disturbed (ruderal) areas (see Figure 3a: Vegetation Cover in Reach 1 and 2 Alignments). The westernmost portion of the reach includes the largest amount of abandoned agricultural land, with smaller ruderal areas near development in the central portion of the reach and adjacent to the CVWD water tank (referred to as Reservoir 4602). Unvegetated areas in this reach are generally limited to roadways and rural residential development, which also include some non-native vegetation (Asian mustard stand).

In the western portion of the reach, soils are mostly consolidated sandy and rocky alluvium with very little windblown sand on the surface. Blowsand is primarily found along road edges and at the bases of larger shrubs in this area. Illegal trash dumping and debris are prevalent across the western portion of Reach 1, especially in areas mapped as disturbed/developed (ruderal). Compared to other reaches, this reach has the highest level of habitat disturbance.

The eastern portion of Reach 1 is near a small community, and scattered residences, transmission lines, a nursery, and water tank (Reservoir 4602) are located within otherwise open creosote scrub.

Reach 2

Reach 2 is the shortest reach and is immediately north of an existing electrical substation. Vegetation along this reach consists of creosote scrub and nonnative Asian mustard stands (see Figure 3a) with silty soils and no loose windblown sand. Several washes are in this reach. Dirt roads cross the area, including roads used to access the power lines associated with the substation. Reach 2 is within the CVMSHCP/ NCCP-designated Thousand Palms Conservation Area and the northwestern end of Reach 2 is near Reserve lands.

Reach 3

Vegetation and soil conditions vary greatly along this reach. Cheesebush and creosote scrub with windblown sand hummocks occurs over the majority of the alignment from west to east. There is a large ruderal (i.e., weedy) component in the southeastern portion of Reach 3 dominated by Asian mustard stands (see Figure 3b: Vegetation Cover in Reach 3). Electrical distribution and subtransmission lines are present. Localized areas of dry, cracked silty soil indicate depressions that experience brief episodes of ponded water after stormflow. There is no wetland vegetation present in these depressions, and they do not possess the characteristics of vernal pools. Soils are hard packed in some areas, and the western portion of this reach contains complex topography with several incised channels, some over six feet deep. There is evidence of periodic vegetation clearing and grading. OHV use and illegal dumping is common in this portion of the reach. Soils vary from loose, windblown sand dunes to compacted areas. Weeds are present, including non-native annual grasses and mustards, and a few scattered tamarisk groves (*Tamarix aphylla*), also known as athel are located north and east of Xavier College Preparatory High School. Evidence of bonfires and illegal dumping were observed near the center of the reach. This area has heavy OHV use. Reach 3 crosses a detention basin on the northern portion of the Xavier College Preparatory High School property. Sand dunes occur just to the north of the Reach. About half of Reach 3 is within the MSHCP-designated Thousand Palms Conservation Area, the northwestern end of Reach 3 is on or adjacent to Reserve lands, and a small portion of Reach 3 is within the CVNWR.

Reach 4

The west end of Reach 4 crosses a former jojoba farm dominated by Asian mustard stands near the I-10 freeway. This reach is adjacent to the southern boundary of designated conservation lands but it is not located within the Thousand Palms Conservation Area, Reserve lands, or the CVNWR. Soils are sandy,

windblown dunes. North-south windrows of tamarisk and other weeds are regularly spaced from Reach 4 south to Varner Road, and large sandy berms have formed along the windrows. These open areas will be used to stockpile excess spoils from the realignment of Avenue 38 and from construction of the channel. Open sandy flats occur between the berms, supporting creosote scrub and hummocks in the western end of the reach and disturbed/developed land (ruderal) in the eastern half (see Figure 3c: Vegetation Cover in Reach 4). Trash is scattered throughout this area, and it is heavily infested with African mustard. OHV use is common in the flats between the large sand berms. To the north of Avenue 38, in the CVNWR, sand dunes are more extensive, and less disturbance is evident than on the south side where Reach 4 would be constructed. Compared to other reaches, this reach has the lowest level of habitat disturbance and the best dune habitat. Industrial development is located just south of the eastern end of the reach.

Downstream

The area downstream of the Project site consists of interspersed developed and undeveloped areas. Some of the undeveloped habitat is in isolated patches surrounded by development. Development includes housing tracts, golf courses, and industrial facilities. Interstate-10 is located southwest of the Project site (see Figure 2a). Downstream habitat is similar to adjacent reaches. An area of approximately 178 acres south of Reach 4 would be used for storage of spoils from the Project (see Figure 2a).

Downwind

The prevailing winds are from the northwest to the southeast and support aeolian sand habitat in the CVNWR. Downwind areas have similar habitat as the adjacent reaches, with large areas of dune and sand field habitat, particularly near Reach 4.

Floodway

The Reach 1 and Reach 2 levees will direct water into a 550-acre floodway area between Reaches 1 and 3. Habitat in the floodway is similar to adjacent reaches.

Invasive Weeds

For purposes of this document, “weeds” includes noxious weeds and any other weed or pest plant identified on weed lists of the California Department of Food and Agriculture or the California Invasive Plant Council. The term “noxious weeds” includes all plants formally designated as such by the Secretary of Agriculture or other responsible State official. These species usually possess one or more of the following characteristics: “aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being non-native or new to or not common to the United States or parts thereof” (USDA, 2011).

Surveys within the Study Area identified 20 non-native plant species. Ten of these are considered invasive weeds by the California Invasive Plant Council (Cal-IPC). Table 6 lists the noxious and invasive plant species that were identified in the Study Area during surveys.

Invasion of Sahara mustard in aeolian sand habitat is of particular concern as it causes dune stabilization and reduction in native annuals and associated plant-eating arthropods. This results in reduced habitat suitability for endemic dune plants and animals, such as Coachella Valley milk-vetch and Coachella Valley fringe-toed lizard (Barrows and Murphy, 2010).

Table 6. Invasive Plant Species Identified in the Study Area		
Scientific Name	**Common Name**	**Threat Level[1]**
Brassica tournefortii	Sahara mustard	High
Cynodon dactylon	Bermuda grass	Moderate
Erodium cicutarium	Red-stemmed filaree	Limited
Eucalyptus sp.	Eucalyptus, gum	Limited or Watch, depending on species
Salsola tragus	Russian thistle	Limited
Schismus arabicus	Mediterranean schismus	Limited
Schismus barbatus	Mediterranean schismus	Limited
Sisymbrium irio	London rocket	Limited
Tamarix aphylla	Athel	Limited
Tamarix ramosissima	Tamarisk	High

1 - Source: Cal-IPC, 2020.
High – severe ecological impacts, moderate to high rates of dispersal and establishment, widely distributed.
Moderate – substantial but generally not severe ecological impacts, moderate to high rates of dispersal but establishment dependent on ecological disturbance, distribution ranges from limited to widespread.
Limited – minor ecological impacts, low to moderately invasive, distribution limited but may be locally problematic.

3.2.3 Wildlife

Habitat in the Study Area provides microhabitat conditions for a wide variety of terrestrial and other invertebrates. Some of the orders identified in the Study Area include Hemiptera (true bugs), Coleoptera (beetles), and Diptera (flies), but common invertebrates were not identified to species. Although not detected during surveys, several species of air breathing land snails including shoulderband snails are known from desert regions of San Bernardino and Riverside counties. Southern California shoulderband snail (*Helminthoglypta tudiculata*) is known from the region and the Coachella Valley Jerusalem cricket (*Stenopelmatus cahuilaensis*) may be present on the Project alignment.

There is no aquatic habitat in the Study Area and no fish or amphibians were observed or are expected to occur.

Common reptiles observed in the Study Area in both disturbed and natural areas include desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), western whiptail (*Aspidoscelis tigris tigris*), sidewinder (*Crotalus cerastes*), desert spiny lizard (*Sceloporus magister uniformis*), and side-blotched lizard (*Uta stansburiana*). Although not observed, several other common reptiles are likely to occur in the Study Area.

Common bird species detected within or in the immediate vicinity of the Study Area include verdin (*Auriparus flaviceps*), common raven (*Corvus corax*), greater roadrunner (*Geococcyx californianus*), great horned owl (*Bubo virginianus*), turkey vulture (*Cathartes aura*), Say's phoebe (*Sayornis saya*), northern rough-winged swallow (*Stelgidopteryx serripennis*), house finch (*Haemorhous mexicanus*), Costa's hummingbird (*Calypte costae*), American kestrel (*Falco sparverius*), lesser nighthawk (*Chordeiles acute-pennis*), killdeer (*Charadrius vociferous*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), Cassin's kingbirds (*Tyrannus vociferans*), western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), cactus wren (*Campylorhynchus brunneicapillus*), cliff swallow (*Petrochelidon pyrrho-nota*), house sparrow (*Passer domesticus*), and Gambel's quail (*Callipepla gambelii*).

Nesting red-tailed hawks (*Buteo jamaicensis*) and verdins were observed during surveys. Many other bird species may use the site either as wintering or seasonal breeding habitat; migrants may use the site as temporary resting or foraging habitat.

The distribution of mammals in the Study Area is associated with the presence of such factors as access to perennial water, topographical and structural components (i.e., rock piles, and vegetation) that provide cover and support prey base, and the presence of sui7 soils for burrowing mammals. Common mammals or their sign observed during surveys include white-tailed antelope squirrel (*Ammospermophilus leucurus*), black-tailed jackrabbit (*Lepus californicus deserticola*), desert cottontail (*Sylvilagus audubonii*), and coyote (*Canis latrans*).

4. Federally Listed Species and Critical Habitat

Table 7 summarizes the three federally listed species with the potential to occur in the Action Area.

Table 7. Species Range, Habitats, and Surveys

Species Status	Range and Preferred Habitat Occurrences in Project Study Area	Surveys[1, 2, 3]
Coachella Valley milk-vetch *Astragalus lentiginosus var. coachellae* E / CVMSHCP/NCCP	Endemic to Coachella Valley and primarily found on loose aeolian or alluvial sands on dunes or flats, and along disturbed margins of sandy washes. One individual was observed in Reach 4 on the north side of Avenue 38 during 2010 surveys. Not found at this location in 2013 or 2016 but may be due to poor rainfall. Suitable habitat in Reaches 3 and 4.	Focused survey and habitat assessment June 29-July 1, 2003. Habitat assessment May 2010. Special-status plant surveys April 29-30, 2010; March 26-28, 2013; and May 10-12, 2016. Multiple reconnaissance surveys from 1997 through 2019.
Critical habitat: Coachella Valley milk-vetch	Portions of the Project site are within designated critical habitat, although these areas support the sand transport system and are not expected to be occupied habitat (Figure 6).	Review of UCR CVMSHCP Annual Report 2019, 2020 for additional data on presence and population trends around the Action Area (UCR 2019; 2020).

Table 7. Species Range, Habitats, and Surveys

Species Status	Range and Preferred Habitat Occurrences in Project Study Area	Surveys[1, 2, 3]
Desert tortoise *Gopherus agassizii* T / CVMSHCP/NCCP	Mojave and Sonoran Deserts in southern California, southern Nevada, Arizona, southwestern tip of Utah, Sonora and northern Sinaloa in Mexico. Habitats from creosote bush scrub on flats and slopes at lower elevations to rocky slopes in blackbrush scrub and juniper woodland ecotones at higher elevations. Occurs most commonly on gently sloping terrain with sandy-gravel soils, herbaceous plants, and sparse cover of low-growing shrubs. The Project site is within the known range, although desert tortoise is very uncommon on floor of Coachella Valley. Suitable habitat occurs in all reaches, although much is only marginally suitable. Nearest documented occurrence is just east of the Project site, within the Thousand Palms Conservation Area. Several unoccupied potential burrows found in Reach 1 during surveys. No live tortoises or other tortoise sign observed. Desert tortoise has a moderate potential for occurrence in the Study Area, although, if present, it would be found only in low numbers.	Habitat assessment May 2010. Multiple reconnaissance surveys from 1997 through 2016. Based on consultation with CDFW, USFWS, and CVAG (Coachella Valley Association of Governments, for CVMSHCP/NCCP), it was determined that protocol surveys for desert tortoise were not required for the Project. Review of UCR CVMSHCP Annual Report 2019, 2020 for additional data on presence and population trends around the Action Area (UCR 2019; 2020).
Critical habitat: Desert tortoise	There is no designated critical habitat in the Action Area.	
Coachella Valley fringe-toed lizard *Uma inornata* T / CVMSHCP/NCCP	Endemic to Coachella Valley and found in fine blowsand habitat and sandy inter-dune areas of aeolian sand hummock habitat. Observed in Reaches 3 and 4 during surveys in 2010 and in Reach 4 during 2015, also observed in 1997 and 2003. Suitable habitat in Reaches 3 and 4.	Focused survey and habitat assessment June 29-July 1, 2003. Habitat assessment May 2010; April 8, 2013. Focused surveys June 20, 2010; March 26-28, 2013. Multiple reconnaissance surveys from 1997 through 2019.
Critical habitat: Coachella Valley fringe-toed lizard	Most of the Action Area is within or adjacent to designated critical habitat. Some of the critical habitat on the Project site (Reaches 1 and 2) supports the sand transport system and is not expected to be occupied habitat (Figure 6).	Review of UCR CVMSHCP Annual Report 2019, 2020 for additional data on presence and population trends around the Action Area (UCR 2019; 2020).

E = Federally Endangered
T = Federally Threatened
CVMSHCP/NCCP = CVMSHCP/NCCP covered species
1 - Reconnaissance surveys = general surveys to document biotic and abiotic conditions.
2 - Focused surveys = surveys conducted to identify a specific species or group of species.
3 - Protocol surveys = surveys conducted in accordance with an accepted standard protocol for a particular species.

5. Effects of the Proposed Action and Determination Statements

This section discusses the action and determination statements for those species that are listed by the USFWS as either threatened, endangered, or candidate species and for designated critical habitat. Species included in this section are protected under the Endangered Species Act of 1973 (*Federal Register* 41(110):22915-22922. June 7, 1976), as amended (P.L. 94-325, P.L. 94-359, P.L. 95-212, P.L., 95-632, P.L. 96-159, P.L. 97-304). Section 3 of this legislation defines an endangered species as a species that is "…in danger of extinction throughout all or a significant portion of its range…" and a threatened species as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

For Federally listed species, direct effects in this document are those effects which would lead to the "taking" of an individual of those species analyzed in this document and as defined in Section 9 and/or Section 10 of the Endangered Species Act of 1974, as amended (Act). Section 9 of the Act prohibits take (i.e., to harass, harm, pursue, hunt, wound, kill, etc.) of listed species of fish, wildlife, and plants without special exemption. "Harm" is further defined as the performance of an act that kills or injures wildlife and includes significant habitat disturbance or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. "Harass" is further defined as actions that create the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering.

Critical habitat is the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing but are essential to its conservation (USFWS, 2017a).

Indirect effects are those that are caused by the Proposed Action and are later in time, but still are reasonably certain to occur (50 CFR 402.02).

Cumulative effects can be described as the effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the Federal action subject to consultation (50 CFR 402.02).

The discussions of direct, indirect, and cumulative effects are described for the Action Area as a whole. Where appropriate, these impacts are separated into impacts occurring within the covered private lands under the MSHCP/NCCP, which are being mitigated within the context of that plan, and impacts occurring on federal land.

5.1 Federally Listed Plants

5.1.1 Coachella Valley Milk-vetch

Status

Coachella Valley Milk-vetch (*Astragalus lentiginosus var. coachellae*). Federal Status: Endangered; State Status: Not Listed; CVMSHCP/NCCP: Covered. The CVMV was federally listed as endangered by the

USFWS on October 6, 1998 (63 FR 53596). Critical habitat was designated on February 13, 2013 (78 FR 10450).

Species Description

CVMV is an annual or short-lived perennial herb. Depending on weather, plants may persist through the summer dry season to the following growing season. It may flower as early as February or as late as May (Wojciechowski and Spellenberg, 2012), depending on rainfall and temperature. During drought years, its seed may not germinate and established perennial plants may not survive. Occupied habitat is re-established from dormant seed during subsequent years of greater rainfall. It reportedly requires at least one winter storm producing an inch or more of rain to sprout (L. LaPre, USDI Bureau of Land Management, personal communication).

This species is endemic to the Coachella Valley and grows primarily on loose aeolian or fluvial sands on dunes or flats, and along disturbed margins of sandy washes.

Population Trends and Threats

There were less than 25 known occurrences at the time of listing in 1998. Additional occurrences have been identified, probably due to increased survey efforts, but the trend of habitat loss and degradation has continued. Development has replaced occupied habitat and altered the sand transport system that maintains habitat for CVMV; the USFWS estimates that CVMV has decreased since listing due to substantial losses of suitable habitat (USFWS, 2009b). Other threats include off-highway vehicles (CNPS, 2020) and degradation and loss of habitat due to invasive non-native plants, such as Sahara mustard (USFWS, 2009b).

Critical Habitat

Portions of the Action Area are within designated critical habitat, although these areas support the sand transport system and are not expected to be occupied by CVMV (see Figure 6: Critical Habitat).

Primary Constituent Elements (PCEs) are those physical and biological features of a landscape that a species needs to survive and reproduce. Each species has a unique set of PCEs related to the natural history of the organism. The PCE specific to CVMV is sand formations associated with the sand transport system in Coachella Valley (USFWS, 2013a). These sand formations have the following features:

- Active sand dunes, stabilized or partially stabilized sand dunes, active or stabilized sand fields (including hummocks), ephemeral sand fields or dunes, and fluvial sand deposits on floodplain terraces of active washes.
- Found within the fluvial sand depositional areas, and the aeolian sand source, transport, and depositional areas of the sand transport system.

Sand originates in the hills surrounding Coachella Valley and alluvial deposits at the base of the Indio Hills, which is moved into the valley by fluvial (water) transport and through the valley by aeolian (wind) transport. The fluvial sand depositional areas and the aeolian sand source, transport, and depositional areas of the sand transport system are within the area occupied by CVMV, but the fluvial sand transport areas are outside the area occupied by CVMV (USFWS, 2013).

The features essential to the conservation of CVMV may require special management or protection to reduce threats from development, non-native plants, OHV use, groundwater pumping, and other activities that may cause alteration of stream flow (USFWS, 2013).

Current Status of the CVMV in the Action Area

Multiple biological surveys have been done in the Study Area from 1997 through 2019, including habitat assessments and focused surveys for CVMV (see Table7).

One individual was observed in Reach 4 on the north side of Avenue 38 during 2010 surveys. No CVMV were found at this location in 2013, 2016, or 2019 but this may have been due to poor rainfall. There is suitable habitat for CVMV in Reaches 3 and 4, and potentially south of Avenue 38 (UCR 2020). In 2020, one additional CVMV was observed within the Action Area, located approximately 0.35 miles (570 m) southeast of Reach 3 within the Coachella Valley National Wildlife Refuge (Calflora, 2020). Portions of the Action Area are within designated critical habitat, although these areas are not expected to support the large occurrences of the plants themselves. These areas were designated as critical habitat to protect sand transport functions, rather than occupied habitat (see Figure 6).

Direct Effects: Construction of the proposed Action will result in permanent impacts to approximately 175.47 acres of natural vegetation, disturbed areas, and dune communities. Approximately 286.36 acres of these communities will be subject to temporary disturbance. Potential habitat for Coachella Valley milk-vetch was observed in portions of Reaches 3 and Reach 4, generally in areas mapped as high or moderate suitability for Coachella Valley fringe-toed lizard (see Figures 7a through 7c: Coachella Fringe-toed Lizard Habitat). Impacts to high, moderate, and low-quality habitat for CVFTL are discussed in Section 5.2.2 (Table 8, below).

Habitat in these areas could support CVMV however only one plant was detected on Reach 4 on the north side of Avenue 38. Most of this habitat is located along disturbed road edges or areas that are currently subject to disturbance from off highway vehicle use, illegal dumping, the placement of lawn clippings, and existing maintenance operations (i.e., sand removal). Most of Reach 3 span disturbed areas including an access road and ruderal field before entering the Classic Club golf course. Similarly, most of Reach 4 would be in the present alignment of Avenue 38. Construction would affect portions of the dunes immediately adjacent to Avenue 38 but would not extend into the large dunes located within the Preserve. Most of the habitat loss would occur south of Avenue 38 where sand fields, and dunes also occur. Although unlikely, this region south of Avenue 38 has the potential to support CVMV and CVFTL. Construction of the Project and the placement of fill in these areas would not impact the large dunes in this area. Soil would be placed in the flat areas and covered with fines.

Potential direct effects to CVMV, if it occurs on the site during construction, would be unlikely to affect more than a few individual plants due to very limited area of occupied habitat in the Study Area. Construction and O&M of the Project could directly affect CVMV and its habitat, should it occur on or near the Project site or downstream or downwind of the Project site or in the floodway, by trampling or crushing plants with heavy equipment, vehicles, or foot traffic; loss or degradation of habitat; fugitive dust; release of hazardous materials; disruption of soil seed bank; sand compaction or other habitat effects that may prevent seeds from germinating or becoming established.

Impacts to Designated Critical Habitat

Construction of the Project would result in the permanent loss of 11.01 acres of designated critical habitat for CVMV and temporary disturbance to 3.31 acres (see Figure 6 and Table 8).

Of this total, federal lands comprise 6.44 acres of permanent disturbance and 0.65 acres of temporary disturbance to designated Critical Habitat for the CVMV.

Most of these areas are not expected to support the plants but were designated as critical habitat to protect sand transport functions rather than occupied habitat (see Section 3.6.1.4).

Table 8. Project Affects to Coachella Valley Milk Vetch Designated Critical Habitat (acres)[1]

Location	Temporary	Permanent	Total
Reach 1	2.65	4.47	7.12
Reach 2	0.00	0.00	0.00
Reach 3	0.66	6.54	7.28
Reach 4	0.00	0.00	0.00
New Soil Deposition	0.00	0.00	0.00
Totals	3.31	11.01	14.32

1 - All CVMV critical habitat is within CVFTL critical habitat

The CVMV is a covered species under the CVMSHCP/NCCP/NCCP. Direct impacts to this species is considered a covered activity and mitigated through participation in the CVMSHCP/NCCP/NCCP.

Direct effects to CVMV on federal lands would be avoided or minimized through implementation of Project ECs (Section 2.3) and Mitigation Measures BIO-1 through BIO-9. CVMV is generally dependent on aeolian sand habitat; thus, ECs and mitigation measures (EC SM-1 and SM-2 and Mitigation Measure SM-1 and SM-2) related to sand migration would contribute to overall mitigation of impacts to CVMV.

Indirect Effects: Project-related introduction or spread of invasive species could indirectly affect CVMV. Non-native invasive plants that become established in a new area may displace native species (including special-status species or plants that provide food or cover for special-status wildlife), alter natural habitat structure, change the edaphic (soil-related) and hydrological conditions, and increase wildfire frequency (Zouhar et al., 2008; Lovich and Bainbridge, 1999). Invasive weeds also stabilize sand fields and dunes and degrade habitat for sand-dependent special-status species. Invasive weeds can create such an unfavorable environment for wildlife that associated, mutualistic species necessary for native plant life cycles, such as seed dispersers, fossorial mammals, or pollinators, are lost from the area. These plants are considered “weeds” or “pest plants” in natural landscapes (Bossard et al., 2000). Weeds are defined here to include any species of non-native plants identified on the weed lists of the California Department of Food and Agriculture or the California Invasive Plant Council.

Invasive weeds generally spread most readily in disturbed, graded, or cultivated soils, including soils disturbed by construction equipment. Construction and O&M activities could result in soil disturbance that could introduce new noxious weeds to the Project site. New introductions occur when seeds are inadvertently introduced, most often with mulch, hay bales, or wattles used for erosion control, or when they are transported on construction equipment or tires from off-site areas. Many invasive non-native species are adapted to and promoted by soil disturbance. Once introduced, they can out-compete native species because of minimal water requirements, high germination potential, and high seed production. Weeds can become locally dominant, representing a serious threat to native desert ecosystems (Lathrop and Archbold, 1980; Beatley, 1966).

Weeds are present throughout the Project site; Reach 4, in particular, is heavily infested with Sahara mustard. Several other invasive weeds were also identified on the Project site, including Mediterranean grass (*Schismus* spp.) and Russian thistle (*Salsola tragus*).

Other potential indirect impacts include alterations to upstream or downstream hydrology leading to alteration of habitat; and interference with fluvial and aeolian sand transport.

The sediment transport system that creates the aeolian dunes and sand fields in the Coachella Valley takes sand from upwind source areas (fluvial deposits on alluvial fans) and transports it to the southeast via strong winds moving along a distinct corridor (see Figure 2c). The entrained sediment travels to depositional areas where wind, topography, and other conditions promote the deposit and accumulation of sand (USGS, 2002). Sand transport in the Coachella Valley maintains and replenishes habitat for endemic sand-dependent plant and wildlife species, such as CVMV.

Construction of the Project is not expected to adversely affect the wind corridor and may result in beneficial affects overtime by trapping sediment that would otherwise be lost to the system as storms carry blowsand out of the wind corridor along the many drainages crossed by the levees. As compared to current conditions, this diversion of flow and resulting fluvial transport has the potential to increase the supply of sand moving into the wind corridor (Lancaster, 2015). In summary, the proposed Project will increase sand supply by 9 to 14 percent, mainly as a result of the diversion of water and sediment to the east and southeast to the primary sand deposition area by the levee and channel of Reach 1 (See Section 4.5 Sand Migration). Similarly, blowsand trapped in the levees or channels would be periodically removed and placed in the wind corridor above the Preserve.

As a part of the proposed project, CVWD would acquire approximately 550 acres of the floodway located along the levees and in the active wind corridor between Reach 1 and Reach 3. Land acquisition in the floodway would be managed and maintained as habitat for special-status species (e.g., as aeolian sand habitat or sand transport area). In addition, during Project O&M, the CVWD would transport sand removed from the project facilities (accumulated along the levees and channels) to the wind corridor upwind of suitable aeolian sand habitat, for aeolian transport onto the Preserve. These two components of the proposed Project would serve to protect and manage aeolian sand habitat for CVMV. The placement of the levee and channels may also hinder OHV use in many locations particularly in Reach 3 where OHV use is common along the western edge of the Refuge. By blocking the dirt road in this location, it may reduce vehicle traffic in areas that could support plants and reduce impacts to portions of the Thousand Palms Conservation Area.

Indirect effects to CVMV would be avoided or minimized through a series of actions as described under Direct Impacts, above.

Cumulative Effects: Cumulative effects are addressed in Section 5 of the EIR/EIS, including a list and map of cumulative projects and their locations. With regard to biological resources, including CVMV, all projects are within the CVMSHCP/NCCP area, subject to its terms and conditions. The CVMSHCP/NCCP mitigates the impacts of cumulative development throughout the Coachella Valley through coordinated habitat set-aside and management. Any potential take of CVMV or adverse modification of critical habitat, would be covered through the CVMSHCP/NCCP. Therefore, adverse cumulative effects are not anticipated.

Determination: Construction and O&M activities of the Proposed Action may affect individual CVMV should they occur within the construction footprint on federal lands. However, if present this is expected to be limited to only a few individuals. The action will affect designated critical habitat for CVMV, but with the implementation of the Project's mitigation measures and environmental commitments the Project would not adversely modify CVMV critical habitat. Most of the critical habitat that would be disturbed by the Action is not occupied by CVMV but has been designated because it contributes to the aeolian and hydraulic transport of fine sands to the Preserve. More importantly the placement of the levees will not disrupt the wind corridor and is expected to result in long term beneficial affects to sand transport in the region.

Rationale:

- Impacts to CVMV on private lands are mitigated through participation in the CVMSHCP/NCCP.
- Most of the project disturbance area on private lands do not support habitat or occurrences of the CVMV.
- One CVMV was observed in Reach 4 in 2010 and there is suitable habitat for CVMV in Reaches 3 and 4.
- Portions of the federal Action Area are within designated critical habitat. These areas support the sand transport system and are not expected to be occupied by CVMV.
- ECs and mitigation measures would require pre-construction clearance surveys, biological monitoring, avoidance of CVMV where possible, and off-site compensation for habitat loss. ECs and mitigation measures would also require avoidance and minimization of impacts to sand and sand transport.
- ECs and mitigation measures would require implementation of an Integrated Weed Management Plan Project to remove and limit the spread of nonnative and invasive plant species.
- Project design would not disrupt aeolian sand transport. Implementation of the proposed Action would result in increase of sand transport to the Refuge.
- ECs and mitigation measures would minimize or mitigate interference with fluvial sand transport.

Implementation of the Proposed Action is not expected to result in a change in population size of CVMV or affect the viability of the species in this area or result in adverse modification of critical habitat.

5.2 Federally Listed Wildlife

5.2.1 Desert Tortoise

Status

Desert Tortoise (*Gopherus agassizii*). Federal Status: Threatened; State Status: Threatened; CVMSHCP/ NCCP: Covered. The Mojave population of desert tortoise was federally listed as threatened by the USFWS on April 2, 1990 (55 FR 12178) after an initial emergency listing as endangered on August 4, 1989 (54 FR 32326). The Mojave population includes those animals living north and west of the Colorado River and includes all wild desert tortoises in California (USFWS, 1990). Critical habitat for the desert tortoise was designated on February 8, 1994 (59 FR 5820). The desert tortoise was State listed as threatened in 1989.

Species Description

The desert tortoise is an herbivorous reptile that occurs in the Mojave and Sonoran Deserts in southern California, southern Nevada, Arizona, and the southwestern tip of Utah, as well as Sonora and northern Sinaloa in Mexico. The designated Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS, 2011a). Desert tortoises east and south of the Colorado River are now recognized as a distinct species, Morafka's desert tortoise (*G. morafkai*).

The desert tortoise occupies a variety of habitats from flats and slopes, typically characterized by creosote bush scrub at lower elevations, to rocky slopes in blackbrush scrub and juniper woodland ecotones (transition zones) at higher elevations. Tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and where there are herbaceous (non-woody) plants and sparse cover of low-growing

shrubs. Soils must be friable (easily crumbled) enough for digging burrows, but firm enough so that burrows do not collapse.

During the winter, desert tortoises will opportunistically use burrows, small caves, rock and caliche crevices, or rock overhangs for cover. Hatchling desert tortoises use abandoned rodent burrows for daily and winter shelter (USFWS, 2011a). Desert tortoises spend much of their lives in burrows, even during their seasons of activity. In late winter or early spring, they emerge from over-wintering burrows and typically remain active through fall. Activity decreases in summer and is often crepuscular during the hottest times. Tortoises often emerge after summer rainstorms. Activity and movement is generally influenced by temperature and precipitation, which correlate with food and water resources. Extreme high and low temperatures and periods of drought typically result in reduced tortoise activity (Peterson, 1996). Mating occurs during spring and fall. Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity [at approximately 180mm midline carapace length (MCL)]. Eggs are generally laid in friable soil near burrow entrances between April and June and occasionally September and October. Eggs hatch within three to four months (Rostal et al., 1994).

Tortoises are found most often on gentle slopes with sandy-gravel soils. Soils must be appropriately soft for digging burrows, but firm enough so that burrows do not collapse (Anderson et al., 2000). Annual forbs and grasses constitute their primary food sources. Current research has suggested that plant species that have high potential for potassium excretion (high-PEP) may be critical to the diet of desert tortoise (Oftedal, 2002; Oftedal et al., 2002). Excess potassium can be detrimental to the health of tortoises. When excreting potassium salts from their bladder, tortoises risk expelling valuable water and protein in the process.

Desert tortoises occupy home ranges, which are generally defined as the area traversed while carrying out a range of normal activities (e.g., foraging and mating) (USFWS, 2011a). The size of their home ranges can vary with respect to sex, geographic location, substrate, topography, and climate. Tortoises are philopatric (tending to remain in a particular area), establishing home ranges between 15 and 45 hectares (Barrett, 1990; O'Connor et al., 1994; Harless et al., 2009) depending on region. Home ranges of females are generally smaller than those of males (Duda et al., 1999). Some tortoises have been known to travel great distances, although these movements may occur outside their usual home range (Berry, 1986).

Population Trends and Threats

At the time the desert tortoise was listed in 1990, available data indicated that populations were declining (USFWS, 2010a). Monitoring since that time shows that the downward trend in populations identified at the time of listing is ongoing, but no significant changes in the distribution of the species have been documented (USFWS, 2010a; 2011a).

Threats to the desert tortoise include degradation and loss of habitat, the spread of non-native invasive plants, disease, coyote or feral dog predation, raven predation on juvenile tortoises, collection for the pet trade, and direct mortality and crushing of burrows by OHVs.

Critical Habitat

The federal Action Area is not within designated critical habitat for desert tortoise. The nearest critical habitat for desert tortoise is located over 7 miles to the east of the Project site (USFWS, 2020).

Current Status of Desert Tortoise in the Action Area

The Action Area lies within the known range of the desert tortoise, although desert tortoises are very uncommon on the floor of the Coachella Valley, including the Project site and surrounding area. The CVMSHCP/NCCP/NCCP habitat models for desert tortoise do not include the Project site. Suitable habitat occurs in all the reaches, although much of this habitat is only marginally suitable due to fine sandy soil that will not support burrows, proximity to development and roads, and OHV use.

The nearest documented occurrence of desert tortoise is just east of the Action Area, within the Thousand Palms Conservation Area, where they have been observed infrequently (CDFW, 2020a). Several burrows which may have been unoccupied desert tortoise burrows, but could not be definitively attributed to desert tortoise, were found in the Reach 1 portion of the Action Area during reconnaissance surveys. No live tortoises, carcasses, scat, tracks, eggshell fragments, or other tortoise sign was observed. Desert tortoise has a moderate potential for occurrence in the Action Area, although, if present, it would be found only in low numbers.

Direct Effects: Construction and O&M of the Project could directly affect desert tortoise and its habitat, should tortoises occur on or near the Project site or downstream or downwind of the Project site or in the floodway. The primary impacts would be in the form of permanent habitat loss in the footprint of the levees. Additional direct impacts could result from mortality due to collisions with vehicles or heavy equipment, falling into or being trapped within channels, harassment due to handling or relocation of tortoises, crushing of burrows, fugitive dust, or release of hazardous materials; alterations to upstream or downstream hydrology leading to alteration of habitat (e.g., removing surface or soil water source, or causing inundation of an upland species occurrence); and increased noise and disturbance.

To avoid and minimize impacts to desert tortoise, CVWD would implement Project ECs (Section 2.3) and Mitigation Measures BIO-1 through BIO-8, BIO-10, BIO-12, and BIO-13.

Mitigation Measure BIO-12 (Conduct Desert Tortoise Surveys, Monitoring, and Avoidance) requires surveys for desert tortoise and monitoring of construction by a qualified biologist. It further requires that desert tortoises found within work areas be allowed to leave on their own or be relocated out of harm's way by an authorized and permitted biologist. Additionally, Project personnel would be required to check for desert tortoises before moving vehicles or equipment. This measure would avoid and minimize mortality of desert tortoise by ensuring that a qualified biologist is on-site during construction and that work areas have been surveyed for the presence of desert tortoise, and by relocating any individual found within a work area or allowing it to leave on its own. Desert tortoises may shelter in the shade of vehicles or equipment, and this measure would avoid and minimize mortality of desert tortoise by requiring vehicles and equipment be checked for desert tortoise before moving.

Indirect Effects: Indirect impacts to desert tortoise could include the introduction and spread of invasive weeds, providing predator subsidies, and increased human presence, including OHV use. Indirect effects to desert tortoise would be avoided or minimized through a series of actions as described under Direct Impacts, above.

Mitigation Measure BIO-13 (Prepare and Implement Raven Monitoring, Management, and Reporting Plan) requires the preparation and implementation of a Raven Monitoring, Management, and Reporting Plan and monetary contribution to the USFWS Regional Raven Management Program. Raven populations in the desert are artificially high due to human presence that provides subsidies to ravens. These subsidies are water or food sources or perching, roosting, or nesting sites (e.g., fences, structures, etc.) that would not naturally be present. Ravens prey on juvenile desert tortoises. Young tortoises cannot easily escape

predators and, until about age 5 or 6, their shells are soft enough to be punctured by a raven bill. Large numbers of juvenile tortoise shells have been found beneath raven nests throughout the desert (Kristan and Boarman, 2003). Implementation of a Raven Plan would avoid and minimize raven-caused mortality of juvenile desert tortoises by requiring management practices to avoid and minimize Project-related raven subsidies. Contribution to the Regional Raven Management Program would compensate for any Project-related raven subsidies by supporting raven control throughout the region.

Cumulative Effects: Cumulative effects are addressed in Section 5 of the EIR/EIS, including a list and map of cumulative projects and their locations. With regard to biological resources, including desert tortoise, all projects are within the CVMSHCP/NCCP area, subject to its terms and conditions. The CVMSHCP/NCCP mitigates the impacts of cumulative development throughout the Coachella Valley through coordinated habitat set-aside and management. Any potential take of desert tortoise would be covered through the CVMSHCP/NCCP. Therefore, adverse cumulative effects are not anticipated.

Determination: Construction and O&M activities of the Proposed Action may affect individual desert tortoise should they occur in the project area. The Proposed Action will have no effect on desert tortoise critical habitat, as critical habitat does not occur in the Action Area.

Rationale:

- Impacts to desert tortoise on private lands are mitigated through participation in the CVMSHCP/NCCP.
- Potential desert tortoise burrows (unoccupied) were found in Reach 1. No live tortoises or other tortoise sign have been observed during multiple years of field surveys. Desert tortoise has a moderate potential for occurrence in the Action Area, although, if present, would be found only in low numbers.
- There is no currently designated critical habitat for desert tortoise within the Action Area.
- ECs and mitigation measures would require pre-construction clearance surveys, biological monitoring, and avoidance measures, such as checking under vehicles for desert tortoise.
- Mitigation measures would require that desert tortoises found within work areas be allowed to leave on their own or be relocated out of harm's way by a qualified and permitted biologist.
- Mitigation measures would require the Project to avoid and minimize subsidies (e.g., food, water) to ravens (predators of juvenile tortoises) and provide funds to support raven control throughout the region.
- ECs and mitigation measures would require implementation of an Integrated Weed Management Plan Project to remove and limit the spread of nonnative and invasive plant species.

Implementation of the Proposed Action is not expected to result in a change in desert tortoise population size or affect the viability of the species in this area.

5.2.2 Coachella Valley Fringe-toed Lizard

Status

Coachella Valley Fringe-toed Lizard (*Uma inornata*). Federal listing status: Threatened; State Status: Endangered; CVMSHCP/NCCP: Covered. The CVFTL was federally listed as threatened by the USFWS on September 25, 1980 and critical habitat was also designated at that time (45 FR 63812). CVFTL was State listed as endangered in 1980.

Species Description

The CVFTL is found only in the Coachella Valley in and around blowsand habitat and in sandy inter-dune areas of aeolian sand hummock habitat. It prefers fine sand (0.180 to 0.355 mm in diameter; Barrows, 1997) on the lee side of dunes and hummocks. It is highly adapted to "swim" through sand and will burrow into loose sand to escape predators and to avoid high temperatures at the surface. CVFTL prefers fine sands with low compaction and deeper sand deposits with topographic relief. It is often found in sandy inter-dune areas consisting of aeolian sand hummock habitat, although these areas likely function as foraging habitat and as connections between dunes or blowsand areas that would otherwise be isolated.

CVFTL is generally active from March through mid-November, with most activity from April through October. CVFTL eats leaves, flowers, ants, and other insects. Vegetation in high CVFTL use areas includes four-winged saltbush (*Atriplex canescens*), twinbugs (*Dicoria* sp.), and non-native Russian thistle (*Salsola tragus*). Sahara mustard can be locally common to abundant in some areas.

Implementation of the CVMSHCP/NCCP created four conservation areas in the Coachella Valley that support CVFTL habitat: Thousand Palms, Whitewater Floodplain, Willow Hole, and Edom Hill. The Project site is adjacent to the Thousand Palms Conservation Area, which contains the largest amount of remaining contiguous habitat for CVFTL and probably the most robust population of the species. Within this Conservation Area, 901 acres of lands are designated as critical habitat. Total CVFTL habitat in this Conservation Area is approximately 1,850 acres.

Population Trends and Threats

CVFTL is endemic to the Coachella Valley. Since the species was listed in 1980, its distribution has decreased by more than 60 percent. Approximately 90-95 percent of historical habitat has been lost and only 15,000-20,000 acres remain available. Based on recent GIS analysis and mapping, only 9,000 to 11,000 acres of this area has the potential to be suitable habitat (USFWS, 2010b). At listing, there were 118 known occurrences, of which 43 were presumed extant. Since listing, additional occurrences have been identified and there are currently 59 presumed extant occurrences, most within CVMSHCP/NCCP conservation areas (USFWS, 2010b).

Results of monitoring in the conservation area suggest that populations of CVFTL fluctuate with annual precipitation. During droughts, population numbers fall to near zero, but rebound during years of average rainfall.

Threats to CVFTL are obstruction of sand transport systems, urban and agricultural growth, non-native invasive plants, and OHV use.

Critical Habitat

Portions of the Action Area are within designated critical habitat (see Figure 6). Portions of the designated critical habitat, including the habitat in Reaches 1 and 2, are not expected to support CVFTL. Instead, these areas were designated as critical habitat due to their role as a sand source, to supply occupied habitat farther downwind (USFWS, 1985; USFWS, 2013). Sand in the Thousand Palms area originates in alluvial deposits at the base of the Indio Hills, including lands along Reach 1 of the Project. Large flooding events, if not interrupted by intervening land uses, can carry the sand into fluvial deposition areas where the sand can be moved and sorted by wind. Based on field surveys and habitat assessments conducted for the Project, this portion of the designated critical habitat is not expected to be occupied by CVFTL.

The USFWS final rule designating critical habitat did not identify PCEs for CVFTL (USFWS, 1985), but habitat requirements (USFWS, 2010b) are:

- Accumulations of aeolian sand;
- Deeper sand deposits with more topographic relief are preferred over flatter sand sheets;
- Fine grain sand (0.1 to 0.5 millimeters) is preferred;
- Low sand compaction;
- Fluvial and aeolian sand transport system to maintain habitat.

Current Status of the CVFTL in the Action Area

The CNDDB (CDFW, 2020a) reports numerous CVFTL occurrences near each Project Reach and individuals were observed several times during the course of field surveys. Habitat assessments conducted in 2013 and re-verified in 2016 and 2020 identified areas of high, moderate, and low habitat suitability in the Study Area (see Section 3.6.1.6 and Figures 7a through 7c and Table 9). The highest suitability habitat is in the large dunes located in Reach 4 and portions of Reach 3. Surveys conducted for this Project detected several CVFTL within Reach 4 and the adjacent sand deposition area as recently as 2013. This species may also occur in the dunes that have formed along the tamarisk windrows south of Avenue 38 adjacent to the proposed sediment disposal area.

Direct Effects: Construction of the proposed Action will result in permanent impacts to approximately 175.47 acres of natural vegetation, disturbed areas, and dune communities. Approximately 286.35 acres of these communities will be subject to temporary disturbance. Suitable habitat for CVFTL is found within Reaches 1, 3, and 4 of the Project Study Area (see Figures 7a through 7c). Based on this assessment approximately 51.92 acres of high to moderate quality habitat for CVFTL would be permanently impacted and 164.16 acres would be subject to temporary disturbance. Approximately 116.26 acres of low-quality habitat would be permanently impacted, and 117.30 acres would be subject to temporary disturbance (Table 9). These low-quality areas likely do not support the species but could be used for dispersal during periods of high reproduction.

Of this total, federal lands comprise 9.43 acres of permanent and 0.89 acres of temporary disturbance to high, moderate, and low-quality habitat for CVFTL.

Table 9. Coachella Valley Fringe-Toed Lizard Habitat

	Reach 1		Reach 2		Reach 3		Reach 4		New Soil Deposition Site[1]	Concrete Batch Plant/ Marshaling Yard[1]
CVFTL Habitat	Perm (acres)	Temp (acres)	Perm (acres)	Temp (acres)	Perm (acres)	Temp (acres)	Perm (acres)	Temp (acres)	Temp (acres)	Temp (acres)
High	0.00	0.00	0.00	0.00	8.88	1.47	21.90	2.00	77.84	0.00
Moderate	0.00	0.00	0.00	0.00	13.84	1.75	7.30	0.80	80.3	0.00
Low	37.06	13.42	4.66	0.97	16.53	2.64	58.01	7.97	55.26	37.04
None	5.98	4.56	0.00	0.00	1.26	0.33	0.05	0.00	0.00	0.00
Total	43.04	17.98	4.66	0.97	40.51	6.19	87.26	10.77	213.4	37.04
Grand Total Permanent and Temporary Disturbance in Acres										461.82

1 - Impacts to the Soil Deposition Site and Concrete Batch Plant are considered temporary

Construction and O&M of the Project could directly affect CVFTL and its habitat, should it occur on or near the Project site or downstream or downwind of the Project site or in the floodway, by mortality due to collisions with vehicles or heavy equipment, loss or degradation of habitat, fugitive dust, release of hazardous materials, sand compaction, increased noise and disturbance, alterations to upstream or downstream hydrology leading to alteration of habitat (e.g., removing surface or soil water source, or causing inundation of an upland species occurrence), and disruption of fluvial and aeolian sand transport. The proposed Project could have similar direct effects on CVFTL critical habitat on or near the Project site, or downstream or downwind of the Project site or in the floodway.

The most likely areas to encounter this species is in the sandy fields of Reaches 3 and 4. While Reach 1 and Reach 2 supports pockets of sand and small sand hummocks the likelihood of encountering animals in these Reaches are low compared to other areas. Reaches 1 and 2 of the project are considered low suitability for CVFTL due to lack of windblown sand habitat, and there were no reports of CVFTL near these reaches during monitoring for the adjacent transmission line project (SCE, 2013). Apparently, windblown sand habitat formerly in this area has shifted toward the southeast in the years since the observations reported in the CNDDB were made.

Most of this habitat is located along disturbed road edges or areas that are currently subject to disturbance from off highway vehicle use, illegal dumping, the placement of lawn clippings, and existing maintenance operations (i.e., sand removal). Most of Reach 3 span disturbed areas including an access road and ruderal field before entering the Classic Club golf course. Similarly, most of Reach 4 would be in the present alignment of Avenue 38. Construction would affect portions of the dunes immediately adjacent to Avenue 38 but would not extend into the large dunes located within the Preserve. Most of the habitat loss would occur south of Avenue 38 where sand fields, and dunes also occur. Construction of the Project and the placement of fill in these areas would not impact the large dunes in this area. Soil would be placed in the flat areas and covered with fines.

Designated Critical Habitat

Construction of the Project would result in the permanent loss of 85.72 acres of designated critical habitat for CVFTL and the temporary disturbance of 23.77 acres (see Figure 6).

Of this total, federal lands comprise 7.44 acres of permanent disturbance and 0.64 acres of temporary disturbance to designated Critical Habitat for the CVFTL (Table 10).

Table 10. Coachella Valley Fringe-Toed Lizard Designated Critical Habitat on Federal Lands (acres)

Location	Temporary	Permanent	Total
Reach 1	0.00	0.00	0.00
Reach 2	0.00	0.00	0.00
Reach 3	0.64	6.70	7.34
Reach 4	0.00	0.74	0.74
New Soil Deposition Site	0.00	0.00	0.00
Totals	0.64	7.44	8.08

The boundary of the designated critical habitat extends beyond the limits of the species' distribution to include the sand source, which is essential in maintaining aeolian sand habitat (USFWS, 1985). Most of the project's potential effects to designated critical habitat would be to this sand source area rather than to occupied or suitable habitat. CVFTL are expected to be absent or occur in very low numbers in Reach 1,

Reach 2, and most of Reach 3. For example, even in Reach 4 most of the impact would occur to existing road surfaces or degraded habitat south of the Refuge. Nonetheless CVFTL can occur in these areas.

On private lands the CVFTL is a covered species under the CVMSHCP/NCCP. Direct impacts to this species is considered a covered activity and mitigated through participation in the CVMSHCP/NCCP.

Direct effects to CVFTL on federal lands would be avoided or minimized through implementation of Project ECs (Section 2.3) and Mitigation Measures BIO-1 through BIO-8, BIO-10, and BIO-11. CVFTL is generally dependent on aeolian sand habitat; thus, ECs and mitigation measures (EC SM-1 and SM-2 and Mitigation Measures SM-1 and SM-2) related to sand migration would contribute to overall mitigation of impacts to CVFTL.

Mitigation Measure BIO-11 requires surveys for CVFTL, monitoring of construction by a qualified biologist, and installation of exclusion fencing around work areas in areas supporting a high potential to occur on federal lands, and the development of a Wildlife Protection and Relocation Plan. This measure would avoid and minimize mortality of individual CVFTL by ensuring that a qualified biologist is on-site during construction and that work areas have been surveyed for the presence of CVFTL, and by physically excluding lizards from work areas and relocating any individual found within a work area using approved protocols as described in the Wildlife Protection and Relocation Plan (MM BIO-11).

Indirect Effects: Indirect impacts include increased human presence, including OHV use, and the introduction and spread of invasive weeds (particularly Sahara mustard) that stabilize sand dunes, outcompete food plants, and do not support the lizard's insect prey. The proposed Project could have similar indirect effects on CVFTL critical habitat on or near the Project site, or downstream or downwind of the Project site or in the floodway.

Weeds are present throughout the Project site; Reach 4, in particular, is heavily infested with Sahara mustard. Other potential indirect impacts include alterations to upstream or downstream hydrology leading to alteration of habitat; and interference with fluvial and aeolian sand transport.

Other potential indirect impacts include alterations to upstream or downstream hydrology leading to alteration of habitat; and interference with fluvial and aeolian sand transport.

The sediment transport system that creates the aeolian dunes and sand fields in the Coachella Valley takes sand from upwind source areas (fluvial deposits on alluvial fans) and transports it to the southeast via strong winds moving along a distinct corridor. The entrained sediment travels to depositional areas where wind, topography, and other conditions promote the deposit and accumulation of sand (USGS, 2002). Sand transport in the Coachella Valley maintains and replenishes habitat for endemic sand-dependent plant and wildlife species, such as CVMV. Construction of the levees would also prevent the transport of sediment out of the wind corridor as storms movement sediment to downstream areas. This material would be trapped by the levels and become available for long term sand replenishment to the Preserve. As compared to current conditions, implementation of the proposed Project may have long term benefits to CVFTL by increasing the supply of sand moving into the wind corridor. Lancaster (2015) found that construction of the proposed Project will increase sand supply by 9 – 14 percent, mainly because of the diversion of water and sediment to the east and southeast to the primary sand deposition area by the levee of Reach 1.

As a part of the proposed project, CVWD would acquire approximately 550 acres of the floodway located along the levees and in the active wind corridor between Reach 1 and Reach 3. Land acquisition in the floodway would be managed and maintained as habitat for special-status species (e.g., as aeolian sand habitat or sand transport area). In addition, during Project O&M, the CVWD would transport sand

removed from the project facilities (accumulated along the levees and channels) to the wind corridor upwind of suitable aeolian sand habitat, for aeolian transport onto the Preserve. These two components of the proposed Project would serve to restore, protect, and manage aeolian sand habitat for CVFTL.

Indirect effects to CVFTL would be avoided or minimized as described under Direct Impacts, above.

Cumulative Effects: Cumulative effects are addressed in Section 5 of the EIR/EIS, including a list and map of cumulative projects and their locations. With regard to biological resources, including CVFTL, all projects are within the CVMSHCP/NCCP area, subject to its terms and conditions. The CVMSHCP/NCCP mitigates the impacts of cumulative development throughout the Coachella Valley through coordinated habitat set-aside and management. Any potential take of CVFTL or adverse modification of critical habitat, would be covered through the CVMSHCP/NCCP. Therefore, adverse cumulative effects are not anticipated.

Determination: Construction and O&M activities of the Proposed Action may affect individual CVFLT should they occur in the disturbance area. The action will affect designated critical habitat for CVFTL, but with the implementation of the Project's mitigation measures and environmental commitments the Project would not adversely modify CVFTL critical habitat. Most of the critical habitat that would be disturbed by the Action is not occupied by CVMV but has been designated because it contributes to the aeolian and hydraulic transport of fine sands to the Preserve. More importantly the placement of the levees will not disrupt the wind corridor and is expected to result in long term beneficial affects to sand transport in the region.

Rationale:

- Impacts to CVFTL on private lands are mitigated through participation in the CVMSHCP/NCCP.
- There are numerous occurrences of CVFTL reported near the proposed Project near Reach 3 and Reach 4 and individuals were observed several times during the course of field surveys.
- The most likely location CVFTL to occur is in Reach 3, Reach 4, and in sand fields located south of Reach 4.
- Portions of the Action Area are within designated critical habitat for CVFTL. Portions of the designated critical habitat, including the habitat in Reaches 1 and 2, are not expected to support CVFTL. These portions of critical habitat support the sand transport system and are not expected to be occupied by CVFTL.
- ECs and mitigation measures would require pre-construction clearance surveys, biological monitoring, installation of CVFTL exclusion fencing around work areas, and off-site compensation for habitat loss. ECs and mitigation measures would also require avoidance and minimization of impacts to sand and sand transport.
- ECs and mitigation measures would require implementation of an Integrated Weed Management Plan Project to remove and limit the spread of nonnative and invasive plant species.
- Project design would have minimal interference with aeolian sand transport; ECs and mitigation measures would minimize or mitigate interference with fluvial sand transport.

Implementation of the Proposed Action is not expected to result in a change in population size of CVFTL or affect the viability of the species in this area.

6. Preparers and Reviewers

Multiple individuals contributed to the preparation and review of this Biological Assessment, including the following:

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7. References

Anderson, M.C., J.M. Watts, J.E. Freilich, S.R. Yool, G.I. Wakefield, J.F. McCauley, and P.B. Fahnestock. 2000. Regression-tree modeling of desert tortoise habitat in the central Mojave Desert. *Ecological Applications* 11 (6): 890-900.

Barrett, S.L. 1990. Home range and habitat of the desert tortoise (*Xerobates agassizi*) in the Picacho Mountains of Arizona. *Herpetologica* 46:202–206.

Barrows, C.W. 1997. Habitat relationships of the Coachella Valley fringe-toed lizard (*Uma inornata*). *Southwestern Naturalist* 42:218-223.

Barrows, C.W., and M. Murphy. 2010. Sahara Mustard in the Desert Southwest: Impacts to Biodiversity. California Invasive Plant Council 2010 Symposium— Weeds and Wildlife: Impacts and Interactions. [Online]: http://www.cal-ipc.org/symposia/archive/pdf/2010/5Murphy.pdf

Beatley, J.C. 1966. Ecological status of introduced brome grasses (*Bromus* spp.) in desert vegetation of southern Nevada. *Ecology* 47:548-554.

Berry, K.H. 1986. Desert tortoise (*Gopherus agassizii*) relocation: Implications of social behavior and movements. *Herpetologica* 42:113-125.

Bossard, C.C., J.M. Randall, and M.C. Hoshovsky (eds.). 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley. 360 pp.

Cal-IPC (California Invasive Plant Council). 2020. Invasive Plant Inventory, online. [Online]: http://www.cal-ipc.org/plants/inventory/ Accessed July 2020.

Calflora. 2020. Information on California plants for education, research and conservation. [web application]. Berkley, California: The Calflora Database [a non-profit organization]. Accessed August 2021. [Online]: https://www.calflora.org/.

CBS (News Channel 3 ABC/CBS Local 2 – Gulf California Broadcasting). 2014. Federal Flood help denied, City offers loans. November 14. [Online]: https://kesq.com/news/2014/11/14/federal-flood-help-denied-city-offers-loans/ Accessed August 3, 2020.

CCH (Consortium of California Herbaria). 2020. Botanical specimen data provided by the participants of the Consortium of California Herbaria. Accessed July 2020. [Online]: http://ucjeps.berkeley.edu/consortium/

CDFG (California Department of Fish and Game). 2010. Hierarchical List of Natural Communities with Holland Types. Vegetation Classification and Mapping Program, CDFG, Sacramento. September. [Online]: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=24716&inline=1

CDFW (California Department of Fish and Wildlife). 2020a. California Natural Diversity Database (CNDDB), Rarefind, Version 5.2.14. Heritage section, CDFG, Sacramento.

_____. 2020b. State and Federally Listed Endangered and Threatened Animals of California. July. [Online]: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals

_____. 2020c. Special Animals List. July. [Online]: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals

_____. 2020d. Threatened and Endangered Species Protected Under the California Endangered Species Act (CESA). [Online]: https://www.wildlife.ca.gov/Conservation/CESA/Code-Regulations Accessed August 3, 2020.

_____. 2016a. Coachella Valley Ecological Reserve. [Online]: https://www.wildlife.ca.gov/Lands/Places-to-Visit/Coachella-Valley-ER.

_____. 2016b. Land Management Planning. https://www.wildlife.ca.gov/Lands/Planning.

CNLM (Center for Natural Lands Management). 2000. Management Plan for the Coachella Valley Preserve System and Environmental Assessment. [Online]: https://www.blm.gov/ca/pdfs/palmsprings_pdfs/CVPplan01.pdf.

CNPS (California Native Plant Society). Rare Plant Program. 2020. Inventory of Rare and Endangered Plants. California Native Plant Society, Sacramento, CA. [Online]: http://www.rareplants.cnps.org. Accessed August 3, 2020.

CVAG (Coachella Valley Association of Governments). 2007a. Final Recirculated Coachella Valley Multiple Species Habitat Conservation Plan. [Online]: https://www.govinfo.gov/content/pkg/FR-2007-11-13/pdf/E7-22087.pdf

_____. 2007b. Section 7.0 Take Authorization for Covered Activities and Term of Permit page 7-1.

Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. *Journal of Wildlife Management* 63:1181-1192.

Harless, M.L., A.D. Walde, D.K. Delaney, L.L. Pater, and W.K. Hayes. 2009. Home range, spatial overlap, and burrow use of the desert tortoise in the West Mojave Desert. *Copeia*:378-389.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Unpublished report available from the California Department of Fish and Game, Sacramento, California.

Kristan, W.B. III and W.I. Boarman. 2003. Spatial pattern of risk of common raven predation on desert tortoises. *Ecology* 84(9):2432–2443.

Lancaster, N. 2015. Geomorphic Assessment of Sand Transport Impacts for the Thousand Palms Flood Control Project – Document Review. Draft Final Report prepared for Aspen Environmental Group. Prepared by Division of Earth and Ecosystems Sciences, Desert Research Institute.

Lathrop, E.W. and Archbold, E.F. 1980. Plant response to utility right of way construction in the Mojave Desert. *Environmental Management* 4(3):215-226.

Lovich, J.E., and D. Bainbridge. 1999. Anthropogenic Degradation of the Southern California Desert Ecosystem and Prospects for Natural Recovery and Restoration. *Environmental Management* 24 (3): 309–326.

O'Connor, M.P., J.S. Grumbles, R.H. George, L.C. Zimmerman, and J.R. Spotila. 1994. Potential hemato-logical and biochemical indicators of stress in free-ranging desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. *Herpetological Monographs* 8:60-71.

Oftedal, O.T. 2002. The nutritional ecology of the desert tortoise in the Mojave and Sonoran deserts. Pages 194-241 *in* T.R. Van Devender (ed.), The Sonoran Desert Tortoise; Natural History, Biology and Conservation. University of Arizona Press, Tucson, Arizona.

Oftedal, O.T., S. Hillard, and D.J. Morafka. 2002. Selective spring foraging by juvenile desert tortoises (*Gopherus agassizii*) in the Mojave Desert: Evidence of an adaptive nutritional strategy. Chelonian *Conservation and Biology* 4:341-352.

Peterson, C.C. 1996. Ecological energetics of the desert tortoise (*Gopherus agassizii*): effects of rainfall and drought. *Ecology* 77:1831–1844.

Rostal, D.C., V.A. Lance, J.S. Grumbles, and A.C. Alberts. 1994. Seasonal reproductive cycle of the desert tortoise (*Gopherus agassizii*) in the eastern Mojave Desert. *Herpetological Monographs* 8:72-82.

Sawyer, J.O., T. Keeler-Wolf and J.M. Evens. 2009. Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento, California.

SCE (Southern California Edison). 2013. Devers to Palo Verde II Field Reporting Environmental Database. Submitted to California Public Utilities Commission.

SLA (Simons, Li and Associates, Inc.). 1996. Sand Migration Study for Flood Control Projects in Thousand Palms Areas, Coachella Valley, California. Prepared for U.S. Army Corps of Engineers, Los Angeles District.

_____. 1997. Sand Migration Impact Evaluation Report: Thousand Palms Area, Coachella Valley, Riverside County, California. Prepared for U.S. Army Corps of Engineers, Los Angeles District.

UCR (University of Riverside). 2019. Coachella Valley Multiple Species Habitat Conservation Plan/ Natural Community Conservation Plan. 2019 Annual Report. Prepared by the University of Riverside Center for Conservation Biology. Prepared for Coachella Valley Conservation Commission.

_____. 2020. Coachella Valley Multiple Species Habitat Conservation Plan/ Natural Community Conservation Plan. 2020 Annual Report. Prepared by the University of Riverside Center for Conservation Biology. Prepared for Coachella Valley Conservation Commission.

USACE (U.S. Army Corps of Engineers). 2000. Whitewater River Basin (Thousand Palms) Flood Control Project. Final Environmental Impact Statement / Environmental Impact Report. September.

USDA (U.S. Department of Agriculture). 2011. Invasive Species Management. Forest Service Manual: FSM 2900. [Online]: http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2900!.

USFWS (U.S. Fish and Wildlife Service). 1985. Coachella Valley Fringe-toed Lizard Recovery Plan. [Online]: http://ecos.fws.gov/docs/recovery_plan/850911b.pdf

_____. 1990. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Mojave Population of the Desert Tortoise: Final Rule. Federal Register 55(63):12178-12191.

_____. 2000a. Fish and Wildlife Coordination Act Report: Whitewater River/Thousand Palms Flood Control Feasibility Study, Riverside County, California. USFWS Carlsbad Fish and Wildlife Office, Carlsbad, California.

_____. 2000b. Biological Opinion on the Whitewater River/Thousand Palms Flood Control Project, Riverside County, California. USFWS Carlsbad Fish and Wildlife Office, Carlsbad, California.

_____. 2008. Intra-Service Formal Section 7 Consultation for Issuance of a Section 10(a)(I)(B) (TE-104604-0) Incidental Take Permit under the Endangered Species Act for the Coachella Valley Multiple Species Habitat Conservation Plan, Riverside County, California. USFWS Carlsbad Fish and Wildlife Office. Carlsbad, California.

_____. 2009a. Desert Tortoise (Mojave Population) Field Manual: (Gopherus agassizii). Region 8, Sacramento, California. [Online]: https://www.fws.gov/nevada/desert_tortoise/documents/field_manual/Desert-Tortoise-Field-Manual.pdf

_____. 2009b. *Astragalus lentiginosus* var. *coachellae* (Coachella Valley milk-vetch) 5-Year Review: Summary and Evaluation. USFWS Carlsbad Fish and Wildlife Office, Carlsbad, California. [Online]: https://ecos.fws.gov/docs/five_year_review/doc3211.pdf

_____. 2010a. Mojave Population of the Desert Tortoise (*Gopherus agassizii*) 5-Year Review: Summary and Evaluation. USFWS Desert Tortoise Recovery Office. Reno, Nevada.

_____. 2010b. Coachella Valley Fringe-toed Lizard 5-Year Review: Summary and Evaluation. USFWS Carlsbad Fish and Wildlife Office, Carlsbad, California. [Online]: http://ecos.fws.gov/docs/five_year_review/doc3562.pdf

_____. 2011a. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Region 8, Pacific Southwest Region, Sacramento, California. [Online]: http://ecos.fws.gov/docs/recovery_plan/RRP%20for%20the%20Mojave%20Desert%20Tortoise%20-%20May%202011_1.pdf

_____. 2011b. Habitat Conservation Plans under the Endangered Species Act. [Online]: https://www.fws.gov/endangered/esa-library/pdf/hcp.pdf

_____. 2011c. Section 7 Biological and Conference Opinion on the Devers–Palo Verde No.2 Transmission Line Project, Riverside County, California. Carlsbad Fish and Wildlife Office, Carlsbad, California. [Online]: https://www.blm.gov/style/medialib/blm/ca/pdf/palmsprings.Par.99673.File.dat/Devers%20Biological%20Opinion.pdf

_____. 2013a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Astragalus lentiginosus var. coachellae* (Coachella Valley Milk-Vetch). Federal Register 78(30): 10450-10497. [Online]: http://www.gpo.gov/fdsys/pkg/FR-2013-02-13/pdf/2013-03109.pdf

_____. 2013b. Biological Opinion for the Establishment of a Sand Relocation Site at the Coachella National Wildlife Refuge (USFWS, 2013).

_____. 2014. Sonny Bono Salton Sea National Wildlife Refuge Complex: Sonny Bono Salton Sea NWR, Coachella Valley NWR. Final Comprehensive Conservation Plan. [Online]: https://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/what_we_do/planning.html

_____. 2017a. Critical Habitat: What is it? [Online]: https://www.fws.gov/endangered/esa-library/pdf/critical_habitat.pdf

_____. 2017b. Amendment to the Memo Establishment of a Sand Relocation Site at the Coachella National Wildlife Refuge (USFWS, 2017).

_____. 2020. Critical Habitat for Threatened and Endangered Species. Online mapping application. [Online]: https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77. Accessed August 3, 2020.

USGS (U.S. Geological Survey). 2002. Long-term Sand Supply to Coachella Valley Fringe-Toed Lizard (*Uma inornata*) Habitat in the Northern Coachella Valley, California. Tuscon, Arizona. Prepared in cooperation with the U.S. Fish and Wildlife Service. Water-Resources Investigations Report 02–4013. 59 pp.

Wojciechowski, M.F., and R. Spellenberg. 2012. Astragalus: Coachella Valley milk-vetch. Pp. 744. *In:* Baldwin, B.G, D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (eds.). The Jepson manual – vascular plants of California, second edition. University of California Press, Berkeley.

Zouhar, K., J.K. Smith, S. Sutherland, and M.L. Brooks. 2008. Wildland Fire in Ecosystems: Fire and Nonnative Invasive Plants. General Technical Report RMRSGTR-42-Vol. 6, USDA Forest Service Rocky Mountain Research Station, Ogden, Utah: 355 pp.

Figures

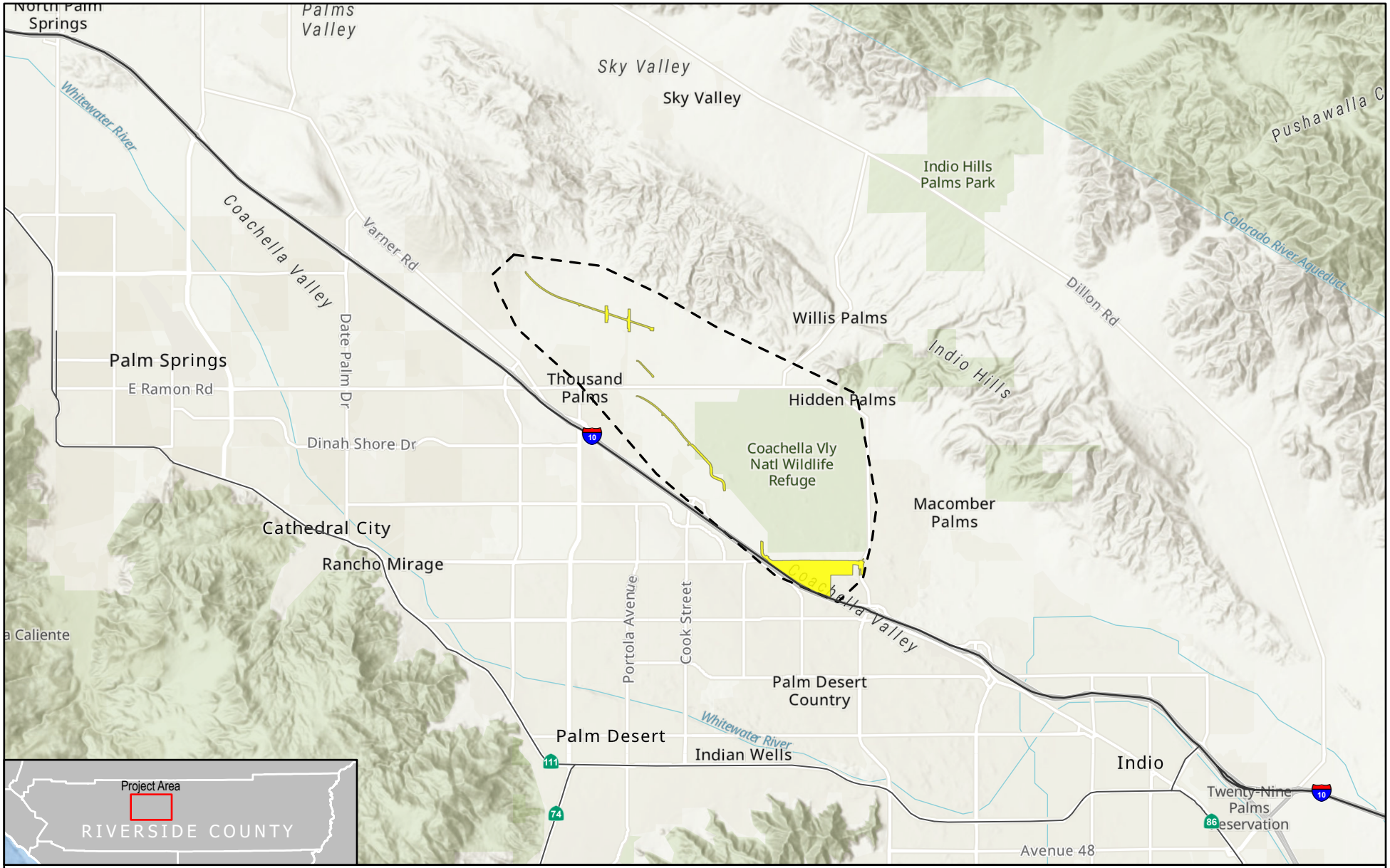
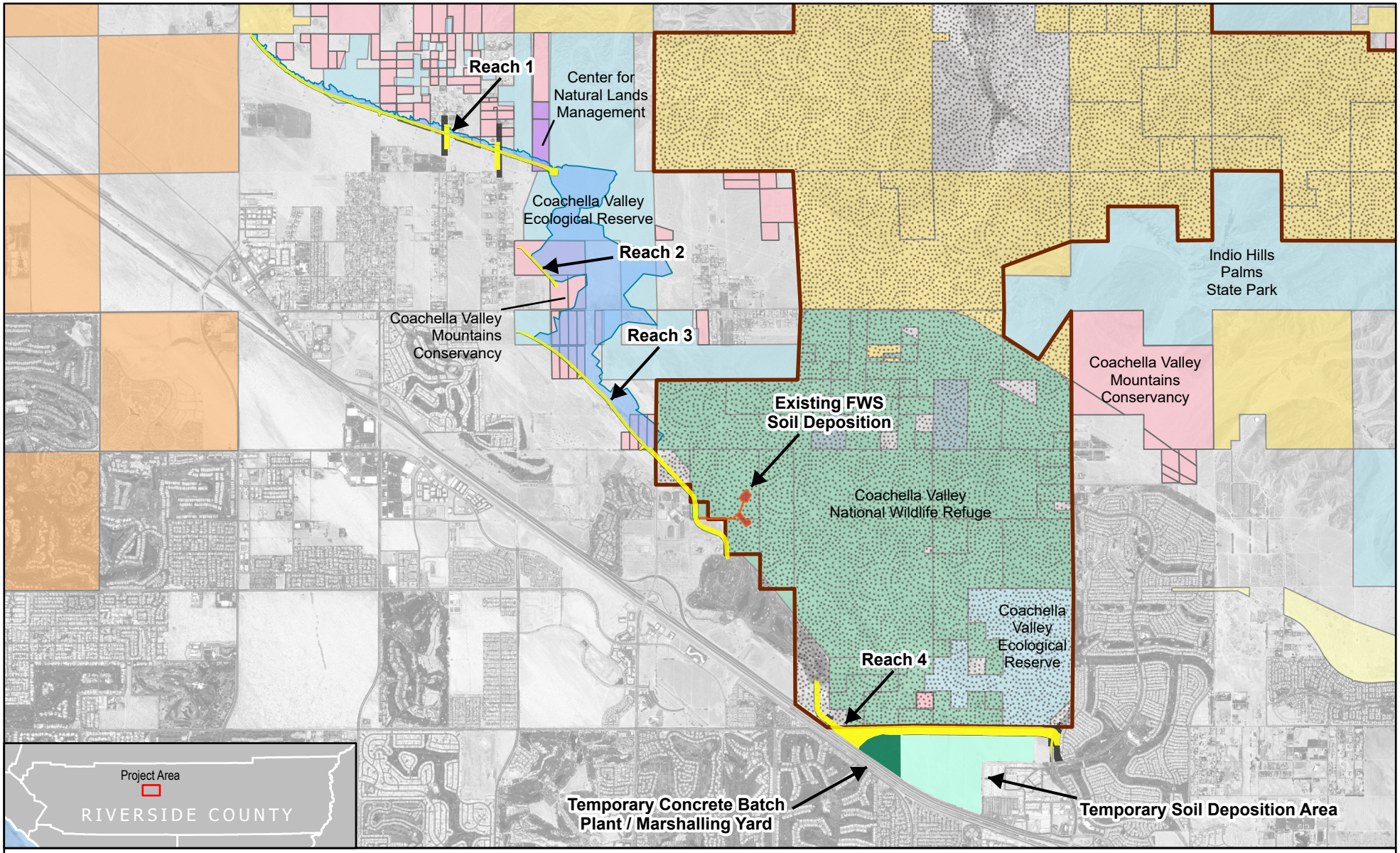


Figure 1

Proposed Project Vicinity and Action Area



Permanent Impact Area
Temporary Impact Area
Temporary Soil Deposition Area
Temporary Concrete Batch Plant/Marshalling Yard
Existing FWS Soil Deposition
550-acre Floodplain Mitigation Lands

Land Ownership and Designations

US Fish and Wildlife Service
Bureau of Land Management
US Bureau of Reclamation
State
Local Government
Bureau of Indian Affairs
Center for Natural Lands Management
Coachella Valley Mountains Conservancy
Coachella Valley Preserve Boundary

0 1 Miles

Figure 2a

Land Ownership
Proposed Project Alignment

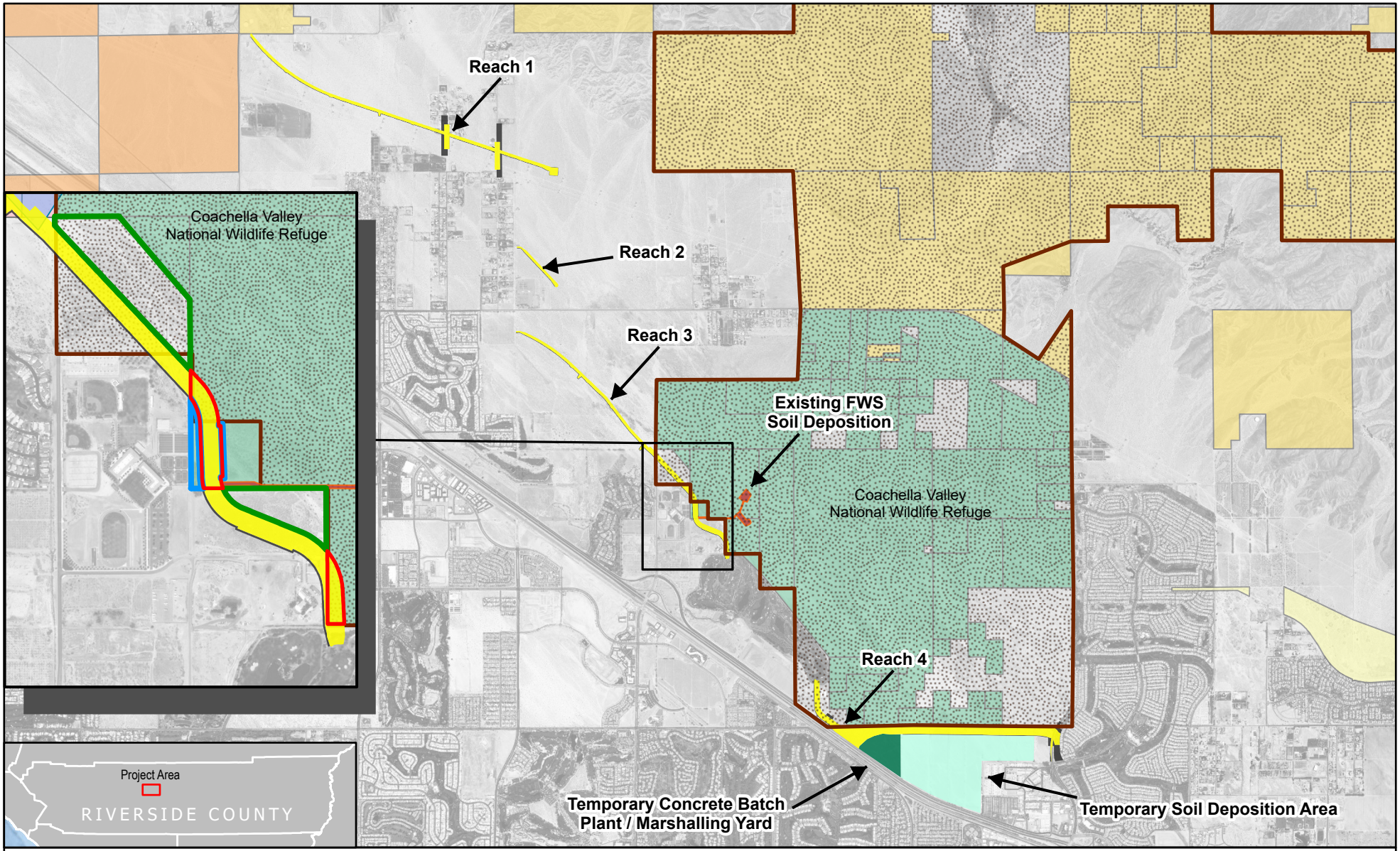
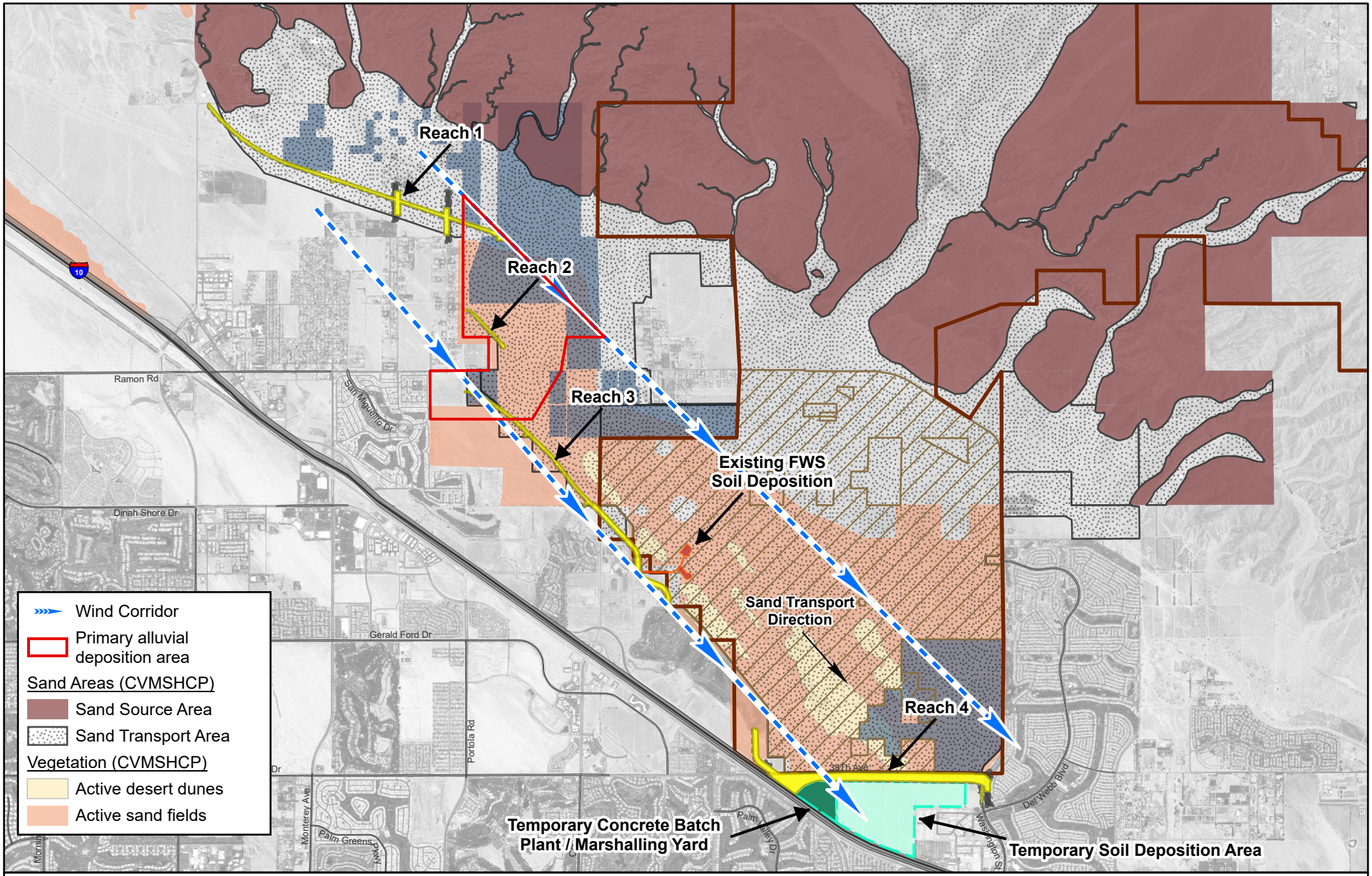


Figure 2b

Impacts to Federal Lands



Source: Lancaster 2015; CVMSHCP 2008; CDFW 2016

0 1 Miles

Permanent Impact Area
Temporary Impact Area
Temporary Soil Deposition Area
Temporary Concrete Batch Plant/Marshalling Yard
Existing FWS Soil Deposition
CDFW Coachella Valley Ecological Reserve Lands
Coachella Valley Preserve Boundary
Coachella Valley National Wildlife Refuge

Figure 2c

Sand Source and Transport Areas

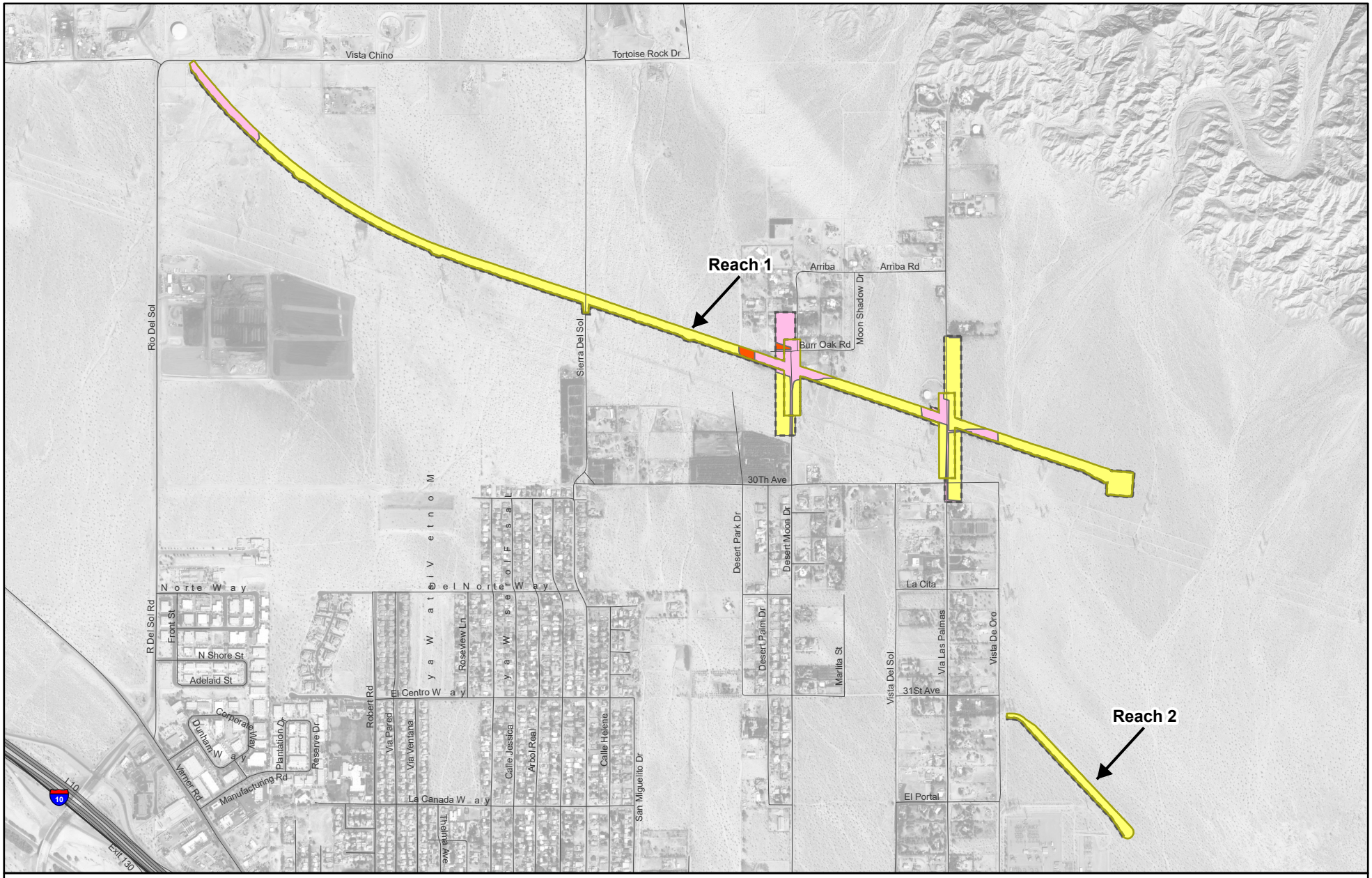


Figure 3a

Vegetation Cover
Reach 1 and 2 Alignments

Permanent Impact Area

Temporary Impact Area

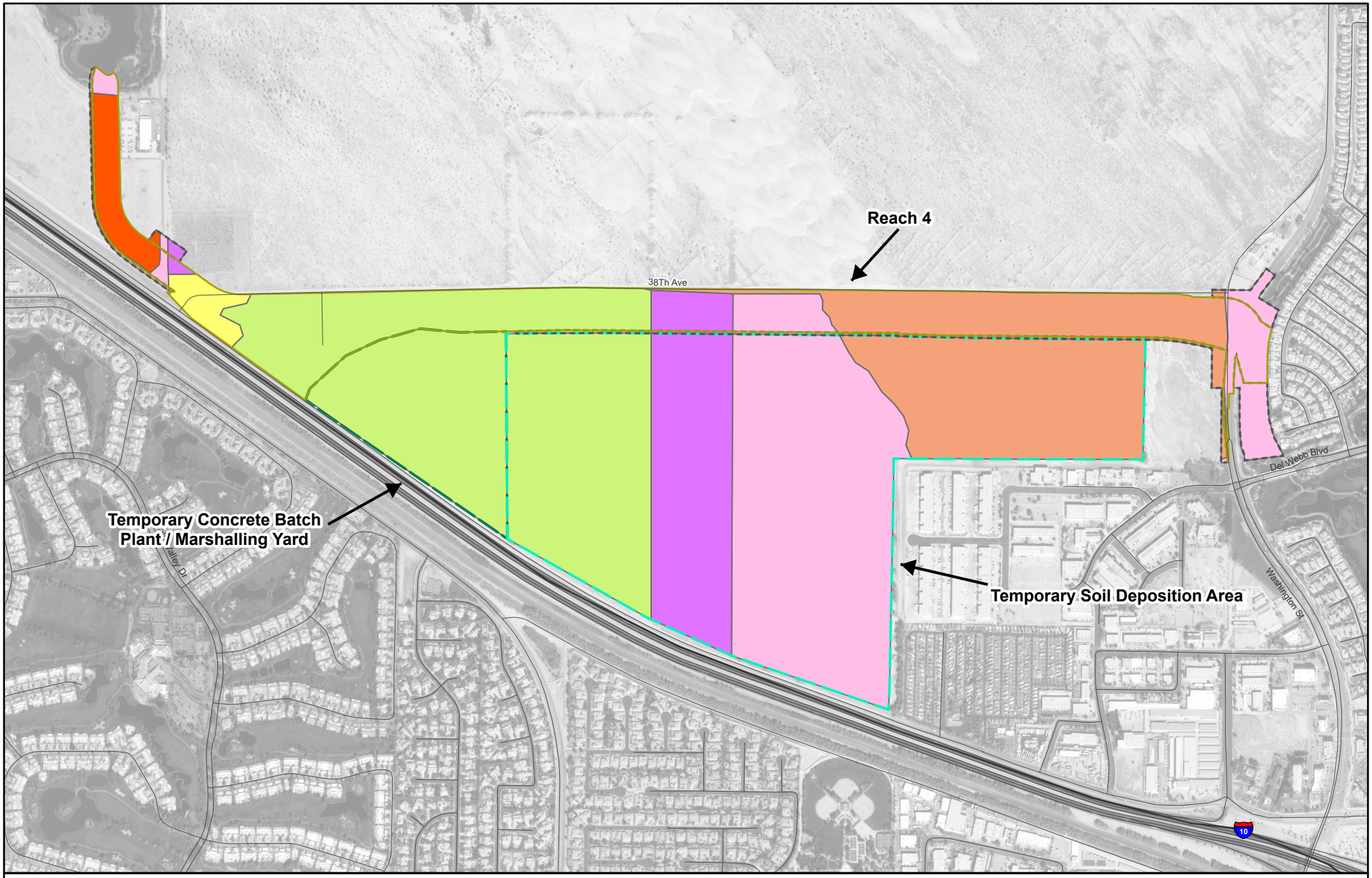
Vegetation and Cover Types

- Asian Mustard Stand
- Cheesebush Scrub
- Creosote Scrub
- Disturbed/Developed

0 0.5 Miles

Figure 3b

Vegetation Cover Reach 3



N

0 0.25 Miles

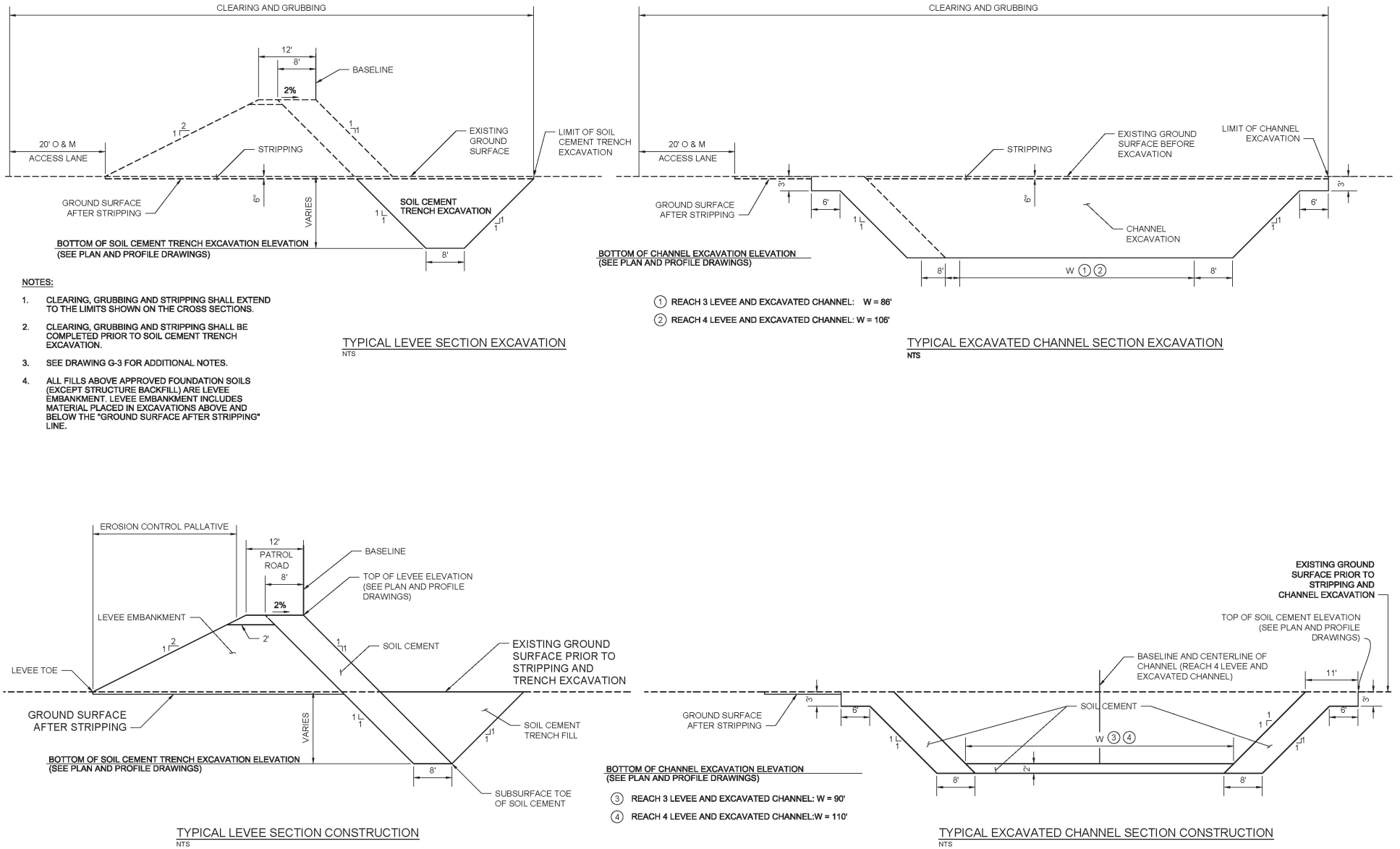
Permanent Impact Area
Temporary Impact Area
Temporary Soil Deposition Area
Temporary Concrete Batch Plant/ Marshalling Yard

Vegetation and Cover Types

Abandoned Agriculture
Active Sand Dune / Stabilized Sand Field
Asian Mustard Stand
Creosote Hummocks
Creosote Scrub
Disturbed/Developed

Figure 3c

Vegetation Cover Reach 4



NOTES:

1. CLEARING, GRUBBING AND STRIPPING SHALL EXTEND TO THE LIMITS SHOWN ON THE CROSS SECTIONS.
2. CLEARING, GRUBBING AND STRIPPING SHALL BE COMPLETED PRIOR TO SOIL CEMENT TRENCH EXCAVATION.
3. SEE DRAWING G-3 FOR ADDITIONAL NOTES.
4. ALL FILLS ABOVE APPROVED FOUNDATION SOILS (EXCEPT STRUCTURE BACKFILL) ARE LEVEE EMBANKMENT. LEVEE EMBANKMENT INCLUDES MATERIAL PLACED IN EXCAVATIONS ABOVE AND BELOW THE "GROUND SURFACE AFTER STRIPPING" LINE.

TYPICAL LEVEE SECTION EXCAVATION
NTS

(1) REACH 3 LEVEE AND EXCAVATED CHANNEL: W = 86'
(2) REACH 4 LEVEE AND EXCAVATED CHANNEL: W = 106'

TYPICAL EXCAVATED CHANNEL SECTION EXCAVATION
NTS

TYPICAL LEVEE SECTION CONSTRUCTION
NTS

(3) REACH 3 LEVEE AND EXCAVATED CHANNEL: W = 90'
(4) REACH 4 LEVEE AND EXCAVATED CHANNEL:W = 110'

TYPICAL EXCAVATED CHANNEL SECTION CONSTRUCTION
NTS

Figure 4

Levee and Channel Construction Cross-Sections

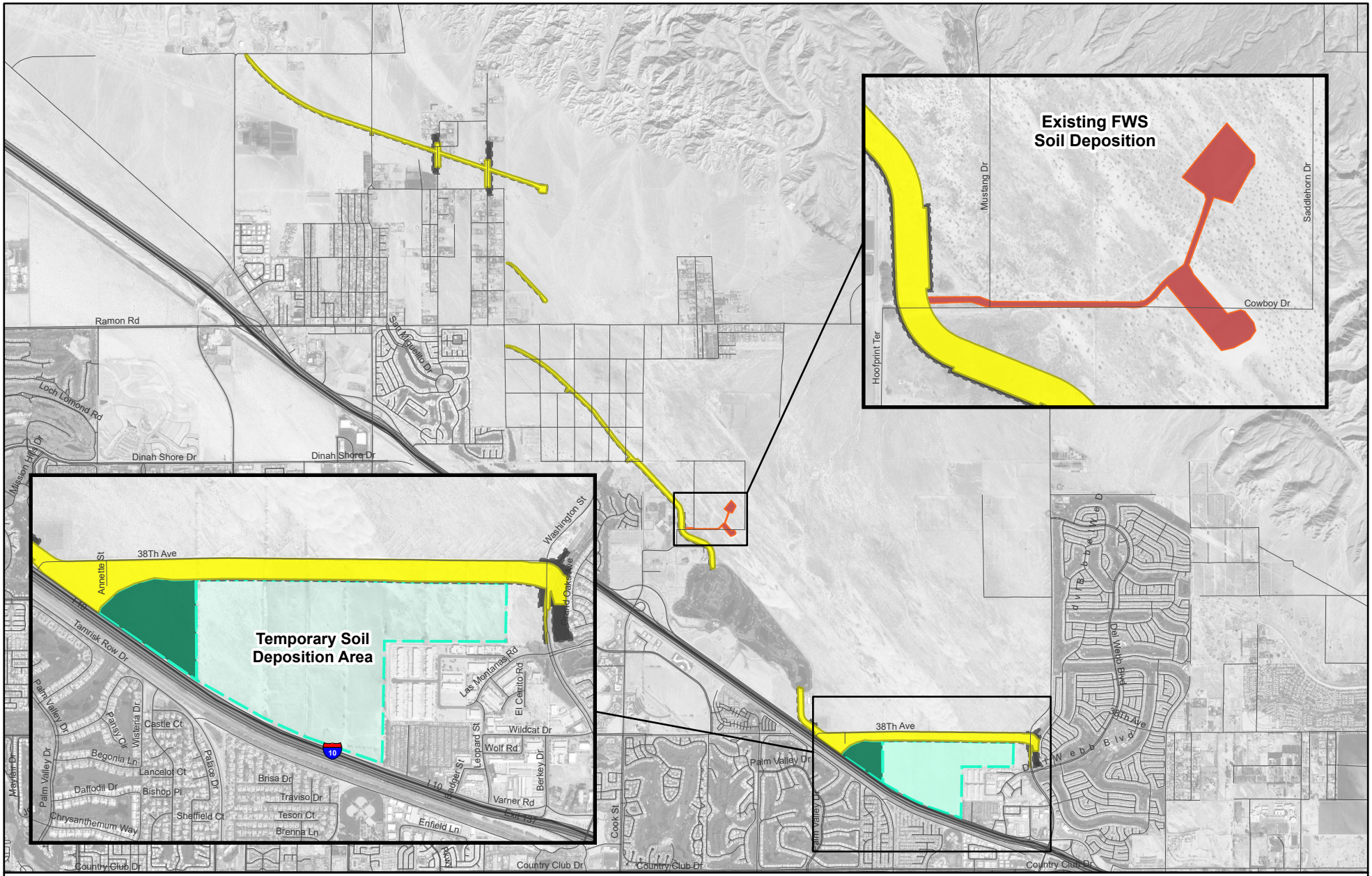


Figure 5

Proposed Sand Disposal Areas

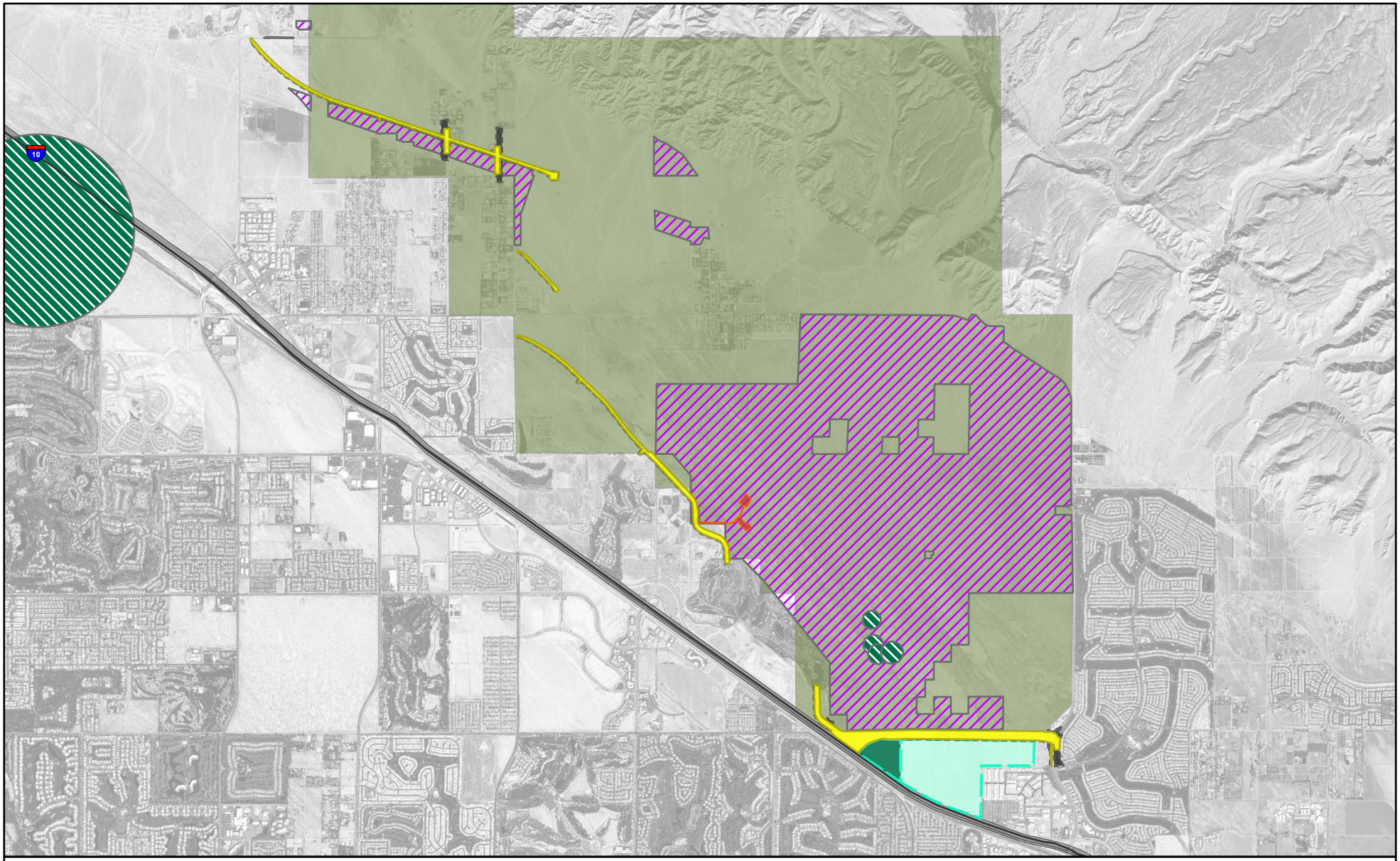


Figure 6

Critical Habitat

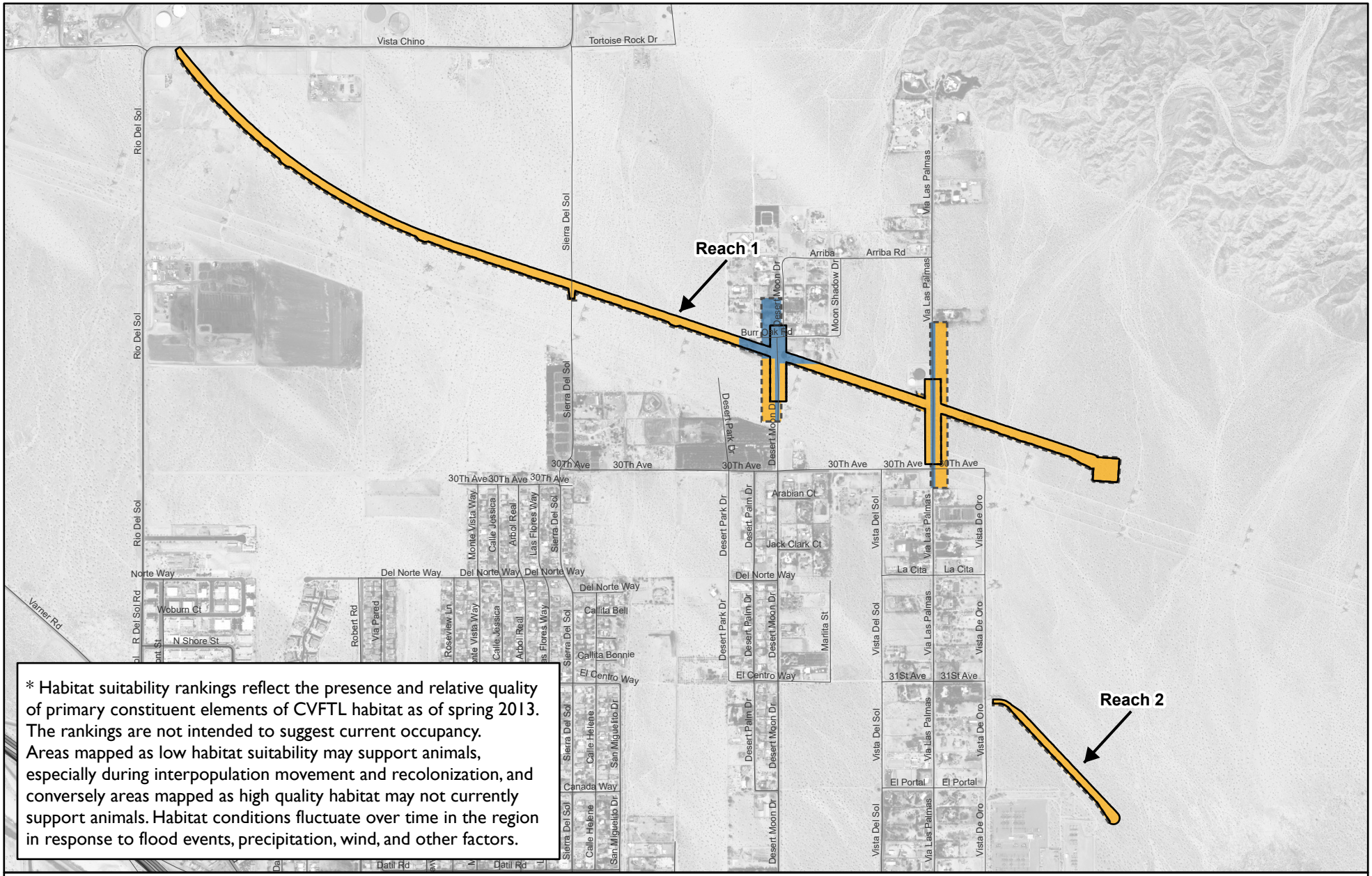


Figure 7a
Coachella Valley
Fringe-Toed Lizard Habitat
Reach 1 and 2 Alignments

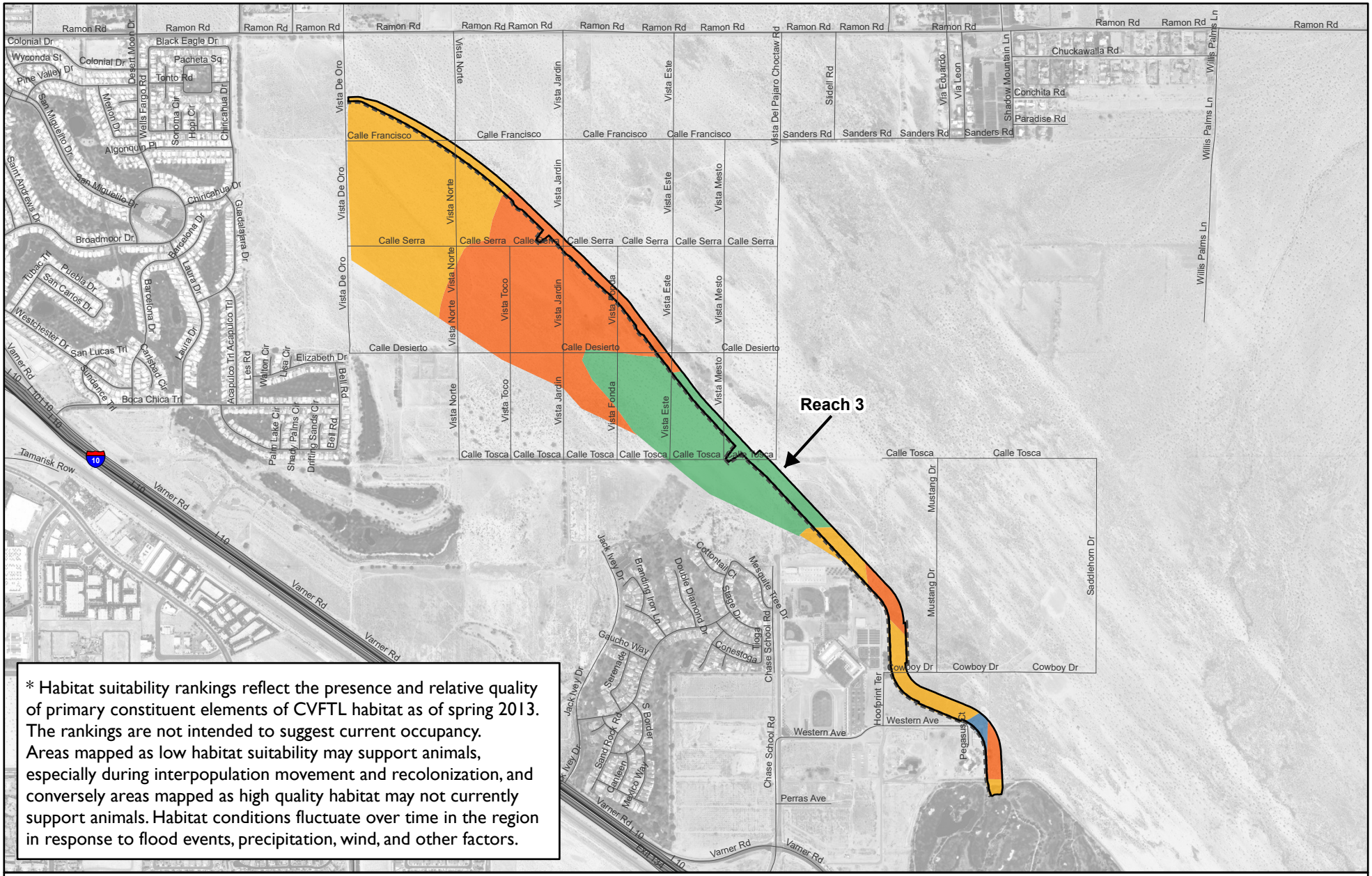


Figure 7b
Coachella Valley
Fringe-Toed Lizard Habitat
Reach 3 Alignment

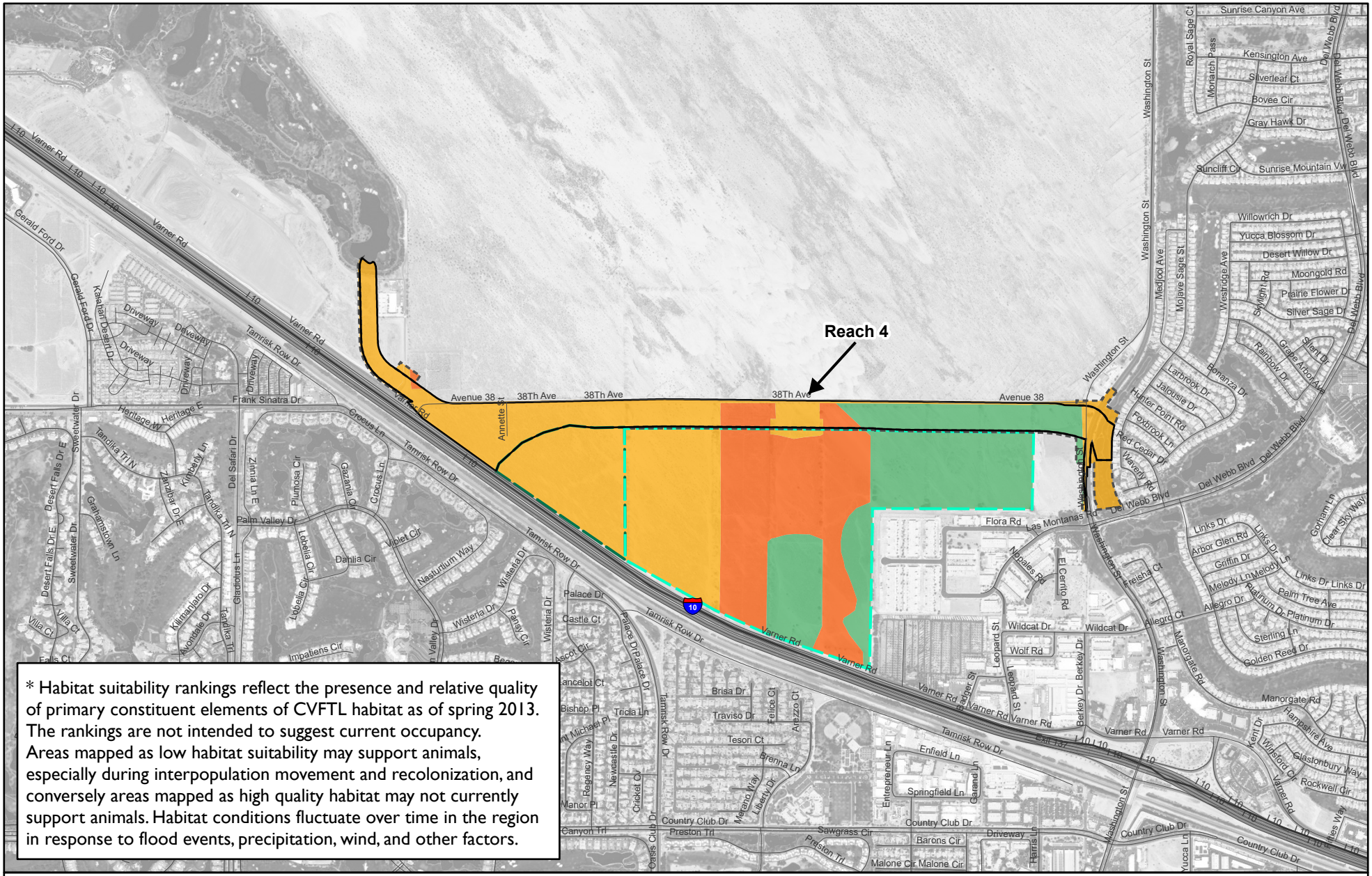


Figure 7c
Coachella Valley
Fringe-Toed Lizard Habitat
Reach 3 Alignment

Appendix A

Coachella Valley Conservation Commission Consistency Determination Letter

August 3, 2021

David Wilson
Engineering Project Manager
Coachella Valley Water District
75-519 Hovley Lane East
Palm Desert, CA 92211

RE: Consistency determination for CVCC 21-001 Thousand Palms Flood Control Project in the Thousand Palms Conservation Area[1]

Dear Mr. Wilson:

The Coachella Valley Conservation Commission (CVCC) has received your request for a consistency determination regarding the final alignment of the Coachella Valley Water District's (CVWD) Thousand Palms Flood Control Project (Project)[2] in the Thousand Palms Conservation Area (TPCA). The Project constitutes a Covered Project under Section 7.3.1 of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP or Plan); the take of any covered species has already been authorized through the issuance of the CVMSHCP permits and will not count against the conservation and take authorization tables for the Conservation Area as listed in section 4.3.11. The Project nonetheless warrants special consideration given the required measures pertaining to its construction and its effect on the Conservation Area. This consistency determination serves to document that those required measures are being met and to further ensure the Project complies with all relevant Avoidance, Minimization, and Mitigation measures and Land Use Adjacency Guidelines, as described in Plan sections 4.4 and 4.5, respectively.

The TPCA constitutes the largest unfragmented habitat area on the valley floor. It encompasses the former Coachella Valley Fringe Toed Lizard Preserve, the sand source in the Indio Hills, and key desert riparian and sand-dependent habitat. In addition, it serves as a key sand source within the Valley, and a sand transport corridor for sand generated in the Little San Bernardino Mountains. The TPCA, along with the West Deception Canyon Conservation Area and Indio Hills/Joshua Tree National Park Linkage Conservation Area, provides an almost uninterrupted corridor into the protected habitat in Joshua Tree National Park and beyond. It contains core habitat for Coachella Valley fringe-toed lizard, flat-tailed horn lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Alongside neighboring Conservation Areas, it contains enough core habitat for Mecca aster to support a self-sustaining population. The desert fan palm oasis woodlands provide the largest concentration of habitat for the southern yellow bat in the CVMSHCP area.

[1] This revised version updates and replaces the original analysis submitted on July 13, 2021.
[2] The Project was formerly referred to as the Whitewater River Flood Control Project throughout the CVMSHCP.

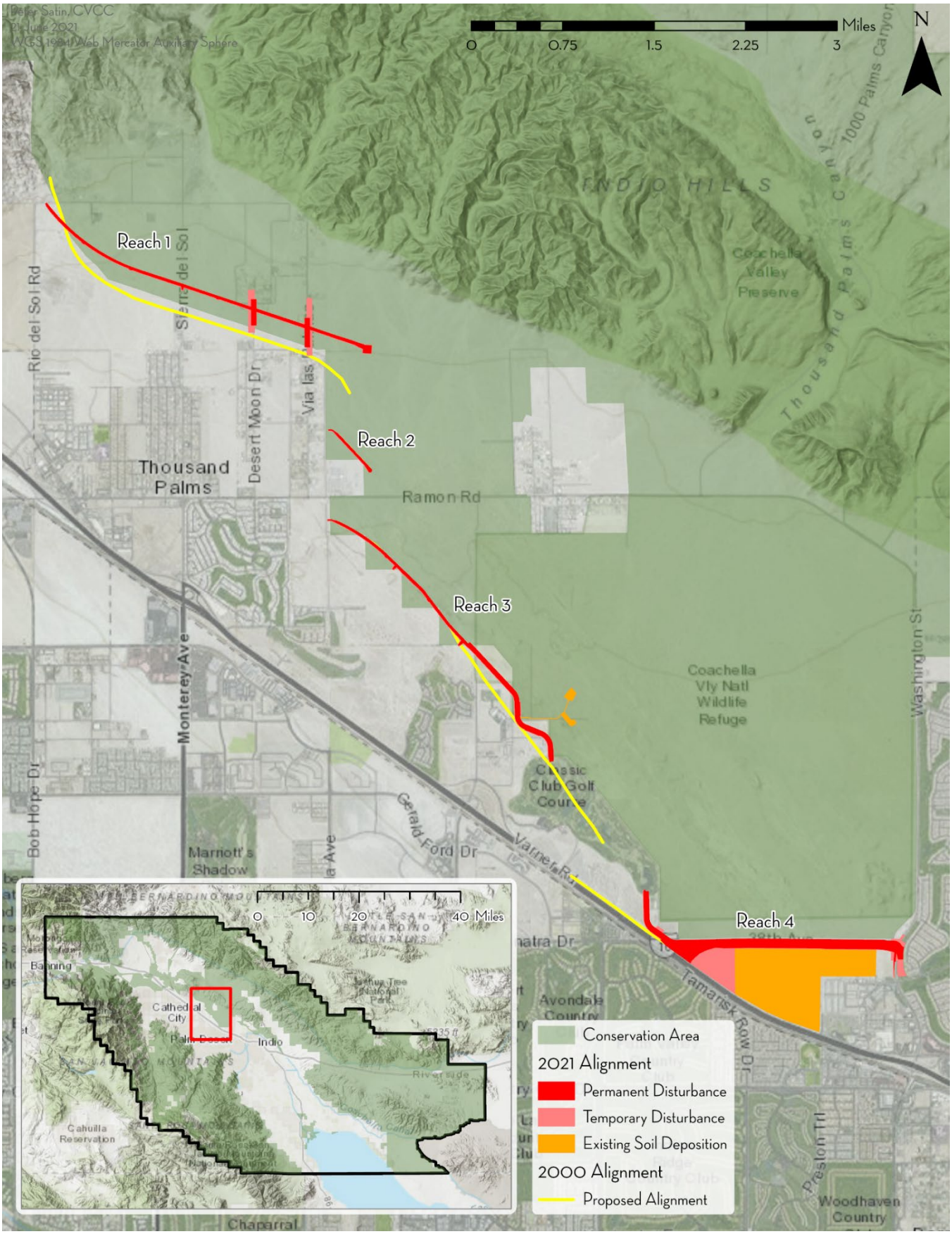


Figure 1: Thousand Palms Flood Control Project alignments in the Thousand Palms Conservation Area.

The CVMSHCP has contemplated the construction of the Project since its inception, noting that it would help direct fluvial-borne sand within the TPCA such that aeolian sand transport processes could transport it downwind. At the time of the Plan's implementation, the final Project design had not been determined, but it was acknowledged that the final alignment "may cause a minor adjustment of the Conservation Area boundary such that the levees will not be in the Conservation Area, but will define the edge of the area." CVWD has since finalized the levee's alignment (Figure 1), which has, in fact, shifted since the original TPCA boundary was drawn. It is therefore necessary to adjust the Conservation Area's boundaries accordingly and to adjust the Conservation Objectives, acres of authorized disturbance, and remaining acres to be conserved so as to reflect the reduced total area of the Conservation Area.

The Project alignment as approved in the 2000 Environmental Initial Study/Environmental Impact Report considered each of the four reaches, but was developed prior to the expansion of both regional electrical utility corridors and urban development[3]. As originally considered, Reach 1 would be located in what is now the right-of-way for the Southern California Edison Devers-Palo Verde 500-kV No. 2 Transmission Line project, and Reach 3 would be situated on lands now occupied by Xavier High School. For these reasons, CVWD has proposed relocating Reach 1 into the existing TPCA boundary, as well as shifting Reach 3 further east, away from established development. CVCC utilized the revised 2021 alignment to draw a new boundary and calculate new acreage totals.

To determine the new TPCA boundary, CVCC first assessed how the Conservation Area's existing boundary would shift under both the 2000 alignment and the 2021 alignment. A 50-foot buffer was drawn around each alignment, and the boundary was re-drawn such that the TPCA was immediately adjacent to the buffered northeastern face of the levee. Any portion south and west of either alignment was excised from the total area. In cases where the alignments did not completely bisect the existing boundary, a shortest-distance straight line to that boundary was used to demarcate the new boundary. Under both alignments, portions of the original TPCA boundary beneath Reaches 2 and 3 are removed, while the 2021 alignment further removes an additional portion under Reach 1 (Figure 2). Reach 4 did not impact the boundary alignment under either scenario. The total acreage for both was then summed and compared to confirm that the 2021 alignment constituted only a minor adjustment from the 2000 alignment, in accordance with the CVMSHCP (Table 1). The 2021 alignment results in an additional 183 acres (0.70%) removed from the TPCA as compared to the 2000 alignment. The boundary areas not impacted by the levees remain unchanged (Figure 3).

Table 1: Gross acreage comparison among the original Thousand Palms Conservation Area boundary, the 2000 levee alignment boundary, and the 2021 levee alignment boundary.

	Total Acreage	*Difference from original (ac)*	*Difference from original (%)*
Original boundary	25,900	-	-
2000 alignment boundary	25,782	-118	-0.46
2021 alignment boundary	25,599	-301	-1.16

[3] This paragraph has been revised at the request of CVWD to clarify the need for deviation from the 2000 alignment.

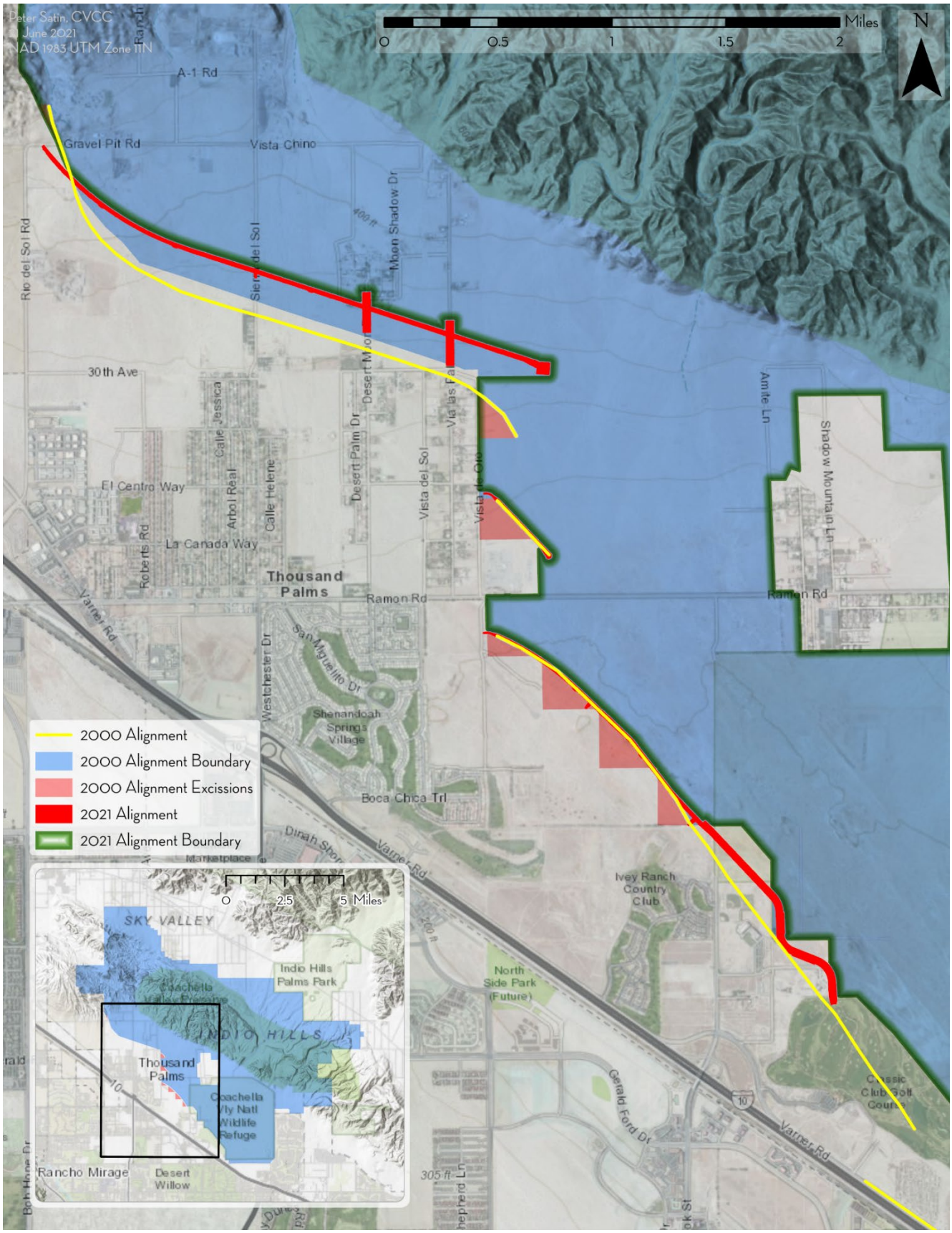


Figure 2: Comparing the boundary adjustments under each alignment. The area under Reaches 2 and 3 is removed in both cases, while the area removed in Reach 1 expands under the 2021 alignment.

In revising Conservation Objectives, acres of authorized disturbance, and acres of remaining habitat, CVCC used 1996 property ownership as a baseline to determine available land under the new TPCA alignment. From that remaining acreage, CVCC applied a 9:1 ratio of conservation of available habitat to authorized disturbance for each of the Covered Species. Finally, the proportion of Conservation Objective minimums to available habitat under the original boundary was calculated to determine revised minimum Conservation Objectives (Table 2). This process corrected certain instances where the original conservation to disturbance ratio was less than 9:1, and where some Conservation Objectives required more conservation than was actually available.

Even after adjusting the Conservation Area boundary, portions of Reach 1 located in Sections 7 and 8, Township 4 South, Range 6 East, and running through parcels designated as Rural Residential by the County of Riverside, may be subject to specific Site Planning Standards as described in section 4.3.11. CVWD has indicated that, in acquiring the necessary property to construct the Project, parcels will be subdivided so as to utilize only the minimum portion of the original parcel required for the Project footprint, located outside the TPCA. The remaining portion within the adjusted TPCA boundary will be available for other uses and shall continue to be subject to the Site Planning Standards.

Section 5.2.1.4 of the CVSHCP requires CVWD to acquire 550 acres of conservation land within the TPCA floodway to mitigate for the Project, and further that CVWD make a contribution to the CVMSHCP endowment fund sufficient to cover the long-term cost of management and monitoring of these lands[4]. It is CVCC's understanding that CVWD has identified these acres, and their acquisition and protection will take place concurrent with the acquisition of land for the Project footprint. Should any portion of the 550 acres remain unprotected at the initiation of Project ground disturbance, CVCC recommends CVWD prepare an acquisition plan outlining the remaining parcels to be acquired and the timeline projected for their acquisition. CVCC encourages early consultation and coordination to ensure this requirement is met. CVCC acknowledges that CVWD has already met its financial obligation under the CVMSHCP.

While the TPCA's boundary has been adjusted to exclude entirely the permanent disturbance caused by the levees, portions of the Project, especially along Reach 1, will involve temporary impacts to the Conservation Area, and are therefore subject to the CVMSHCP's Avoidance, Minimization, and Mitigation requirements as described in section 4.4. Specific attention shall be paid to those measures pertaining to biological corridors, burrowing owl, sand transport, Le Conte's thrasher, Palm Springs pocket mouse, and Coachella Valley round-tailed ground squirrel. Furthermore, the Project's immediate proximity to the TPCA necessitates the implementation of any and all relevant Land Use Adjacency Guidelines detailed in section 4.5.

CVCC has determined that the Project as proposed by CVWD is consistent with the CVMSHCP Conservation Objectives for the Thousand Palms Conservation Area. The 2021 alignment constitutes only a minor adjustment from the originally contemplated 2000 alignment. Parcels subject to Site Planning Standards will be subdivided such that portions remaining within the TPCA will still be available for conservation and/or development consistent with CVMSHCP requirements. The 550 acres of mitigation have been identified and will be protected during the

[4] This contribution is included as part of CVWD's total endowment contribution of $3,583,400.

land acquisition phase of the Project, while the funding of the long-term management of these acres has already been fulfilled. The Project represents a net benefit to conservation in the TPCA. The levees will serve to retain sand within the system which would otherwise be transported outside the conservation area. Loss of this sand would put the long-term sustainability of the sand dune ecosystem in the TPCA at risk. Acquisition of 550 acres will ensure that sand source and habitat areas are permanently conserved. The Project's overall consistency with the CVMSHCP is predicated on its meeting the above requirements; should CVCC determine at any point that the Project has failed to implement any of the required measures discussed above, it reserves the right to revoke this consistency determination.

Please do not hesitate to reach out to me if you have any questions regarding this analysis, either by phone at 760.346.1127 or by email at psatin@cvag.org.

Sincerely,

Peter Satin
Regional Planner

CC: William Patterson, CVWD
Steve Bigley, CVWD
Carrie Oliphant, CVWD
Heather Pert, CDFW
Carly Beck, CDFW
Jenness McBride, USFWS
Alicia Thomas, USFWS
Katie Barrows, CVCC

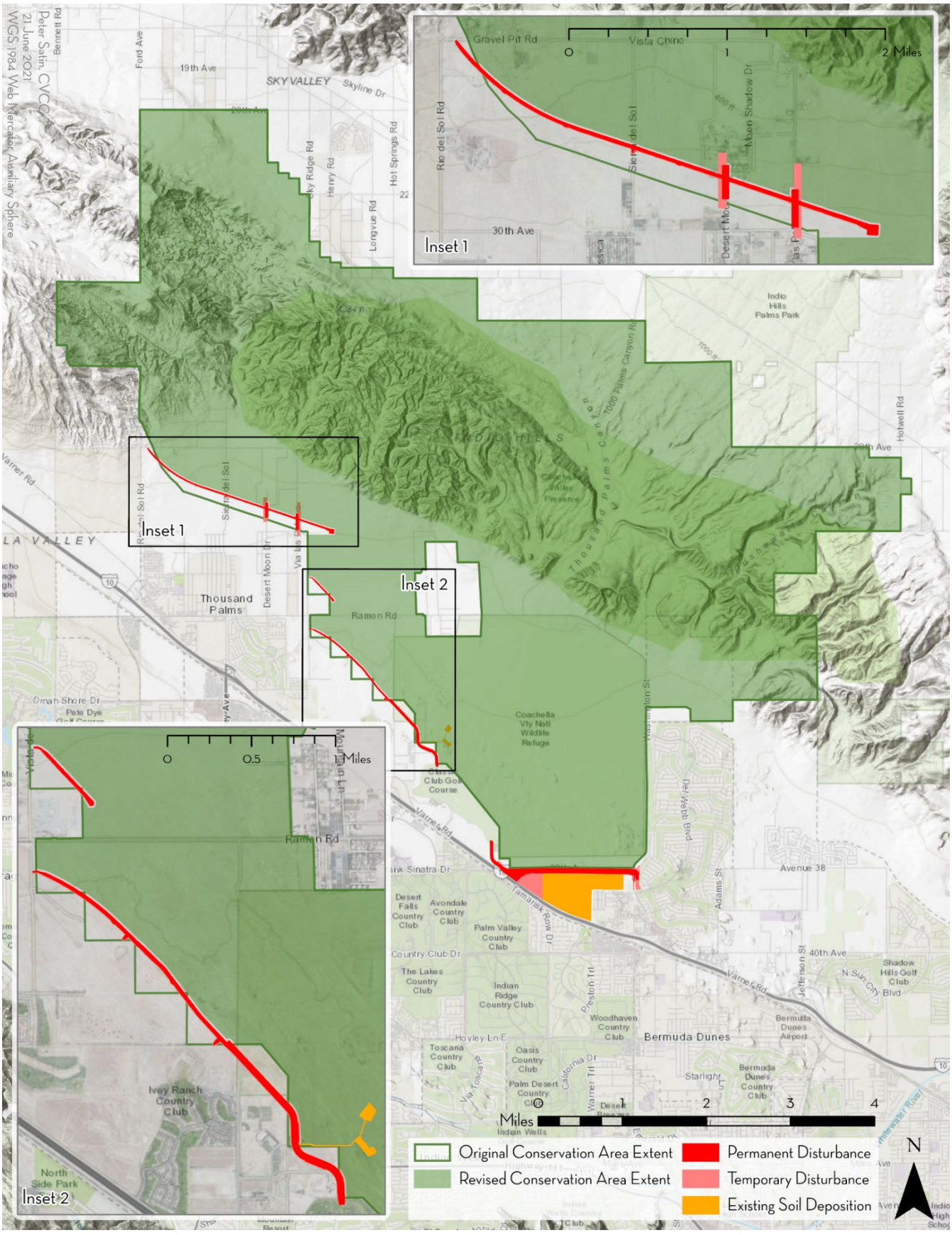


Figure 3: Revised Thousand Palms Conservation Area boundary under the 2021 alignment of the Thousand Palms Flood Control project.

Table 2: Revised acreage totals for authorized disturbance, remaining conservation to be acquired, and Conservation Objectives for the Thousand Palms Conservation Area.

Conservation Objective	Total Acres in Conservation Area	Acres of Existing Conservation Lands	Acres of Disturbance Authorized	Remaining Acres to be Conserved	Conservation Objective Minimum
Conserve Core Habitat for CV Milkvetch	4,322	3,285	104	933	919
Conserve Core Habitat for Mecca aster	11,763	8,776	299	2,688	2,688
Conserve Core Habitat for CV giant sand-treader cricket	3,860	3,029	83	748	733
Conserve refugium locations for desert pupfish	($15m^2$)	($15m^2$)	N/A	0	N/A
Conserve Core Habitat for CV fringe-toed lizard	3,860	3,029	83	748	733
Conserve Core Habitat for flat-tailed horned lizard (predicted)	4,046	3,167	88	791	776
Conserve Other Cons. Habitat for Le Conte's thrasher	10,848	6,626	422	3,800	3,785
Conserve Core Habitat for CV round-tailed ground squirrel	8,391	5,065	333	2,993	2,977
Conserve Core Habitat for Palm Springs pocket mouse	11,530	7,598	393	3,539	3,523
Conserve active desert dunes	420	403	2	15	15
Conserve active desert sand fields	3,443	2,627	82	734	720
Conserve mesquite hummocks	57	57	0	0	N/A
Conserve Sonoran cottonwood-willow riparian forest	4	4	0	0	N/A
Conserve desert dry wash woodland	748	710	4	34	34
Conserve desert fan palm oasis woodland	136	136	0	0	N/A
Conserve sand source areas	13,137	8,937	420	3,780	3,780
Conserve fluvial & aeolian sand transport areas	12,429	7,847	458	4,124	4,124
Conserve Linkages	25,554	16,784	877	7,893	0

C.4 404(b)(1)Analysis

THOUSAND PALMS FLOOD CONTROL PROJECT:
Draft Section 404(b)(1) Alternatives Analysis

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Appendix A Impacts to Waters of the U.S.
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1.0 Introduction

The Coachella Valley Water District (CVWD) proposes to construct and operate the Thousand Palms Flood Control Project (proposed Project), formerly known as the Whitewater River Basin Flood Control Project. The proposed Project consists of a series of flood control improvements designed to provide the maximum flood protection for developed and planned development areas in Thousand Palms and the vicinity to meet the Federal Emergency Management Agency (FEMA) 0.01 chance, or 100-year, flood event. The need for flood control has increased substantially in recent years due to continued growth and development in the Coachella Valley. The proposed Project is also designed to support continued aeolian (wind-driven) transport of sand to the Coachella Valley Preserve (or Preserve), where it forms habitat for the sensitive Coachella Valley fringe-toed lizard (CVFTL) (*Uma inornata*) (State-listed as endangered and federally listed as threatened). The proposed Project is linear in nature and is generally located on the northern and eastern margins of the community of Thousand Palms. Components of the proposed Project include levees, channels, culverts, and a sediment basin. The levees and channels would be comprised of compacted native soil with a layer of soil cement to protect the structures from erosion.

The U.S. Army Corps of Engineers (Corps) previously partnered with CVWD on this Project via the Corp's Civil Works Program; however, the Corp's involvement under this program terminated over 10 years ago. The current proposed action is a modified version of that Project. The Corps is now evaluating an application by CVWD for a Section 404 Clean Water Act permit that would allow CVWD to place dredged or fill material within waters of the United States (waters of the U.S.) as part of constructing this Project. This 404(b)(1) analysis is a required component of the permit review process and assesses alternatives from a Clean Water Act perspective in support of the Corps' permitting decision.

This Section 404(b)(1) Analysis considers the impacts to the aquatic environment resulting from construction and implementation of CVWD's preferred alternative as well as other alternatives that were considered during the alternatives formulation process and evaluated in the Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) for the proposed Project (CVWD/USACE 2020).

1.1 Project Background

In 2000, CVWD and Corps Planning prepared a Feasibility Report and Final EIS/EIR for the Whitewater River Basin Flood Control Project, with Corps Planning functioning as the Federal Lead Agency under NEPA and CVWD functioning as the CEQA Lead Agency. Corps Planning is no longer involved in the Project, and Corps Regulatory is currently functioning as the NEPA Lead Agency. The 2000 Final EIS/EIR determined that Alternative 6 was the Preferred Alternative based on the proposed action of providing sufficient flood control and environmental protection, avoiding disruption to aeolian (wind-driven) sand transport through the wind corridor, and could be designed to provide recreational opportunities in the form of equestrian and hiking trails along levee rights-of-way. Alternative 6 consisted of four earthen levees (no channels or detention basins) protected with soil cement west of Del Webb and included the purchase of 550 acres of floodway. However, due to funding restrictions the action was never implemented or constructed.

In 2011, Corps Planning initiated a revised project description to address development built in the Project area. Specifically, since finalization of the 2000 EIS/EIR, residential, institution, and recreational development has substantially expanded throughout the Project area (increasing the need for flood control).

The 2011 analysis was referred to as a Preliminary Draft Supplemental Environmental Assessment (SEA) and Mitigated Negative Declaration (MND). As a supplemental analysis, the Preliminary Draft SEA/MND tiered-

off the Final EIS/EIR, and characterized potential impacts of the Project, or "Proposed Action," in terms of how they would differ from impacts of Alternative 6, as characterized in the 2000 Final EIS/EIR. Each environmental issue area section in the Preliminary Draft SEA/MND discussed how impacts of the Proposed Action and alternatives would be the same or different from those discussed in the 2000 Final EIS/EIR and identified any new impacts that would be introduced as well as any previously identified impacts that would be avoided.

Due to federal funding restrictions, the design of the Project never progressed far enough to publish or finalize the 2011 SEA/MND, which remained in the "Preliminary Draft" phase. Therefore, the 2011 SEA/MND was considered an internal planning document and was not used to make any decision on the Project. Meanwhile, CVWD decided it was necessary to move forward with the design and construction of the Project to address the persisting flood hazard issues in the Thousand Palms area.

In early 2012, Corps Planning signed over authority of design of the Project to the CVWD, which is functioning as the CEQA Lead Agency for this EIR/EIS. Corps Regulatory now serves as the NEPA Lead Agency in preparation of this EIR/EIS, which will be used to support the Corps' decision-making process for the Section 404 Clean Water Act permit.

1.2 Section 404(b)(1) Regulatory Background

The goal of the Clean Water Act (CWA) Section 404(b)(1) Guidelines (Guidelines) developed by the U.S. Environmental Protection Agency (USEPA) is "to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged of fill material" [40 CFR (Code of Federal Regulations) § 230.1(a). The regulations set forth in 40 CFR Section 230 are the substantive criteria issued by the USEPA, used in evaluating discharges of dredged or fill material into waters of the U.S. The Guidelines provide regulations outlining measures to avoid, minimize, and compensate for impacts. The Guidelines impose four restrictions which must be satisfied in order to make a finding that a proposed discharge of dredged or fill material complies with the Guidelines [40 CFR § 230.10]. The Guidelines generally state that no discharge of dredged or fill material shall be permitted if:

1) *There is a practicable alternative to the proposed discharge which would have less adverse impacts on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.*
2) *The discharge would:*
    a. *Cause or contribute, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard.*
    b. *Violate any applicable toxic effluent standard or prohibition under Section 307 of the CWA.*
    c. *Jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or result in the likelihood of the destruction or adverse modification of a habitat which is determined by the Secretary of the Interior or Commerce, as appropriate, to be a critical habitat under the Endangered Species Act of 1973, as amended; or*
    d. *Violate any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.*

3) *The discharge would cause or contribute to significant degradation of waters of the US. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by the subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in the subparts.*
4) *And, unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.*

Under 40 CFR Section 230, an alternative is practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose".

If the proposed Project would involve a discharge into a special aquatic site, such as a wetland, the Guidelines distinguish between those projects that are water dependent and those that are not. A water dependent project is one that requires access or proximity to, or siting within, a special aquatic site to achieve its basic purpose, such as a marina. A non-water dependent project does not exhibit the same requirements, such as a housing development or wind farm.

The Guidelines establish two presumptions for non-water dependent projects that propose a discharge or a fill into a special aquatic site. First, it is presumed that there are practicable alternatives to non-water projects, "unless clearly demonstrated otherwise" [40 CFR § 230.10(a)(3)]. Second, "where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impacts on the aquatic ecosystem, unless clearly demonstrated otherwise" [40 CFR § 230.10(a)(3)]. The intent of the Guidelines is that Applicants should design proposed projects to meet the overall project purpose while avoiding and minimizing impacts to the aquatic environment.

The Corps must evaluate alternatives that are practicable and reasonable. The Guidelines state "a permit cannot be issued if a practicable alternative exists that would have less adverse impact on the aquatic ecosystem (known as the Least Environmentally Damaging Practicable Alternative [LEDPA]), provided that the LEDPA does not have other significant adverse environmental consequences to other natural ecosystem components [40 CFR 230.10(a)].

In addition to requiring the identification of the LEDPA, the Guidelines mandate that no discharge of dredged or fill material shall be permitted if it causes or contributes to violations of any applicable State water quality standard [40 CFR § 230.10(b)(1)], violates any applicable toxic effluent standard or prohibition [40 CFR § 230.10(b)(2)], jeopardizes the continued existence of any endangered or threatened species (or destroys or adversely modifies critical habitat) [40 CFR § 230.10(b)(3)], or causes or contributes to significant degradation of waters of the U.S. [40 CFR § 230.10(c)].

1.3 Basic and Overall Project Purpose

1.3.1 Basic Project Purpose and Water Dependency Determination

The basic project purpose comprises the fundamental, essential, or irreducible purpose of the project, and is used by the Corps to determine if the project is water dependent. If a project is not water dependent, practicable alternatives that do not involve a discharge of fill into special aquatic sites are presumed to be available, unless clearly demonstrated otherwise. The basic project purpose for the proposed Project is "flood protection", which is not water dependent. The discharge of fill material is not proposed to occur in any special aquatic sites in the proposed Project area. Therefore, the presumption

that practicable alternative sites or designs that do not affect special aquatic sites are available does not apply to this assessment.

1.3.2 Overall Project Purpose

The overall project purpose serves as the basis for the 404(b)(1) alternatives analysis and is determined by further refining the basic project purpose in a manner that more specifically describes the applicant's goals for the Project and which allows a reasonable range of alternatives to be analyzed. The overall purpose for the proposed Project is to provide flood hazard protection to the maximum number of developed and planned development areas located within the FEMA-designated flood hazard zone in the Thousand Palms area while avoiding and minimizing adverse effects to wildlife and habitat and enhancing aeolian sand transport within the Coachella Valley Preserve.

1.4 Proposed Project Location

The Project is in the Thousand Palms area of the Coachella Valley in Riverside County, California. The unincorporated community of Thousand Palms is about ten miles east of the City of Palm Springs and immediately north of the City of Palm Desert (see Figure 1-1). Portions of the Coachella Valley are urbanized, with most development along the southern edge of the valley from the City of Palm Springs in the northwest to the Cities of Indio, Coachella, and La Quinta in the southeast. The only incorporated city on the north side of the Coachella Valley is the City of Desert Hot Springs, located north of Palm Springs (USACE, 2000).

The Coachella Valley is defined by the San Jacinto and Santa Rosa Mountains to the southwest and the Little San Bernardino Mountains to the north and northeast. The Coachella Valley slopes gradually from the San Gorgonio Pass toward the Salton Sea for approximately 40 miles. The Whitewater River is the main drainage course in the Coachella Valley, originating on the southern slopes of the San Bernardino Mountains and flowing in a southeasterly direction through the valley to the Salton Sea (USACE, 2000). The Coachella Valley is within the Colorado Desert (a subdivision of the larger Sonoran Desert) and the climate is hot and dry. Annual rainfall averages four inches but varies by location and from year to year. Common habitat types in the Coachella Valley include, but are not limited to, creosote bush scrub, desert saltbush scrub, desert wash, sand dunes and sand fields (CVAG, 2007).

Regional elevations range from about 30 feet above mean sea level (AMSL) near Indio to 1,614 feet AMSL at Edom Hill near the northwestern end of the Indio Hills. Elevations within the proposed Project area range from approximately 100 to 400 feet AMSL. Two segments of the San Andreas Fault are in the area. These include the Mission Creek Fault along the north edge of the Indio Hills and the Banning Fault along the south edge of the Indio Hills (USACE, 2000).

The Coachella Valley is influenced by infrequent seasonal heavy rains, and prevalent northwest winds (SLA, 1997). During rain events, sand and sediment is carried by flowing water (fluvial transport) from the surrounding hills and mountains and deposited in the Coachella Valley. The sand that has been introduced through fluvial deposition is often carried by the wind (aeolian transport) and deposited toward the southeast, throughout the valley. Sand that has been subject to aeolian transport is often referred to as blowsand, which is generally very fine sand that creates a loose and destabilized surface (SLA, 1996). The combined effect of the fluvial and aeolian transport of sand creates a series of sand formations that form dynamic and continuously altering environments. These sand formations include hummocks (mounds), dunes, and sandy plains. Many plant and wildlife species in the Coachella Valley are uniquely adapted to this type of habitat.

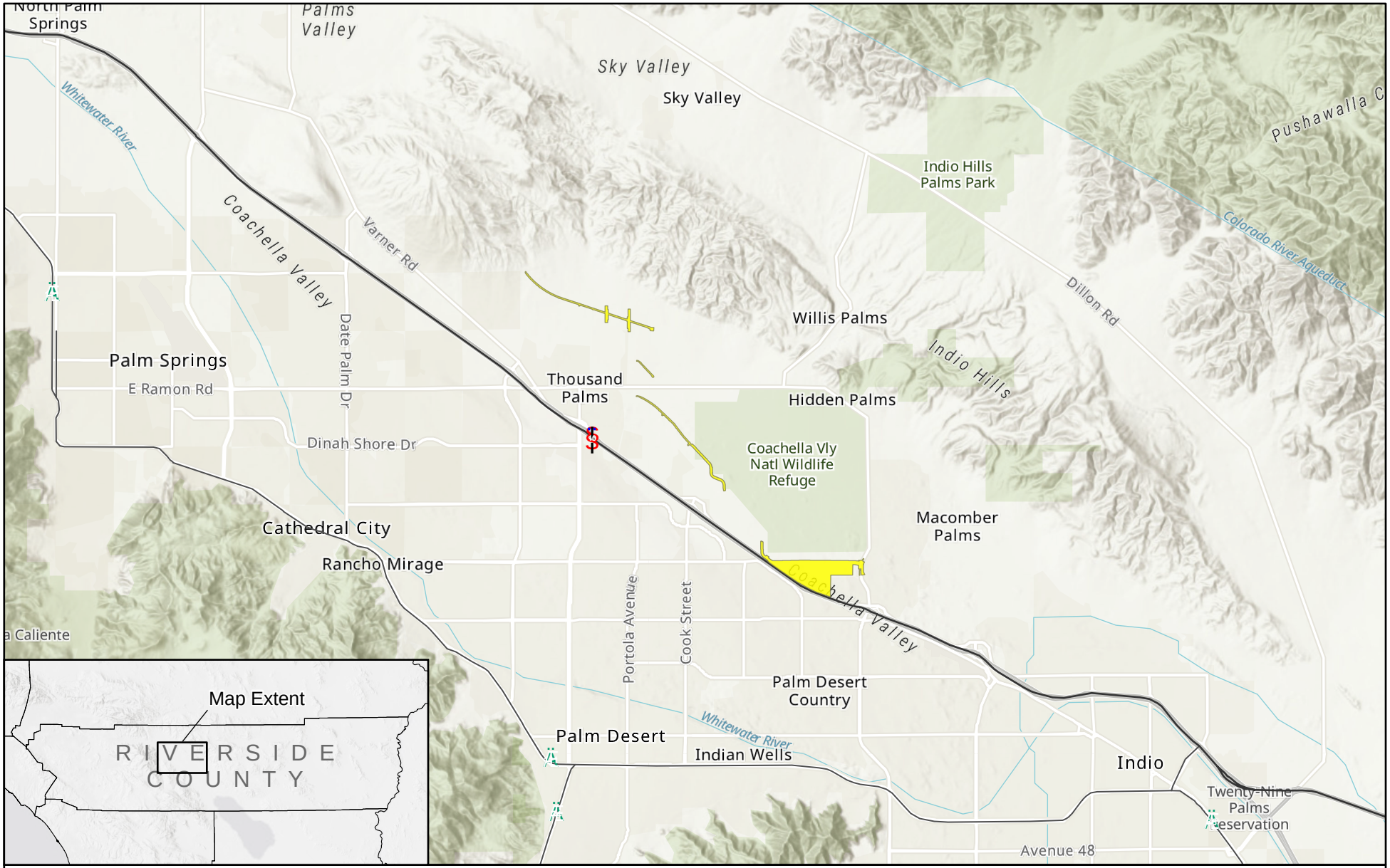


Figure 1-1

Proposed Project Vicinity

There are four main sand transport systems in the Coachella Valley that maintain blowsand habitat. These include the Thousand Palms, Whitewater Floodplain, Willow Hole, and Snow Creek systems. Each system is composed of sand source areas, fluvial transport zones, fluvial deposition/aeolian erosion areas, wind transport corridors, and aeolian sand deposition areas. The proposed Project area is located within the Thousand Palms system. Sand erodes from canyons and hillsides and is deposited onto alluvial plains. Strong winds blow through the Coachella Valley from the west and pick up the sand particles. Shrubs, structures, and topographic features slow the winds near the ground surface and the sand particles drop out and accumulate into dunes and hummocks.

Sand dunes increase and decrease over time, depending on the amount of sand being deposited and eroded by the wind. If upwind sources of sand are reduced or eliminated, wind deposition of sand will be insufficient to replace sand lost by wind erosion and dunes and hummocks will become depleted. This results in degradation or loss of suitable habitat for the CVFTL and other sand-dependent species. Maintenance of blowsand processes is therefore essential to sustaining habitat for these species.

The proposed Project area also lies within the area covered by the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (CVMSHCP/NCCP) and partly within the Thousand Palms Conservation Area as identified in the CVMSHCP/NCCP.

2.0 Formulation of Project Alternatives

This section describes the alternatives formulation process that was used to develop an array of alternatives for screening from a Clean Water Act permitting perspective under the 404(b)(1) guidelines. The alternatives screened for the 404(B)(1) analysis generally parallel the screening that has been done previously by the Corps and CVWD as part of the overall project development history. The alternatives described below are screened under the 404(b)(1) guidelines in later sections of this analysis.

2.1 Alternatives Formulation Background

Flooding and related problems in the Whitewater River Basin, including Coachella Valley, have been intermittently studied by the Corps Planning Division (Los Angeles District) since the Flood Control Act of 1937 authorized a survey for flood control in the entire area of the Whitewater River. A reconnaissance phase for the proposed Project was completed in 1992. During that phase, the Corps investigated flood-related problems along the entire reach of the Whitewater River and determined that a federal interest existed relating to the provision of flood protection in the Thousand Palms area.

The Corps certified the Reconnaissance Report in October of 1993, giving the Los Angeles District authority to move into the feasibility phase. The purpose of the feasibility phase was to describe and evaluate alternative plans for flood protection in the Project area and to select a preferred alternative.

In 2000, CVWD and the Corps prepared a Feasibility Report and Final EIS/EIR for the Whitewater River Basin Flood Control Project. The Feasibility Study and the subsequent concurring report from the Corps' Chief of Engineers determined that Alternative 6 was the Preferred Alternative based on the proposed flood control and environmental protection elements provided, including avoiding disruption to aeolian (wind-driven) sand transport through the wind corridor. Alternative 6 consisted of four earthen levees (no channels or detention basins) protected with soil cement along some of the levees and included the purchase of 550 acres of floodway. However, due to funding restrictions the action was never implemented or constructed.

In anticipation of the Project's eventual implementation, the Corps maintained coordination efforts with local land developers and regulatory agencies to ensure consistency of the Project with other projects in the area. Specifically, the Corps proceeded in coordination with Xavier College Preparatory High School, a portion of which would be traversed by Reach 3, and with the Berger Foundation regarding the Classic Club Golf Course, into which Reach 3 would direct stormwater flows.

In 2011, the Corps developed a revised project description to address development built in the Project area. Specifically, since finalization of the 2000 EIS/EIR, residential, institution, and recreational development has substantially expanded throughout the Project area, increasing the need for flood control.

The 2011 analysis was evaluated in a Preliminary Draft Supplemental Environmental Assessment (SEA) and Mitigated Negative Declaration (MND). As a supplemental analysis, the Preliminary Draft SEA/MND tiered-off the Final EIS/EIR, and characterized potential impacts of the Project, or Proposed Action, in terms of how they would differ from impacts of Alternative 6, as characterized in the 2000 Final EIS/EIR. Each environmental issue area section in the Preliminary Draft SEA/MND discussed how impacts of the Proposed Action and alternatives would be the same or different from those discussed in the 2000 Final EIS/EIR and identified any new impacts that would be introduced as well as any previously identified impacts that would be avoided.

Due to federal funding restrictions, the design of the Project never progressed far enough to publish or finalize the 2011 SEA/MND, which remained in the "Preliminary Draft" phase. Therefore, the 2011 SEA/MND was considered an internal planning document and was not used to make any decision on the Project. Meanwhile, CVWD decided it was necessary to move forward with the design and construction of the Project to address the persisting flood hazard issues in the Thousand Palms area without the Corps' active involvement in the project development process. The Corps' involvement shifted from a planning, design, and construction role for the Project to a regulatory role under the Clean Water Act.

The alternatives resulting from previous planning efforts to be screened under the 404(b)(1) guidelines include the following and are further described below.

Alternatives Evaluated in the 2021 EIR/EIS:

- Alternative 1 (Preferred Project)
- Alternative 2: Removal of Reach 2 Alignment
- Alternative 3: Modified Reach 3 Alignment-Option A
- Alternative 3: Modified Reach 3 Alignment-Option B
- No-Action Alternative

Previous Alternatives Considered:

- Previously Approved Project (1999 Feasibility Study)
- Complete Channelization Alternative
- I-10 Channel Alternative
- Detention Basins Alternative
- Reach 1 South of Utility Corridor Alternative
- Continuous Reach 1 Alternative
- Straight Reach 3 Alternative
- Reach 3 With Debris Basin
- Reach 3 Paralleling Classic Club Golf Course
- Reach 3 West of Xavier High School Alternative
- Reach 1 Culverts Alternative
- Non-Structural Alternative
- Off-site alternatives

2.2 Description of Alternatives Screened

The following describes the range of alternatives that were evaluated within this 404(b)(1) alternatives analysis. Each of the alternatives considered by CVWD are described below. In addition, information is provided for the initial high-level screening of the alternatives to determine whether there are any substantial issues associated with the alternative in question that warrant withdrawing the alternative from further screening. Table 2.1-1 provides an initial screening of the various alternatives that have been considered for analysis in this document. Alternatives were evaluated and considered based on several factors related to the purpose and need, practicability, available technology, and others. If the alternatives did not meet the screening criteria they were eliminated from further analysis.

Table 2.1-1. Alternative Screening Criteria

Alternative	Passes Initial Screening	Meets Project Purpose	Practicable-Logistics	Practicable-Available Technology	Practicable-Cost	Evaluate for LEDPA
Alternative Evaluated in the EIR/EIS						
Alternative 1 (Preferred Project)	Y	Y	Y	Y	Y	Y
Alternative 2: Removal of Reach 2 Alignment	N	N	Y	Y	Y	Y
Alternative 3: Modified Reach 3 Alignment – Option A	N	N	Y	Y	Y	N
Alternative 3: Modified Reach 3 Alignment – Option B	N	N	Y	Y	Y	N
No-Action Alternative	N	N	N	N	N	N
Other Alternatives						
Previously Approved Project (1999 Feasibility Study)	N	N	N	Y	N	N
Complete Channelization Alternative	N	N	N	Y	N	N
I-10 Channel Alternative	N	N	N	Y	N	N
Detention Basins Alternative	N	N	N	Y	Y	N
Reach 1 South of Utility Corridor Alternative	N	N	N	Y	N	N
Continuous Reach 1 Alternative	N	N	N	Y	N	N
Straight Reach 3 Alternative	N	N	N	Y	N	N
Reach 3 With Debris Basin	N	N	N	Y	N	N
Reach 3 Paralleling Classic Club Golf Course	N	N	N	Y	N	N
Reach 3 West of Xavier High School Alternative	N	N	N	Y	N	N
Reach 1 Culverts Alternative	N	N	N	N	N	N
Non-Structural Alternative	N	N	N	N	N	N
Off-site alternatives	N	N	N	N	N	N

2.2.1 Alternative 1 (Preferred Project)

Alternative 1 is comprised of four individual reaches that would tie into existing flood control features including the floodway at the Classic Club Golf Course and the existing channel in the Del Webb/Sun City residential development located on the east side of Washington Street (see Figure 2-1). Implementation of Alternative 1 would protect the most undeveloped and developed areas on the alluvial fan downstream of proposed Project features. Areas located above Reach 1 would remain subject to flooding from Long Canyon and Morongo Wash, including various industrial facilities (CalPortland cement plant, Desert Recycling Center), residences along the northernmost areas of Desert Moon drive and Via Las Palmas, and open undeveloped lands, including the Coachella Valley Preserve.

Alternative 1 includes levees, channels, culverts, and a sediment basin (at the end of Reach 1). Soils generated by the implementation of Alternative 1 would either be used to construct the levees or disposed of offsite. All levees would have an underground "toe" (levee toe) extending to a depth of approximately 15 feet. The top, upstream/northern sides and the toe of the levees would be covered with soil cement, while the southern/downstream side would be comprised of earthen materials (soil). Soil cement is a compacted high-density mix of pulverized native rocks and soils bonded with cement and water that is highly resistant to erosion while maintaining an earthen color. The channels would also be fully lined with soil cement to protect the structures during large flow events.

- **Reach 1.** Reach 1 (see Figure 2-2) is comprised of an approximately 12,700-foot long (2.4 miles) levee (Levee 1). Water and sediment from the Indio Hills would flow naturally toward Reach 1 and be diverted to the 550-acre floodway located at the terminus of Reach 1 (described below). The height of Levee 1 would vary from 5 feet to 14 feet depending on topography and ground slope and be designed to accommodate a 100-year flood event. A minimum 12-foot access (patrol) road would be constructed on the top of the levee and an unpaved access road would be located on the downstream (west side) of the levee to support operations and maintenance (O&M) activities. Levee 1 would range from 75 to 100 feet in width and initiate approximately 0.1 mile to the east of the intersection of 28th Avenue and Rio del Sol Road, on the south side of 28th Avenue, and extend in an east-southeasterly direction. The levee would generally run parallel and north of an existing Southern California Edison (SCE) utility corridor. Levee 1 would cross Sierra del Sol, Desert Moon Drive, and Via Las Palmas. Culverts and road crossings of the levee would be constructed at Desert Moon Drive and Via Las Palmas.

  The proposed alignment of Reach 1 would cross 37 non-residential properties and 7 residential properties. These properties would need to be obtained by the CVWD in order for this reach to be constructed. The limits of land acquisition depend on the percent of the parcel crossed by the final Project alignment and the temporary construction access needs. If the existing use of any parcel impacted by the proposed Project cannot be maintained, the entire parcel may be acquired.

  Sediment Basin. A sediment basin would be installed at the downstream end of Reach 1 in order to trap sediment, slow the velocity of stormwater flow across the Coachella Valley Preserve, and avoid adverse effects associated with erosion or channel migration (see Figure 2-2). The sediment basin would be approximately 2.1 acres in size and would consist of an excavated basin with riprap protection on the upstream side. The sediment basin would also induce deposition of fluvially-transported sediment on the wind corridor for natural transport onto the Preserve. Storm water directed by Reach 1 would flow through the sediment basin, overland in a southeast direction towards Reaches 2 and 3, described below.

  Road Crossing. Roads would be constructed over the Reach 1 levee at Via Las Palmas and at Desert Moon Drive to maintain access between the communities north and south of Levee 1. The road crossings would generally match the width of the existing roadways and be consistent with Riverside

County standards. The design speed is 35 miles per hour (mph) at Via Las Palmas and 25 mph at Desert Moon Drive. The road crossings are designed to have the smallest permanent footprint to minimize impacts to sand migration.

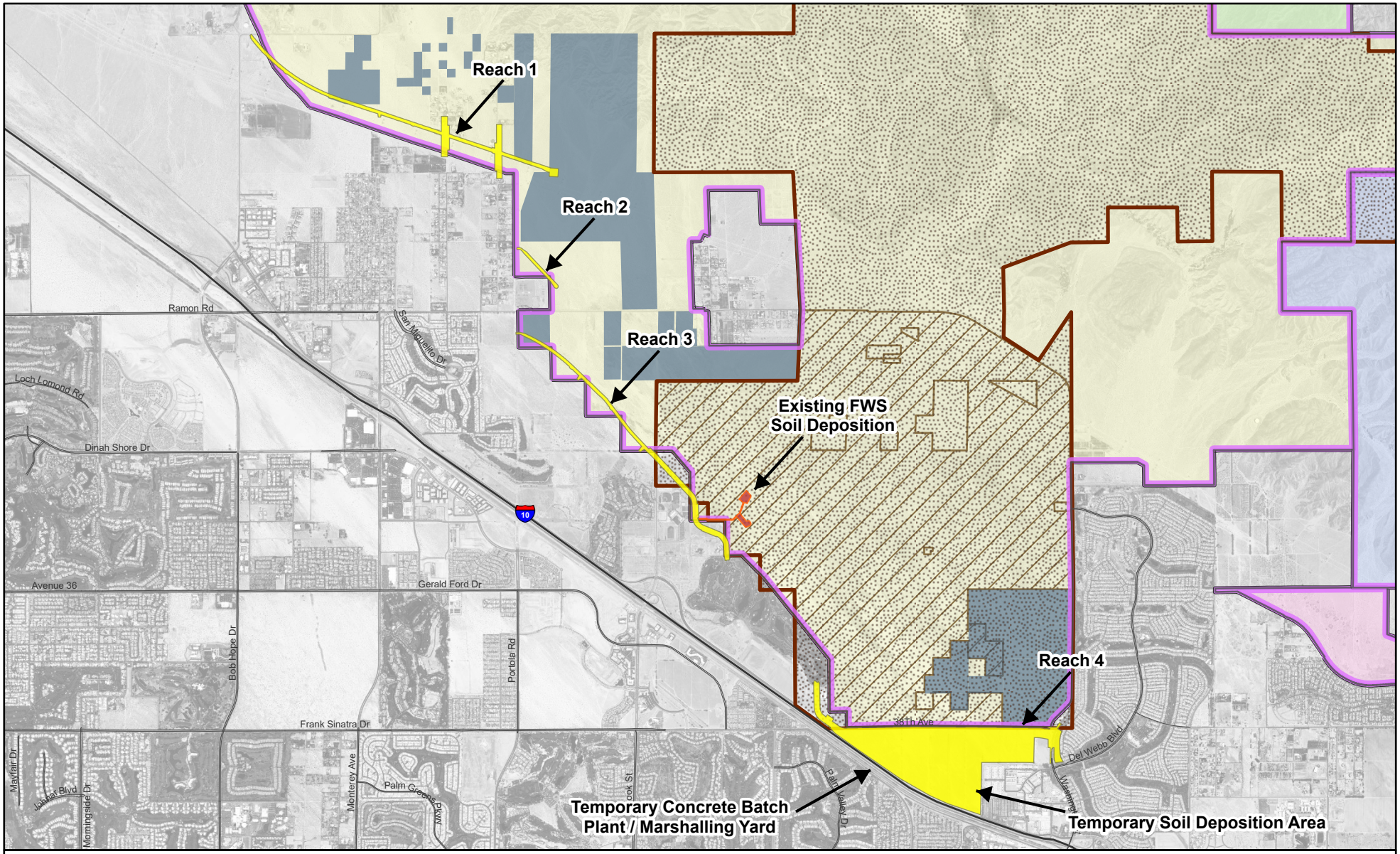


Figure 2-1

Preferred Project (Alternative 1) Alignment

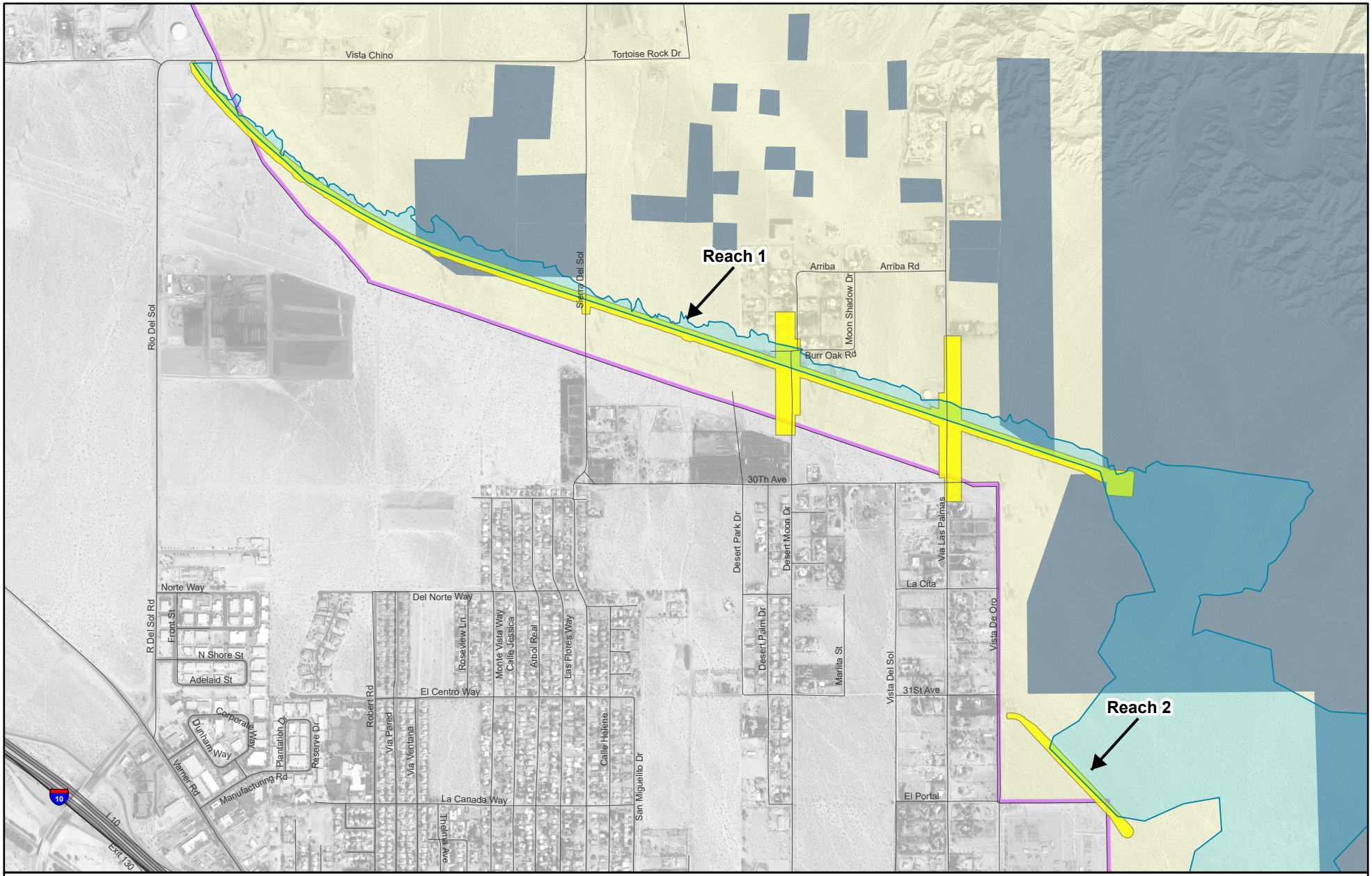


Figure 2-2

Alternative 1:
Reach 1 and 2 Alignment

Reservoir 4602. Reservoir 4602 is an existing above ground water tank owned and operated by CVWD. The reservoir is located west of Via Las Palmas and north of the proposed Reach 1 alignment. The reservoir is protected by a small berm with established vegetation and would be protected and maintained in-place during construction of the proposed Project. Additional flood protection may be provided in the future to ensure the integrity of the structure after the construction of Reach 1.

- **Reach 2.** Reach 2 (see Figure 2-2) is comprised of an approximately 1,700-foot long (0.32 mile) levee (Levee 2) with a height of approximately 5 feet. The levee would range from 12 to 135 feet in width and is positioned in the mid-alluvial fan just northeast of SCE's Mirage Substation to protect the substation and to facilitate the diversion of water in a southeasterly direction. A minimum 12-foot access (patrol) road would be constructed on the top of the levee and an unpaved access road would be located on the downstream (west side) of the levee to support O&M activities. Levee 2 is aligned in the direction of the prevailing wind to avoid interference with aeolian transport in this area. Reach 2 would capture large storm events from Reach 1 and direct flow towards Reach 3.

  The proposed alignment of Reach 2 would cross 3 non-residential properties. These properties would need to be obtained by the CVWD in order for this reach to be constructed. As noted above, the limits of land acquisition depend on the percent of the parcel crossed by the final Project alignment and the temporary construction access needs. If the existing use of any parcel impacted by the proposed Project cannot be maintained, the entire parcel may be acquired.

- **Reach 3.** Reach 3 (see Figure 2-3) is comprised of an approximately 6,500-foot long (1.2 miles) levee (Levee 3) and a 5,300-foot long (1.0 mile) incised trapezoidal channel lined with soil cement (Reach 3 Channel). A minimum 12-foot wide access road would be located on top of the levee and an unpaved access road would occur on the downstream (west side) of the levee. Levee 3 would vary from approximately 5 feet to 14 feet in height depending upon the topography and ground slope in order to accommodate the volume and velocity of water associated with the 100-year flood event. Levee 3 would range from 12 to 200 feet in width and initiate 1,000 feet south of East Ramon Road and approximately 2,000 feet southwest of the downstream end of Levee 2. Reach 3 would cross natural lands, private lands owned by Xavier College Preparatory High School, portions of the Coachella Valley Preserve/Coachella Valley National Wildlife Refuge (or Refuge), and the Pegasus Riding Academy. As noted above, the limits of land acquisition depend on the percent of the parcel crossed by the final Project alignment and the temporary construction access needs. If the existing use of any parcel impacted by the proposed Project cannot be maintained, the entire parcel may be acquired. Although not constructed, new residential developments have been proposed south of Reach 3; however, the proposed Project alignment is not expected to interfere with these developments should they occur.

  An existing earthen berm located approximately one-half mile north of Xavier High School would also be crossed by Reach 3. This berm would be crossed where the reach transitions from a levee to a channel configuration. At the terminus of Reach 3 the channel would divert flows into an existing storm water conveyance system located on the Classic Club Golf Course before connecting to Reach 4.

  The transition of Reach 3 to a channel configuration is intended to minimize land use conflicts with athletic fields located at Xavier College Preparatory High School and to minimize the disruption to aeolian sand transport patterns. The channel configuration would curve around the athletic fields, whereas a levee would need to maintain a straighter alignment through the high school property to maintain storm conveyance.

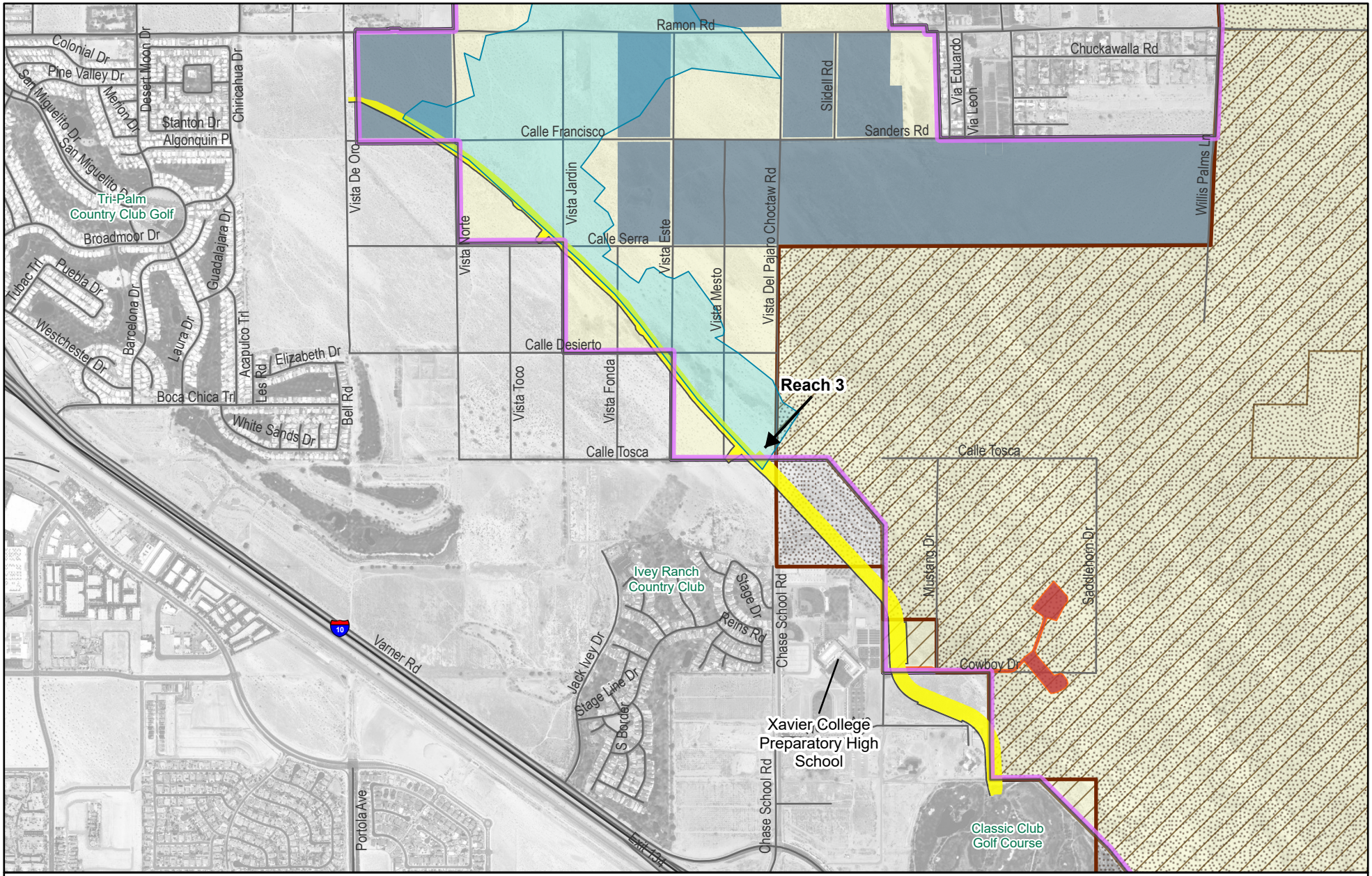


Figure 2-3

Alternative 1: Reach 3 Alignment

The curved channel configuration would minimize disruptions to sand migration onto the Preserve/ Refuge because, in comparison to a levee design, the channel would not create a vertical obstruction to sand migration (with the exception of a short length of Reach 3 Channel where the embankment would be approximately 3 feet high). Sand that blows into the channel or is deposited during storm events would be removed from the channel and placed on the active wind corridor for natural migration onto the Preserve/Refuge.

Storm flows leaving Reach 3 would flow into the existing stormwater conveyance system located within the Classic Club Golf Course.

- **Reach 4.** Reach 4 (see Figure 2-4) is comprised of an approximately 10,300-foot long (2.0-mile) incised trapezoidal channel (Reach 4 Channel). The Reach 4 Channel would range from 200 to 350 feet in width and convey stormwater flows from the southeast end of the Classic Club Golf Course and continue south then east, adjacent to the south of the existing alignment of Avenue 38. The channel would span a fallow jojoba farm and be immediately adjacent to the Preserve/Refuge. The Riverside County Board of Supervisors previously approved the realignment of Avenue 38 as a County project which would move Avenue 38 adjacent and south of the proposed Reach 4 Channel. Realignment of the road would now occur as a component of the proposed Project, where CVWD would build two of the four proposed lanes, including shoulders and gutters. The Reach 4 Channel would terminate at Washington Street and tie into existing stormwater conveyance facilities located in the Del Webb / Sun City development (see "Washington Street Crossing" discussion below).
- **Washington Street Crossing.** At Washington Street the proposed Project would include construction of a conveyance system to direct stormwater flows under Washington Street and into an existing stormwater conveyance system with the capacity to transmit Project-related flows (see Figure 2-4). The maximum area that could be affected by this crossing is estimated to be 5 acres, accounting for any road realignment that may be necessary. On the downstream side of the Washington Street crossing, an existing stormwater basin (Sun City Collection Basin) would be deepened (excavate approximately 9,000 cubic yards [CY]) to accommodate flows diverted by the proposed Project. This basin is currently landscaped and would be fully restored to conditions agreed to by the Sun City development following completion of the proposed Project. The southbound side of Washington Street, south of the realigned Avenue 38 and just north of Las Montanas Road/Del Webb Blvd., where the current road is three lanes (one southbound and two northbound), would be widened as part of the proposed Project to make it easier to turn on and off of the relocated Avenue 38.
- **Floodway.** The proposed Project includes acquisition of an approximate 550-acre floodway located along the levees and in the active wind corridor between Reach 1 and Reach 3 (see Figure 1-3). Development would be prohibited in this floodway to protect the wind corridor and limit disruptions to sand migration. Drainages located within the floodway would be preserved and would receive additional flow as larger storm events convey flow along the floodway. In addition, it is likely that new channels will form within this area as flows coalesce on the face of the levee and convey flow to downstream areas. During O&M of the proposed Project suitable material (e.g., fine sands) that accumulate along the levees and channels would be excavated and distributed in the floodway area for natural distribution onto the Preserve or placed in the proposed U.S. Fish and Wildlife Service (USFWS) sediment disposal area (see Figure 2-5).

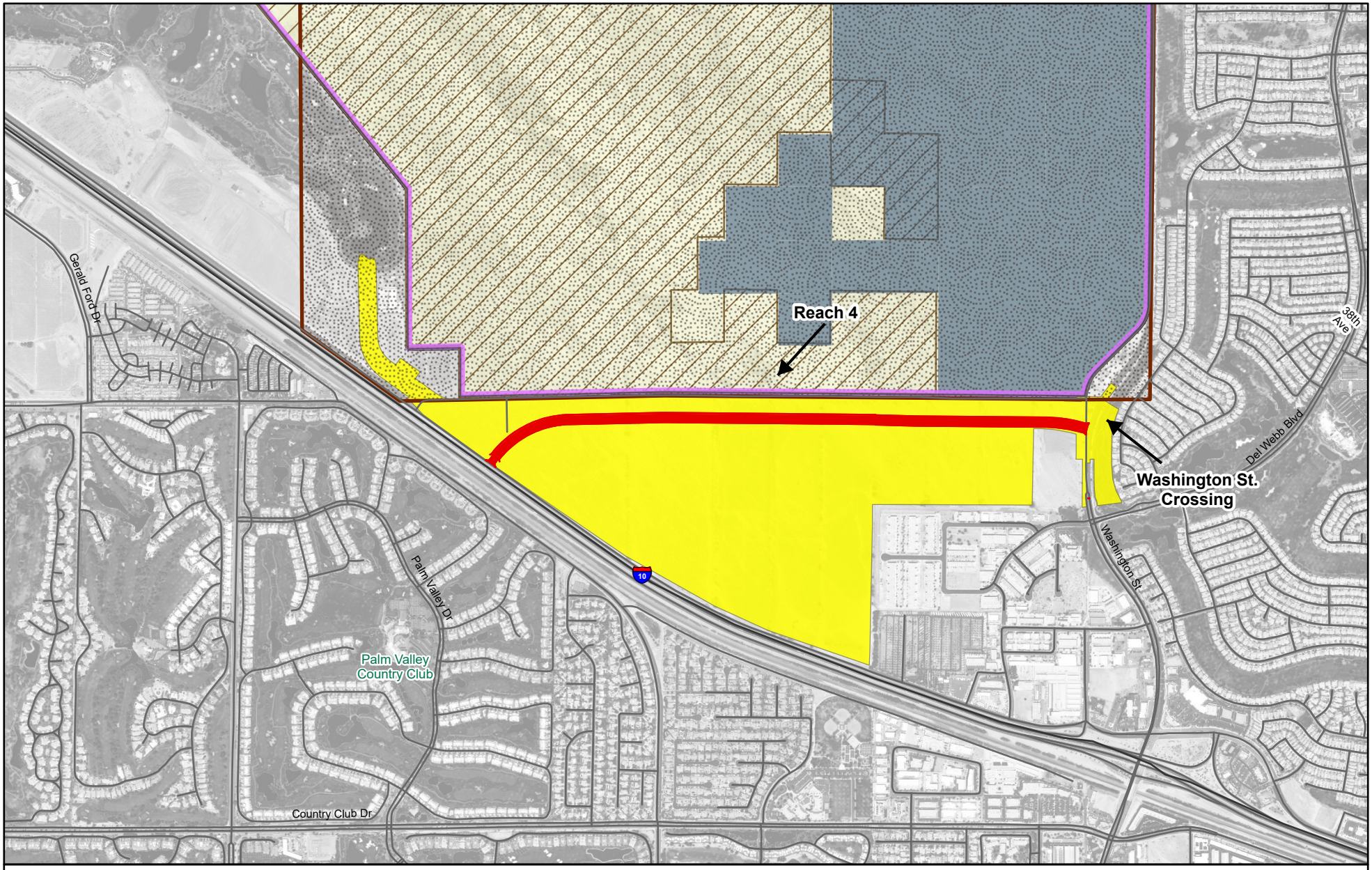


Figure 2-4

Alternative 1: Reach 4 Alignment

Initial Screening

This alternative represents the culmination of a long-term alternatives development process that occurred for the purpose of addressing the flood risk situation in the Thousand Palms area. This alternative has incorporated refinements that have been developed since the 1999 Feasibility Study was completed to address changes in land use in the project area and other conditions that affect the siting, alignment, and design of project features. For this reason, as CVWD's preferred alternative, this alternative was brought forward for further screening and analysis.

2.2.2 Alternative 2: Removal of Reach 2 Alignment

Under this alternative Reach 2 would not be constructed. Reaches 1, 3, and 4 would be implemented as described for the proposed Project (see Figure 2-6).

Initial Screening

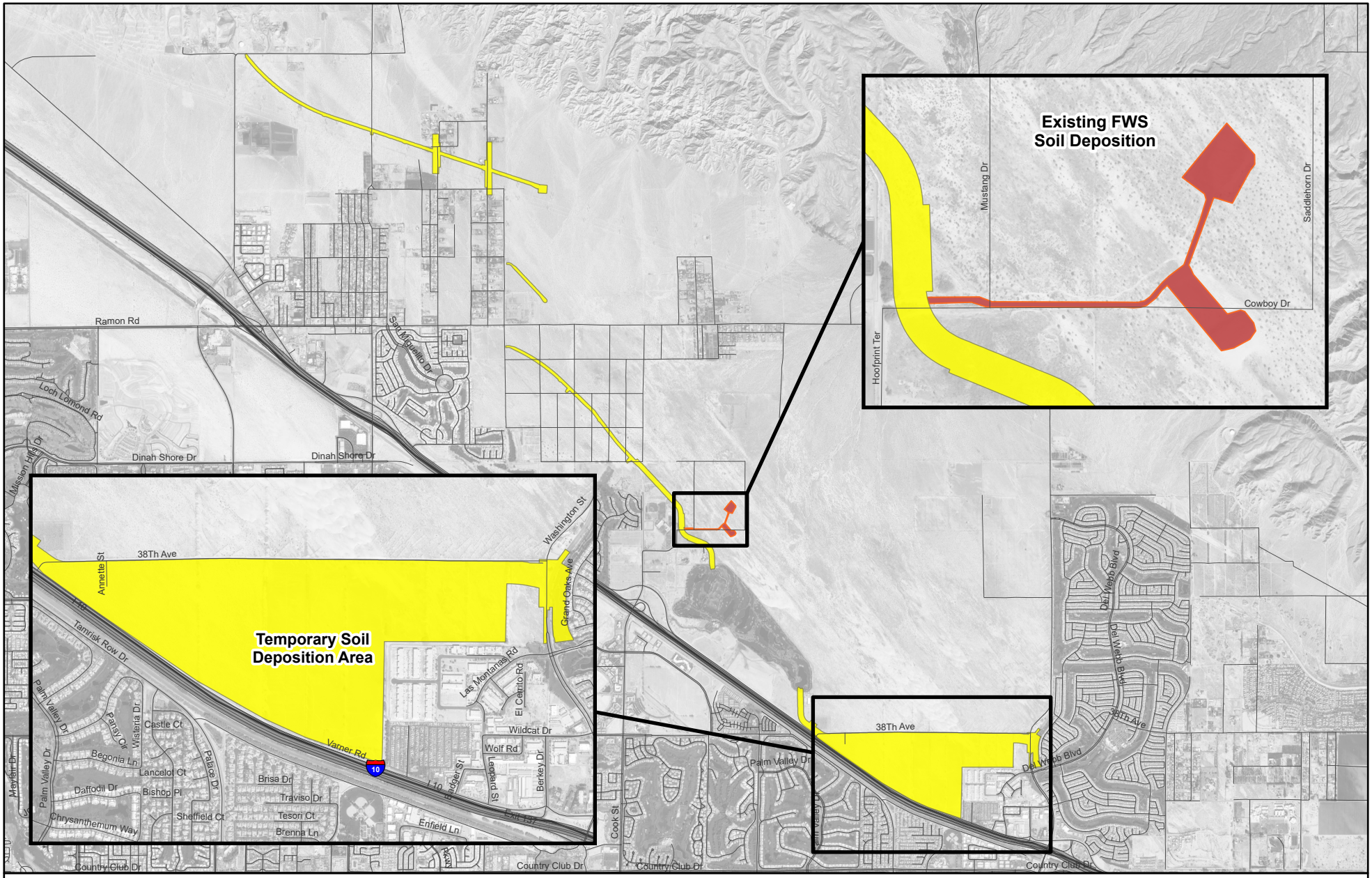
This alternative was considered in an effort to reduce impacts to waters of the U.S. by removing a levee in an area with lower risk to housing. However, under this alternative the existing Mirage Substation would not receive flood protection other than an existing berm which currently protects the site. In the event of a 100-year flood event, with current levels of protection, the substation would become partially inundated (NHC, 2017). Residences to the southwest are not anticipated to be inundated during a 100-year flood event (NHC, 2017). However, removing this reach could increase potential flood risk to downstream areas and would not meet the purpose and need of the project. For this reason, this alternative was removed from consideration in this document.

2.2.3 Alternative 3: Modified Reach 3 Alignment Option A

Under this alternative, Option A would tilt Reach 3 approximately six to 10 degrees to the west/southwest away from the active wind corridor. Reaches 1,2, and 4 would be implemented as described for the proposed Project (Figure 2-7).

Initial Screening

This alternative was considered in an effort to reduce impacts to waters of the U.S. by avoiding several large ephemeral drainages that occur along the Reach 3 alignment. However, this alternative decreases the flood protection for the area and conflicts with the purpose and need of the project. Because of the shifting alluvial fans in the area, it is difficult to predict flood flow paths with certainty. Reach 3, as well as the other project features, were designed to maximize the interception of flood flows while accommodating the dynamic nature of alluvial systems. For this alternative, the northwestern end of the Reach 3 levee would be lowered by 10 degrees to avoid impacts to ephemeral washes. However, by implementing this alternative the modified Reach 3 may not be able to intercept flows coming from Reaches 1 and 2 and flows that may travel westward near the downstream edges of the alluvial fans, across Vista de Oro, south of Ramon Road. Due to the anticipated shifting of coalescing alluvial fan flows and their unpredictable flow path, even a minor relocation of the end of Reach 3 south or east of its proposed location reduces the ability of the Reach 3 levee to effectively intercept flows toward Vista de Oro, which would result in potential flooding to the existing community and future planned developments protected by Reach 3. Any deviation in the Reach 3 proposed location would diminish the project's ability to achieve the Project objectives and presents a significant risk and liability to community. For these reasons, this alternative was removed from consideration in this document.



0 0.5 1 Miles

Proposed Project Area

Existing FWS Soil Deposition

Figure 2-5

Sand Disposal Areas

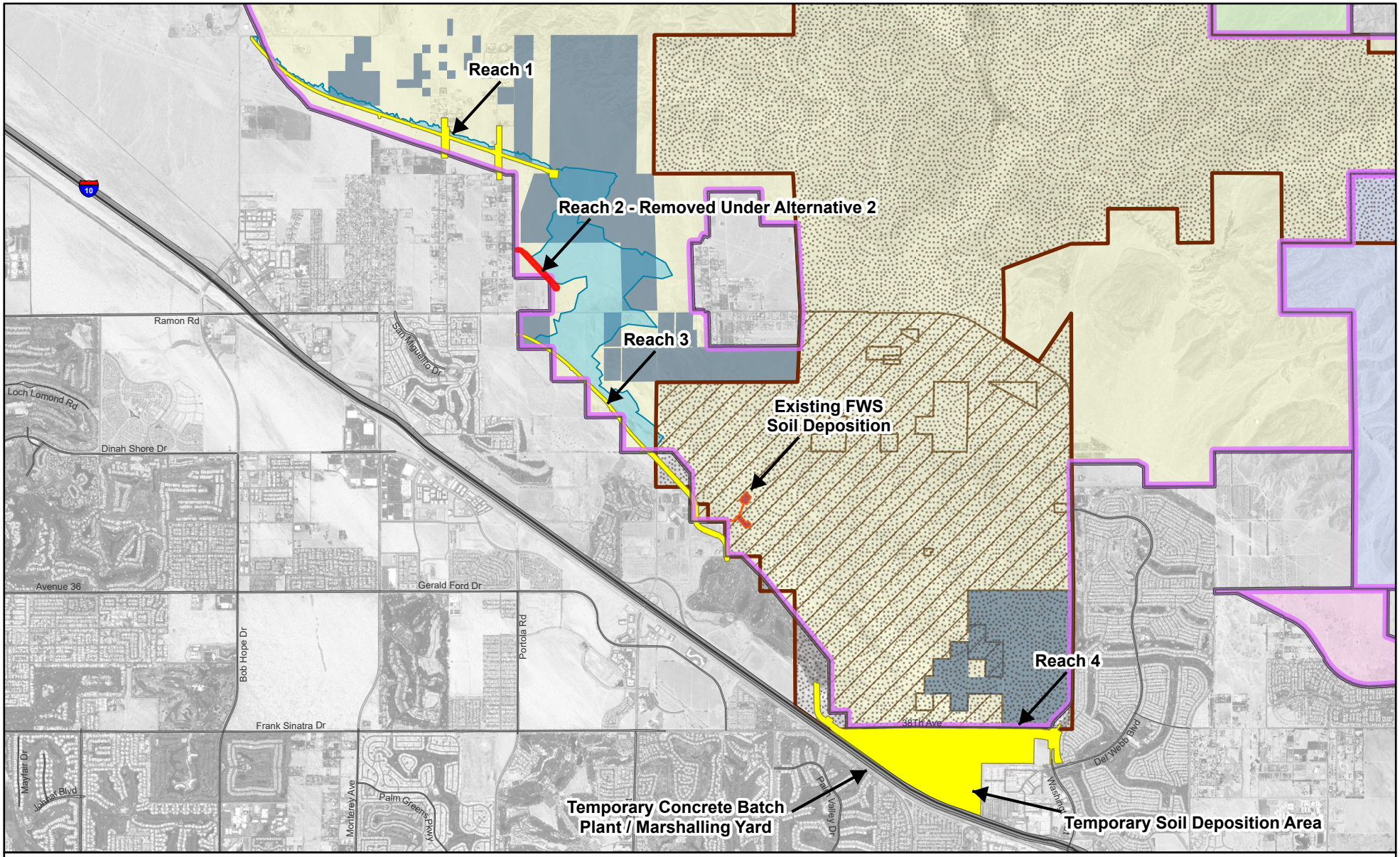


Figure 2-6

Alternative 2:
Removal of Reach 2 Alignment

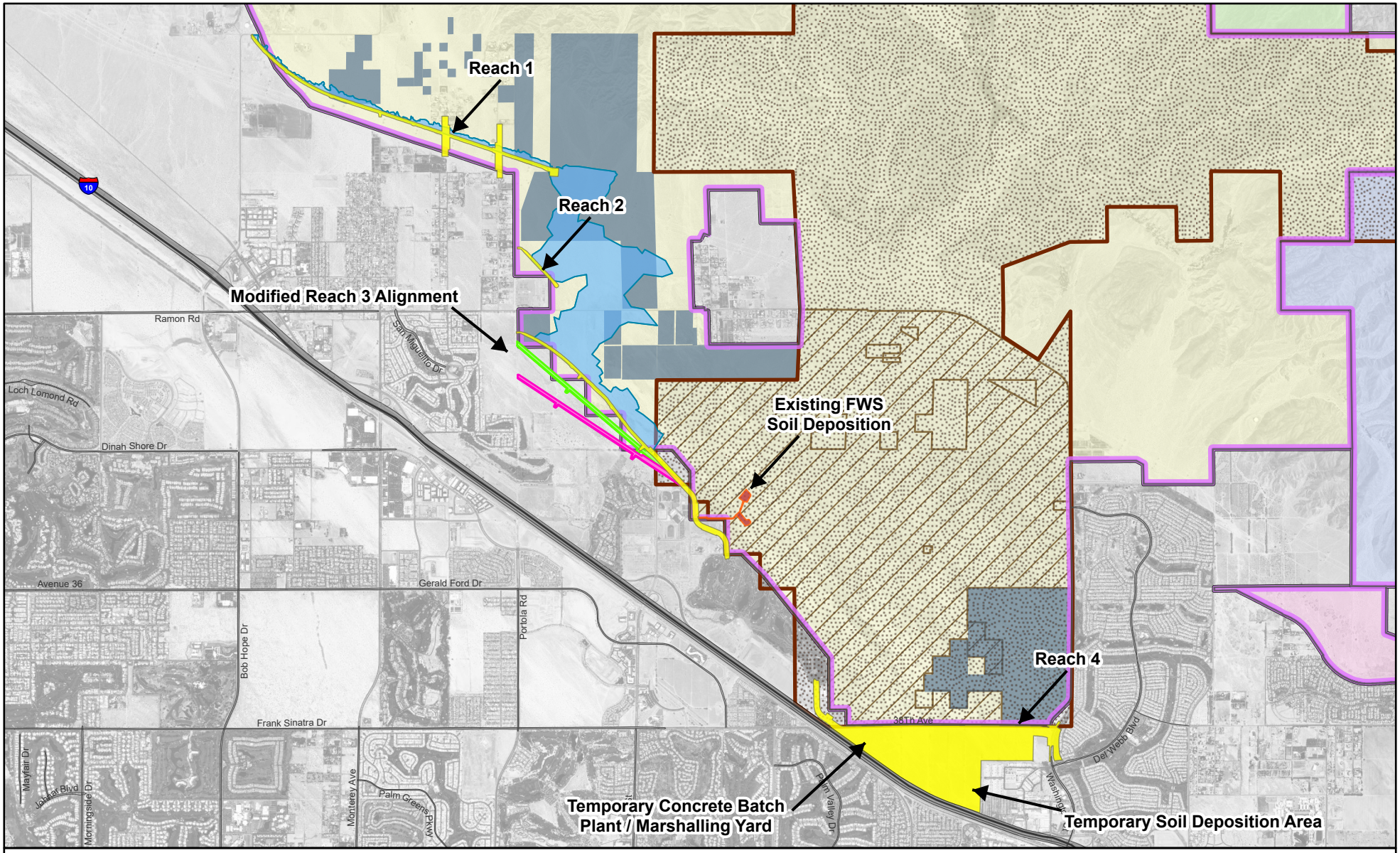


Figure 2-7

Alternative 3: Modified Reach 3 Alignment

2.2.4 Alternative 3: Modified Reach 3 Alignment Option B

Under this alternative, Option B would tilt Reach 3 approximately 17 degrees to the west/southwest away from the active wind corridor. Reaches 1,2, and 4 would be implemented as described for the proposed Project (Figure 2-7).

Initial Screening

This alternative was considered in an effort to reduce impacts to waters of the U.S. by avoiding several large ephemeral drainages that occur in or near the Reach 3 alignment. Under this alternative the Reach 3 levee would be lowered by 17 degrees. Similar to Alternative 3: Modified Reach 3 Alignment Option A this alternative pose potential flood risks for the region. Under this alternative the modified Reach 3 would increase the areas where flood flows could bypass the Reach as they flow from Reaches 1 and 2, and other upstream areas. Any deviation in the Reach 3 proposed location would diminish the project's ability to achieve the Project objectives and presents a significant risk and liability to the community. For these reasons, this alternative was removed from consideration in this document.

2.2.5 No-Action Alternative

Under the No Action alternative, construction and operation of the Project would not occur and existing conditions related to flood hazard would continue to persist. Without the Project or additional flood protection, potentially catastrophic flooding would continue to threaten the Thousand Palms area, potentially resulting in the destruction of property and possibly loss of life. In the absence of the Project, new construction on properties in flood hazard areas would continue to be subject to flood-proofing requirements imposed by Riverside County. Due to the ongoing hazard, other flood protection strategies may be proposed in the future to address the area's flooding problem. Properties currently included in Federal Emergency Management Agency (FEMA) Flood Hazard Areas would continue to be included in such areas, and potentially required to purchase flood insurance.

Initial Screening

This alternative is a required element for the EIR/EIS analysis and was brought forward for further screening and analysis.

2.2.6 Previously Approved Project

The 1999 Final EIS/EIR prepared by the Corps identified Alternative 6 as the Preferred Alternative. The Previously Approved Project is an earlier iteration of the current Project and includes structural changes and a shift in the alignment of some Project features to account for updated baseline conditions. In addition, the current proposed Project has eliminated temporary disturbance areas on the upstream side of Project features in order to minimize potential effects on the Coachella Valley Preserve (Preserve), the Coachella Valley National Wildlife Refuge (Refuge) and waters of the U.S.

The Previously Approved Project consists of levees with no channels. Levees 2 through 4 would be set back approximately 500 feet from the boundary of the Preserve to assure 100-year flows are not increased on the Preserve and that scour (i.e., removal of sediment caused by swift-moving water) is not induced on the Preserve as a result of the levee (USACE, 2000). In comparison, Reaches 3 and 4 of the proposed Project define portions of the Preserve boundary, as provided in the current MSHCP which was approved and permitted in 2008 (Figure 2-8). The Previously Approved Project is summarized below.

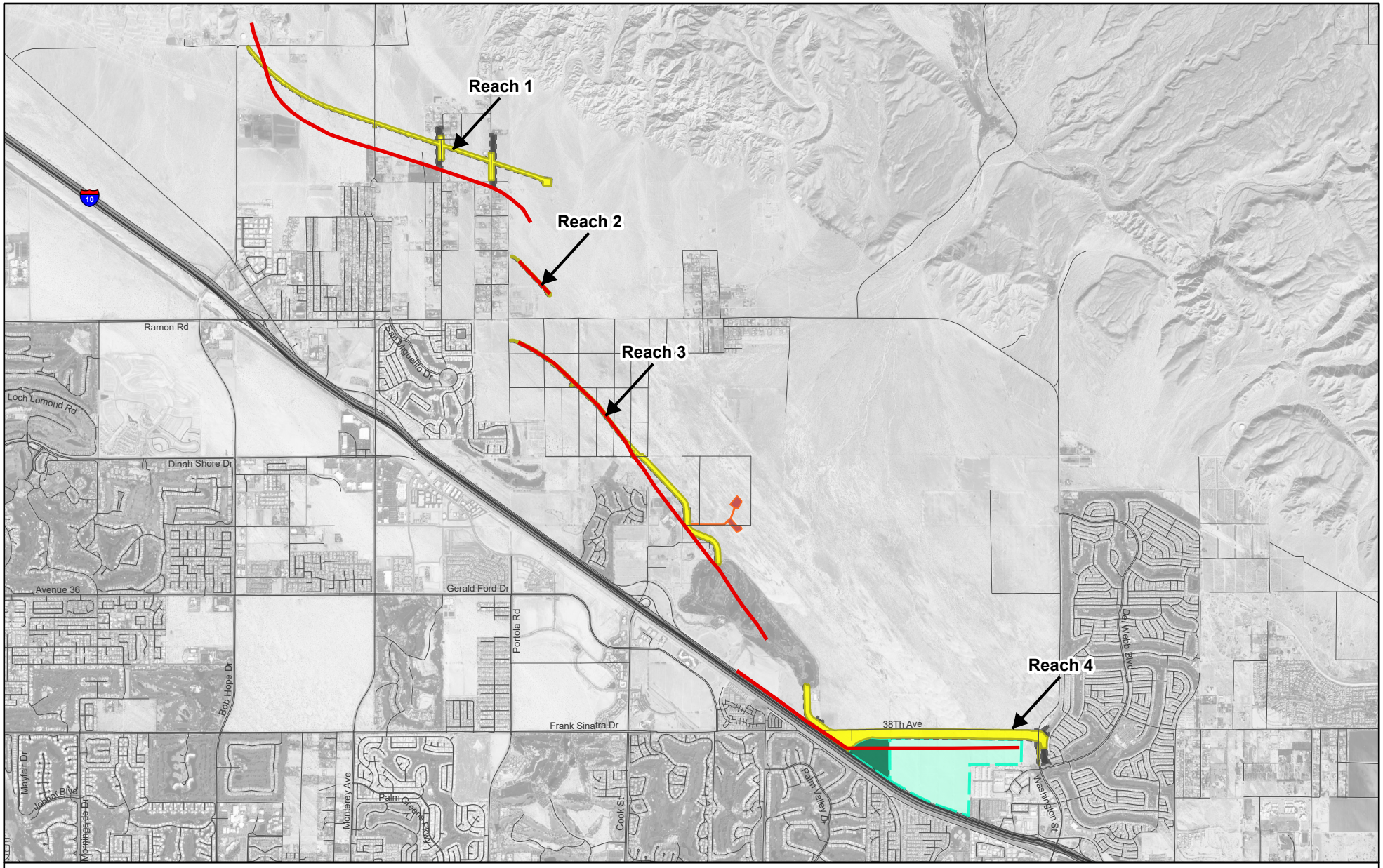


Figure 2-8

Comparison of 2020 and 2000 Alignments

- **Levee 1.** This levee**,** referred to in the 2000 document as the "Transmission Corridor Levee", would be located within an existing SCE utility corridor, specifically along the Devers-Palo Verde 500-kV No. 2 (DPV2) Transmission Line Project right-of-way. Levee 1 would initiate near the junction of Rio Del Sol Road and 28th Avenue and terminate east of Via Las Palmas.
- **Levee 2.** This levee, referred to in the 2000 document as a "Wind Corridor Levee", would have the same alignment as Reach 2 of the proposed Project.
- **Levee 3.** This levee, also referred to in the 2000 document as a "Wind Corridor Levee", would begin approximately 2,000 feet south of Levee 2 and runs along the south side of the wind corridor to the western and southwestern boundary of the Preserve. In comparison with Reach 3 of the proposed Project, this levee would continue through the Classic Club Golf Course. Levee 3 would also traverse a larger portion of Xavier High School than would Reach 3 of the proposed Project. When the 2000 Final EIS/EIR was prepared neither the golf course or the high school had been constructed. Levee 3 also did not transition into a channel, as it would under the proposed Project.
- **Levee 4.** This levee, referred to in the 2000 document as the "Cook Street Levee", would run along the north side of I-10 and across the southern boundary of the Preserve. The levee for the proposed Project would be located north of the Cook Street Levee slightly below Avenue 38.

Initial Screening

The Previously Approved Project was eliminated from consideration for further analysis due to land use conflicts associated with changes in baseline conditions that occurred since this alternative was considered in 2000. Since that time the Xavier High School and the Classic Club Golf Course have been constructed. The alignment of the Previously Approved Project would result in direct impacts to Xavier High School and the Classic Club Golf Course. This would require the acquisition of a substantial portion of both properties and the golf course would no longer support recreation. In addition, the alignment of Levee 1 would overlay a designated SCE utility corridor supporting existing gas and transmission lines. Construction of the Previously Approved Project would result in substantial impacts to the local community and disrupt existing land uses. Because the purpose and need of the proposed action is to protect the community of Thousand Palms from flood hazard this alternative was eliminated from further consideration in this document.

2.2.7 Complete Channelization Alternative

The 2000 EIR/EIS assessed a Complete Channelization Alternative which was also evaluated in the 1999 Feasibility Study (Figure 2-9). This alternative included an extensive network of channels supplemented with levees to direct surface runoff from the Long Canyon area (north-northwest of the proposed Project facilities) through the existing Del Webb / Sun City development (east of the proposed Project facilities) into the Coachella Canal siphon near Madison Street (south-southeast of the terminus of proposed Project facilities at Washington Street). Downstream of the Del Webb / Sun City development flows would be guided to the existing Coachella Canal siphon by a 2.5 mile, 7-foot tall levee. At the siphon crossing, flows would enter the Thousand Palms Wash channel which converges with the Whitewater River downstream of I-10. The walls and existing levees surrounding the siphon would be raised from 8 to 10 feet in height to accommodate increased flows. Major components of this alternative include more than 20 miles of channels, drop structures along several reaches of the main channel and at the channel inlets, in-channel sediment management basins, and levees parallel to the channel along the Preserve to minimize sedimentation. (USACE, 2000)

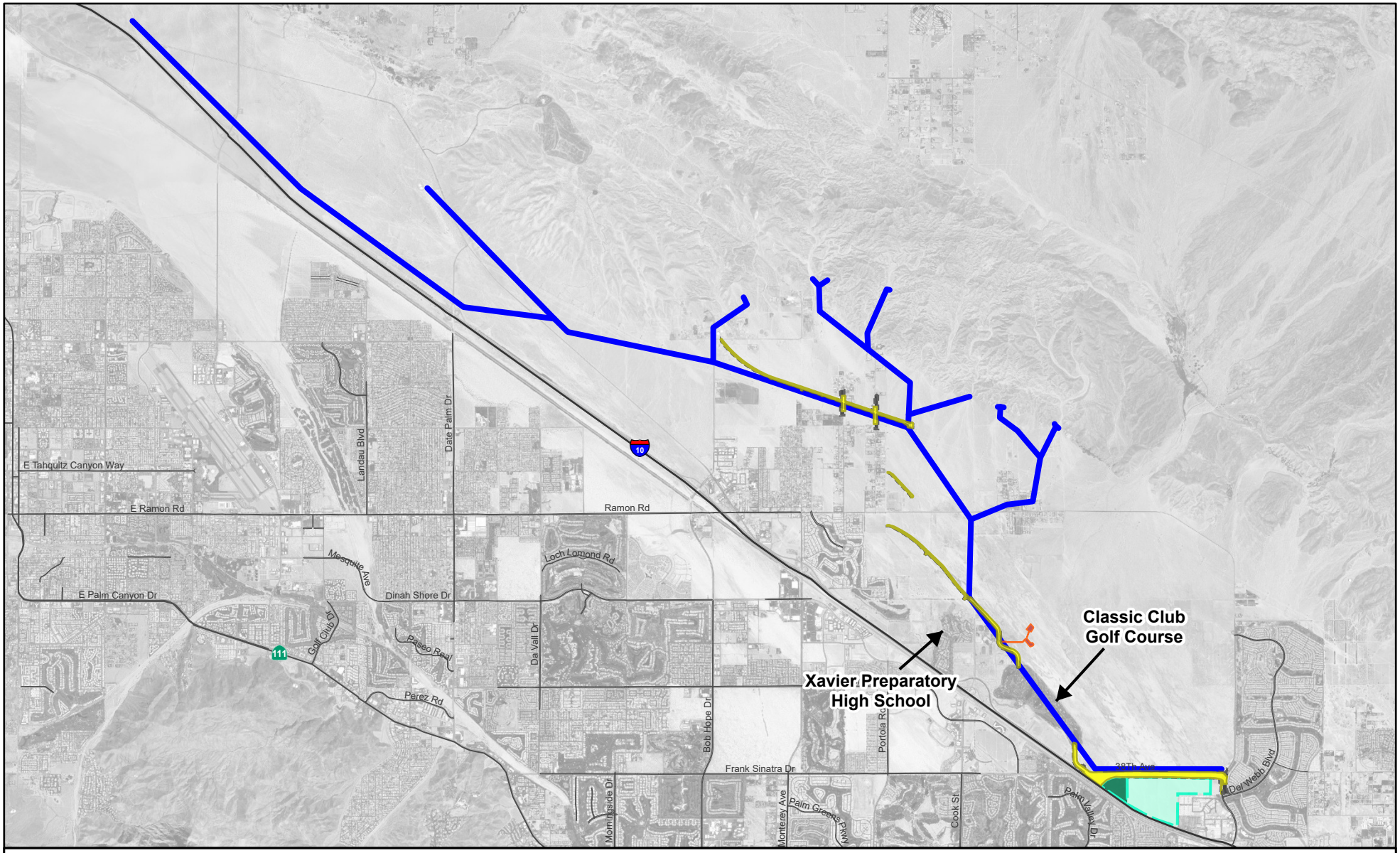


Figure 2-9

Complete Channelization Alternative

This alternative was originally developed when less development existed in the Project area. Under current conditions this alternative would conflict with numerous land uses, including but not limited to ten residential properties, six commercial/industrial institutional properties, as well as twelve existing roadways and a transmission line corridor. Roads that would be traversed by a levee or channel would either be terminated at the crossing or spanned by installing road crossings similar to those identified for the proposed Project.

Initial Screening

The Complete Channelization Alternative was eliminated from further analysis due to extensive land use conflicts associated with the type and amount of property that would need to be acquired to construct the channels and levees. This alternative would include more than 20 miles of channels, more than twice as much as the proposed Project (Alternative 1). When this alternative was analyzed in the 2000 EIR/EIS there was less development in the region. Since 2000 development has expanded in the Project area and construction of this alternative would require the acquisition and removal of extensive residential and commercial developments, including portions of the existing Del Webb / Sun City development. Implementation of this alternative would also result in the loss of habitat in the Preserve/Refuge.

In addition, this alternative would conflict with the Purpose and Need of the Project, which is to provide flood protection while facilitating the transport of sand onto the Preserve/Reserve. The design of this alternative would adversely affect the wind corridor by trapping and funneling material away from the Preserve/Reserve. Due to these land use conflicts, unacceptable significant impacts, and the lack of benefits to the Preserve/Reserve, this alternative was removed from further consideration in this document.

2.2.8 I-10 Channel Alternative

The 2000 EIR/EIS assessed an I-10 Channel Alternative which was also evaluated in the 1999 Feasibility Study (Figure 2-10). Under this alternative, the Project would be configured as one long channel (main channel) and three shorter channels (collector channels). The main channel would be approximately 25 miles in length and would be located adjacent and north of I-10. The channel would initiate at the mouth of Long Canyon, approximately 8 miles north-northwest of the upstream end of Reach 1 under the proposed Project (Alternative 1) and continue along I-10 past the Indio Hills eventually discharging storm flows onto the Preserve/Refuge. Collector channels would direct storm flows from the Indio Hills into the main channel.

Initial Screening

The I-10 Channel Alternative was eliminated from analysis due to extensive land use conflicts associated with the type and amount of property that would need to be acquired to construct the channels and levees. Since 2000 development has expanded in the Project area and construction of this alternative would require the acquisition and removal of extensive residential and commercial developments. For example, some of the frontage properties located in the development footprint are residential properties, including all the homes located on Westchester Drive in Thousand Palms. Several developments would be bisected by this alternative, resulting in split communities along with lost homes. This alternative would also result in severe impacts to commercial properties as the alignment would cross numerous commercial developments. Similar to the information provided for the Complete Channelization Alternative, the I-10 Channel Alternative would conflict with a variety of existing land uses at approximately 65 locations. Additionally, 75 roads would either be clocked by alternative elements or road crossings would have to be reconstructed.

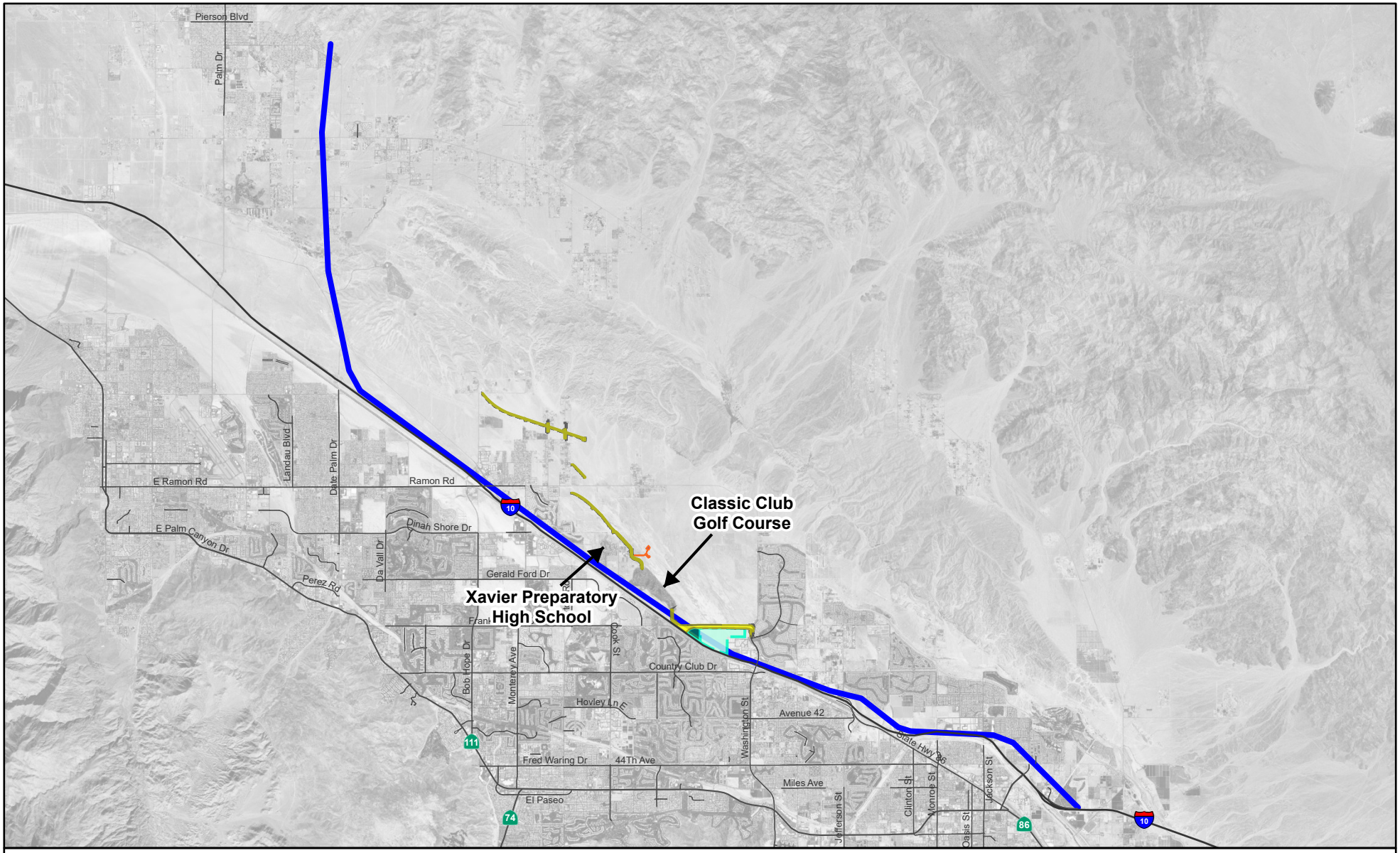


Figure 2-10

I-10 Channelization Alternative

In addition, this alternative would conflict with the Purpose and Need of the Project, which is to provide flood hazard protection to the maximum number of developed and planned development areas located within the FEMA-designated flood hazard zone in the Thousand Palms area while avoiding and minimizing adverse effects to wildlife and habitat and enhancing aeolian sand transport within the Coachella Valley Preserve. The discharge point on the Preserve boundary is located too far south to provide any benefit to sensitive habitat as fluvially-transported sand that would otherwise be deposited on the Preserve/Refuge would be directed to stormwater conveyance systems south/southeast of the CVFTL habitat areas. The design of this alternative would also adversely affect the wind corridor by trapping and funneling material away from the Preserve/Reserve. This alternative would substantially increase direct and indirect impacts to waters of the U.S. by altering hydrology across the alluvial fan and disrupting natural stream function.

Due to these land use conflicts and the lack of benefits to the Preserve/Reserve, construction of the I-10 Channel Alternative would result in unacceptable significant impacts and was removed from consideration in this document.

2.2.9 Detention Basins Alternative

The Detention Basins Alternative would include a series of eight stormwater/sediment detention basins, located at the mouth of the Indio Hills canyons, designed to capture, and attenuate storm flows. The detention basins would allow for a substantially lower outflow discharge and reduce the necessary size of downstream flood control facilities. Each detention basin would be approximately 3- to 24-acres in size with a total storage volume ranging from 28 to 261 acre-feet. Most of the basins would include below-ground storage to avoid qualifying as a State of California dam. All basins would be designed to drain within approximately one day following a storm event (USACE, 2000).

The Detention Basins Alternative would include a network of channels to convey stormwater flows through the Del Webb / Sun City area to the existing Coachella Canal siphon. These channels would be similar in scope and design as described in the Complete Channelization Alternative and the I-10 Channel Alternative. Flows from this area are directed into the Thousand Palms Wash channel eventually joining the Whitewater River downstream of I-10.

Initial Screening

The Detention Basins Alternative was eliminated from analysis for the same rationale presented for the Complete Channelization Alternative and the I-10 Channel Alternative. Primarily that land use disruptions and local roadway interferences would be substantial and adverse and would result in unacceptable impacts to the local community. In addition, this alternative would not achieve the Purpose and Need of the Project, which is to provide flood hazard protection to the maximum number of developed and planned development areas located within the FEMA-designated flood hazard zone in the Thousand Palms area while avoiding and minimizing adverse effects to wildlife and habitat and enhancing aeolian sand transport within the Coachella Valley Preserve. The basins would also result in substantial disruption to the hydrology and sediment transport processes that occur in upstream areas of the alluvial fans. This would substantially alter the services and functions of the washes and result in adverse effects to a variety of native plant and animal species. The basins would substantially alter the movement of blow sand to the Preserve/Refuge by trapping sediment in locations outside the active wind corridor. The detention basins would substantially disrupt natural stream processes to downstream areas, substantially increasing the loss to State and Federal Waters. Although the channels would be smaller under the Detention Basins Alternative, land use conflicts would still be substantial. In addition, the detention basins would require extensive operations and maintenance efforts to ensure that sediment does not collect in the basins and compromise their flood control capacity.

Due to these land use conflicts and the lack of benefits to the Preserve/Reserve, the Detention Basins Alternative was removed from consideration in this document.

2.2.10 Reach 1 South of Utility Corridor Alternative

Under this alternative the Reach 1 levee would be located south of the existing SCE utility corridor compared to the northern location for the proposed Project (Figure 2-11). In order to avoid flooding of the utility corridor during and following a storm event, the levee would be situated approximately 1,000 feet south of the utility corridor. The distance between Reach 1 and the utility corridor varies from approximately 700 feet to approximately 2,000 feet south of the corridor depending on the location. All other features of this alternative would be the same as described for the proposed Project (Reach 1 of Alternative 1). Implementation of this alternative would minimize impacts to sand migration by moving the levee farther away from the active wind corridor and reduce impacts to jurisdictional waters of the U.S.

This alternative would also avoid the loss of approximately five or six properties located north of the utility corridor, which would occur under the proposed Project. However, this alignment would require the acquisition of all or parts of approximately 58 properties, 28 of which are residential, that occur south of the utility corridor to account for the levee's permanent footprint and the new flood zone located along the face of the levee. The 28 residential properties to be acquired for this alternative have an estimated land value of approximately $1,686,022. The 30 non-residential properties have an estimated land value of approximately $8,912,662. In total, the combined estimated land value associated with properties to be acquired in part or in full to accommodate the revised alignment of Reach 1 is approximately $10,598,684. It is important to note that this estimate may not reflect the value of certain improvements implemented on the properties and would be expected to change with current market values in the region. Property values were estimated by comparing the Project footprint with the county assessor's office assessed values for the land. Any structures on the land were considered based on current market values of homes and properties in the region. As described in Section 2.2.1, the proposed Project alignment of Reach 1 would affect five residential properties (approximately $227,816 in combined land value) and 32 non-residential properties (approximately $1,531,726 in combined land value), for a total of 37 properties with combined land value of $1,759,542.

This alternative would affect 21 more properties and displace more people than the proposed Project's Reach 1 alignment. In addition, this would increase the cost of land acquisition by approximately $8,839,142.

Initial Screening

The Reach 1 South of Utility Corridor Alternative would require the acquisition and conversion of approximately 58 existing private properties, 28 of which are residential homes. Construction of the levee in this location would result in substantially greater impacts to sensitive receptors from noise, traffic congestion, exposure to fugitive dust, and disproportionally effect minority communities. In addition, this alternative would not meet the purpose and need of the project by protecting the maximum amount of property with Thousand Palms. Due to these substantial conflicts with existing land uses and the purpose and need compared to the proposed Project, this alternative was eliminated from further analysis in this document.

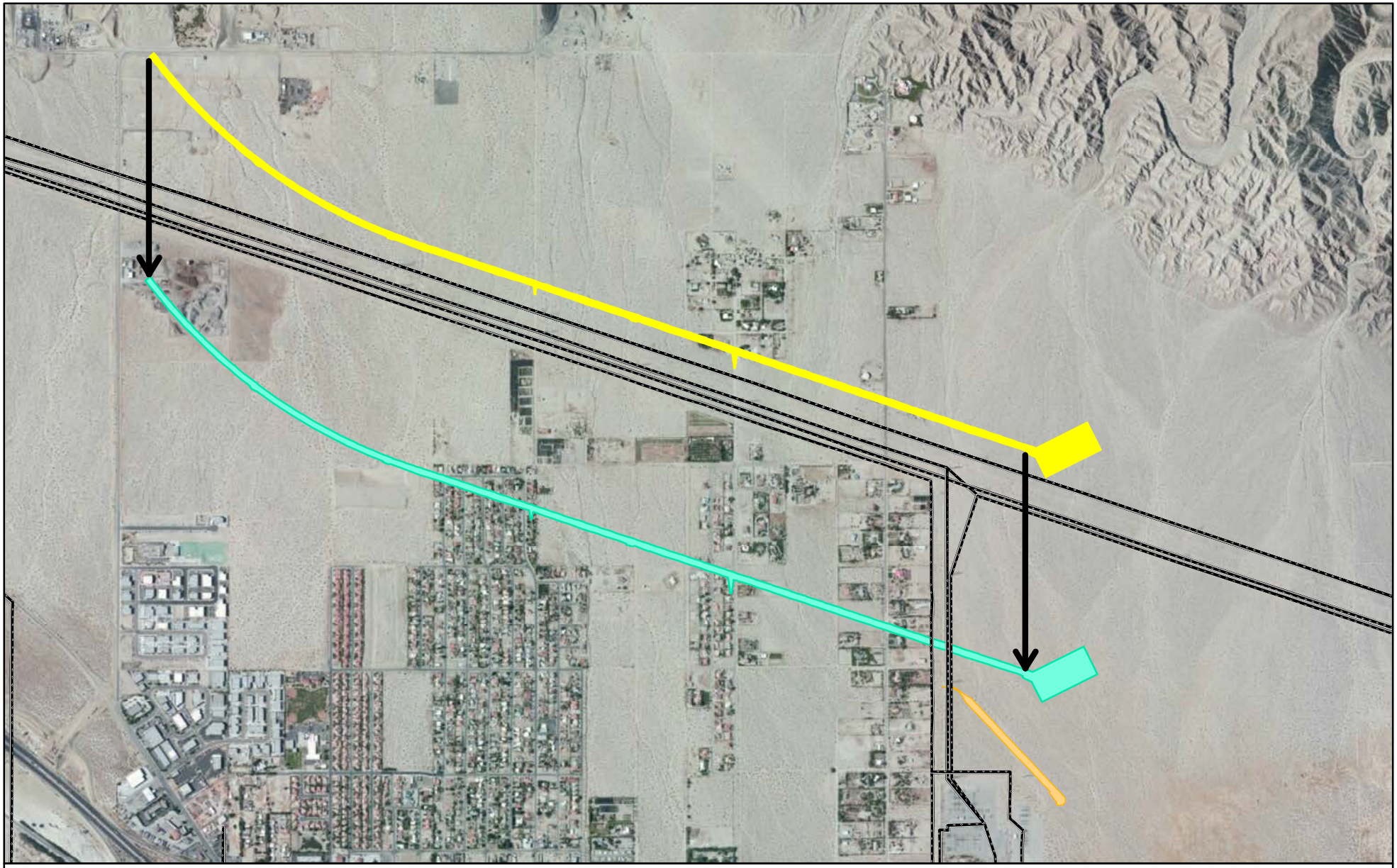


Figure 2-11

Reach 1
Levee Alternative

2.2.11 Continuous Reach 1 Alternative

Under the Continuous Reach 1 Alternative, Reaches 1 and 2 (referred to as Reach 1a) would consist of one continuous levee. Reach 1a would be designed as described for Reach 1 of the proposed Project, except that the levee's downstream end would turn to the south to protect the existing Mirage Substation. All other components of this alternative would be the same as described for the proposed Project.

Initial Screening

In this alternative the Reach 1a levee would traverse the existing SCE utility corridor, a high-pressure gas line, and a fiber optic line. Construction of this alternative would require re-alignment of the natural gas line, fiber optic cables, and modification to the existing transmission lines. In addition, connecting Reaches 1 and 2 would create a substantial barrier that would disrupt the wind corridor and the distribution of wind-blown sand to the Preserve/Refuge. This would cause a larger disruption to aeolian processes and sand reaching the Preserve/Refuge compared to the proposed Project. This alternative would reduce impacts to several drainages at the end of Reach 1. Due to the substantial impacts to aeolian transport and the disruption of local utilities compared to the proposed Project, this alternative was eliminated from further consideration in this document.

2.2.12 Straight Reach 3 Alternative

Under this alternative Reach 3 would be configured in a straight alignment through what is now the Xavier High School and the Classic Club Golf Course. Similar to the proposed Project, Reach 3 would consist of both a levee and an excavated channel. The upstream portion of Reach 3 would consist of a levee approximately 1.23-miles long varying in height from 14 to 18 feet. The downstream portion of Reach 3 would consist of a 1.01-mile long trapezoidal channel with a bottom width of 90 feet and a depth ranging from 14 to 18 feet. A 5-foot high levee would run along the west side of the excavated channel to protect the area to the west from flooding. The freeboard levee also allows for the collection of the excavated channel material. Reaches 1, 2, and 4 of this alternative would be the same as described for the proposed Project.

This alternative would require the removal or modification to existing developments on the Xavier High School property and the Classic Club Golf. Most of the high school's existing athletic facilities, including the football stadium, would need to be removed. Most of the Classic Club Golf Course would also need to be removed. Although Reach 3 does not extend all the way down to the bottom of what is now the Classic Club Golf Course, this alternative would likely render the golf course unusable. Based on construction requirements it is plausible that the entire golf course and associated facilities would need to be removed to facilitate development of this alternative. In addition, residential developments adjacent to and north of the golf course would need to be removed under this alternative.

O&M activities associated with the Straight Reach 3 Alternative would be the same as described for the proposed Project, except sand removal activities along the Reach 3 portion of this alternative would not be required as frequently when compared to the proposed Project. The straight alignment of Reach 3 would further reduce impacts to the wind corridor.

Initial Screening

The Straight Reach 3 Alternative would require the acquisition of lands associated within the Xavier High School athletic facilities, residential properties, and the conversion of the Classic Club Golf Course property from its existing recreational uses to a flood control system. Construction of the levee in this

location would result in substantially greater impacts to sensitive receptors from noise, traffic congestion, exposure to fugitive dust, and disproportionally effect minority communities, and recreationists. Due to these substantial land use conflicts, this alternative was eliminated from further consideration in this document.

2.2.13 Reach 3 With Debris Basin

This alternative was suggested during scoping by Stantec on behalf of the H.N. and Frances C. Berger Foundation to reduce land acquisitions of both public use and educational properties, as well as to reduce conveyance of sediment and debris on to the Classic Club Golf Course. The proposed alignment for Reach 3, specifically the channel portion, would be pushed farther east of three currently vacant properties (APNs 694-050-007, 695-070-011, 695-070-015), as well as the Xavier College Preparatory High School and the Pegasus Riding Academy. Additionally, a debris basin would be added immediately north of the tie-in with the Classic Club Golf Course. All other features of this alternative would be the same as described for the proposed Project.

Initial Screening

This alternative would avoid direct loss of the athletic fields at Xavier College Preparatory High School and potentially the loss of the Pegasus Riding Academy; however, depending on the size and exact location of the debris basin, the Pegasus Riding Academy could continue to be impacted, if not more so than the proposed Project. Moving Reach 3 farther west would place it on the Preserve/Refuge, which would conflict with the CVMSHCP. Per the Project objectives, Reach 3 is intended to better define portions of the Preserve boundary, not redefine and reduce the Preserve lands. This alternative would also result in greater disruption of aeolian transport (sand migration) and associated biological resources impacts to sensitive wildlife, including the Coachella Valley fringe-toed lizard (federally listed, threatened; State listed endangered), Coachella Valley milk vetch (federally listed, threatened; rare and endangered in California), among other sand-dependent special-status species. The Classic Club Golf Course was designed to accept the flood flows of the Project, including associated debris; a flood easement agreement with CVWD was previously established prior to construction of the golf course (see Section 1.2, Project History and Previous Studies). As such, the debris basin, is not necessary, other than to minimize cleanup activities within the golf course.

Furthermore, the size of the debris basin with consideration of the quantity of flood flow and debris is likely inadequate to prevent much of any reduction in the amount of material passed downstream during a significant flood event. A study completed in 2013 by Parsons Brinkerhoff (2013) considered sediment removal facilities to determine their locations and effectiveness. Modeling was completed with two trial sediment basin sizes, which were assumed to be enlargements of the Reach 3 Channel, with the following modifications: (1) a weir at the point Reach 3 connects to the Classic Club Golf Course with a crest elevation of 165 feet, (2) flattened slope of the Reach 3 Channel from approximately 0.003 ft/ft to 0.001 ft/ft, and (3) widened channel invert from 86 feet to 172 feet (Trial 1) and 258 feet (Trial 2). The Trial 1 and Trial 2 sediment basins were estimated to remove approximately 16 acre-feet of sediment (46%) and 19.2 acre-feet of sediment (55%), respectively (PB, 2013). The basin would have to get substantially larger to approach 100 percent removal. The substantial increase in cost for widening the Reach 3 Channel, as well the additional biological resources and large-scale land use impacts associated with doubling or tripling the width of the channel, eliminated consideration of implementing this strategy for sediment control.

Due to the substantial impacts to aeolian transport, the refuge, and impacts to sensitive species of plants and wildlife compared to the proposed Project, this alternative was eliminated from further consideration in this document.

2.2.14 Reach 3 Paralleling Classic Club Golf Course

This alternative was suggested during scoping by Stantec on behalf of the H.N. and Frances C. Berger Foundation to reduce land acquisitions of both public use and educational properties, as well as to reduce conveyance of flood flows on to the Classic Club Golf Course. The proposed alignment for Reach 3, specifically the channel portion, would be pushed farther east of three currently vacant properties (APNs 694-050-007, 695-070-011, 695-070-015), as well as the Xavier College Preparatory High School and the Pegasus Riding Academy. Reach 3 would then parallel the Classic Club Golf Course rather than tying into the existing stormwater conveyance system located within the Classic Club Golf Course. All other features of this alternative would be the same as described for the proposed Project.

Initial Screening

This alternative would avoid direct loss of the athletic fields at Xavier College Preparatory High School and potentially the loss of the Pegasus Riding Academy. Moving Reach 3 farther west would place it on the Preserve/Refuge, which would conflict with the CVMSHCP. Per the Project objectives, Reach 3 is intended to better define portions of the Preserve boundary, not redefine and reduce the Preserve lands. This alternative would also result in greater disruption of aeolian transport (sand migration) and associated biological resources impacts to sensitive wildlife, including the Coachella Valley fringe-toed lizard (federally listed, threatened; State listed endangered), Coachella Valley milk vetch (federally listed, threatened; rare and endangered in California, among other sand-dependent special-status species. The Classic Club Golf Course was designed to accept the flood flows of the Project, including associated debris; a flood easement agreement with CVWD was previously established prior to construction of the golf course (see Section 1.2, Project History and Previous Studies). Due to the substantial biological resource impacts, conflicts with the purpose and need, and minimal improvement in land use impacts, this alternative was eliminated from further consideration in this document.

2.2.15 Reach 3 West of Xavier High School Alternative

This alternative would place Reach 3 to the west of the Xavier High School. All other features of this alternative would be the same as described for the proposed Project.

Initial Screening

This alternative reduces the disruption of aeolian transport onto the Preserve/Refuge and would avoid the direct loss of the athletic fields at Xavier High School. This alternative would not reduce the flood risk or provide flood protection to the high school or adjacent properties. In addition, construction of the levee in this location would be adjacent to residential properties and result in substantially greater impacts to sensitive receptors from noise, traffic congestion, and exposure to fugitive dust. Due to these substantial land use conflicts and because this alternative does not meet the purpose and need, this alternative was eliminated from further consideration in this document.

2.2.16 Reach 1 Culverts Alternative

This alternative would include the installation of bottomless culverts in the Reach 1 levee to allow the passage of water during small storm events. The purpose of using culverts under the Reach 1 levee would be to allow low and medium flows to pass under Reach 1 to maintain some elements of natural hydrology and sediment transport to the channels while still providing flood protection to the community of Thousand Palms under heavy flow conditions. All other aspects of this alternative would be the same as described for the proposed Project.

Initial Screening

The placement of bottomless culverts on the Reach 1 levee would compromise the integrity of the structure and would conflict with the FEMA and Corps guidelines for levee construction. The placement of culverts would require design changes to the levee to accommodate bypass flows and ensure flood protection during large storm events. However, culverts in Reach 1 would be prone to failure due to the large sediment loads that are known from the watershed. Alternatively, they would need to be sized to allow clean out and the passage of sediment. Sizing these culverts to accommodate sediment and water would diminish the flood control capacity of the levee during large storm events. While it may be possible to install a gate to control the flow, crews may not be available to close the gates in time to react to a large storm event. Flash floods associated with seasonal thunderstorms occur so quickly that adequate warning time to close the flood gates may not be possible. Although the placement of culverts in the levee would maintain connectivity to drainages below the levees, it is still likely that many drainages would remain isolated from their historic conditions. In addition, water would be forced through discrete areas forming new drainages that may compromise flood protection. Because culverts would diminish flood protection and conflict with the purpose and need, this alternative was eliminated from further consideration in this document.

2.2.17 Non-Structural Alternative

This alternative would consist of a flood warning system of alarms and/or announcements that would be broadcasted in the Project area. The system would provide information to local residents of an impending flood and the need to evacuate the area.

Initial Screening

Flood warning systems were eliminated from further consideration as a viable flood control project because flash floods associated with seasonal thunderstorms occur so quickly that adequate warning time is not available for residents to evacuate from the floodway in time to avoid the hazard. In addition, some people may not hear or respond to the warnings and would be at risk from flood waters and debris flows.

This alternative would not meet the Project Objectives or the Purpose/Need of providing flood hazard protection to existing properties and structures, and existing properties and structures would continue to be subject to flood hazards. Additionally, this alternative would not facilitate sand migration and blowsand habitat replenishment on the Preserve/Refuge. Under current conditions, sediment and blow sand is washed into developed areas and is no longer available in the wind corridor. Because this alternative does not meet the purpose and need of the proposed project it was eliminated from further consideration on this document.

2.2.18 Off-Site Alternatives

A 404(b)(1) alternatives analysis typically considers "off-site" alternatives as a means for considering locations where waters of the U.S. could be avoided, or impacts reduced. For flood hazard reduction projects, locations for project elements are generally confined to the watershed, which comprises the broader area of concern for the project. Locating project features outside the watershed would not be a relevant means of addressing flooding within the watershed of concern. The alternatives formulated for this project and described above considered locations throughout the watershed. Therefore, no additional off-site alternatives were considered.

Initial Screening

No off-site alternatives were brought forward for screening. Because they do not meet the purpose and need of the project.

3.0 Alternatives Analysis

As described in Section 2.0 above, the alternatives formulation process considered 18 alternative scenarios for further screening and analysis. Seventeen alternatives were screened out from further consideration for the reasons stated above and were not brought forward for further consideration.

This section provides a description of the screening process that is required under the 404(b)(1) guidelines. The screening process provides a means of using specified criteria to progressively screen out alternatives to eventually arrive at designating an alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA). The LEDPA is the only alternative that can be permitted by the Corps under Section 404 the Clean Water Act. The screening process follows the steps outlined below:

1. Determine whether an alternative meets the project purpose. If an alternative does not meet the project purpose, it is not brought forward for further screening.
2. Determine whether an alternative is considered practicable. Further explanation of practicability is provided below. If an alternative is not considered practicable, it is not brought forward for further screening.
3. All alternatives considered practicable are compared with respect to impacts to waters of the U.S. Consideration is also made with respect to other adverse environmental effects that are associated with the alternatives being compared.

3.1 Project Purpose

The purpose for this project is to provide flood hazard protection to the maximum number of developed and planned development areas located within the FEMA-designated flood hazard zone in the Thousand Palms area while avoiding and minimizing adverse effects to wildlife and habitat and enhancing aeolian sand transport within the Coachella Valley Preserve. Alternatives were evaluated on the achievement of the following objectives that are tiered from the project purpose:

- Reduce the likelihood and consequences of flooding on human life and safety;
- Reduce the risk of flood damages, including critical infrastructure, within the area;

- Develop and implement environmentally sustainable flood risk management features consistent with natural geomorphic processes and ecological functions, particularly sand migration, of the proposed Project area; and,
- Use environmentally sustainable designs and construction methodologies, which would minimize environmental impacts from future operation and maintenance actions in the proposed Project area.

Of the alternatives considered after initial screening, only one alternative would meet the project purpose and is screened for practicability further below. The remaining alternatives would not meet the project purpose for the reasons described below:

- **Alternative 2: Removal of Reach 2 Alignment**. This Alternative does not meet the purpose and need because it does not provide flood protection for portions of the city of Thousand Palms including the SCE Mirage electrical sub-station which would be subject to partial flooding.
- **Alternative 3: Modified Reach 3 Alignment Option A**. This Alternative does not meet the purpose and need because it increases flood risk to the community of Thousand Palms below Reach 3.
- **Alternative 3: Modified Reach 3 Alignment Option B**. This Alternative does not meet the purpose and need because it increases flood risk to the community of Thousand Palms below Reach 3.
- **No-Action Alternative**. This alternative would not provide flood protection to the Thousand Palms area, potentially resulting in the destruction of property and possibly loss of life.
- **Reach 3 With Debris Basin**. This alternative would result in substantial impacts to aeolian sand transport, the federal wildlife refuge, and adversely affect sensitive species of plants and wildlife including the Coachella Valley fringe-toed lizard (federally listed, threatened; State listed endangered), Coachella Valley milk vetch (federally listed, threatened; rare and endangered in California, among other sand-dependent special-status species compared to the proposed Project.
- **Reach 3 Paralleling Classic Club Golf Course**. This alternative would result in greater impacts to the federal wildlife refuge, disruption of aeolian transport and associated biological resources impacts to sensitive wildlife, including the Coachella Valley fringe-toed lizard (federally listed, threatened; State listed endangered), Coachella Valley milk vetch (federally listed, threatened; rare and endangered in California, among other sand-dependent special-status species compared to the proposed project.
- **Reach 3 West of Xavier High School Alternative**. This alternative would not reduce the flood risk or provide flood protection to the high school or adjacent properties.
- **Reach 1 Culverts Alternative**. This alternative would diminish flood protection and could compromise the integrity of the levee.
- **Non-Structural Alternative**. This alternative would not provide flood hazard protection to existing properties and structures, and existing properties and structures would continue to be subject to flood hazards.

3.2 Practicability Screening

An alternative is considered practicable if "it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose" [40 CFR § 230.10(a)(2)]. In this section, the three alternatives that meet the project purpose are screened using criteria based on cost, existing technology, and logistics. The three alternatives brought forward for further screening are:

- Alternative 1 (Preferred Project)

Cost Practicability

Cost was analyzed in the context of the overall scope of the project and whether it is unreasonably expensive to construct, operate, and maintain. The cost of acquiring land from willing sellers was also considered and what economic impact that would have on the region from the loss of private lands. With the exception of the no action alternative, each alternative requires the acquisition of private lands and in Reach 1 several private residences would need to be acquired to construct the levee. To support the evaluation of costs CVWD assessed the number of private parcels that would have to be acquired, the costs of engineering, and construction. Preliminary estimates conclude the project will cost approximately $70,000,000.00.

Alternative 1 (Preferred Project): Lowest project cost. Requires the least acquisition of private lands compared to other alternatives screened from the analysis.

Existing Technology

The technological practicability criterion considered whether an alternative was capable of being implemented with existing construction materials and methods while maintaining efficiency and minimizing environmental impacts. For an alternative to be practicable, construction and O&M activities should be implemented while satisfying these conditions.

Alternative 1 (Preferred Project): The proposed alternative could be constructed using available technology.

Logistics

There are logistical factors to consider that constrain the engineering design of the proposed Project, including: layout of permanent and temporary project features and how they relate to meeting the overall project purpose and applicable land use plans, policies, and regulations; necessary private property acquisitions; and project access. In order to be practicable, an alternative should optimize these factors through specific geographic placement of a project, necessary acquisitions of private properties by the project applicant, and the use of existing access routes.

- **Alternative 1 (Preferred Project):** The logistical factors are practicable for this alternative.

This alternative requires the acquisition of private lands in Reach 1 several private residences would need to be acquired to construct the levee.

3.3 Environmental Effects

Table 3.2-1 provides a summary of the alternative criteria selection for the alternative that has been brought forth for analysis. Further analysis for the proposed onsite alternative is presented below.

Table 3.2-1. Practicability of On-Site Alternative

Practicability Criteria	Preferred Alternative (Alternative 1)
Project Purpose	
Meets Overall Project Purpose	Yes
Cost Criteria	
Cost	$70,000,000

Table 3.2-1. Practicability of On-Site Alternative

Practicability Criteria	Preferred Alternative (Alternative 1)
Difference Compared to Preferred Alternative	Yes
Meets Cost Criteria	Yes
Technology Criteria	
Meets Technology Criteria	Yes
Logistics Criteria	
Number of Displaced Properties	7 Residential 37 Non-Residential
Meets Logistics Criteria	Yes
Environmental Criteria	
Impacts to Waters of the US (acres)	Perm: 10.62 Downstream: 17.98 Total: 28.6
Impacts to Sand Migration	Increase of sand supply by 9-14 percent
Total Impacts to Native Vegetation Communities (acres)	273.80
Total Impacts to Critical Habitat – Coachella Valley Milk-Vetch (acres)	14.32
Total Impacts to Critical Habitat – CVFTL (acres)	109.49
Impacts to Cultural, Tribal, or Paleontological Resources	None
Practicable Alternative	**Yes**

3.3.1 Impacts to the Aquatic Ecosystem

The Project would affect ephemeral jurisdictional waters of the U.S. during construction by placing fill material into the drainages to construct levees, channel, and by redirecting runoff away from existing natural channels. Direct impacts would include the removal of native vegetation, the discharge of fill, temporary degradation of water quality, and altered hydrology. Indirect impacts could include alterations to the existing topographical and hydrological conditions to downstream areas that are blocked by the levees.

The levees, channels, and other Project facilities will redirect water flows towards the east, reducing or eliminating the surface flow south (downstream) of the Project. Downstream habitat that could be affected by reduced surface flow is similar to that in the adjacent reaches, and it is interspersed with developed areas. Some of the habitat is in isolated patches surrounded by development. Construction of the levees and channels would redirect runoff and sediment along the upstream sides of the linear project features.

Habitat functions in much of the Project area have been compromised to some degree from illegal dumping, invasive weeds, and OHV use. Reach 1 is located immediately north of a utility right of way which bisect the drainages in the area and provides access for illegal dumping and vehicle passage. Although transient individuals of CVFTL and other species may occur in Reach 1 the drainages in this area. OHV use is also common in the drainages along Reach 3.

3.3.1.1 Alternative 1

Alternative 1 would result in permanent impacts to approximately 17,162 linear feet (LF) and indirect or downstream impacts to 75,407 LF (95,805 total LF) of non-wetland waters of the U.S. Special aquatic sites do not occur in the Alternative 1 footprint or downstream areas and would not be impacted by construction. This amounts to approximately 10.62 acres of permanent impacts and 17.98 acres of downstream impacts (28.6 total acres) to non-wetland waters of the U.S. These impacts are summarized in Table 3.3-1, below. The impacts to waters of the U.S. associated with Alternative 1 are illustrated in Figures A-1 through A-12 of Appendix A.

Table 3.3-1. Impacts to Waters of the US (Alternative 1)

Impact to Waters of the US	Linear Feet	Acres
Permanent	17,162	10.62
Indirect/Downstream	75,407	17.98
Total	95,569	28.6

3.3.2 Other Adverse Environmental Consequences

The alluvial fans, sand fields, and shallow drainages present in the project area support a broad assemblage of native vegetation, dunes, wildlife, and invasive non-native plant species. Road construction and improvements, site preparation for construction of levees, and other Project activities would necessitate removing existing vegetation and habitat.

Direct impacts to wildlife could occur from Project construction and O&M activities because of mechanical crushing, trampling, and disturbance from human activity. Disturbance to wildlife would be associated with the removal of vegetation, construction, and maintenance of the channels and levees and other Project facilities, and changes to existing topographical and hydrological conditions. Indirect impacts to wildlife could include degradation of water quality, changes in hydrology, interference with fluvial and aeolian sand transport, and the spread of invasive weeds.

3.3.2.1 Alternative 1

Implementation of Alternative 1 would result in permanent impacts of approximately 117.82 acres and temporary impacts of approximately 155.98 acres (273.80 total acres) to native vegetation communities. Table 3.3-4, below, provides a summary of these impacts.

Table 3.3-4. Impacts to Native Vegetation Communities (Alternative 1)

Impacts to Native Vegetation Communities	Active Sand Dune/Stabilized Sand Field	Cheesebush Scrub	Creosote Scrub	Creosote Hummocks	Total
Permanent	26.78	3.62	54.89	32.53	117.82
Temporary	48.65	0.84	17.10	89.39	155.98
Total	75.43	4.46	71.99	121.92	273.80

The proposed Project area includes USFWS-designated Critical Habitat for Coachella Valley milk-vetch and CVFTL. In the proposed Project area, Critical Habitat for Coachella Valley milk-vetch is encompassed by Critical Habitat for CVFTL. Under Alternative 1, a total of approximately 14.32 acres of Critical Habitat for Coachella Valley milk-vetch would be affected. This includes 3.31 acres of temporary and 11.01 of

permanent impacts. Additionally, approximately 109.49 acres of Critical Habitat for CVFTL, including 23.77 acres of temporary impacts and 85.72 acres of permanent impacts would occur under Alternative 1. Table 3.3-5 provides a summary of impacts acreages to Critical Habitat under Alternative 1. Most of these impacts occur to areas that do not support the species and are included in the critical habitat designation because they provide important sand fine grain material used by these species.

Table 3.3-5. Impacts to Critical Habitat (Alternative 1)

Critical Habitat	Permanent	Temporary	Total
Coachella Valley Milk-vetch	11.01	3.31	14.32
CVFTL	85.72	23.77	109.49

There are no significant cultural or tribal resources located within the Area of Potential Effect (APE) for the proposed Project. Therefore, potential impacts to cultural or tribal resources associated with implementation of Alternative 1 would only result from unanticipated or inadvertent discoveries during construction. Activities associated with O&M would be unlikely to adversely affect unanticipated cultural or tribal resources. Similarly, the proposed Project area is not located within a paleontologically sensitive area and impacts to buried resources are unlikely during construction or O&M activities associated with Alternative 1.

Implementation of the preferred alternative would increase the sand supply to the Preserve by 9 – 14 percent. This would mainly be attributed to the diversion of water and sediment to the east and southeast towards the primary sand deposition areas along Reach 1. Under current conditions, sand is lost to the system when it is carried into developed areas outside the wind corridor during seasonal storms.

3.4 Conclusions

3.4.1 Preferred Alternative (Alternative 1)

Only Alternative 1 meets the overall project purpose to protect the community of Thousand Palms while minimizing impacts to the aeolian and fluvial sand transport. This alternative also meets the cost, technology, logistics, and environmental effects criteria and therefore, is a practicable alternative. Alternative 1 would:

- Result in 10.62 acres of permanent impacts and 17.98 acres of downstream impacts (28.6 total acres) to non-wetland waters of the U.S.
- Result in the loss of7 Residential and 37 Non-Residential properties.

3.4.4 Conclusions

Each of the alternatives considered in this 404 (B)(1) were evaluated based on meeting the project purpose and need and their ability to have similar cost, technology, and logistics criteria and, therefore, are practicable alternatives. Based on the above practicability analysis there are no less environmentally damaging practicable alternatives for the proposed Project that fully meets the overall project purpose than Alternative 1. As such, the preferred alternative (Alternative 1) is the LEDPA for the proposed Project. Impacts of Alternative 1 on the physical, chemical, and biological components of the aquatic environment are presented and discussed in Section 4.0 of this document.

3.5 Compensatory Mitigation

To offset permanent and indirect impacts to state and federal waters, CVWD is planning to preserve and enhance a total of 70.41 acres of existing drainages following the acquisition of the 550-acre floodway located along Reaches 1 through 3. The Conceptual Mitigation Plan developed for the project identified the project would require 30.28 acres of mitigation under this approach, thus meeting the mitigation requirements while providing surplus acreage and an overall substantial net gain in the function and values of aquatic resources. The 550-acre floodway was selected as the primary source of compensatory mitigation because the area supports a variety of channels, it meets the purpose and need of the project, it ensures that storm flows are conveyed through the project area to the Whitewater River, and it enhances and preserves important fluvial and aeolian wind processes in the region. Under existing conditions, the channels convey storm flows into residential and commercial areas that damage properties and increase the potential for introducing contaminants to the system. In addition, fine sands important to the long-term preservation of the Coachella National Wildlife Refuge are currently lost under existing conditions. Placement of the levees and the preservation of the 550-acre floodway will increase sediment transport to the Refuge and enhance sand habitat within the 550-acre floodway. Development would be prohibited in this floodway and the floodway will covey storm flows southeast towards Reach 3 before entering the channel and flowing through Reach 4. The floodway will drastically increase the extent of jurisdictional waters by increasing the flows from additional canyons in the Indio Hills resulting in a floodway that varies from about 600 feet wide to more than 1 mile wide. Water in this portion of the floodway will travel south towards, and eventually crossing Ramon Road. These features are expected to be inundated during larger storm events.

Development would be prohibited in this floodway to protect the wind corridor and limit disruptions to sand migration. Utilizing the floodway for mitigation will preserve the existing water bodies within the same watershed, and in the same habitats, as well as through enhancement due to increased connectivity and merged flows.

4.0 Existing Conditions, Impacts Analysis and Actions to Minimize Adverse Effects

This section describes the existing physical, chemical, and biological conditions of the proposed Project area.

4.1 Physical and Chemical Characteristics of the Aquatic and Upland Environment

4.1.1 Jurisdictional Determination

A Preliminary Jurisdictional Waters and Wetlands Delineation Report has been prepared for the proposed Project, using pre-2015 rules and guidance for determining geographic jurisdiction (33 CFR 328.3 [1986] as informed by 2003 SWANCC and 2008 Rapanos Guidance documents). The Corps Carlsbad Field Office responded with a Preliminary Jurisdictional Determination in June 2020. There are no intermittent or perennial streams or wetland waters of the US within the proposed Project area. All delineated aquatic features within the proposed Project area are characterized as ephemeral desert drainages (see Figures A-1 through A-12 in Appendix A).

4.1.2 Physical Substrate

Existing Conditions: Soil types in the study area are identified in the "Soil Survey of Riverside County, California, Coachella Valley Area" prepared by the USDA Soil Conservation Service. The dominant soils present on the alluvial fans of the Indio Hills are mostly gravelly sand (Carsitas: CdC), cobbly sand (Carsitas: ChC), and fine sand (Carsitas: CkB). The soils are high in soluble salts and low in organic matter. It is likely that the alluvial fans below the Indio Hills were at least partially formed from historical deposition of sediments prior to the uplift of the hills (USACE, 1997). In the dune areas south of Ramon Road, the soils surface is composed of fine sands (Myoma: MaD) (USACE, 2000).

Weathering of granitic and metamorphic rock in the mountains surrounding the study area has produced large quantities of sand-sized and finer sediment composed primarily of quartz, biotite, and feldspar. Frequent, strong winds blow from the northwest towards the southeast through the San Gorgonio Pass and the Project area, distributing these fine-grained materials throughout large areas of the northern Coachella Valley, and forming dune complexes and sand sheets including in the Coachella Valley Preserve. Sand movement occurs primarily along a wind corridor, which runs in a northwest-to-southeast direction between the Indio Hills and the Whitewater River (USACE, 2000).

Impacts: Construction of the proposed Project is expected to take approximately 27 months to complete. Construction activities would include clearing, grading, trenching and excavation to build the levees and channels. The proposed Project would affect physical substrates of waters of the US during construction and O&M, by placing fill material into jurisdictional waters to construct levees; constructing channels or other flood control structures across jurisdictional drainages; and redirecting runoff away from existing natural channels During these activities, both permanent and temporary impacts to the substrates associated with waters of the US would occur. Implementation of the Alternative 1 would permanently and temporarily impact roughly 10.62 acres and 4.50 acres of channel substrate, respectively. Additionally, approximately 17.98 acres of channel substrate would potentially be affected by downstream impacts (see Figures A-1 through A-12 in Appendix A).

Mitigation Measures: As a part of the proposed Project, CVWD would acquire approximately 550 acres of the floodway located along the levees and in the active wind corridor between Reach 1 and Reach 3. Land acquisition in the floodway would offset impacts if the acquired land is managed and maintained as habitat for special-status species. To further reduce impacts to physical substrates of waters of the US, Mitigation Measures (MMs) BIO-6 (Compensate for Habitat Loss) and MM BIO-19 (Minimize and Mitigate Impacts and Ensure No Net Loss for Jurisdictional Waters) would be implemented.

Prior to proposed Project construction, a water quality certification under Section 404 of the CWA would be obtained from the Regional Water Quality Control Board (RWQCB). The requirements and conditions of the water quality certification would be included as special conditions of the Corps permit decision as necessary and would further mitigate any adverse impacts associated with physical substrates of waters of the U.S.

4.1.3 Currents, Circulation, and Drainage Patterns

Existing Conditions: The proposed Project area does not support any perennial streams or wetland waters of the U.S.; however, numerous ephemeral drainages and desert washes traverse the proposed Project area. During most of the year, there is little or no surface water flow largely due to extremely limited rainfall. During large storm events, flash floods with sharp peaks and short durations are common. Most of these flows eventually percolate into the ground on alluvial fans and along mainstream channels.

Impacts: Construction and operation of the proposed Project would substantially alter the natural drainage patterns in the immediate Project area. Floodwaters with a predominantly southerly flow would be intercepted and directed generally towards the east-southeast. These intercepted flows would be concentrated from sheet flows to more channel-like flows along the toes of the levees and within the channelized reaches. This concentrated stormwater flow could lead to localized increases in erosion and sedimentation. However, the proposed Project includes the installation of a sediment basin at the downstream end of Reach 1, which would reduce storm flow velocity and avoid adverse effects associated with erosion or channel migration.

Additionally, the Reach 4 channel would divert stormwater flows from the southeast end of the Classic Club Golf Course to Washington Street, at which point flows would be guided under Washington Street and into an existing conveyance system with the capacity to transmit proposed Project-related flows. These flows would discharge into an existing detention basin that would be deepened as part of the proposed Project. The proposed Project would deepen the existing Sun City Collection detention basin, such that the current infiltration capacity of the Project area is maintained. Therefore, off-site flooding would not increase from baseline conditions due to construction or operation of the proposed Project.

Under proposed Project conditions, fluvial transport of sand via erosion and sedimentation to the aeolian transport corridor would not only be maintained but would be increased in a supply-limited corridor, which represents a beneficial effect (Lancaster, 2015). Overall, the substantial drainage alteration induced by construction and operation of the proposed Project would result in a substantial beneficial effect for flood protection of residential structures, as well as the supply of sand for aeolian transport to critical habitat. The pattern of erosion and sedimentation in the Project area would be substantially altered through construction and operation of the proposed Project. However, the wind transport corridor for downwind sand transport would be largely undisturbed and may benefit from an increased sand supply (Lancaster, 2015). Sand deposition along the toes of the levees and within the channelized reaches would be removed, distributed, and adaptively managed to not disrupt the existing sand transport capacity of the Project area.

The change in existing stormwater flow patterns would protect existing housing units from the baseline 100-year flood and would divert stormwater flows into an existing conveyance system with adequate capacity. The proposed Project would also increase the sand supply for the aeolian transport corridor within the Project area (Lancaster, 2015), which would be a beneficial impact.

Mitigation Measures: CVWD and the Corps have developed Environmental Commitments (ECs) to be implemented as part of the Project design and/or construction, or O&M activities. ECs are considered part of the proposed Project and would be incorporated during all Project activities. In order to reduce impacts associated with the disruption of the existing sand transport capacity within the proposed Project area, EC SM-1 (Sand Removal and Distribution or Disposal) and EC SM-2 (Adaptive Management Plan) would be implemented. Through implementation of these ECs, sand deposition along the toes of the levees and within the channelized reaches would be removed, distributed, and adaptively managed

4.1.4 Suspended Particulates and Turbidity

Existing Conditions: The proposed Project area does not support any perennial streams or wetland waters of the U.S. and there have been no water quality studies conducted for the proposed Project, thus the existing levels of suspended particulates and turbidity that naturally occur in the proposed Project area have not been measured. Water quality of surface runoff flows would be dependent on materials picked up on the ground surface, which is primarily comprised of natural desert substrates. The proposed Project area is subject to short-term, high-intensity rain events. These naturally occurring, unevenly distributed,

and often extreme events result in temporary increases in suspended particulates and turbidity levels while water is present and flowing in the proposed Project area.

Impacts: Under the proposed Project, there is a potential for water quality impacts due to increased turbidity to non-wetland waters of the US during grading, trenching, and excavation activities. During construction, portions of the proposed Project area may be subject to potential erosion through the removal of stabilizing vegetation and exposure of erodible materials. Some proposed Project activities would include: (1) placing fill materials into waters of the US to construct levees; (2) construction channels or other flood control structures across drainages; and (3) redirecting runoff away from existing natural channels. Cleared, unvegetated, and graded areas exposed to wind, rain, and surface runoff could potentially result in increased turbidity in and immediately downstream from proposed Project work areas. As previously mentioned, there is no water quality data specific to the proposed Project; however, the proposed Project area is subject to short-term, high-intensity rain events that temporarily increase suspended particulates/turbidity in waters of the US throughout the general region. The potential for loosened soil to be transported to a nearby waterbody would be minimized by the generally arid nature of the Project area. Most of the waterbodies within the Project area are ephemeral, and only carry stream flow during and shortly after storm events. Also, the Project area contains an abundance of already loose or poorly consolidated soils (mostly sand) that are routinely transported downstream during storm events. The additional amount of loose soil that would be generated during Project construction would represent a small portion of the total amount of existing loose or poorly consolidated soil within the Project area. A report on the effects of the proposed Thousand Palms flood control structures on the supply of sand-sized sediment to the aeolian sand transport system concluded that the system is supply-limited and that the increased fluvial transport and deposition of sand that would occur under the proposed Project would represent a beneficial impact to the aeolian sand transport system (Lancaster, 2015).

Mitigation Measures: As part of the proposed Project, a Stormwater Pollution Prevention Program (SWPPP), including Best Management Practices (BMPs), would be implemented in compliance with the conditions set forth in State and federal permits or authorizations (California Fish & Game Code Sections 1600-1616 and CWA Sections 401 and 404). Additionally, EC W-2 (Limit Construction During Precipitation Events), MM BIO-6 (Compensate for Habitat Loss), and BIO-19 (Minimize and Mitigate Impacts and Ensure No Net Loss for Jurisdictional Waters) would be implemented to reduce impacts associated with increased levels of suspended particles and turbidity.

Prior to proposed Project construction, a water quality certification under Section 404 of the CWA would be obtained from the RWQCB. The requirements and conditions of the water quality certification would be included as special conditions of the Corps permit decision as necessary and would further mitigate any adverse impacts associated with increased levels of suspended particles and turbidity.

4.1.5 Water Quality

Existing Conditions: The region surrounding the proposed Project area receives runoff from six distinct watersheds (hydrologic subunits) which drain a total area of 421 square miles (USACE, 1997). Following is a summary list of the six watersheds relevant to the proposed Project area.

- **Morongo Wash**. This watershed, located at the western edge of the region, drains an area of approximately 157.8 square miles north of I-10 (USACE, 1997). During normal storm events/conditions, water from the Morongo Wash watershed discharges through three highway bridges at I-10 to the mid-valley area and/or to Whitewater River.

- **Long Canyon/Willow Hole**. This basin is located in the western part of the region and drains an area of approximately 51 square miles (USACE, 1997). The Long Canyon stream system has its headwaters in the Little San Bernardino Mountains and discharges onto an alluvial fan in western Sky Valley. On the alluvial fan, these streams are joined by flows diverted from East-West Wide Canyons and exits Sky Valley at Willow Hole into the Edom Hill area.
- **East and West Wide Canyons**. This watershed is approximately 31.5 square miles in size and drains a portion of the Little San Bernardino Mountains (USACE, 1997). The streams are intercepted at the canyon mouth by Wide Canyon Dam and diverted to the Willow Hole area.
- **Thousand Palms Canyon**. This watershed encompasses about 81.5 square miles of both mountain and valley areas (USACE, 1997). The stream system originates in the Little San Bernardino Mountains, branches through eastern Sky Valley, enters the Indio Hills, and emerges into the Coachella Valley through Thousand Palms Canyon.
- **Pushawalla Canyon**. This watershed is 35.5 square miles in size and originates in the Little San Bernardino Mountains (USACE, 1997). Streams flow in a southerly direction across Sky Valley and pass through the Indio Hills via Pushawalla Canyon, generally parallel to Thousand Palms Canyon.
- **Indio Hills/Coachella Valley**. This watershed is approximately 63.5 square miles in size and is generally bounded by the Indio Hills on the north, I-10 on the south, Flat Top Mountain on the west, and Whitewater River on the east (USACE, 1997). Flood waters from the all the watersheds described above drain into this area. All these flows ultimately discharge eastward to the Whitewater River.
- **Whitewater River.** The Whitewater River is the main drainage course in the Coachella Valley, where it flows in the Whitewater River Stormwater Channel north and northwest of Washington Street (the downstream end of the proposed Project's Reach 4), and in the Coachella Valley Stormwater Channel to the south and southeast of Washington Street. Collectively this drainage system is referred to as the Whitewater River and Coachella Valley Stormwater Channel. This drainage system originates on the southerly slopes of the San Bernardino Mountains and flows in a southeasterly direction through the Coachella Valley and terminates at the Salton Sea.

In addition to the major watersheds listed above, a number of ephemeral drainages that typically only convey surface flows in response to precipitation events are present in the proposed Project area. Given the ephemeral nature of the drainages that occur in the proposed Project area, no specific water quality studies have been conducted for the proposed Project.

Impacts: Construction of the proposed Project would involve the use of heavy equipment and machinery. Use of this construction equipment would involve the handling, use, and storage of hazardous materials, such as diesel fuel, gasoline, lubrication oil, cement slurry, hydraulic fluid, antifreeze, transmission fluid, and lubricating grease. Accidental releases or spills of hazardous materials used during construction could result in the direct contamination of waterbodies within the proposed Project area or the indirect contamination of nearby waterbodies through subsequent transport by stormwater runoff. The potential for the accidental release or spill of a hazardous material to contaminate surface water or groundwater within or near the Project area would be relatively low due to the ephemeral nature of most streams in the proposed Project area. Also, the quantity of hazardous materials that would be handled, used, and stored during construction of the proposed Project would be small enough such that an accidental release or spill could be quickly contained and removed for safe disposal.

Construction of the proposed Project, including excavation and trenching, may encounter shallow groundwater. The potential to encounter shallow groundwater within the Project area is low due as the depth to groundwater throughout the Project area generally exceeds 40 feet below ground surface (bgs).

One exception is the presence of several desert fan palm oases that are sustained by groundwater welling up along fault fractures (USACE, 2000). In the event that shallow groundwater is encountered, dewatering of the excavation or trenching site may be required. If improperly managed, these dewatering activities could result in the discharge of contaminated groundwater.

Mitigation Measures: As mentioned above, a SWPPP, including BMPs, and a RWQCB water quality certification would be implemented as part of the proposed Project. Additionally, EC W-1 (Hazardous Spills) and EC W-2 (Limit Construction During Precipitation Events) would be implemented to further reduce impacts associated with water quality.

4.1.6 Flood Control Functions

Existing Conditions: Average annual precipitation is generally low in the Coachella Valley, but intense storms frequently produce precipitation in a single month which exceeds the normal annual value, and sometimes average annual precipitation is exceeded by more than 100 percent by a single summer thunderstorm. These episodes of intense rainfall, combined with the steep terrain of the surrounding mountains and relatively little vegetation to impede runoff, have historically caused flash floods along the water courses and alluvial fans of the Whitewater River basin.

Due to expanding development throughout the Coachella Valley over the past decade, a larger population of residents is now subject to public safety issues associated with flood hazards increasing the need for flood control and flood hazard protection in the Project area. The portion of the valley north of I-10 is designated as a Special Flood Hazard Area by the Federal Emergency Management Agency (FEMA), indicating that the area would be inundated during the 100-year storm event.

In addition, south of the proposed Project footprint, I-10 acts as a partial barrier to flood flows emanating from the Indio Hills. As a result, interior drainage problems can occur in the southeastern corner of the Thousand Palms area, adjacent to the Coachella Valley Preserve. Flooding can be a problem in this area and along the northern side of I-10, as far north as the Long Canyon drainage.

FEMA publishes Flood Insurance Rate Maps (FIRMs) to identify areas subject to flooding during different flood events, such as 100-year floods. A 100-year flood has a 1/100 or one percent chance of occurring in any given year. The practice is to avoid or restrict construction within the 100-year flood zones, or to engage in flood proofing techniques such as elevating building pads or by constructing flood walls and levees.

Impacts: Construction of the proposed Project would add roughly six miles of levees for the purpose of protecting residents of the Thousand Palms area from seasonal and periodic flooding. The proposed Project would purposefully redirect flood flows away from inhabited areas, removing people and structures from risk of damage due to flooding. The proposed Project would not involve the construction or installation of holding ponds, dams, or any other water storage structures which could potentially rupture and cause flooding. The overall purpose for the proposed Project is to provide flood hazard protection to the areas which are currently located within the FEMA-designated flood hazard zone and floodplain, thus removing the areas at risk from the flood hazard area. These areas are currently at risk of flooding due to the nature of the stormwater runoff from the nearby mountains and the coalescing alluvial fans.

Construction and operation of the proposed Project would purposefully redirect flood flows away from housing units and inhabited areas while maintaining or enhancing the fluvial transport and infiltration capacity of the Project area. Additional housing units would be protected from the 100-year flood and the surrounding areas would be removed from the FEMA flood hazard zone, thus removing the existing risk to life or property from flooding, and not adding any new risk of exposure. This would be a beneficial impact.

Mitigation Measures: No mitigation measures associated with flood control functions are included as part of the proposed Project as implementation of the proposed Project would result in beneficial impacts associated with flood control.

4.1.7 Aquifer Recharge

Existing Conditions: The proposed Project area is underlain by the Coachella Valley Groundwater Basin, which is generally bounded on the north and east by the San Bernardino and Little San Bernardino Mountains and on the south and west by the Santa Rosa and San Jacinto Mountains. There is some flow of groundwater throughout the basin; however, movement of water between sub-basins is limited by fault barriers, basin constrictions, and areas of low permeability. Depth to groundwater varies across the basin, with the depth of domestic, municipal, and irrigation wells ranging from 47 to 1,420 feet (DWR, 2004). Surface runoff and subsurface inflow are significant sources of recharge to local groundwater (DWR, 2004). Following are summary descriptions of the four sub-basins that make up the Coachella Valley Groundwater Basin.

- **Mission Creek Subbasin**. This subbasin is approximately 76 square miles in size and underlies the northwestern portion of the Coachella Valley, north of the proposed Project area. This sub-basin is bounded on the north and east by the Mission Creek Fault (North Branch San Andreas Fault) and on the south by the Banning Fault (South Branch San Andreas Fault), with the San Bernardino Mountains to the west. Both the Mission Creek Fault and the Banning Fault are barriers to groundwater movement. Water level differences across the Banning Fault, between the Mission Creek Subbasin and Garnet Hill Subbarea, are approximately 200 to 250 feet (CVWD, 2012).
- **Whitewater River (Indio) Subbasin**. This sub-basin is approximately 525 square miles in size and encompasses a major portion of the Coachella Valley floor. The proposed flood control facilities are located within the Thousand Palms Sub-area of the Whitewater River Subbasin. This sub-area is peripheral, with unconfined groundwater conditions. Unlike the other aquifers in the Whitewater River Subbasin, which have a calcium bicarbonate chemical characteristic, groundwater in the Thousand Palms sub-area is sodium sulfate in character. The chemical differences suggest that recharge to the Thousand Palms sub-area comes primarily from the Indio Hills and is limited in supply. The Whitewater River Subbasin includes five Subareas: Palm Springs, Garnet Hill, Thermal, Thousand Palms, and Oasis Subareas. (CVWD, 2012). This subbasin is drained by the Whitewater River and its tributaries. The Whitewater River rarely flows throughout the year and flow in its tributaries is intermittent.
- **San Gorgonio Pass Subbasin**. This sub-basin is located northeast of the Garnet Hill Fault and the Whitewater River Subbasin. It is considered a distinct sub-basin because the Banning and Garnet Hill Faults are effective barriers to groundwater movement. The main source of recharge to the sub-basin is the Whitewater River through the permeable deposits which underlie Whitewater Hill. (CVWD, 2012)
- **Desert Hot Springs Subbasin**. This sub-basin is located in the alluvial fan area between the Little San Bernardino Mountains and the Indio Hills. The San Andreas and Mission Creek Faults form the south-westerly boundary of the sub-basin. This subarea is not extensively developed except in the Desert Hot Springs area. (CVWD, 2012)

Impacts: Construction of the proposed Project would require the use of water for dust suppression, soil conditioning, and the mixing of soil cement. Approximately 647.9 acre-feet of water would be required for construction of the proposed Project. It is anticipated that this water would be obtained from public hydrants supplied by the CVWD. Construction water use for the proposed Project would be temporary and would represent a small percentage of the total available water supply from the CVWD. Construction water use would not directly deplete groundwater supplies.

A small amount of dewatering, however, may be required during construction of the proposed Project, but these dewatering activities would be temporary and would not adversely affect the production of a nearby well or substantially deplete groundwater supplies. Neither construction nor operation of the proposed Project would substantially interfere with groundwater recharge; impervious surfaces would be small and distributed throughout the watershed. Sufficient permeable surfaces would remain throughout the watershed such that the rate of groundwater recharge would remain unchanged as a result of construction and operation of the proposed Project.

Mitigation Measures: Neither construction nor operation of the proposed Project would result in substantial groundwater extraction or dewatering which would adversely affect a nearby water well or substantially deplete groundwater supplies. Construction and operation of the proposed Project would not substantially interfere with groundwater recharge because sufficient permeable surfaces would remain throughout the watershed such that infiltration rates would remain unchanged. Consequently, no mitigation associated with groundwater recharge has been presented.

4.2 Biological Characteristics of the Aquatic Environment

4.2.1 Threatened or Endangered Species

Existing Conditions: The Draft EIR/EIS includes details regarding the methodologies that were used to determine the potential for threatened and endangered species to occur in the proposed Project area (CVWD/USACE, 2020). These methods consisted of literature searches, consultation with applicable agencies and local experts, and a variety of field surveys. Through these efforts, it was determined that one federally-listed plant species, Coachella Valley milk-vetch, and two federally-listed wildlife species, desert tortoise and CVFTL occur, or have the potential to occur, in the proposed Project area. A single Coachella Valley milk-vetch was observed within Reach 4 along the northern shoulder of Avenue 38 during surveys conducted in 2010. This occurrence was not observed during surveys conducted in 2013 or 2016; however, this species may occur only as dormant seed in periods of low rainfall. Desert tortoise has not been observed in the proposed Project area; however, unoccupied potential desert tortoise burrows were observed during surveys. Desert tortoise is only rarely observed in the general vicinity of the proposed Project area. It has a moderate potential for occurrence in the proposed Project area, although only rarely and in very low numbers. The California Natural Diversity Data Base (CNDDB) reports numerous CVFTL occurrences near each proposed Project Reach. However, many of these observations are historic data. Surveys conducted for the proposed Project detected several CVFTL within Reach 4 and the adjacent sand deposition area as recently as 2013.

USFWS-designated Critical Habitat for Coachella Valley milk-vetch and CVFTL also occur in the proposed Project area (see Figure 4-1). The Coachella Valley milk-vetch requires fluvial or aeolian sand habitat and the CVFTL requires aeolian sand habitat. Therefore, the boundary of the designated Critical Habitat for each species extends beyond the limits of the species' distribution to include the upwind and upstream sand source, which is essential in maintaining fluvial and aeolian sand habitat (USFWS, 1985; USFWS, 2013).

The proposed Project area supports an assemblage of native vegetation communities and habitats, including creosote scrub and hummocks, cheesebush scrub, and active sand dunes/stabilized sand fields (the vegetation types described in this report use the Sawyer et al. [2009] classifications). Additionally, several unnamed ephemeral drainages flow throughout the proposed Project area. Ephemeral streams in the arid west provide important habitat for wildlife and are responsible for much of the biotic diversity

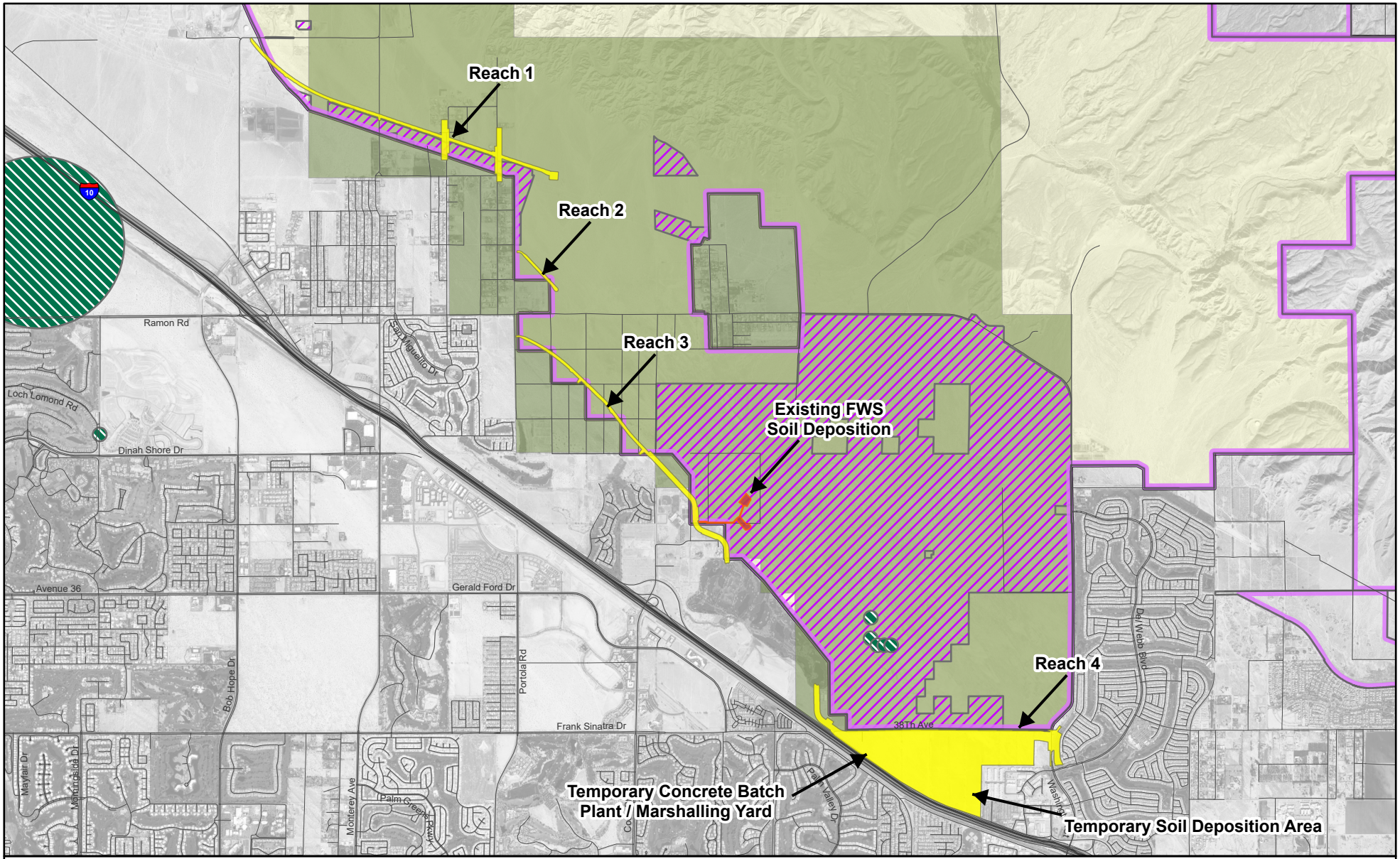


Figure 4-1

Critical Habitat Near Proposed Project Area

(Levick et al., 2008). They have higher moisture content and provide shade and cooler temperatures within the channel. In cases where the habitat is distinct in species composition, structure, or density, wash communities provide habitat values not available in the adjacent uplands. Wash dependent vegetation along desert washes drive food webs, provide seeds for regeneration, habitat for wildlife, access to water, and create cooler, more hospitable microclimatic conditions essential for a number of plant and animal species. Baxter (1988) noted that washes, because of their higher diversity plant communities, are probably important foraging locations for desert tortoise; in smaller washes, there is greater cover and diversity of spring annuals, providing important food sources. Although these drainages do not provide the same complexity, structure, and species composition as more mesic, riparian systems, arid drainages provide important structural features and play an important role in dispersal for a variety of wildlife species.

Impacts: The proposed Project could have potential direct and indirect impacts to Coachella Valley milk-vetch, desert tortoise, and CVFTL. These could include loss of habitat, trampling or crushing from heavy equipment, vehicles, or foot traffic, alterations to the native seed bank due to soil compaction, and modifications to existing hydrological conditions. Potential indirect impacts could include the disruption of native seed banks through soil alterations, the accumulation of fugitive dust, increased erosion and sediment transport, disruption of the sand transport system, and the colonization of non-native, invasive plant species.

Implementation of Alternative 1 would result in temporary impacts to approximately 3.31 acres and permanent impacts to approximately 11.01 acres (14.32 total acres) of Critical Habitat for Coachella Valley milk-vetch. It would also result in temporary impacts to approximately 23.77 acres and permanent impacts to approximately 85.72 acres (109.49 total acres) of Critical Habitat for CVFTL.

Mitigation Measures: The proposed Project includes numerous ECs and MMs that are required to minimize or avoid impacts to T&E species and Critical Habitat. These include, but are not limited to, EC B-3 (Avoid Impacts to Sensitive Species), MM BIO-1 (Conduct Preconstruction Biological Resources Surveys), MM BIO-2 (Conduct Biological Monitoring and Reporting), MM BIO-10 (Conduct Coachella Valley Fringe-Toed Lizard and Flat-Tailed Horned Lizard Surveys, Monitoring, and Avoidance), and MM BIO-12 (Conduct Desert Tortoise Surveys, Monitoring, and Avoidance).

4.2.2 Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web

The drainages that occur within the proposed Project area are defined as ephemeral and are typically dry. Water conveyance is infrequent and only occurs following precipitation events of intensities that are sufficient enough to result in flowing water. As such, drainages present in the proposed Project area do not support suitable habitat for fish, crustaceans, mollusks, or other aquatic organisms.

4.2.3 Other Wildlife

Existing Conditions: The distribution of wildlife in the proposed Project area varies depending on location, vegetation community, and disturbance level. There is no aquatic habitat in the proposed Project area and no fish or amphibians are expected to occur. As identified in the Draft EIR/EIS, five non-listed, special status wildlife species were detected within the proposed Project area during surveys conducted for the proposed Project, including: burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), Bendire's thrasher (*Toxostoma bendirei*), Colorado Valley woodrat (*Neotoma albigula venusta*), and Palm Springs round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*) (CVWD/USACE, 2020).

Although not identified during surveys, the proposed Project area supports suitable habitat for 16 additional non-listed, special-status wildlife species. The Draft EIR/EIS identified each of these species as having a moderate to high potential to occur. These include: Coachella Valley giant sand treader cricket (*Macrobaenetes valgum*), Coachella Valley Jerusalem cricket (*Stenopalmatus caehuilaensis*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), Le Conte's thrasher (*Toxostoma lecontei*), black-tailed gnatcatcher (*Polioptila melanura*), vermilion flycatcher (*Pyrocephalus rubinus*) flat-tailed horned lizard (*Phrynosoma mcallii*), Palm Springs pocket mouse (*Perognathus longimembris bangsi*), earthquake Merriam's kangaroo rat (*Dipodomys merriami collinus*), western mastiff bat (*Eumops perotis californicus*), western yellow bat (*Lasiurus xanthinus*), pocketed free-tailed bat (*Nyctinomops femerosaccus*), big free-tailed bat (*N. macrotis*), American badger (*Taxidea taxus*), and desert kit fox (*Vulpes macrotis arsipus*).

Impacts: The proposed Project would permanently impact 10.62 acres and temporarily impact 4.50 acres of waters of the US. Additionally, approximately 17.98 acres would potentially be affected by downstream impacts. The proposed Project would also result in the permanent disturbance of 117.82 acres and temporary disturbance of 155.98 acres of native vegetation communities.

Implementation of the proposed Project would result in direct and indirect impacts to non-aquatic biological resources, including wildlife, their habitat, and their movement corridors. Construction of the proposed Project could have direct effects on non-aquatic wildlife as a result of mortality or habitat loss. Construction activities such as grading, trenching, and the movement of vehicles and heavy equipment may result in the direct mortality of terrestrial species. Non-aquatic wildlife may also be indirectly affected by construction of the proposed Project as a result of noise, vibration, night lighting, the introduction of invasive weed species, and fugitive dust.

Construction activities could also directly and indirectly impact nesting birds found in and adjacent to the proposed Project area through the removal of native vegetation or the destruction or abandonment of active nests.

Mitigation Measures: To minimize and avoid impacts to non-aquatic wildlife, numerous ECs and MMs would be implemented as part of the proposed Project. These include, but are not limited to, the following: MM BIO-1 (Conduct Preconstruction Biological Resource Surveys); MM BIO-2 (Conduct Biological Monitoring and Reporting); MM BIO-8 (Prepare and Implement an Integrated Weed Management Plan); MM BIO-10 (Ensure Wildlife Impact Avoidance and Minimization); MM BIO-14 (Conduct Preconstruction Surveys and Monitoring for Breeding Birds); MM BIO-15 (Conduct Surveys and Avoidance for Burrowing Owl); MM BIO-16 (Conduct Surveys and Avoidance for Bat Roosts); MM BIO-17 (Conduct Surveys and Avoidance for Special-Status Small Mammals); and, MM BIO-18 (Conduct Surveys and Avoidance for American Badger and Desert Kit Fox).

4.3 Special Aquatic Sites

There are no special aquatic sites (as defined by 40 CFR 230.40-45) located within the proposed Project area.

4.4 Human Use Characteristics of the Aquatic Environment

4.4.1 Municipal and Private Water Supplies

Existing Conditions: The CVWD provides water-related services for most of the Coachella Valley, including the Thousand Palms area. The CVWD's sources of water supply include local groundwater, Colorado River water, and the State Water Project. Water from the Colorado River is delivered to the Coachella Valley by

the Coachella Canal, which is a branch of the All-American Canal. The Coachella Canal is 122 miles long and branches out from the All-American Canal 37 miles downstream from the All-American Canal's origin at Imperial Dam on the Colorado River. Lake Cahuilla is the terminal reservoir for the Coachella Canal and provides storage for a reserve supply of water. In addition, the CVWD exchanges its allocation of water from the State Water Project with the Metropolitan Water District (MWD) for water from the Colorado River. The water exchanged with MWD is delivered from MWD's Colorado River Aqueduct, which crosses the Coachella Valley. (USACE, 2000)

Impacts: It is possible that construction and operation of the proposed Project could contaminate one of these sources of public water supply either through increased sedimentation or through indirect contamination of the waterbody from the accidental release and subsequent transport by storm water of a hazardous material. The potential for contamination of a public water supply is very low due to the generally arid nature of the Project area, the distance between Project activities and public water supplies, and the small amounts of hazardous materials that would be used during construction and operation of the proposed Project.

Mitigation Measures: BMPs would be established through EC W-1 (Hazardous Spills) and EC W-2 (Limit Construction During Precipitation Events). Additionally, MMs PS-2 (Refueling Practices), PS-3 (Worker Training), PS-4 (Human Waste), PS-5 (Phases I Environmental Site Assessment), and PS-6 (Worker Environmental Awareness Program) would be implemented to reduce potential impacts associated with water supplies.

4.4.2 Recreational and Commercial Fisheries

All waters of the U.S. that occur in the proposed Project area are characterized as ephemeral. The waters of the U.S. occurring in the proposed Project area do not support opportunities for recreational or commercial fisheries.

4.4.3 Water-Related Recreation

The proposed Project area does not support opportunities for water-related recreation.

4.4.4 Aesthetics

Existing Conditions: With respect to aesthetics, the general study area boundaries include Interstate 10 (I-10) to the southwest, the Indio Hills to the northeast and east; Flat Top Mountain, Edom Hill, and the mouth of Long Canyon to the northwest; and Coachella Canal Siphon on the southeast. This area is approximately 45 square miles in size and is considered sufficient to capture all potential aesthetic impacts of the proposed Project (USACE, 2000). The community of Thousand Palms is located within the study area for aesthetics, and cities in the vicinity include Palm Springs to the northwest, Cathedral City to the southwest, the City of Indio to the southeast.

Impacts. Construction of the proposed Project would alter the visual character of the project area as a whole, primarily due to the development of the levees which, although would be designed to blend in with the natural surroundings, would result in a disruption of the viewshed. Foreground views of the desert landscape would be obstructed for residences located in proximity to the levee in Reach 1, as well as for recreationists using the regional trails located near Reach 1 and Reach 3. Impacts to scenic vistas would be significant and unavoidable.

The proposed Project would permanently impact approximately 10.62 acres of a broader total of 55.08 acres of waters of the US that occur within the proposed Project area. This represents approximately 19.3

percent of those that are present in the proposed Project area. Temporary impacts to waters of the US would occur to approximately 4.50 acres where necessary to allow for construction of the proposed Project components and approximately 17.98 acres may potentially be affected by downstream impacts. The ephemeral drainages that occur within the proposed Project area viewshed are currently unvegetated or sparsely vegetated with desert plants that also typically occur in the surrounding upland habitats and are not visually unique.

Mitigation Measures. Impacts to aesthetic resources resulting from the proposed Project are significant and unavoidable. To reduce these impacts, EC-V1 (Design Consistent with Surroundings) would be implemented.

4.4.5 Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

Existing Conditions: There are several designated conservation lands in the proposed Project vicinity. These include: the state-owned Coachella Valley Ecological Reserve; the Coachella Valley National Wildlife Refuge, which is mostly owned by the USFWS and includes part of the Coachella Valley Ecological Reserve; and the Coachella Valley Preserve which encompasses U.S. Bureau of Land Management (BLM) Area of Critical Environmental Concern (ACEC) land as well as privately owned conservation lands. Together these conservation lands help to protect a large dune system and its biological resources.

Located immediately adjacent to the proposed Project boundary to the north and east is the 15,000-acre Preserve (see Figure 4-2). The Preserve is managed per direction of the CVMSHCP, and in compliance with a Natural Community Conservation Plan (NCCP) Permit issued by the California Department of Fish and Wildlife (CDFW) in September of 2008, with a final permit for the CVMSHCP issued USFWS in October of 2008 (CVAG, 2014). The Coachella Valley National Wildlife Refuge, managed by the USFWS in conjunction with the Sonny Bono Salton Sea National Wildlife Refuge Complex, comprises approximately 3,709 acres within the Preserve (USFWS, 2011). Whereas the Refuge is managed exclusively by the USFWS, the Preserve is jointly managed by The Nature Conservancy, the BLM, the California Department of Fish and Wildlife (CDFW), the USFWS, and the Center for Natural Lands Management (USFWS, 2011). As noted, the Preserve is managed in compliance with a 2008 permit issued by the USFWS. Both the Preserve and the Refuge protect a large sand dune complex that provides habitat for the CVFTL, which is listed as a threatened species by the federal government and as an endangered species by the State of California.

The Coachella Valley Preserve would be traversed by portions of Reaches 3 and 4. This open space area provides many outdoor recreational opportunities including sightseeing, hiking, bird watching, photography, and picnicking. Overnight camping and off-highway vehicle (OHV) use are restricted within the Preserve. The Preserve also contains several palm oases including the Thousand Palms Oasis, and Willis and Indian Palms Oases. Horses and bicycles are not allowed in any of the palm oases. The Preserve is open every day from sunrise to sunset (CNLM, 2012).

Impacts: Secondary objectives of the proposed Project are to enhance the viability of the Coachella Valley Preserve and Wildlife Refuge (respectively) by establishing clear boundaries; avoiding disruption of aeolian (wind) processes for sand transport; preserving an approximately 550-acre floodway area; and replenishing sand on the Preserve/Refuge during the O&M phase by collecting material that has gathered along Project facilities and redistributing it on the Preserve/Refuge within the active wind corridor, whereas such materials would otherwise continue traveling downwind/downstream away from the protected habitat areas. As such, implementation of the proposed Project would ultimately result in beneficial impacts to the Preserve.

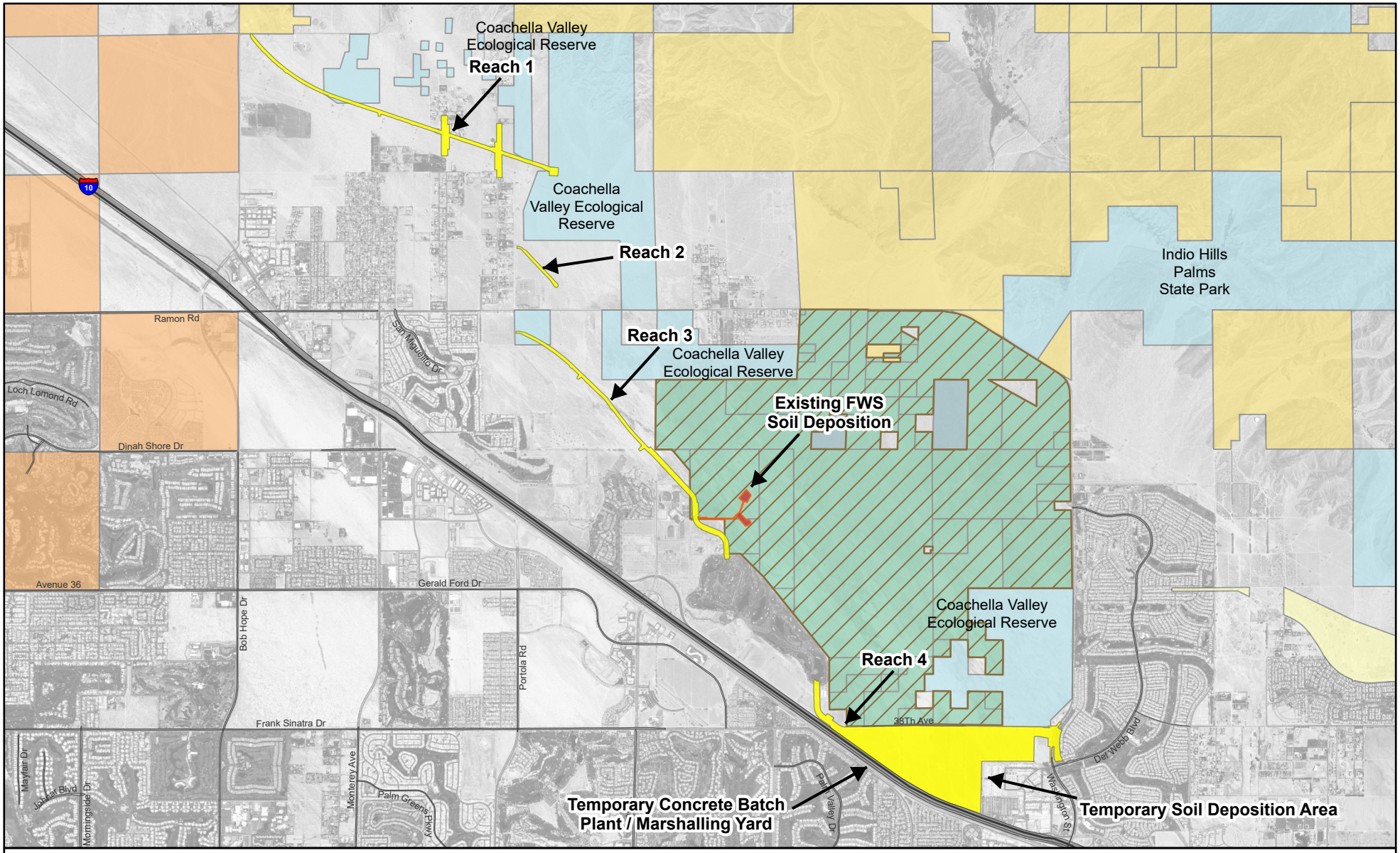


Figure 4-2

Land Ownership in the Proposed Project Area

Mitigation Measures: In order to ensure that beneficial impacts are maintained, the proposed Project requires the implementation of EC SM-1 (Sand Removal and Distribution or Disposal), EC SM-2 (Adaptive Management Plan), MM SM-1 (Minimize Sand Impacts), and MM SM-2 (Prepare and Implement a Sand Migration Management Plan).

5.0 Determination of Cumulative Effects on the Aquatic Environment

Cumulative effects associated with the proposed Project are described in detail in Section 5.0 of the Draft EIR/EIS (CVWD/USACE, 2020). That analysis determined that implementation of the proposed Project would contribute to significant and unavoidable cumulative impacts to Aesthetics, Air Quality (specifically PM10 and PM2.5 air pollutant emissions), Land Use and Recreation, Noise, and Traffic. With implementation of mitigation measures, cumulative impacts to sand migration would be reduced to less than significant. Lastly, there would be no cumulative impacts to Biological Resources; Cultural Resources; Paleontological Resources; Public Safety; Socioeconomics and Environmental Justice; Topography, Geology, and Soils; and Water Resources.

Existing and future projects analyzed in the Draft EIR/EIS, including those listed in Table 5.1-1, which are considered to result in potentially cumulative impacts, are under the jurisdiction of the CVWD; County of Riverside; the cities of Palm Desert, Rancho Mirage, Indio, and Palm Springs; US Fish and Wildlife Service (USFWS); Bureau of Land Management (BLM–Palm Springs); and Coachella Valley Association of Governments (CVAG). In compiling this list, additional agencies and organizations were contacted to determine all potential cumulative projects, including the community of Bermuda Dunes; cities of Cathedral City, Palm Desert, Indian Wells, and La Quinta; Coachella Valley National Wildlife Refuge; Bureau of Indian Affairs (Agua Caliente Reservation); and California State Lands Commission.

5.1 Baseline Conditions

The "geographic scope" of the analysis of cumulative impacts refers to the area within which cumulative impacts are likely to occur. For the proposed Project, the majority of the cumulative effects analysis makes a broad, regional evaluation of the impacts of existing and reasonably foreseeable future projects that affect waters of the US, plant communities, wildlife, and habitats within the northern Coachella Valley.

The area of potential cumulative effects for water resources is defined as the drainage area bordered by the south flanks of the Little San Bernardino Mountains on the north and east, the Morongo Wash/Mission Creek drainage divide on the west, and Interstate 10 (I-10) on the south. Cumulative impacts for water quality and resources are assessed based on consideration of past, current, and future development. In particular, the projects that could have the greatest potential to combine with the Project's effects on water resources are listed in Table 5.1-1 and illustrated in Figure 5-1.

Table 5.1-1. Projects with Potential to Contribute to Cumulative Effects

Project ID and Type	Project Name	Location	Description and Status
APN 648-030-016 Domestic Water Supply	Mission Hills Pressure Zone Infrastructure Improvements	Northeast intersection of Rio Del Sol Road and Vista Chino Drive	Construction of a potable water reservoir facility that includes up to three 6.5-million-gallon reservoirs, a retention basin, and a graded access road. A new 36-inch diameter pipeline running south from the reservoir site and then west to a private easement is also proposed. Status: Bidding.

Table 5.1-1. Projects with Potential to Contribute to Cumulative Effects

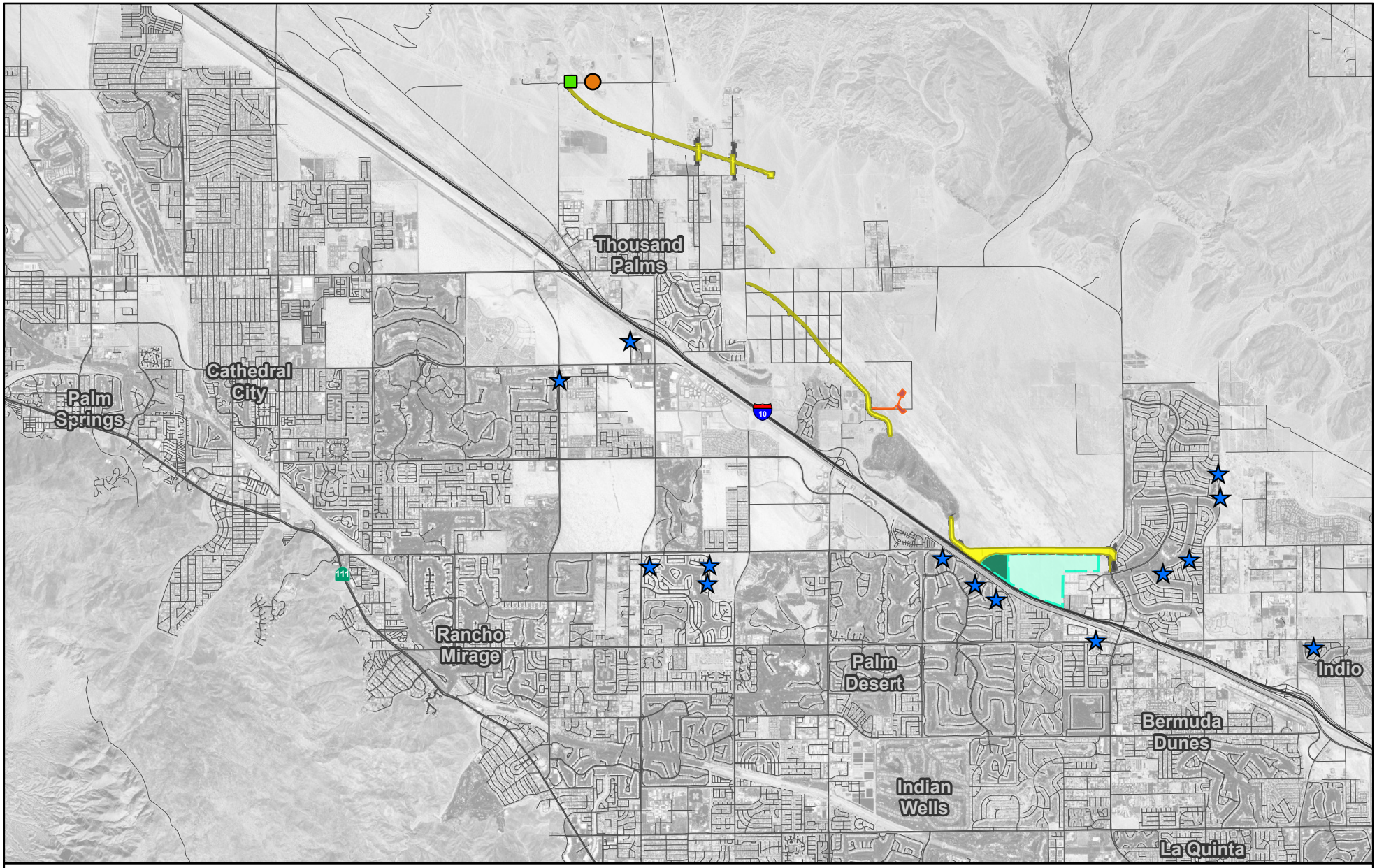
Project ID and Type	Project Name	Location	Description and Status
APN 648-030-020 Domestic Water Supply	Sky Mountain Reservoir No. 4605 and Pipeline	North of Vista Chino Drive, and approximately one-half mile east of Rio del Sol	Construction of two 10-million-gallon reservoirs and associated water conveyance pipeline. Status: Construction 2016/2017.
Domestic Water Treatment	Chromium-6 Water Treatment Facilities Project	Various sites within the Coachella Valley	Installation of chromium-6 water treatment facilities throughout the Coachella Valley. Status: Construction planned for spring/winter 2016 for duration of 3 years.

5.2 Context

At the landscape level, the proposed Project is large compared to other activities that have occurred within the geographic area. However, in terms of impacts to waters of the US when compared to other reasonably foreseeable projects (see Table 5.1-1), the proposed Project is typical of other activities in the watershed.

The proposed Project would be located in the Coachella Valley in an area characterized by braided, erosive stream channels, flash flooding, alluvial fan conditions, low rainfall, sparse vegetation, and the potential for wind erosion. There are no perennial or intermittent drainages within the proposed Project area. Alterations to hydrology and water quality from surface runoff would be dependent on disturbances to the ground surface, which is primarily comprised of natural desert. Cumulative impacts to water quality are not anticipated due to the low amount of rainfall received in the region, the irregularity of subsequent flow events, and the lack of impervious surfaces that would be constructed as part of the proposed Project. The proposed Project includes ECs and MMs that have been designed to limit the potential adverse effects on hydrology and water quality, as well as to ensure that implementation of the proposed Project would adhere to applicable regulatory requirements for both the construction and the O&M phases. These regulatory requirements would not only apply to the proposed Project, but to all foreseeable projects in the region. Therefore, cumulative impacts on surface water quality of receiving waters from the proposed Project and future projects in the watershed would be addressed through compliance with applicable regulatory requirements that are intended to be protective of beneficial uses of the receiving waters.

While the Project might combine with other projects in the region, offsite soil mobilization which could lead to violations of water quality standards, waste discharge requirements, or contaminate groundwater, is unlikely to combine with other projects in the region with implementation of the SWPPP, project-specific BMPs, and in consideration of the temporal nature of construction overlap, and the arid climate in the region. Impacts would not be cumulatively considerable. The Project's construction water use would be temporary and represent a small percentage of the total available water supply from the CVWD, such that water supply impacts would not be cumulatively considerable. The Project has been designed to tie into existing facilities with capacity to accept the flood flows and would purposefully redirect storm water flows within the region to remove people and structures from risk of damage due to flooding resulting in a beneficial impact.



Sources: Riverside County, 2016; City of Palm Desert, 2016; City of Rancho Mirage, 2016; City of Indio, 2016; City of Palm Springs, 2016; USFWS, 2016; BLM, 2016; CVAG, 2016; Coachella Valley National Wildlife Refuge, 2016

0 2 Miles

- Permanent Impact Area
- Temporary Impact Area
- Temporary Soil Deposition Area
- Temporary Concrete Batch Plant/ Marshalling Yard
- Existing FWS Soil Deposition
- Mission Hills Pressure Zone Infrastructure Improvements
- Sky Mountain Reservoir No. 4605 and Pipeline
- Chromium-6 Water Treatment Facilities Project

Figure 5-1

Cumulative Projects

As described in the Draft EIR/EIS, the proposed Project would be expected to contribute only a small amount to the cumulative effects related to sand migration and biological resources. Development in the proposed Project area could affect (directly and indirectly) sand source areas and fluvial transport, which would result in a significant cumulative impact. However, the proposed Project has specifically been designed with the objective of enhancing the viability of the Preserve/Refuge by establishing clear boundaries for the Preserve/Refuge, minimizing disruption of aeolian processes for sand transport, preserving an approximately 550-acre floodway area, and replenishing sand on the Preserve/Refuge during the O&M phase. With these features, and implementation of EC SM-1 (Sand Removal and Distribution or Disposal), EC SM-2 (Adaptive Management Plan), and Mitigation Measures SM-1 (Minimize Sand Impacts), and SM-2 (Prepare and Implement a Sand Migration Management Plan) during Project construction would be reduced to a less-than-significant level. As such, the Project's sand migration impacts would not be cumulatively considerable. Implementation of MM BIO-6 (Compensate for Habitat Loss) and MM BIO-19 (Minimize and Mitigate Impacts to Jurisdictional Waters) would reduce cumulative impacts to biological resources to less than significant as these require compensation for both permanent and temporary impacts to biological resources.

Based on the above, the proposed Project's contribution, in combination with past, present, and reasonably foreseeable project, to potential cumulative impacts at the watershed level would not be cumulatively significant.

6.0 References

Aspen Environmental Group. 2020. Draft Environmental Impact Report/Environmental Impact Statement for the Thousand Palms Flood Control Project

Baxter, R.J. 1988. Spatial distribution of desert tortoises (*Gopherus agassizii*) at Twentynine Palms, California: Implications for relocations. In: Proceedings of the symposium: Management of amphibians, reptiles, and small mammals of North America. 1988 July 19-21. Gen. Tech. Rep. RM-166. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO: 180-189.

CNLM (Center for Natural Lands Management). 2012. Coachella Valley Preserve - Thousand Palms Oasis Preserve. [Online]: http://coachellavalleypreserve.org/. Accessed March 2016.

CVAG (Coachella Valley Association of Governments), 2014. Coachella Valley MSHCP. [Online]: http://www.cvmshcp.org/. Accessed October 22, 2014.

_____. (Coachella Valley Association of Governments). 2007. Coachella Valley Multiple Species Habitat Conservation Plan (CV-CVMSHCP) Final Recirculated Draft. [Online]: http://www.cvmshcp.org/Plan_Documents.htm.

CVWD (Coachella Valley Water District). 2012. Engineer's Report on Water Supply and Replenishment Assessment, Lower Whitewater River Subbasin Area of Benefit 2012–2013. May. [Online]: http://www.cvwd.org/news/publicinfo/2012_07_13_EngineeringReport-LowerWhitewaterRiver2012-2013-FINAL.pdf. Accessed January 22, 2013.

CVWD / USACE (U.S. Army Corps of Engineers). 2020. Thousand Palms Flood Control Project. Draft Environmental Impact Statement / Environmental Impact Report. September.

DWR (California Department of Water Resources). 2004. California's Groundwater Bulletin 118: Hydrologic Region Colorado River, Coachella Valley Groundwater Basin. [Online]: www.water.ca.gov. Accessed January 22, 2013.

Lancaster, Nicholas. 2015. Geomorphic Assessment of Sand Transport Impacts for the Thousand Palms Flood Control Project – Document Review. Prepared for Aspen Environmental Group. 13 pp.

Levick, L., J. Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, R. Leidy, M. Scianni, D.P. Guertin, M. Tluczek, and W. Kepner. 2008. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. U.S. Environmental Protection Agency and USDA/ARS Southwest Watershed Research Center, EPA/600/R-08/134, ARS/233046, 116 p. [Online]: http://www.epa.gov/esd/land-sci/pdf/EPHEMERAL_STREAMS_REPORT_Final_508-Kepner.pdf.

NHC (Northwest Hydraulic Consultants). 2017. Technical Memorandum from Brady McDaniel and Jimmy Pan of Northwest Hydraulic Consultants to Mark Salmon of Parsons Brinkerhoff and Tesfaye Demissie of Coachella Valley Water District. Subject: Draft: Thousand Palms Flood Control Project (TPFCP) Reach 2 Levee Removal Hydraulic Modeling. May 11.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento, CA. 1300 pp.

SLA (Simons, Li and Associates, Inc). 1997. Sand Migration Impact Evaluation Report: Thousand Palms Area, Coachella Valley, Riverside County, California. Volume I and II. Prepared for U.S. Army Corps of Engineers, Los Angeles District.

_____. 1996. Sand Migration Study for Flood Control Projects in Thousand Palms Area, Coachella Valley, California. Prepared for U.S. Army Corps of Engineers, Los Angeles District.

USACE (U.S. Army Corps of Engineers). 2000. Whitewater River Basin (Thousand Palms) Flood Control Project. Final Environmental Impact Statement/Environmental Impact Report. September.

_____. 1997. Sand Migration Impact Evaluation for Thousand Palms Flood Control Project, Volume II: Baseline and Future Without Project Conditions. Prepared by Simons, Li & Associates. February.

USFWS (U. S. Fish and Wildlife Service). 2013. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Astragalus lentiginosus var. coachellae* (Coachella Valley Milk-Vetch). Federal Register 78(30): 10450-10497. [Online]: http://www.gpo.gov/fdsys/pkg/FR-2013-02-13/pdf/2013-03109.pdf

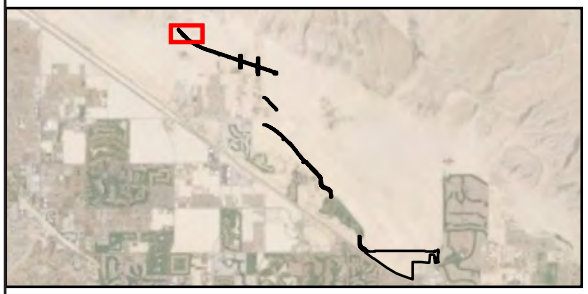
_____. (U.S. Fish and Wildlife Service), 2011. Coachella Valley National Wildlife Refuge. [Online]: http://www.fws.gov/saltonsea/Coachella/CV_index.html. Accessed October 22, 2013.

_____. 1985. Coachella Valley Fringe-toed Lizard Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 60 pp. [Online]: https://www.fws.gov/carlsbad/SpeciesStatusList/RP/19850911_RP_CVFTL.pdf

Appendix A

Impacts to Waters of the U.S.

Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

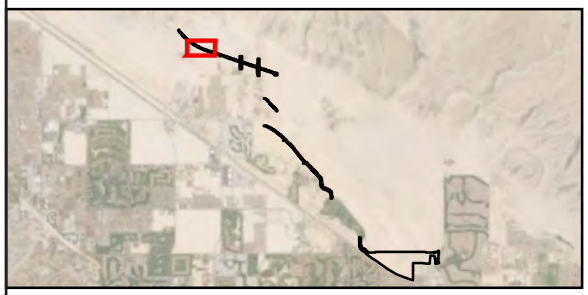
100 0 200 Feet

Figure A-1

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

100 0 200 Feet

Figure A-2

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

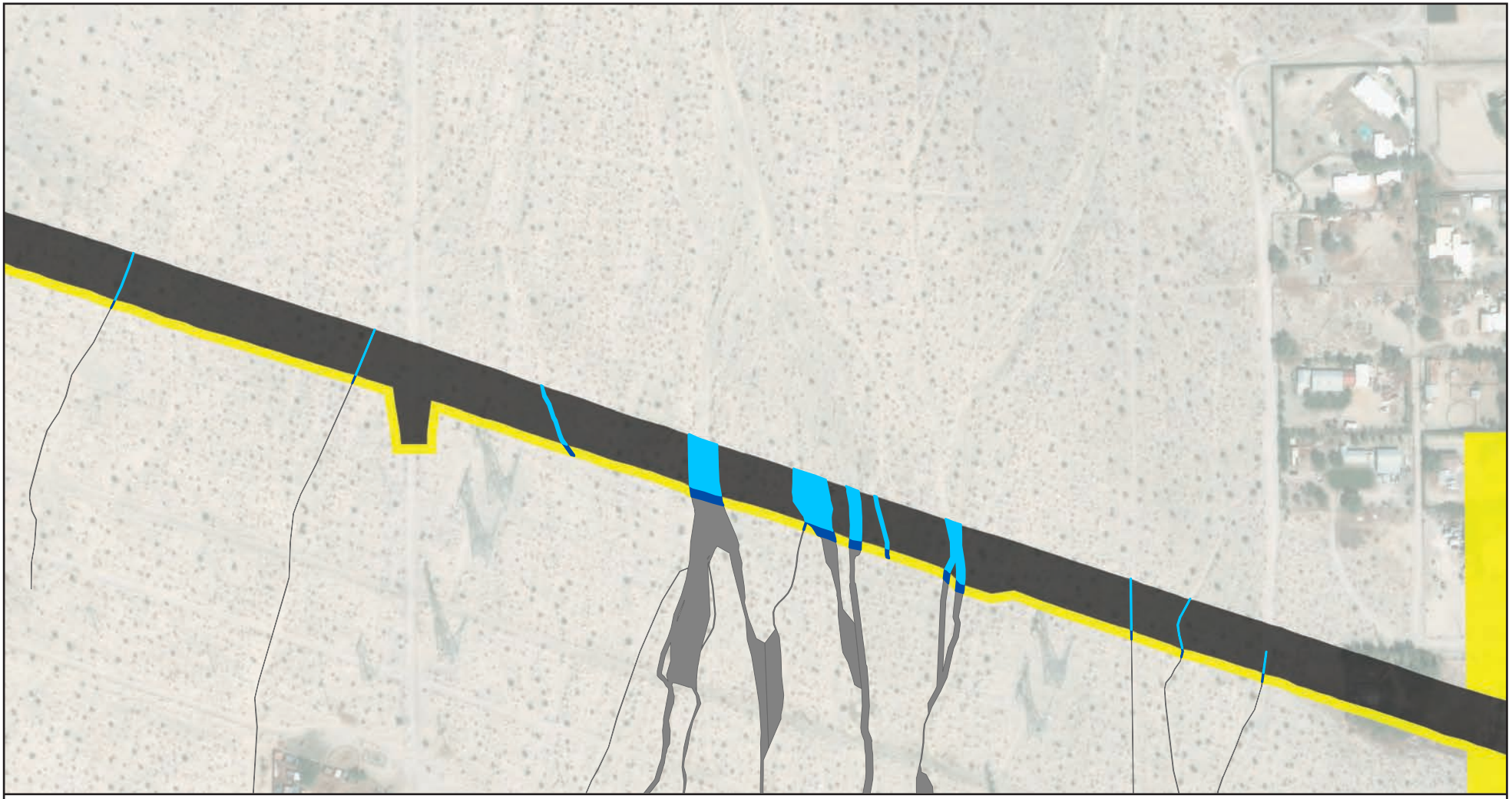
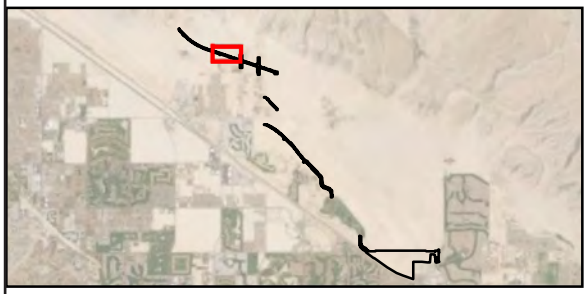


Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

100 0 200 Feet

Figure A-3

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

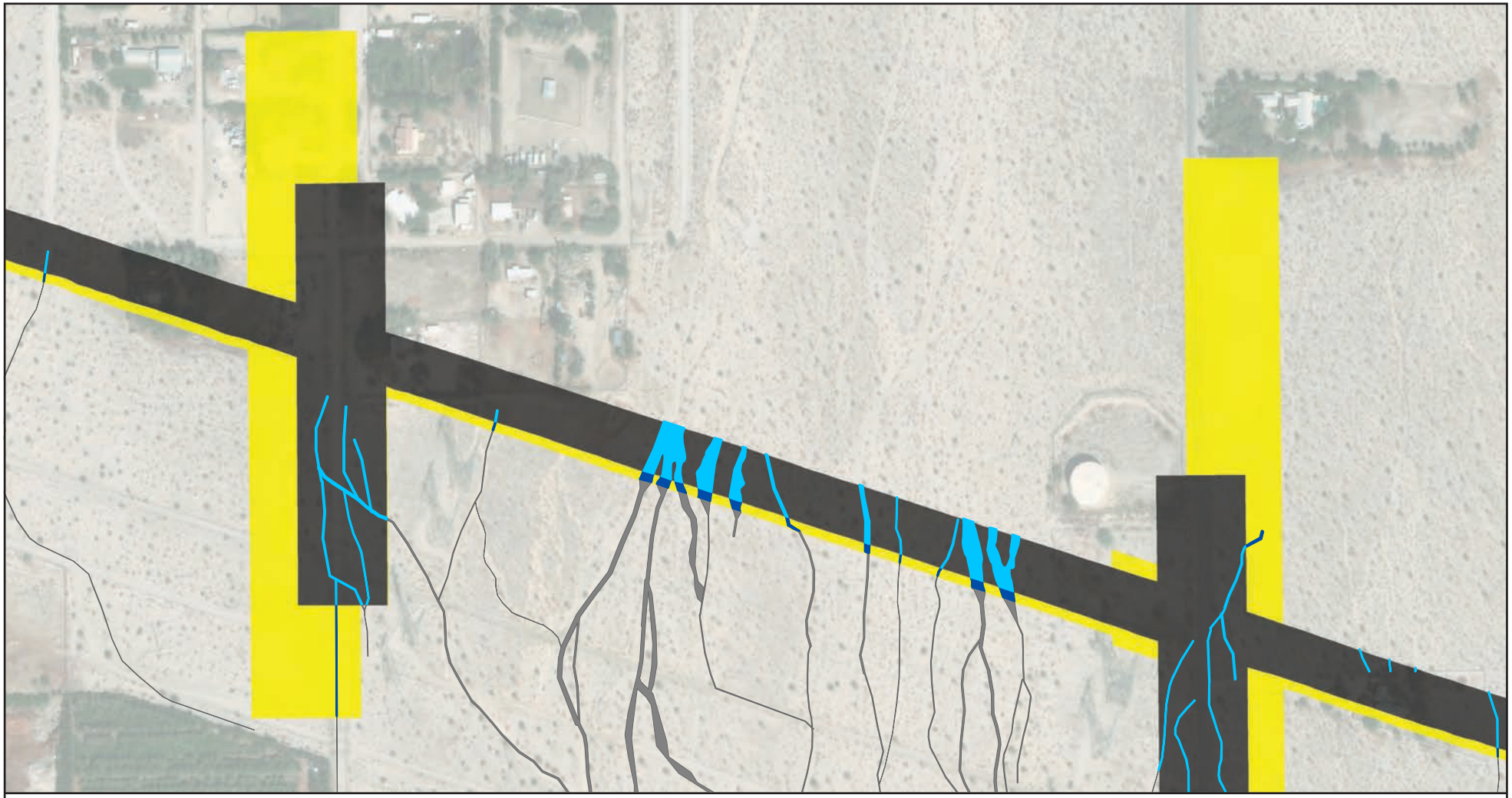
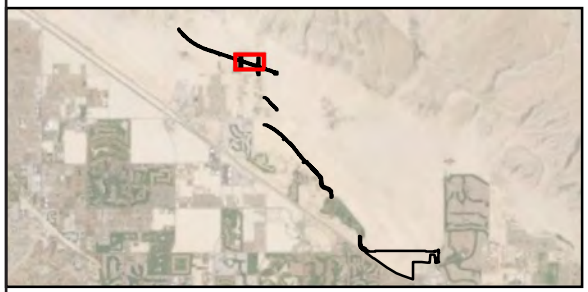


Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

100 0 200 Feet

Figure A-4

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

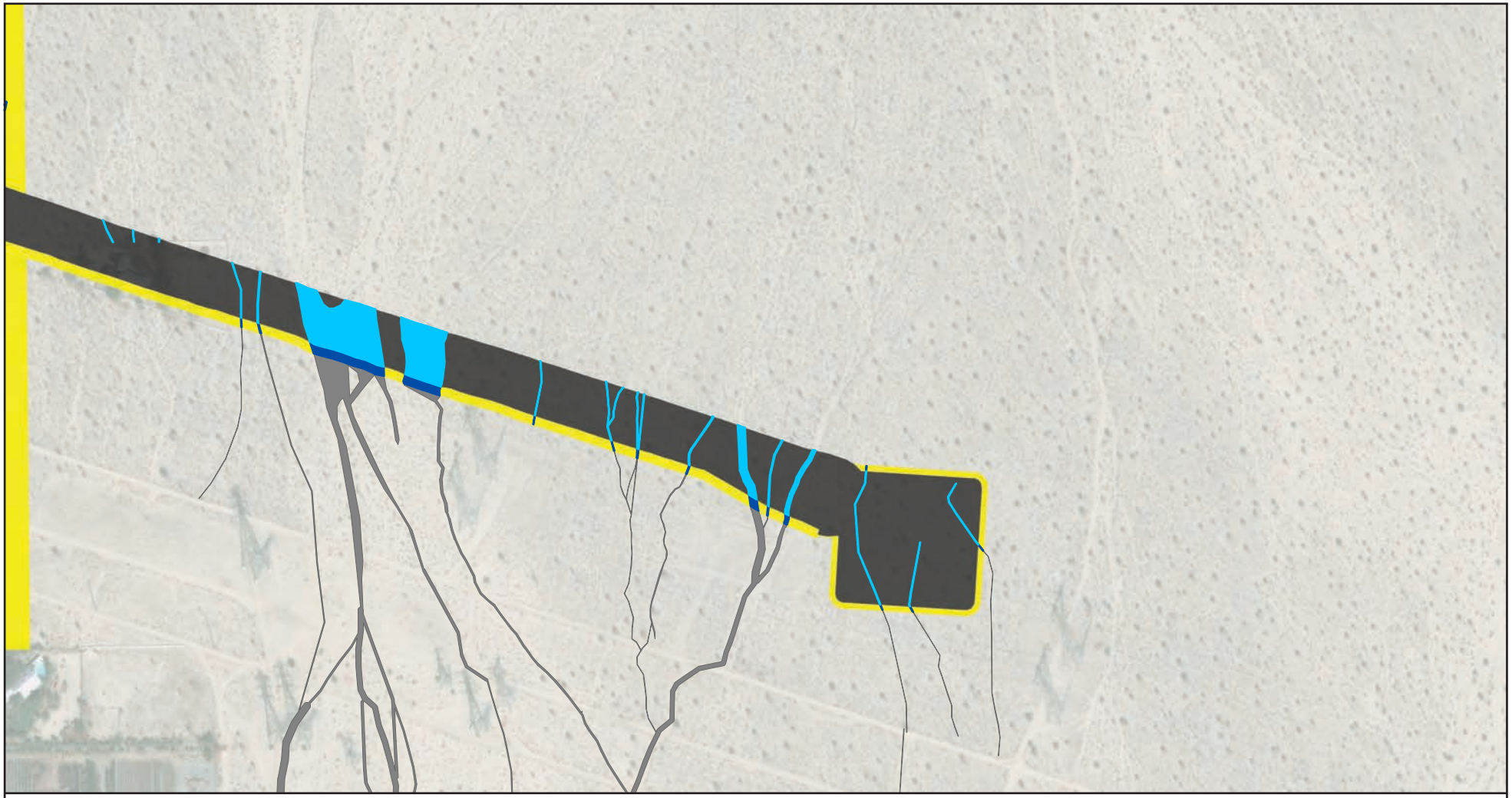
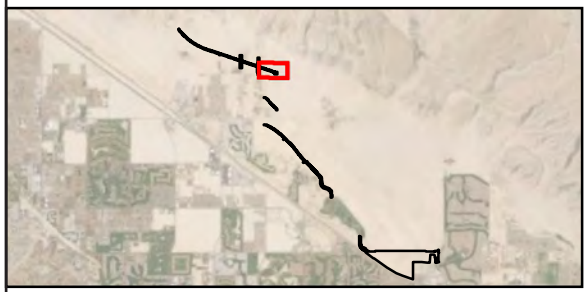


Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

100 0 200 Feet

Figure A-5

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

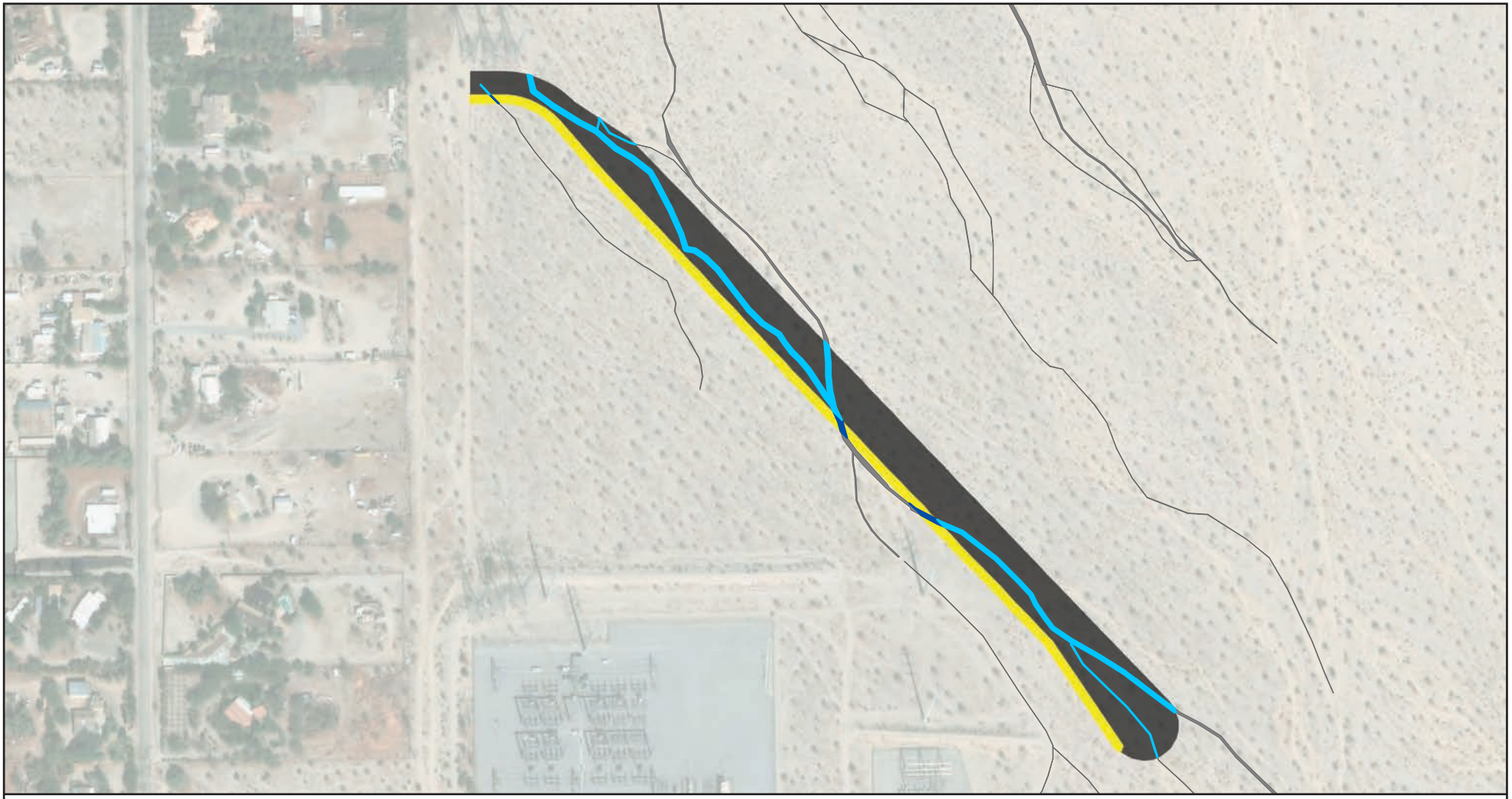


Image Source: DigitialGlobe, 2018

Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

100 0 200 Feet

Figure A-6

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

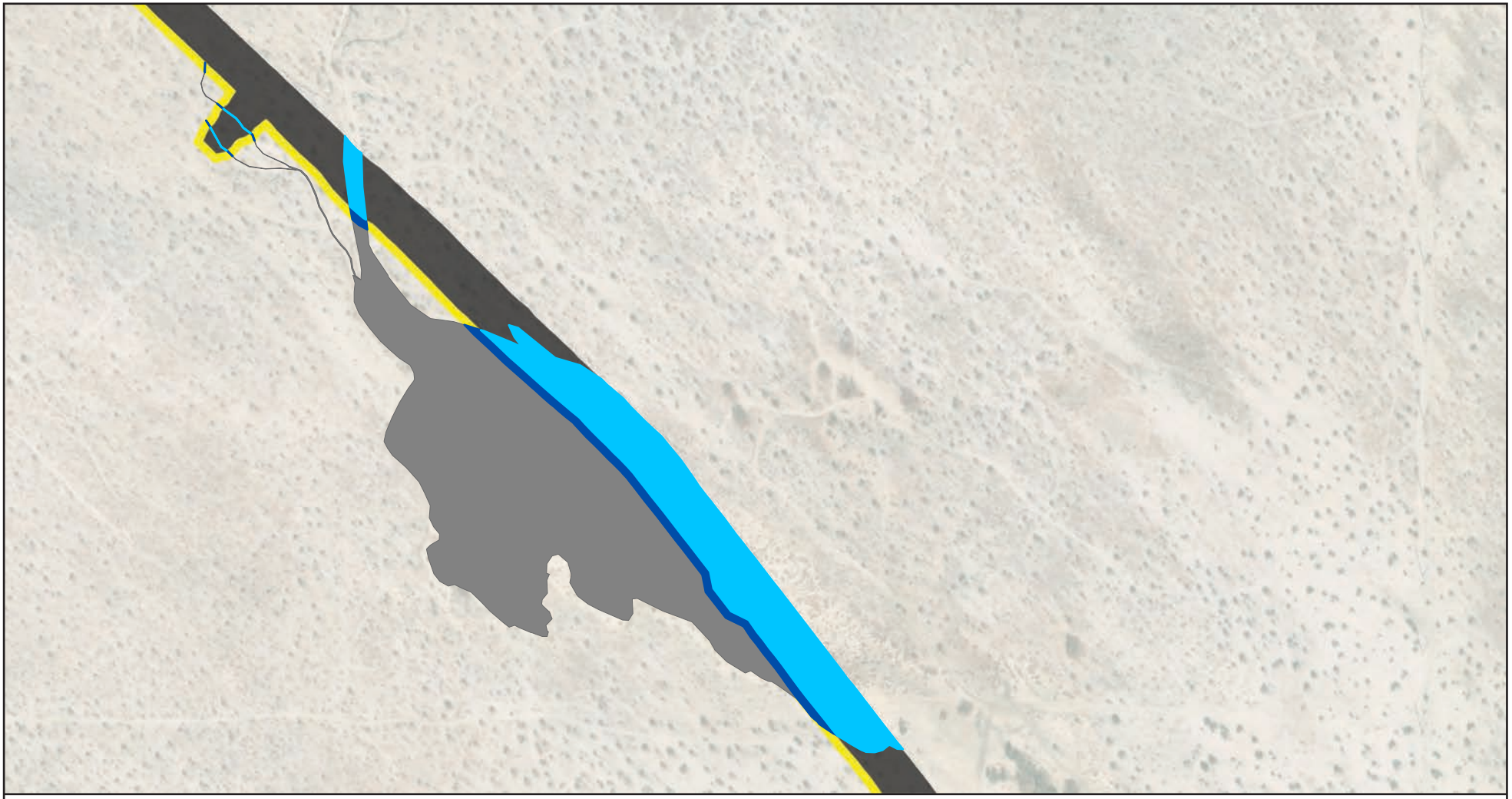
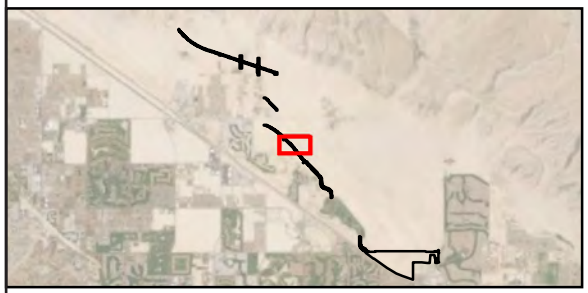


Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

100 0 200
Feet

Figure A-7

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

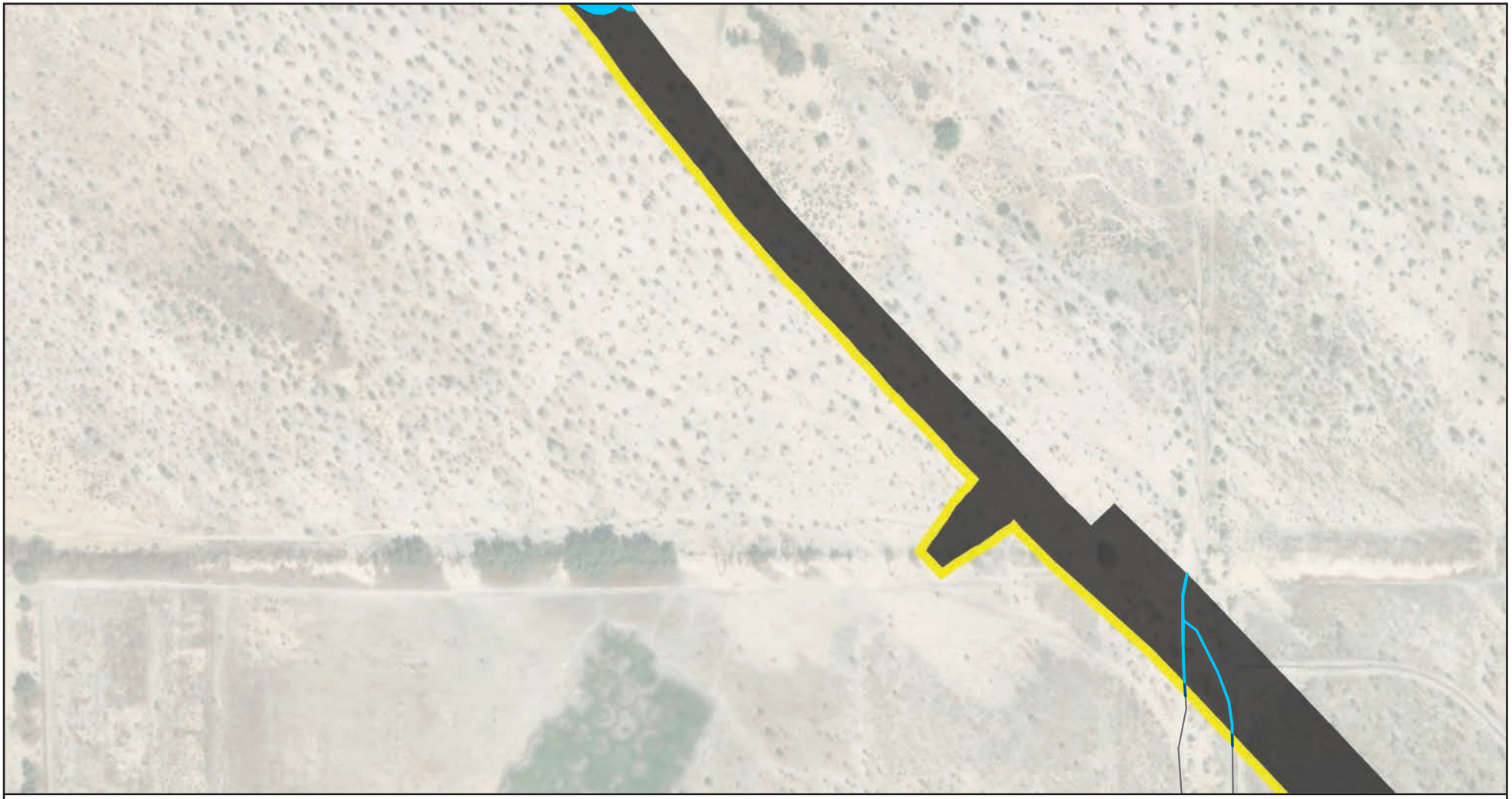


Image Source: DigitialGlobe, 2018

Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

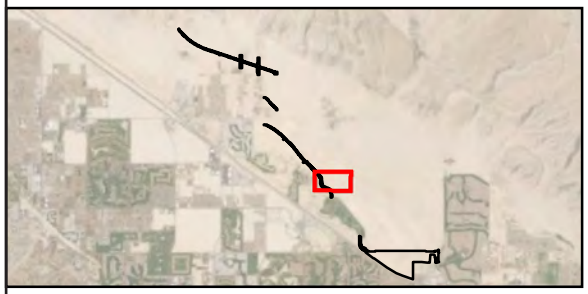
100 0 200 Feet

Figure A-8

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

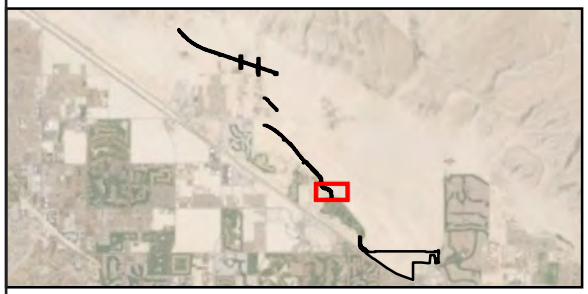
100 0 200 Feet

Figure A-9

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

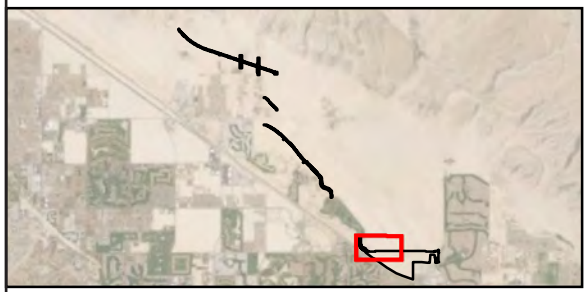
100 0 200 Feet

Figure A-10

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact

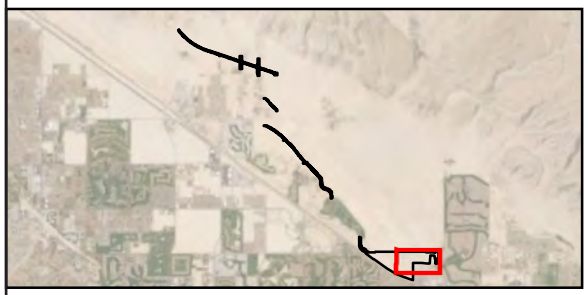
100 0 200 Feet

Figure A-11

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018



Permanent Disturbance Area
Temporary Disturbance Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

100 0 200 Feet

Figure A-12

**Alternative 1:
Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

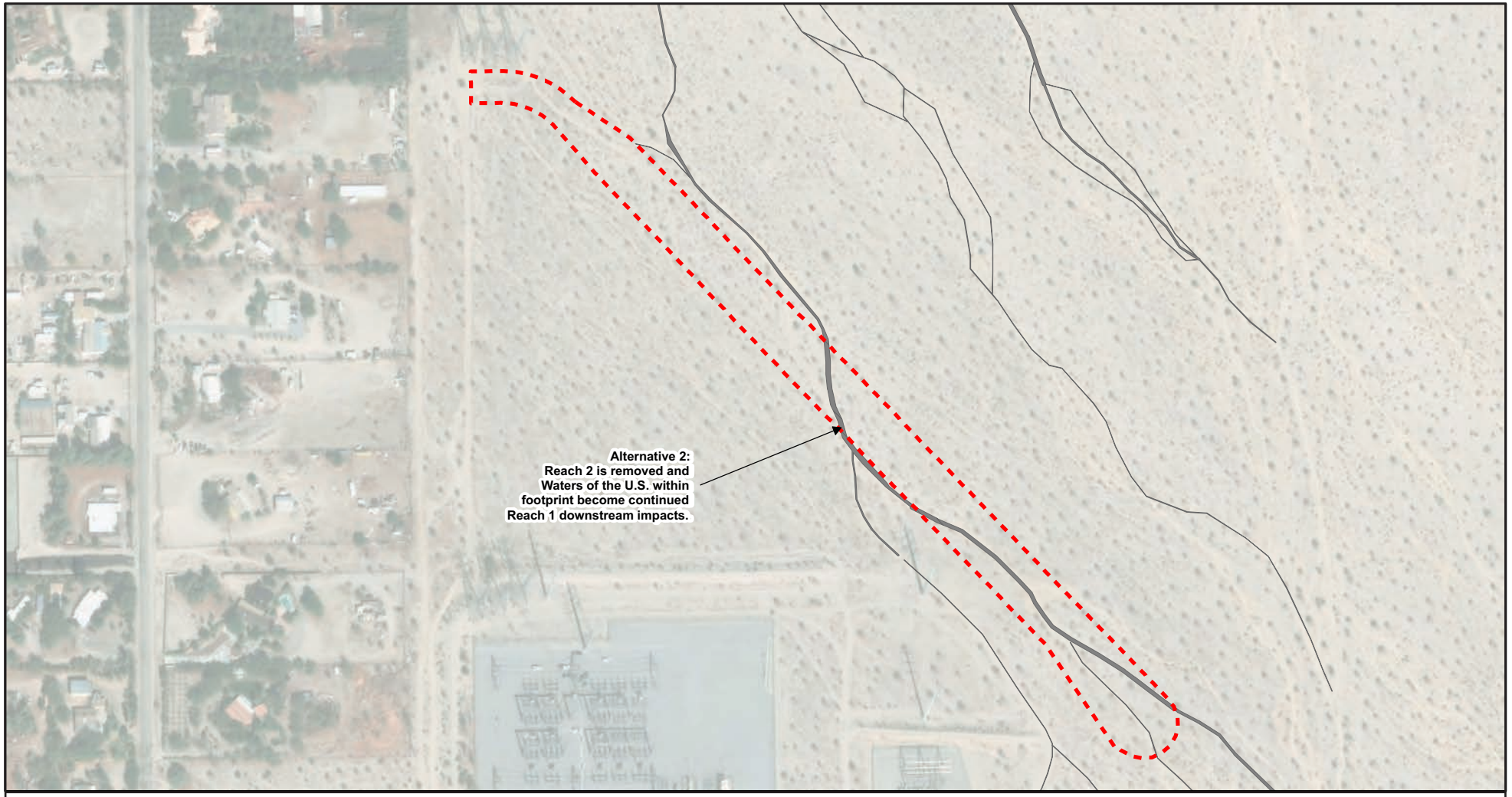


Image Source: DigitialGlobe, 2018

Alt 2: Reach 2- Removed

Downstream Waters of the U.S.

100 0 200 Feet

Figure A-13

Alternative 2:
Modified Impacts to Waters of the U.S.

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

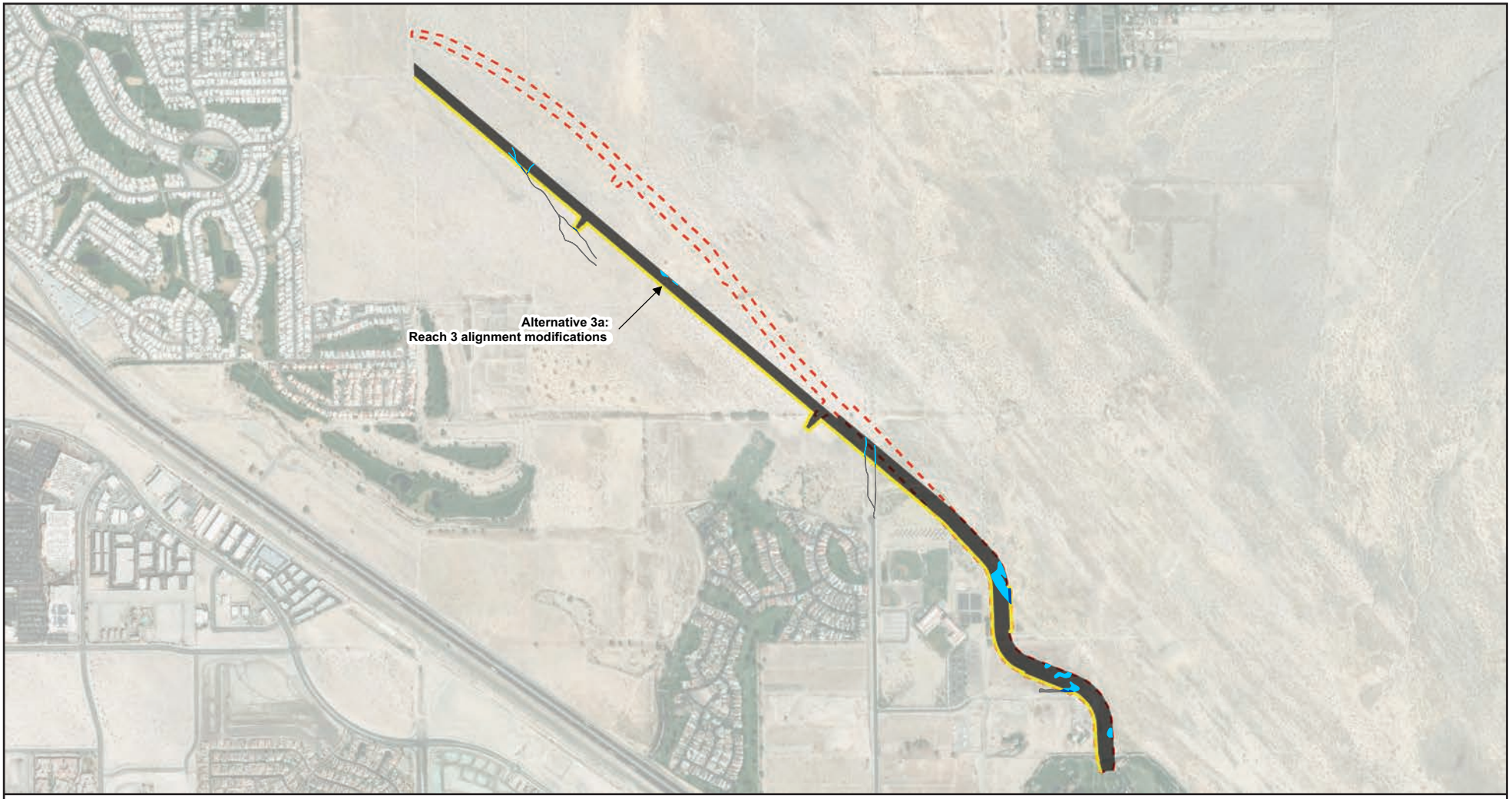
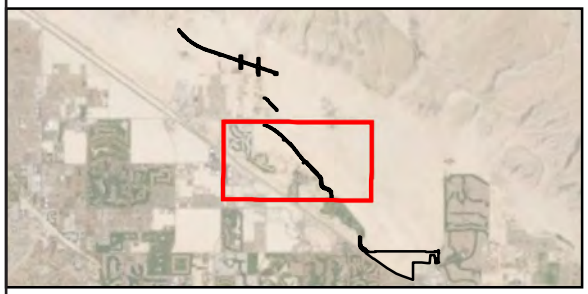


Image Source: DigitialGlobe, 2018



Alt 3a: Permanent Disturbance Area
Alt 3a: Temporary Disturbance Area
Alt 1: Proposed Project Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

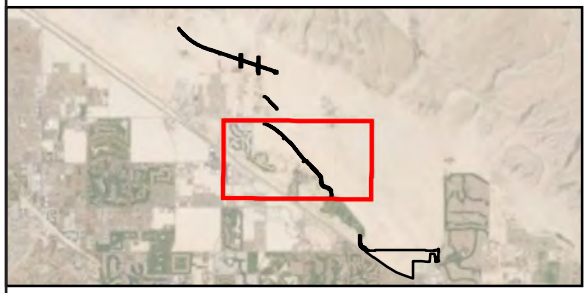
500 0 1,000 Feet

Figure A-14

**Alternative 3a:
Modified Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018



Alt 3b: Permanent Disturbance Area
Alt 3b: Temporary Disturbance Area
Alt 1: Proposed Project Area

Non-wetland Waters of the U.S.
Permanent Impact
Temporary Impact
Downstream Impact

500 0 1,000 Feet

Figure A-15

**Alternative 3b:
Modified Impacts to Waters of the U.S.**

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Appendix B

Conceptual Compensatory Mitigation Plan

Conceptual Compensatory Mitigation Plan
Thousand Palms Flood Control Project

Prepared for:

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December 2021

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1.0 Introduction

This report presents a conceptual compensatory mitigation plan (Plan) for the Thousand Palms Flood Control Project (Project). The proposed Plan was developed by Aspen Environmental Group (Aspen) and the Coachella Valley Water District (CVWD) as a first step to evaluating and mitigating project related impacts to aquatic systems for the proposed Project. This report provides a semi-quantitative, function-based approach to assigning habitat values in order to develop compensatory mitigation ratios for permanent impacts to episodic aquatic systems subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE).

As part of a 404 permit authorizing impacts to federal waters, the 404 permit may require the permittee to obtain compensatory mitigation lands, conduct stream restoration or enhancement activities in federal waters to compensate or offset project permanent impacts, or participate in an in-lieu fee program. The 2008 Federal Mitigation Rule recommends that a functional or condition assessment be completed at the impact site to quantify ecological losses (debits) and at the mitigation site to quantify projected ecological gains (credits), which would be realized if the mitigation project is successfully implemented (33 CFR 332.3(f)(1), 2008).

1.1 Project Description

The Project is located in the Thousand Palms area of the Coachella Valley in Riverside County, California. CVWD proposes to construct a series of flood control improvements (i.e., levees, channels, and energy dissipaters) to reduce flood hazards in the Thousand Palms area. Implementation of the Project has the potential to result in 10.62 acres of permanent and 4.50 acres of temporary impacts to ephemeral drainages under the jurisdiction of the USACE. In addition, the Project is expected to result in indirect impacts to approximately 17.98 acres of ephemeral waters located below the levees or channels. Flood control improvements associated with the Project would reduce flood hazards from coalescing alluvial fans in the area between the Indio Hills and Interstate 10. A community of approximately 3,000 homes (encompassing approximately 2,000 acres) is present downslope of the Review Area and lacks storm water control features. It is the Projects primary objective to protect existing and future development in this area.

The Project includes levees, channels, and energy dissipating structures. The levees and channels would be comprised of native material excavated from the Project footprint. To provide scour protection, the upslope sides of each levee and channel would be armored with soil cement, which is typically a compacted, high-density mix of pulverized rocks and soils combined with cement and water.

As a secondary objective, the Project would maintain or improve an important sand transport corridor (via aeolian and/or fluvial means) to the Coachella Valley Preserve. A portion of the 15,000-acre Coachella Valley Preserve, including the Coachella Valley National Wildlife Refuge, is located in and adjacent to portions of the project. The lands lying within the Preserve are owned and administered by the U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Wildlife (USACE, 2000). The Preserve supports Critical Habitat, including sand dunes, for populations of the State endangered and federally threatened Coachella Valley fringe-toed lizards.

The Project is broken into four reaches starting with Reach 1 in the northwest and ending with Reach 4 in the southeast (see Figure 1). The four Reaches are further described below:

1.1.1 Reach 1

Reach 1 is comprised of a 12,667-foot-long (2.4 miles) levee (Levee 1) with an access road at Via Las Palmas. Levee 1 would have a height of approximately 11.5 feet on the upstream end, increasing to

approximately 14 feet on the downstream end, in order to ensure capacity associated with a 100-year storm event. Levee 1 would initiate approximately 0.1 miles to the east of the intersection of 28th Avenue and Rio del Sol and then extend in an east-southeasterly direction. The levee would generally run parallel to and north of Southern California Edison's (SCE) existing utility corridor. Continuing in a southeasterly direction, Levee 1 would cross over Sierra del Sol and Desert Moon Drive. Water and sediment from the Indio Hills would flow naturally toward Reach 1 and be diverted by the project to the 550-acre floodway in the wind corridor.

1.1.3 Reach 2

Reach 2 is comprised of a 1,747-foot-long (0.33 mile) levee (Levee 2) with a height of approximately 14 feet. Levee 2 is located in the mid-alluvial fan area just northeast of an existing electrical substation and adjacent residential development. Reach 2 would accept flows from Reach 1 and divert flows to the southeast along the western border of the Coachella Valley Preserve. Levee 2 would be situated in the direction of the prevailing wind to avoid interference with aeolian processes, or the movement of sand by wind.

1.1.4 Reach 3

Reach 3 is comprised of a 6,498-foot-long (1.23 mile) levee (Levee 3), an access road, and a 5,314-foot-long (1.01 mile) incised channel (Reach 3 Channel). Levee 3 would have a height of approximately 14 feet at the upstream end, increasing to approximately 18 feet at the downstream end in order to accommodate the 100-year storm event. Levee 3 would initiate approximately 2,000 feet southwest of the downstream end of Levee 2, roughly 1,000 feet south of Ramon Road. Levee 3 would run parallel to the north of the future Cook Avenue, then transition to an incised channel. The Reach 3 Channel would divert flows from Levee 3 into the Classic Club Golf Course, where existing stormwater drainage features are sufficient to transport flows through the golf course property. The Project would not alter the Classic Club Golf Course, and the Project has been developed in coordination with golf course management.

A portion of the Reach 3 Channel would traverse athletic facilities located in the northeast corner of the Xavier High School, then turn south to follow the school's eastern border before turning east and terminating at the Classic Club Golf Course. The Reach 3 Channel would be supplemented with a five-foot-tall embankment on the west side and lined with either concrete or soil cement. A 15-foot-wide access road would be located adjacent to the north (east) of Levee 3 and the Reach 3 Channel to support operation and maintenance activities. A proposed sediment disposal site is also located just east of Reach 3 near the Pegasus Therapeutic Riding facility.

1.1.5 Reach 4

Reach 4 is comprised of an approximately 10,560-foot-long (two-mile) incised channel (Reach 4 Channel). The Reach 4 Channel would accept stormwater flows from the southeast end of the Classic Club Golf Course and continue south then east, north of Avenue 38 (to be re-aligned) and Interstate 10. Reach 4 is located immediately south of the Coachella Valley Preserve and would terminate at Washington Street near the community of Del Webb / Sun City where the flows enter existing storm water facilities. A sediment disposal area is also included in Reach 4. This area will be used to dispose of excess sediment that accumulates in the Reach 4 Channel.

1.1.6 Floodway

The Project includes acquisition of an approximate 550-acre floodway located along the levees and on the active wind corridor between Reach 1 and Reach 3. Development would be prohibited on this floodway

area to protect the existing sand transport corridor. During operation and maintenance of the Project, some of the material that accumulates along Project levees and channels would be excavated and distributed on the preserved floodway to provide source material for natural sand distribution onto the Preserve. There are numerous stream channels within the floodway, and these are evaluated as part of the mitigation for Project impacts as described in this report. As flood flows are diverted from Reach 1, increased hydrology in the floodway is expected to enhance existing alluvial fan features and create additional episodic areas through natural processes.

2.0 Assessment Methods

To evaluate the overall stream health in the Project area this evaluation considers the Stream Functions Pyramid Framework (USEPA 2012) and the stream functions framework created by the US Army Corp of Engineers (USACE) for determining and evaluating objectives for stream restoration projects (Fischenich, 2006). This approach is a systematic method to apply current scientific understanding and best professional judgment about conditions in arid aquatic systems that considers hydrologic, biogeochemical, and habitat-support functions. Aspen identified key functions and assessment indices that evaluates the physical, chemical, and biological characteristics of the drainages that will be directly and indirectly disturbed by construction of the project and drainages located downstream of the levees which will be degraded from the redirection of flows. This report also evaluates the physical, chemical, and biological characteristics of the drainages located in the 550-acre floodway to better understand the pre- and post-project benefits of the project. The floodway is an existing mitigation component to the project in regard to sand transport and will also be subject to enhanced ephemeral flows during precipitation events, significantly providing mitigation for impacts to federal waters.

2.1 Environmental Components

This evaluation considers the Stream Functions Pyramid Framework (Harman et al. 2012) and other factors in order to assess the stream health and evaluate mitigation requirements that may result from the construction and maintenance of the proposed project. This plan also evaluates changes to existing stream functions from conveying flow to these systems.

This method is based on a set of environmental factors supported by a series of decision indices that require the data collector to consider a variety of biotic and abiotic factors. These include:

- Hydrology (transport of water from the watershed to the stream) Factor-1.
- Hydraulic (transport of water in the channel, floodplain, or sediments) Factor- 2.
- Geomorphology (transport of organic material and sediment to create bed conditions) Factor-3.
- Physicochemical (temperature, oxygen, and processing organic matter) Factor-4.
- Biology (biodiversity found within the system) Factor-5.
- Anthropogenic Disturbances (effects of adjacent land use and human disturbances) Factor-6

These environmental factors consider hydrology, hydraulics, geomorphology, physiochemical, and the biological resources present in the system. This evaluation also includes an evaluation of anthropogenic disturbances that may affect overall stream health. These factors form a pyramid that are supported by each successive level. For example, hydrology or the presence of water is the basis of the pyramid that supports all other stream functions. Each of these factors combine to provide the functions and services

that ultimately support the presence of aquatic organisms (Biology- Level 5). How these factors all contribute to stream health in the project area is discussed qualitatively below.

For each environmental factor there are decision indices that support the conclusion or evaluation of the environmental factor. A numeric value of -1, 0, or +1 is assigned to each decision index which is used to calculate overall stream health. Generally, streams that have lower stream scores are considered to have lower functions and services compared to streams with higher scores. Each of the environmental factors and several of their decision indices is presented below.

2.1.1 Factor 1. Hydrology

Factor 1 considers the transport of water from the watershed to the streams that occur within the Thousand Palms floodplain.

Factor 1 Decision Indices:

- Drainages flow unimpeded from their headwaters?
- Watershed is intact and free from development?
- Watershed affects local channel formation for storms under 10-year event?

2.1.2 Factor 2. Hydraulics

Factor 2 considers the transport of water in the channel, floodplain, or underlying sediment.

Factor 2 Decision Indices:

- Drainages are free from obstructions or physical structures that impede or redirect flow?
- Drainages connects to downstream waters through natural features?
- Drainages supports temporary surface water storage during less than 10-year storm event?

2.1.3 Factor 3. Geomorphology

Factor 3 considers if the system functions in the transport of organic material and sediment to create bed conditions that support vegetation and wildlife.

Factor 3 Decision Indices:

- Drainages maintain sediment for aeolian transport.
- Drainages provide substrate and structural components that support vegetation and wildlife?
- Drainages contain floodprone areas, terraces, and other features?

2.1.4 Factor 4. Physicochemical

Factor 4 considers the water temperature, dissolved oxygen, and the processing of organic matter in the creeks.

Factor 4 Decision Indices:

- Drainage supports organic matter?
- Channels support pools or other ponding areas?

- Water temperatures are affected by flow, shade, or other factors in this system?

2.1.5 Factor 5. Biological

Factor 5 considers the biological resources that are dependent on the stream function in this system.

Factor 5 Decision Indices:

- Drainage supports aquatic dependent plants or wildlife?
- Drainage supports listed plants or wildlife and contributes to their habitat?
- Drainage relatively free from invasive plants or animals?

2.1.6 Factor 6. Anthropogenic Disturbance

Factor 6 considers the effects of adjacent land uses, roadways, off-highway vehicle use, and other human disturbance in this system.

Factor 6 Decision Indices:

- Drainages not subject to disturbance from OHV use, equestrian use, roads, or other infrastructure?
- Drainages not affected by other human induced influences (such as trash) that may affect stream health?

For each environmental factor, a series of decision indices was reviewed that support the conclusion or evaluation of the environmental factor. Using the decision indices, a numeric value ranked as -1, 0, or +1 was assigned for each of the environmental factors. For the five factors a maximum of 17 points can be achieved. This rank would be given to a pristine drainage supporting sensitive plants and wildlife found in an undeveloped area free from disturbance and with direct connectivity with their receiving waters. The rank is not meant to devalue the existing system but to provide a mechanism to evaluate overall habitat conditions and stream functions compared to the proposed mitigation sites.

3.0 Baseline Conditions and Functions

Baseline conditions of the habitat and stream channels is described in detail in the Draft EIS/EIR and the Preliminary Jurisdictional Delineation and Wetland Determination Report (Aspen, 2020). This report focuses on the drainages mapped within the Project area that were presented in an Aquatic Resources Delineation Report submitted to the USCAE on June 9, 2020 and approved by the USACE in 2020. Table 1 provides a summary of the drainages within the Project area that were determined to have a defined Ordinary High-Water Mark (OHWM) and are under the jurisdiction of the USACE. In addition, there are approximately 70 braided drainages that would be preserved in the 550-acre floodway as in-kind mitigation as a component of compensatory mitigation. The drainages within the floodway flow through creosote bush scrub, cheese bush scrub, and areas that are primarily barren or support sparse vegetation such as portions of the active channel, hard pans, and sand dunes.

Table 1. Measurements and Classifications of Jurisdictional Waters of the U.S.

Drainage ID	Latitude	Longitude	Drainage Area (acres)	Drainage Length (feet)	Drainage Width (feet)[1]	Dominant Vegetation Type
1-1	33.84466383	-116.4038552	0.003	146	0.9	Disturbed/Developed

Table 1. Measurements and Classifications of Jurisdictional Waters of the U.S.

Drainage ID	Latitude	Longitude	Drainage Area (acres)	Drainage Length (feet)	Drainage Width (feet)[1]	Dominant Vegetation Type
1-2	33.84463967	-116.4037696	0.035	160	9.5	Disturbed/Developed
1-3	33.84406318	-116.4031467	0.013	145	3.9	Disturbed/Developed
1-4	33.8437784	-116.4028461	0.018	134	5.9	Disturbed/Developed
1-5[3]	33.84227207	-116.4009543	0.047	171	12.0	Creosote Scrub
1-6	33.84100848	-116.3989095	0.038	168	9.9	Creosote Scrub
1-7	33.83979783	-116.3964145	0.021	233	3.9	Creosote Scrub
1-8[3]	33.83862613	-116.3931115	0.039	173	9.8	Creosote Scrub
1-9	33.83881385	-116.3931107	0.003	104	1.3	Creosote Scrub
1-10[3]	33.83788999	-116.3903711	0.003	134	1.0	Creosote Scrub
1-12	33.83741838	-116.3885969	0.003	123	1.1	Creosote Scrub
1-13	33.83702754	-116.3871893	0.023	175	5.7	Creosote Scrub
1-14	33.83671542	-116.3860891	0.207	138	65.3	Creosote Scrub
1-15	33.83661868	-116.3853749	0.218	145	65.5	Creosote Scrub
1-16	33.83624794	-116.3849682	0.076	135	24.5	Creosote Scrub
1-17	33.83621541	-116.3847329	0.020	143	6.1	Creosote Scrub
1-18[3]	33.83614684	-116.3842019	0.095	166	24.9	Creosote Scrub
1-19	33.83585659	-116.3829285	0.003	137	1.0	Creosote Scrub
1-20	33.83573544	-116.3825836	0.003	139	0.9	Creosote Scrub
1-21	33.83548222	-116.3819479	0.002	69	1.3	Creosote Scrub
1-22	33.83443864	-116.3799598	0.024	512	2.0	Creosote Scrub
1-23	33.83435157	-116.3797481	0.010	197	2.2	Creosote Scrub
1-24	33.83420191	-116.3796014	0.007	166	1.8	Creosote Scrub
1-25	33.83417431	-116.379897	0.017	193	3.8	Creosote Scrub
1-26	33.83369647	-116.3796248	0.006	263	1.0	Creosote Scrub
1-27	33.83311593	-116.3798172	0.007	308	1.0	Creosote Scrub
1-28	33.83451781	-116.3786217	0.002	46	1.9	Creosote Scrub
1-29	33.83445464	-116.3773713	0.188	140	58.5	Creosote Scrub
1-30	33.83436453	-116.376993	0.090	140	28.0	Creosote Scrub
1-31	33.83416532	-116.376836	0.055	144	16.6	Creosote Scrub
1-32	33.83403118	-116.3765535	0.017	187	4.0	Creosote Scrub
1-33	33.83386363	-116.3758866	0.030	152	8.6	Creosote Scrub
1-34	33.83382195	-116.3756706	0.003	149	0.9	Creosote Scrub
1-35	33.8335468	-116.3753635	0.006	136	1.9	Creosote Scrub
1-36	33.83383965	-116.375111	0.104	154	29.4	Creosote Scrub
1-37	33.83342018	-116.3748379	0.110	166	28.9	Creosote Scrub
1-38	33.83276116	-116.3736735	0.007	305	1.0	Creosote Scrub
1-39	33.83199147	-116.3735208	0.016	676	1.0	Creosote Scrub
1-40	33.83346104	-116.3731725	0.029	962	1.3	Creosote Scrub
1-41	33.8330378	-116.3731801	0.007	150	2.0	Creosote Scrub
1-42	33.83305178	-116.3722441	0.001	55	0.8	Creosote Scrub
1-43	33.83297355	-116.3720247	0.001	26	1.7	Creosote Scrub
1-44	33.83292202	-116.371836	0.001	8	0.5	Creosote Scrub
1-45	33.83259761	-116.3712333	0.003	148	0.9	Creosote Scrub
1-46	33.83258921	-116.3711059	0.006	139	1.9	Creosote Scrub
1-47	33.83259327	-116.3706905	0.532	153	151.5	Creosote Scrub
1-48	33.83207084	-116.3698428	0.299	175	74.4	Creosote Scrub
1-49	33.83199453	-116.3690235	0.003	144	0.9	Creosote Scrub

Table 1. Measurements and Classifications of Jurisdictional Waters of the U.S.

Drainage ID	Latitude	Longitude	Drainage Area (acres)	Drainage Length (feet)	Drainage Width (feet)[1]	Dominant Vegetation Type
1-50	33.83202187	-116.3685301	0.004	158	1.1	Creosote Scrub
1-51	33.8319695	-116.3684406	0.002	96	0.9	Creosote Scrub
1-52	33.83176836	-116.3683092	0.003	149	0.9	Creosote Scrub
1-53	33.83173431	-116.3682833	0.003	145	0.9	Creosote Scrub
1-54	33.83167864	-116.3678611	0.007	147	2.1	Creosote Scrub
1-55	33.83173969	-116.3675337	0.070	191	16.0	Creosote Scrub
1-56	33.83165599	-116.367251	0.008	173	2.0	Creosote Scrub
1-57	33.83159035	-116.3669983	0.033	180	8.0	Creosote Scrub
1-58	33.83127586	-116.3666981	0.008	340	1.0	Creosote Scrub
1-59	33.83092794	-116.3662463	0.004	161	1.1	Creosote Scrub
1-60	33.83116539	-116.3659087	0.004	179	1.0	Creosote Scrub
2-1	33.82304396	-116.3708062	0.001	58	0.8	Creosote Scrub
2-2	33.82312197	-116.3704838	0.392	1874	9.1	Creosote Scrub
2-3	33.82285547	-116.3699907	0.001	30	1.5	Creosote Scrub
2-4	33.82273688	-116.369775	0.002	104	0.8	Creosote Scrub
2-5	33.82137564	-116.3682912	0.029	140	9.0	Creosote Scrub
2-6	33.8189734	-116.365909	0.007	333	0.9	Creosote Scrub
3-1	33.8095457	-116.3630288	0.004	157	1.1	Creosote Scrub
3-2	33.80938056	-116.3631784	0.003	112	1.2	Creosote Scrub
3-3	33.80896859	-116.3621075	0.155	225	30.0	Cheesebush Scrub
3-4	33.80672521	-116.3592614	3.939	1498	114.5	Asian Mustard Stand
3-5	33.80163678	-116.3536505	0.028	276	4.4	Asian Mustard Stand
3-6	33.80115813	-116.3533849	0.028	315	3.9	Asian Mustard Stand
3-7	33.79665531	-116.3485887	1.002	435	100.3	Asian Mustard Stand
3-8	33.79375687	-116.3466935	0.048	47	44.5	Allscale scrub
3-9	33.79347004	-116.3460187	0.185	220	36.6	Allscale scrub
3-10	33.79302899	-116.3456504	0.197	254	33.8	Allscale scrub
3-11	33.79160581	-116.3442987	0.107	60	77.7	Creosote Scrub
4-1	33.77466181	-116.333238	0.338	177	83.2	Asian Mustard Stand
4-2	33.77423311	-116.3329984	0.450	289	67.8	Active Sand Dune / Stabilized Sand Field
4-3	33.77221977	-116.3143107	0.448	336	58.1	Active Sand Dune / Stabilized Sand Field
4-4	33.77194789	-116.3106466	1.011	377	116.8	Active Sand Dune / Stabilized Sand Field
4-5	33.77210541	-116.3090468	1.465	695	91.8	Active Sand Dune / Stabilized Sand Field
4-6	33.77234974	-116.3072497	0.102	112	39.7	Active Sand Dune / Stabilized Sand Field
4-7	33.77209484	-116.3067289	0.230	162	61.8	Active Sand Dune / Stabilized Sand Field
4-8	33.77263532	-116.3054702	0.270	387	30.4	Active Sand Dune / Stabilized Sand Field
4-9	33.77251705	-116.3041076	0.121	357	14.8	Active Sand Dune / Stabilized Sand Field
4-10	33.77105103	-116.3069854	1.924	521	160.9	Active Sand Dune / Stabilized Sand Field
Total:	--	--	15.087	20,398	1913.2	--

3.1 Reach Descriptions and Stream Assessment

The baseline conditions and functions for each of the Reaches is evaluated below based on field work, existing environmental documents, and aerial imagery. Each of the reaches is described for baseline conditions and overall habitat conditions. In addition, each reach includes a description of the general hydrology, hydraulics, geomorphology, physiochemical, biological resources, and anthropogenic disturbances that affect stream functions. Table 2 (Stream Assessment Indicators and Stream Function) provides a numerical ranking for each of the assessment indicators evaluated in this report.

3.1.1 Reach 1

Reach 1 includes sixty drainages mapped as waters of the U.S. (see Figure 1). These drainages originate within two miles to the north of the Project area in six unnamed canyons within the Indio Hills. Water from these canyons flow south onto an extensive alluvial fan. Vegetation within these drainages is dominated by creosote bush (*Larrea tridentata*), with other species such as smoke tree (*Psorothamnus spinosus*), desert lavender (*Hyptis emoryi*), catclaw (*Senegalia greggii*), cheesebush (*Ambrosia salsola*) and Schott's dalea (*Psorothamnus schottii*) also being present but in limited numbers. The vegetation within Reach 1 and throughout the Project area is described in more details in the Preliminary Jurisdictional Delineation and Wetland Determination Report (Aspen, 2020).

Drainages 1-1 through 1-46 are impacted by upstream development that restricts or impedes flows. This includes paved and unpaved roads such as 28th Avenue, Sierra Del Sol, Vista Chino, Via Las Palmas, and others. It also includes approximately 12 industrial developments including a sand and gravel quarry, automotive scrap yard, and various other facilities. Approximately 40 residential properties are also present off of Desert Moon Dr. and Via Las Palmas. This extensive development has altered flows to many of the drainages in Reach 1. Drainages 1-47 through 1-60, near the eastern end of Reach 1 are the only drainages that are unimpeded north of Reach 1.

Anthropogenic disturbances are common in most of Reach 1 and includes off-road vehicles, illegal trash dumping, green waste disposal, and a Southern California Edison (SCE) powerline corridor. These activities impact the function and health of these drainages.

Downstream connectivity is also important to understand the function and importance of these drainages. Drainages 1-1 through 1-13, 1-19 through 1-21, and 1-38 through 1-46 appear to end within a 0.5-mile or less of the Project area.

Drainages 1-14 through 1-18 coalesce into a single drainage which eventually enter The Club at Shenandoah Springs, a golf course and trailer park with a series of low-flow fairways designed to carry storms flows. These flows would eventually reach detention basins along the southern edge of The Club at Shenandoah Springs. A review of aerial images available through Goggle Earth from 1996 through 2019 shows no clear evidence that flows have reached The Club at Shenandoah Springs during this time period.

Drainages 1-22 through 1-37 coalesce into a single drainage which flows south along the west side of several residential properties. The bulk of the flows travel south and eventually reach Ramon Rd. where they flow on the road and enter several smaller drainages south of Ramon Rd. These drainages also do not appear to flow with any regularity based on a review of aerial images from 1996 to 2019.

Stream Ranking

Reach 1 was separated into two sub reaches. This decision was made because Drainages 1-47 through 1-60, near the eastern end of Reach 1, are the only drainages that flow unimpeded from their headwaters

compared to other drainages in this reach. Based on the stream Assessment Indicators identified in Table 2, Reach 1 (Drainages 1-1 through 1-46) was assigned a score of 0 compared to Reach 1 (Drainages 1-47 through 1-60) which was assigned a score of 4. The higher scores of Reach 1 (Drainages 1-47 through 1-60) were primarily related to the unimpeded hydrology, reduced obstructions from roads, and lower human disturbance compared to Reach 1 (Drainages 1-1 through 1-46).

Table 2. Stream Assessment Indicators and Stream Function Reach's 1 Through 4.

	Reach 1 Drainages		Reach 2	Reach 3	Reach 4
	1-46	47-60			
Stream Assessment Indicators	**Stream Assessment Score: No: -1, Partial: 0, Yes: +1**				
Factor 1: Hydrology					
Drainages flow unimpeded from their headwaters?	-1	+1	+1	-1	-1
Watershed is intact and free from development?	0	0	0	-1	0
Watershed affects local channel formation for storms under 10-year event?	+1	+1	+1	-1	-1
Factor 2: Hydraulics					
Drainages are free from obstructions or physical structures that impede or redirect flow?	-1	0	-1	-1	-1
Drainages connects to downstream waters through natural features?	0	0	0	-1	-1
Drainages supports temporary surface water storage during less than 10-year storm event?	+1	+1	0	+1	0
Factor 3: Geomorphology					
Drainages maintain sediment for aeolian transport.	0	0	0	+1	-1
Drainages provide substrate and structural components that support vegetation and wildlife?	+1	+1	+1	+1	+1
Drainages contain floodprone areas, terraces, and other features?	+1	+1	+1	+1	0
Factor 4: Physiochemical					
Drainage supports organic matter?	+1	+1	+1	+1	+1
Channels support pools or other ponding areas?	0	0	0	+1	0
Water temperatures are affected by flow, shade, or other factors in this system?	0	0	0	+1	0
Factor: 5 Biological Resources					
Drainage support aquatic dependent plants or wildlife?	-1	-1	-1	0	-1
Drainage supports listed plants or wildlife and contributes to their habitat?	0	0	0	0	+1
Drainage relatively free from invasive plants or animals?	0	0	0	-1	-1
Factor 6: Anthropogenic Disturbances					
Drainages not subject to disturbance from OHV use, equestrian use, roads, or other infrastructure?	-1	-1	-1	-1	-1
Drainages not affected by other human induced influences that may affect stream health?	-1	0	0	0	0
Total Ranking by Assessment Area	0	4	2	0	-5
Total Rank by Reach	2		2	0	-5

3.1.2 Reach 2

Reach 2 includes six drainages that are all interconnected braids of the same channel. This channel also crosses through Reach 1 near drainages 1-47 and 1-48. Flows that enter these six drainages originate in an unnamed canyon about 2.7 miles north of Reach 2 in the Indio Hills. The vegetation in these drainages is similar to what is described under Reach 1 above.

Drainages 2-1 through 2-6 all flow nearly unimpeded from the Indio Hills. Unpaved roads along the SCE utility corridor may alter the flow pattern within Reach 1 which may influence the flows in Reach 2. A second SCE utility corridor that runs north to south between Reaches 1 and 2 may also be shifting flows to the east. Downstream of Reach 2, flows from these drainages cross Ramon Rd. and eventually enter Reach 3.

Stream Ranking

Based on the Stream Assessment Indicators identified in Table 2, Reach 2 was assigned a score of 2. Reach 2 scores were influenced by the large unobstructed watershed and general stream channel configuration. While there are some roads that divert flow, large areas appear to maintain connectivity with upstream areas and human disturbance is moderate.

3.1.3 Reach 3

Reach 3 includes 11 drainages that generally flow from northwest to southeast. The primary source of water in Reach 3 is from upstream drainages, some of which are within Reaches 1 and 2. These flows enter Reach 3 at drainage 3-3 which continues downstream into drainages 3-4, 3-5, 3-6, and 3-7. Flows through the eastern half of Reach 3 change from clearly defined desert washes to poorly defined playas and low-lying areas. Most of the flows in this reach eventually reach the expansive sand dunes which largely block flows and cause ponding. Drainages 3-7 through 3-10 represent these low-lying areas where water seasonally ponds. Ponding water results in aggressive seasonal proliferations of non-native Asian mustard (*Brassica tournefortii*) and other non-native species. The remainder of the sand dune habitat is vegetated with sparse creosote bush and numerous annuals such as Spanish needle (*Palafoxia arida*), pincushions (*Chaenactis* spp.), and hairy desert sunflower (*Geraea canescens*).

Drainages 3-1 and 3-2 originate within Reach 3 and quickly merge with flows from drainage 3-3. Drainage 3-3 is incised where it has cut into the vast sand fields that form the western edge of the sand dunes that provide habitat for Coachella Valley fringe-toed lizards. Drainage 3-3 quickly changes from an incised, well-defined drainage, to a broad poorly defined playa.

Flows in Reach 3 are largely unimpeded by anthropogenic influences but are subject to heavy off-highway vehicle use. These drainages are impeded by the sand dunes which are slightly higher in elevation in comparison to the ponded areas to the west. Reach 3 intentionally wraps around several areas of develop, as described in Section 1.1.4.

Stream Ranking

Based on the Stream Assessment Indicators identified in Table 2, Reach 3 was assigned a score of 0. Reach 3 scores were influenced by the presence of Ramon Road which captures and diverts flow and the presence of dunes and development which reduce connectivity with downstream areas under most storm regimes. Many areas along Reach 3 are subject to routine OHV or were used as green waste areas (east of Xavier High School) and no longer connect to downstream areas. In addition, ponded areas support extensive weed occurrences.

3.1.4 Reach 4

Reach 4 includes ten drainages. These drainages show indicators of flow and hydrology, likely the result of large episodic storms. The drainages are discontinuous, and it is difficult to understand flow patterns in this Reach. Drainages 4-1 and 4-2 are located within a detention basin just south of the Classic Club Golf Club and this basin has no outlets. Drainages 4-3 through 4-10 are poorly defined drainages that formed following significant storm flows. With the exception of some runoff from Avenue 38 that may enter drainages 4-8 and 4-9, water must travel more than 3.5 miles from Thousand Palms Canyon to the north to reach these drainages. The water must also cross an active sand dune system. Based on a review of aerial images from Reach 4, these drainages receive water on a greater than 10-year frequency.

Human uses in Reach 4 also impact these drainages. Drainages 1 and 2 are within a detention basin that is periodically maintained. Drainages 4-3 through 4-10 are all located in areas that appear to have been previously cleared, presumably for agriculture. A series of old windrows of tamarisk (*Tamarix ramosissima*) are also present between drainages 4-3 and 4-10 which were likely planted to catch drifting sand. Evidence of an old irrigation system is also present near several of these drainages. Illegal off-road vehicles and trash dumping are also prevalent in Reach 4 and may impact these drainages. In addition to the tamarisk windrows, the vegetation is largely dominated by annual and short-lived perennial dune species that have begun to move in to Reach 4 from the active dunes to the north of Avenue 38. These include species such as birdcage evening primrose (*Oenothera deltoides*), desert sand verbena (*Abronia villosa*), and milk-vetches (*Astragalus* spp.).

Stream Ranking

Based on the Stream Assessment Indicators identified in Table 2, Reach 4 was assigned a score of -5. Reach 4 scores were strongly influenced by the location of the Reach in the watershed. Reach 4 is located below a dune system that effectively blocks flows from entering or leaving the Reach under all but the largest storm events. In addition, what flows that accumulate from rain events are trapped with little chance of connecting to downstream channels. Similar to other sites many portions of Reach 4 are also subject to human disturbance including OHV use, illegal camping, and trash dumping. While Reach 4 has a high potential to support listed plants and wildlife species it also contains numerous weeds that grow after winter rains.

3.1.5 Floodway

The proposed Project includes acquisition of an approximate 550-acre floodway located along the levees and in the active wind corridor between Reach 1 and Reach 3 (see Figure 1). Development would be prohibited in this floodway to protect the wind corridor and limit disruptions to sand migration. The floodway will covey storm flows southeast towards Reach 3 before entering the channel and flowing through Reach 4. The floodway will result from water flowing into the levee, ponding momentarily, and then finding the downslope path of least resistance. Flows will travel southeast along the toe of the levee and based on modeling, a 190-year storm will result in a floodway that varies from about 20 feet wide to more than 300 feet wide as it narrows and widens based on topography and slope. The floodway will hit an energy dissipater at the east end of Reach 1 before flows turn south towards Reach 2.

At the eastern end of Reach 1, the floodway will have increased velocity and will merge with flows from additional canyons in the Indio Hills resulting in a floodway that varies from about 600 feet wide to more than 1 mile wide. Water in this portion of the floodway will travel south towards, and eventually crossing Ramon Road. The western portion of the floodway will hit Reach 2 and will protect the SCE substation from inundation. At Ramon Road, the floodway will be approximately 0.55 miles wide.

South of Ramon Road, the floodway will shift slightly west and will narrow as it hits the levee in Reach 3. This levee will cause the floodway to eventually coalesce as water hits the active sand dunes. Approximately 1.3 miles from the northwest end of Reach 3, the levee will transition to a channel which will convey flows around Xavier High School and the Pegasus Therapeutic Riding facility before terminating into the Classic Club Golf Course. Flows will continue through a water conveyance system within the Classic Club Golf Course for approximately 1.1 miles before reaching Reach 4.

Water that reaches Reach 4 will travel east through a concrete-lined channel that parallels Avenue 38. Construction of the channel in Reach 4 will impact drainages 4-1, 4-2, 4-9, and portions of drainages 4-3 through 4-8. The remainder of the drainages in Reach 4 are expected to be impacted by a proposed sediment disposal site.

Habitat along the floodway matches the descriptions of vegetation for each Reach. The floodway includes numerous drainages which often include the upstream portions the drainages that were identified for each Reach (see Figure 1). In addition, there are several large networks of drainages that flow nearly unimpeded from their headwaters in the Indio Hills where the floodway widens between Reach 1 and Reach 2. These drainages do cross two existing dirt access roads and a transmission line corridor however the larger drainages are not obstructed by the roadbed. The floodway also includes several large areas that pond above Ramon Road and immediately upstream of Reach 3 (see Figure1).

Stream Ranking

Based on the Stream Assessment Indicators identified in Table 2, the floodway was assigned an average score of 3. This includes a high score of score of 8 through Reach 2, and a score of 4 for a short section of the floodway at the east end of Reach 1 to a low of 0 at Reach 3. Reach 3 scores were influenced by the presence of Ramon Road which captures and diverts flow and the presence of dunes and development which reduce connectivity with downstream areas under most storm regimes. Many areas along Reach 3 are subject to routine OHV and no longer connect to downstream areas. In addition, ponded areas support extensive weed occurrences.

Table 3. Stream Assessment Indicators and Stream Functions for the Floodway.

	Floodway Reaches				
	Reach 1 Area Above Streams		Reach 2	Reach 3	Reach 4
	1-46	47-60			
Stream Assessment Indicators	Stream Assessment Score: No: -1, Partial: 0, Yes: +1				
Factor 1: Hydrology					
Drainages flow unimpeded from their headwaters?	-1	+1	+1	-1	N/A
Watershed is intact and free from development?	0	0	0	-1	N/A
Watershed affects local channel formation for storms under 10-year event?	+1	+1	+1	-1	N/A
Factor 2: Hydraulics					
Drainages are free from obstructions or physical structures that impede or redirect flow?	-1	0	+1	-1	N/A
Drainages connects to downstream waters through natural features?	0	0	0	-1	N/A
Drainages supports temporary surface water storage during less than 10-year storm event?	+1	+1	+1	+1	N/A

Table 3. Stream Assessment Indicators and Stream Functions for the Floodway.					
	Floodway Reaches				
	Reach 1 Area Above Streams		Reach 2	Reach 3	Reach 4
	1-46	47-60			
Stream Assessment Indicators	**Stream Assessment Score: No: -1, Partial: 0, Yes: +1**				
Factor 3: Geomorphology					
Drainages maintain sediment for aeolian transport.	0	0	+1	+1	N/A
Drainages provide substrate and structural components that support vegetation and wildlife?	+1	+1	+1	+1	N/A
Drainages contain flood prone areas, terraces, and other features?	+1	+1	+1	+1	N/A
Factor 4: Physiochemical					
Drainage supports organic matter?	+1	+1	+1	+1	N/A
Channels support pools or other ponding areas?	0	0	+1	+1	N/A
Water temperatures are affected by flow, shade, or other factors in this system?	0	0	0	+1	N/A
Factor 5: Biological Resources					
Drainage supports aquatic dependent plants or wildlife?	-1	-1	-1	0	N/A
Drainage supports listed plants or wildlife and contributes to their habitat?	0	0	0	0	N/A
Drainage relatively free from invasive plants or animals?	0	0	0	-1	N/A
Factor 6: Anthropogenic Disturbances					
Drainages not subject to disturbance from OHV use, equestrian use, roads, or other infrastructure?	-1	-1	0	-1	N/A
Drainages not affected by other human induced influences that may affect stream health?	-1	0	0	0	N/A
Total Ranking by Assessment Area	0	4	8	0	N/A
Total Rank by Reach	2		8	0	N/A
Average Floodway Ranking	3				

4.0 Project Impacts to Aquatic Resources

4.1 Levee Construction

The Project is expected to directly impact portions of all drainages in Reaches 1 through 4 (see Table 1 and Table 4). These impacts will result from fill placement in drainages for construction of the levee, channel, and construction access. The diversion of flow will result in increased hydrology to many of the drainages within the floodway that will be created by the construction of levees in Reaches 1, 2, and portions of Reach 3. The Project has been designed to avoid and minimize impacts to Waters of the U.S. to the greatest extent feasible, while maximizing flood control impacts to the community, but will result in unavoidable and permanent impacts to 87 drainages. Permanent impacts will require compensatory mitigation, whereas all areas of temporary impacts will be restored.

Table 4. Impacts to Jurisdictional Waters of the U.S.			
Waters of the U.S.			
Location	**Impact Type**	**Area (Acres)**	**Length (Linear Feet)**
Reach 1	Permanent	2.23	10,042
	Temporary	0.37	1,527
Reach 2	Permanent	0.41	2,319
	Temporary	0.02	127
Reach 3	Permanent	4.97	2,355
	Temporary	0.76	331
Reach 4	Permanent	3.01	2,446
	Temporary	3.35	1,251
Downstream	Indirect	17.98	75,407
Permanent Total		**10.62**	**17,162**
Temporary Total		**4.50**	**3,236**
Downstream Indirect		**17.98**	75,407
Grand Total		**33.1**	**95,805**

* Grand total calculation only includes Permanent and Temporary impacts, not Indirect.

4.2 Downstream Indirect Impacts

The Project is expected to result in indirect impacts to portions of the stream channel in downstream areas below the levees. These areas will no longer receive the same amount of flow during large storms that would occur after construction of the project. All of these channels are ephemeral and most only flow during large rain events. In addition, most of these channels have altered hydrologic patterns from the establishment of paved roads, graded dirt access roads, OHV use, and illegal trash dumping. While scouring flows will be attenuated, they would be expected to still provide functions and services based on rainfall and coalescing sheet flows in downstream areas.

Based on the existing conditions in the region and the disturbed sections of the channels it is expected that these drainages will continue to function as ephemeral streams even if some flow is cut off from the channels. Based on a comparison of upstream and downstream areas along the Colorado River Aqueduct and levees associated with Interstate 10, downstream areas still supported similar vegetative cover compared to upstream areas. Loss of hydrologic connectivity can reduce the abundance of annual plants and is more likely to adversely affect riparian or microphyll vegetation communities that are more dependent of seasonal flows compared to vegetation in the project area.

Placement of the levee will change the amount of water that flows to drainages 1-1 through 1-57 in Reach 1. As discussed above, these drainages either terminate shortly after crossing through Reach 1 as the alluvial fan becomes distributary or enter residential developments that eventually flow into detention

basins. The downstream portions of these drainages provide minimal biological value and function. Furthermore, the downstream portions of these drainages will continue to convey storm flows that originate downstream of the levee during rainfall events. The downstream vegetation and habitat are not expected to significantly change as a result of the project.

All drainages within Reach 2 flow parallel to the floodway and levee. Project construction is not expected to alter any downstream portions of these drainages because they will remain in the floodway. Vegetation and habitat are also not expected to change significantly downstream of Reach 2 because much of it is currently developed as a substation with a small patch of creosote bush.

Drainages within Reach 3 also generally flow parallel to the levee and floodway. The levee construction is not expected to block flows to downstream drainages but instead will shift these drainages into the floodway or concrete-line channel. Downstream vegetation and habitat are primarily sand fields vegetated with creosote bush and one large patch of tamarisk, all of which are not expected to be negatively impacted by project construction.

In Reach 4, all drainages are poorly defined playas and channels as discussed above. These drainages do not provide functional stream channels and also provide limited habitat. Downstream impacts to drainages in Reach 4 are not expected to alter their form and function. Aeolian processes are likely to continue to influence the downstream habitat in Reach 4.

4.3 Summary of Project Impacts and Floodway

4.3.1 Reach 1

Reach 1 is expected to impact 2.60 acres of USACE waters. The overall stream assessment for Reach 1 is 2. Similarly, the floodway in Reach 1 was given an overall stream assessment of 2. Due to the broad extent of Reach 1, this Reach has further been broken into two segments that encompass drainages 1-1 through 1-46 and 1-47 through 1-60. The overall stream assessment for drainages 1-1 through 1-46 was given a score of 0, as was the floodway. The overall stream assessment for drainages 1-47 through 1-60 was given a score of 4, as was the floodway.

4.3.2 Reach 2

Reach 2 is expected to impact 0.43 acres of USACE waters. The overall stream assessment for Reach 2 is 2. The floodway in Reach 2 was given a significantly higher overall stream assessment of 8, mostly due to the larger area of largely unobstructed channels that facilitate the aeolian and fluvial sediment deposition.

4.3.3 Reach 3

Reach 3 is expected to impact 5.73 acres of USACE waters. The overall stream assessment for Reach 2 is 0. Similarly, the floodway in Reach 3 was given an overall stream assessment of 0.

4.3.4 Reach 4

Reach 4 is expected to impact 6.36 acres of USACE waters. The overall stream assessment for Reach 2 is -5. There is no floodway as part of Reach 4, therefore there is no stream assessment for the floodway.

5.0 Mitigation Strategy

5.1 Mitigation Considered

The 2008 compensatory mitigation rule provides several mechanisms for mitigating permanent and unavoidable impacts. These mechanisms in order of preference are:

- Mitigation Bank –sites are restored, enhanced, created, or preserved through the purchase of credits and then maintained by a mitigation bank sponsor.
- In-Lieu Fee Program - sites are restored, enhanced, created, or preserved through a governmental or non-profit through the purchase of credits.
- Permittee-Responsible Mitigation (In-Kind) – sites are restored, enhanced, created, or preserved by the permittee in similar stream type and in the same or adjacent systems, and permittee is responsible for maintenance.
- Permittee-Responsible Mitigation (Out-of-Kind) – sites are restored, enhanced, created, or preserved by the permittee in a different stream type or location, and permittee is responsible for maintenance.

It is understood that mitigation banks and in-lieu fee programs are preferred compensatory mitigation mechanisms as these have additional assurances in place to minimize risks and uncertainties of their continued preservation. However, the 550-acre was identified as an important area for preservation in the Coachella Valley Multi-Species Habitat Conservation Plan (CVMSHCP). The preservation of this area is essential because it is located in an important wind corridor and sand transport area that provides fine sediments to the Coachella National Wildlife Refuge. The refuge is home to several State and federally endangered species including the Coachella Valley fringe-toed lizard and the Coachella Valley milk-vetch. As part of the design of the Project, which was considered in the CVMSHCP, and as a condition of the Biological Opinion issued by the United States Fish and Wildlife Services, the 550-acre floodway will be preserved from any future development. The existing 70.41 acres of Waters of the U.S. within the floodway will be preserved and enhanced with activities such as trash removal and fencing. Because these waters are available, have a mechanism in place to ensure their protection, play an essential role in the preservation and enhancement of important functions and services, and will be enhanced through increased flows and fine sediment transport, the PRM mitigation is appropriate for this project. The multiple functions and services of the 550-acre floodway allow a comprehensive compensatory mitigation approach that meets different resource agency requirements and provides CVWD with a cost-effective approach.

5.2 Permittee-Responsible Mitigation (In-Kind)

To offset permanent and indirect impacts to state and federal waters, CVWD is planning to preserve and enhance existing drainages following the acquisition of the 550-acre floodway located along Reaches 1 through 3. The 550-acre floodway was selected as the primary source of compensatory mitigation because the area supports a variety of channels, it meets the purpose and need of the project, it ensures that storm flows are conveyed through the project area to the Whitewater River, and it enhances and preserves important fluvial and aeolian wind processes in the region. Under existing conditions, the channels convey storm flows into residential and commercial areas that damage properties and increase the potential for introducing contaminants to the system. In addition, fine sands important to the long-

term preservation of the Coachella National Wildlife Refuge are currently lost under existing conditions. Placement of the levees and the preservation of the 550-acre floodway will increase sediment transport to the Refuge and enhance sand habitat within the 550-acre floodway. Development would be prohibited in this floodway and the floodway will covey storm flows southeast towards Reach 3 before entering the channel and flowing through Reach 4. The floodway will drastically increase the extent of jurisdictional waters by increasing the flows from additional canyons in the Indio Hills resulting in a floodway that varies from about 600 feet wide to more than 1 mile wide. Water in this portion of the floodway will travel south towards, and eventually crossing Ramon Road. These features are expected to be inundated during larger storm events.

The floodway will be clearly delineated to avoid risk to people and property which will also provide clear boundaries and signage indicating that these areas are off limits to trespass, off-road vehicles, trash dumping, and other human land uses and impacts. Control of invasive species and other enhancements may also be implemented by CVWD to control Asian mustard and tamarisk within the floodway.

Utilizing the floodway for mitigation will preserve the existing water bodies within the same watershed, and in the same habitats, as well as through enhancement due to increased connectivity and merged flows. Areas of temporary impacts will be mitigated through restoration to the original contouring following construction. The mitigation ratios were determined utilizing the stream assessment conducted by Reach, compared to the average stream assessment of the floodway. The overall average floodway score was used to determine the mitigation ratios due to Reach 4 and the downstream indirect impacts not having an associated floodway score. Overall, the floodway has a higher stream function than many of the drainages in the impact area. A lower mitigation ratio was utilized where the stream assessment for each Reach was lower than the average stream assessment for the floodway. The minimum mitigation ratio has been established at 1:1, which is the minimum ratio allowed under the USACE 2008 mitigation rule.

Where the stream assessment for the Reach was higher than the average stream assessment for the floodway, the ratio was increased by 2 for each score higher than the average floodway score. Reach 1 was assessed in two segments, and therefore each segment received its own mitigation ratio. Table 5 below provides the mitigation ratios by Reach for the required acres needed for mitigation for permanent and indirect impacts.

A stream assessment was not conducted for indirect impacts to drainages downstream of the levees. Most of the downstream drainages are affected by the same disturbances described for waters subject to permanent impacts. Many of these drainages have minimal biological value and have been heavily affected by illegal trash dumping and nearby development. The downstream drainages are positioned on the broader scale alluvial fan in a location where they become distributary and decrease in prominence with flow direction. Indirect impacts from the loss of upstream flows in this area are expected to be minimal with the greatest impact within a short distance from the levees. The loss of any function from to downstream areas from the levee construction will be mitigated through the preservation and enhancement of the floodway. To mitigate for indirect impacts, the minimum mitigation ratio of 1:1 was used. This coincides with the Mitigation Ratio Setting Checklists provided in Attachment B.

Table 5. Proposed Mitigation Ratios for Permanent and Indirect Impacts to Waters of the U.S.					
Reach	**Stream Assessment Score**	**Average Floodway Score**	**Impacted Acres**	**Proposed Mitigation Ratio**	**Acres of Mitigation Needed Based on Proposed Mitigation Ratio**
1 (Drainages 1-46)	0	3	1.39	1:1	1.39
1 (Drainages 47-60)	4	3	0.84	3:1	2.52
2	2	3	0.41	1:1	0.41
3	0	3	4.97	1:1	4.97
4	-5	3	3.01	1:1	3.01
Downstream Indirect Impacts	NA	3	17.98	1:1	17.98
Total Existing Mitigation Acreage Available on 550-acre Floodway for Preservation					*70.41*
Total Proposed Mitigation Needed					**30.28**

The floodway will preserve a total of 70.41 acres (1.54 acres of USACE waters in Reach 1; 47.86 acres in Reach 2; and 21.00 acres in Reach 3). The total acres that need to be mitigated based on the proposed ratios provided in Table 5 is 30.28. Therefore, the floodway will preserve and enhance about two times the anticipated required mitigation for impacts to waters of the U.S. In addition, several drainages will receive increased connectivity, and flows that have been partially obstructed upstream. It is expected that the acreage and quality of drainages within the floodway will increase, which is evident in the hydrology study (see Figures 2 and 3).

The 550-acre floodway will be protected by a conservation easement and the CVMSHCP provides a framework for the long-term management of the mitigation area. This reduces risk and uncertainty factors. Development would be prohibited in this floodway to protect the wind corridor and limit disruptions to sand migration.

6.0 Summary and Conclusions

The proposed mitigation strategy will preserve approximately 70.41 acres of existing jurisdictional streambeds through the acquisition and enhancement of the 550-acre floodway to off-set the permanent loss of approximately 10.62 acres of waters of the US, and indirect impacts to approximately 17.98 acres of waters of the US. The waters within the floodway will be managed and maintained in perpetuity to ensure that the floodway continues to function and convey storm flows and provide essential benefits to downstream areas.

7.0 References

Aspen (Aspen Environmental Group). 2020. Preliminary Jurisdictional Delineation and Wetland Determination Report for the Thousand Palms Flood Control Project. Prepared for the Coachella Valley Water District.

Fischenich, C. 2006. Functional Objectives for Stream Restoration. Available at: https://apps.dtic.mil/sti/pdfs/ADA456784.pdf

Harman, W., R. Starr, M. Carter, K. Tweedy, M. Clemmons, K. Suggs, C. Miller. 2012. A Function-Based Framework for Stream Assessment and Restoration Projects. US Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Washington, DC EPA 843-K-12-006.

Northwest Hydraulic Consultants (NHC). 2013. North Cathedral City and Thousand Palms Stormwater Master Plans.

USACE (U.S. Army Corps of Engineers). 2000. Whitewater River Basin (Thousand Palms) Flood Control Project. Final Environmental Impact Statement/Environmental Impact Report. September.

____. 2008. Compensatory Mitigation for Losses of Aquatic Resources. Available at: https://www.epa.gov/sites/production/files/2015-03/documents/2008_04_10_wetlands_wetlands_mitigation_final_rule_4_10_08.pdf

Attachment A

Figures

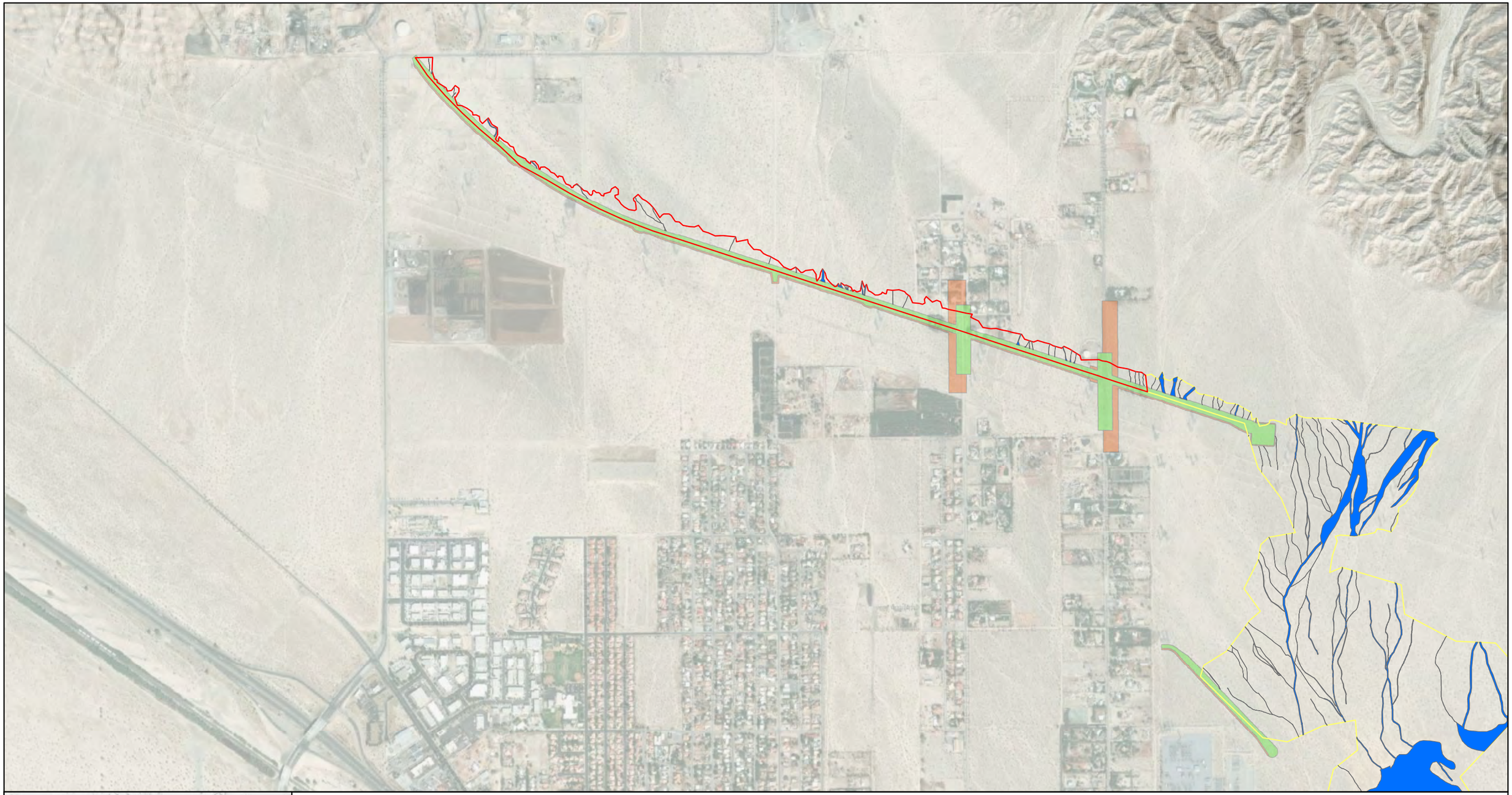


Image Source: DigitialGlobe, 2018

1,000 0 1,000
Feet

- Floodway Reach 1
- Floodway Reach 2
- Preserved Floodway Waters
- Permanent
- Temporary

Reach 1 and 2

Preserved Floodway Waters

Reach 3

Study Area

RIVERSIDE COUNTY

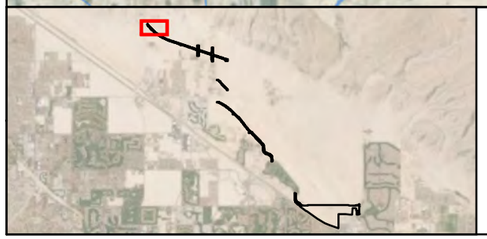
Image Source: DigitialGlobe, 2018

1,000 0 1,000 Feet

Floodway Reach 2
Floodway Reach 3
Preserved Floodway Waters
Permanent
Temporary

Reach 2 and 3

Preserved Floodway Waters



Review Area
Permanent Disturbance Area
Temporary Disturbance Area
20-foot Maintenance Area

Floodway (8.83 ac of Non-wetland Waters of the U.S. in Floodway)
Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac
X-X Drainage Number

Sample Location
Ordinary High Water Mark
X-X Data Sheet Number

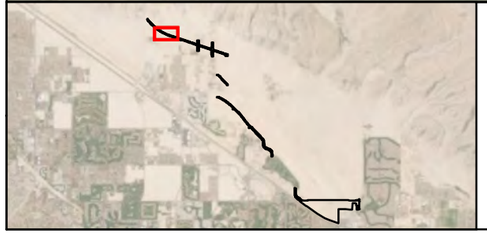
100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1A.

Aquatic Resources Delineation Map



Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway
(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location

Ordinary High Water Mark

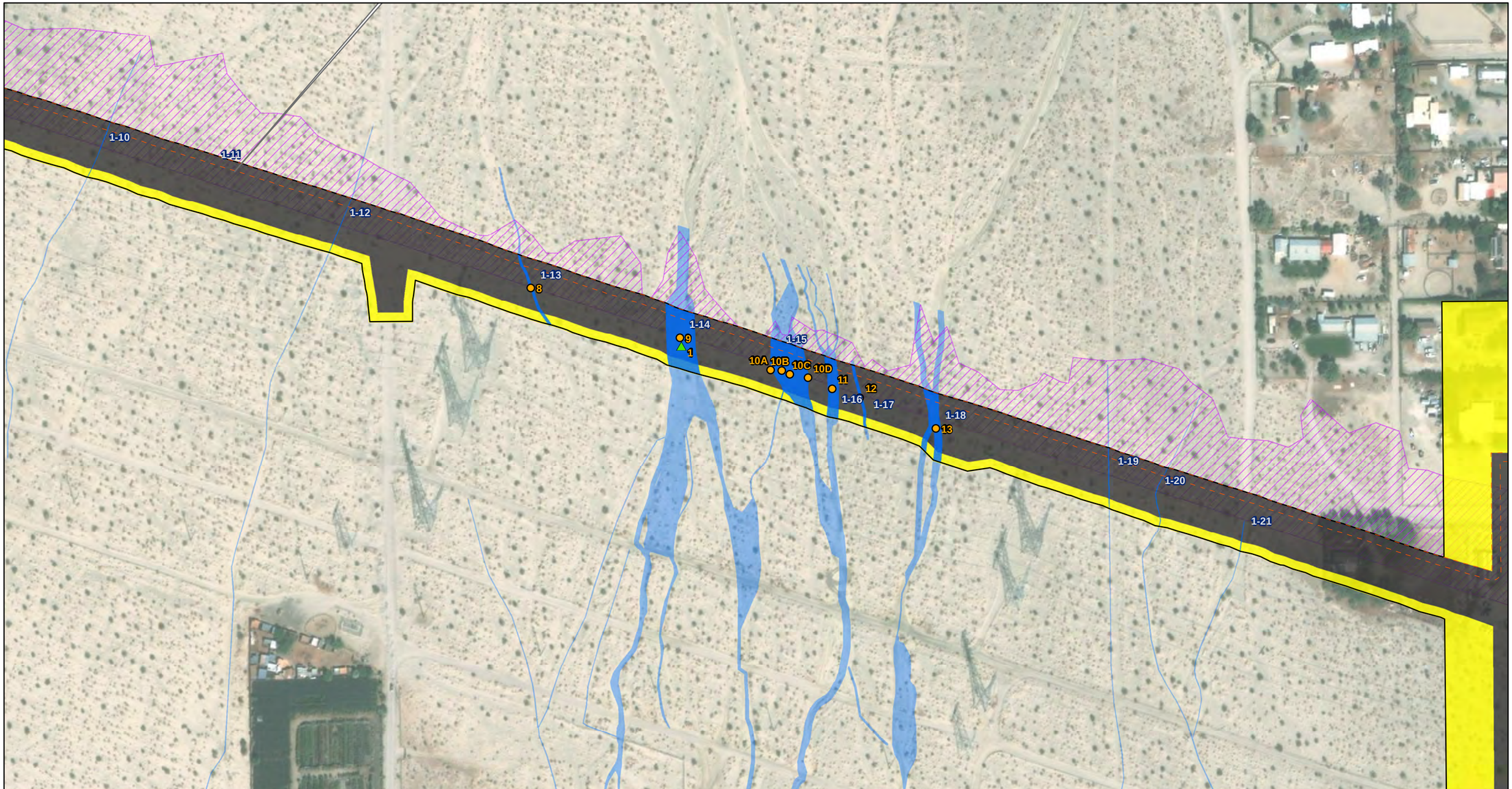
100 0 200 Feet

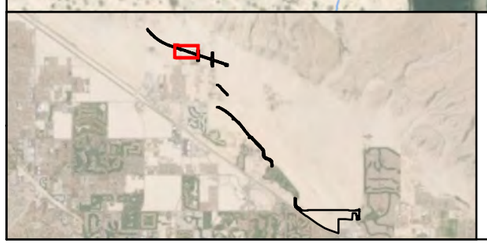
Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1B.

Aquatic Resources Delineation Map





Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway
(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location

Ordinary High Water Mark

Wetland Sample Location

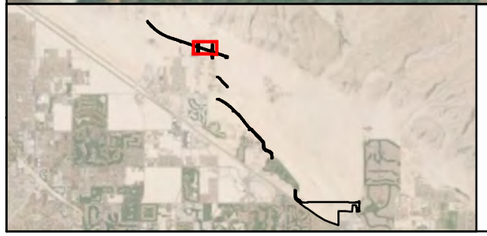
100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1C.

Aquatic Resources Delineation Map



Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway
(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location

Ordinary High Water Mark

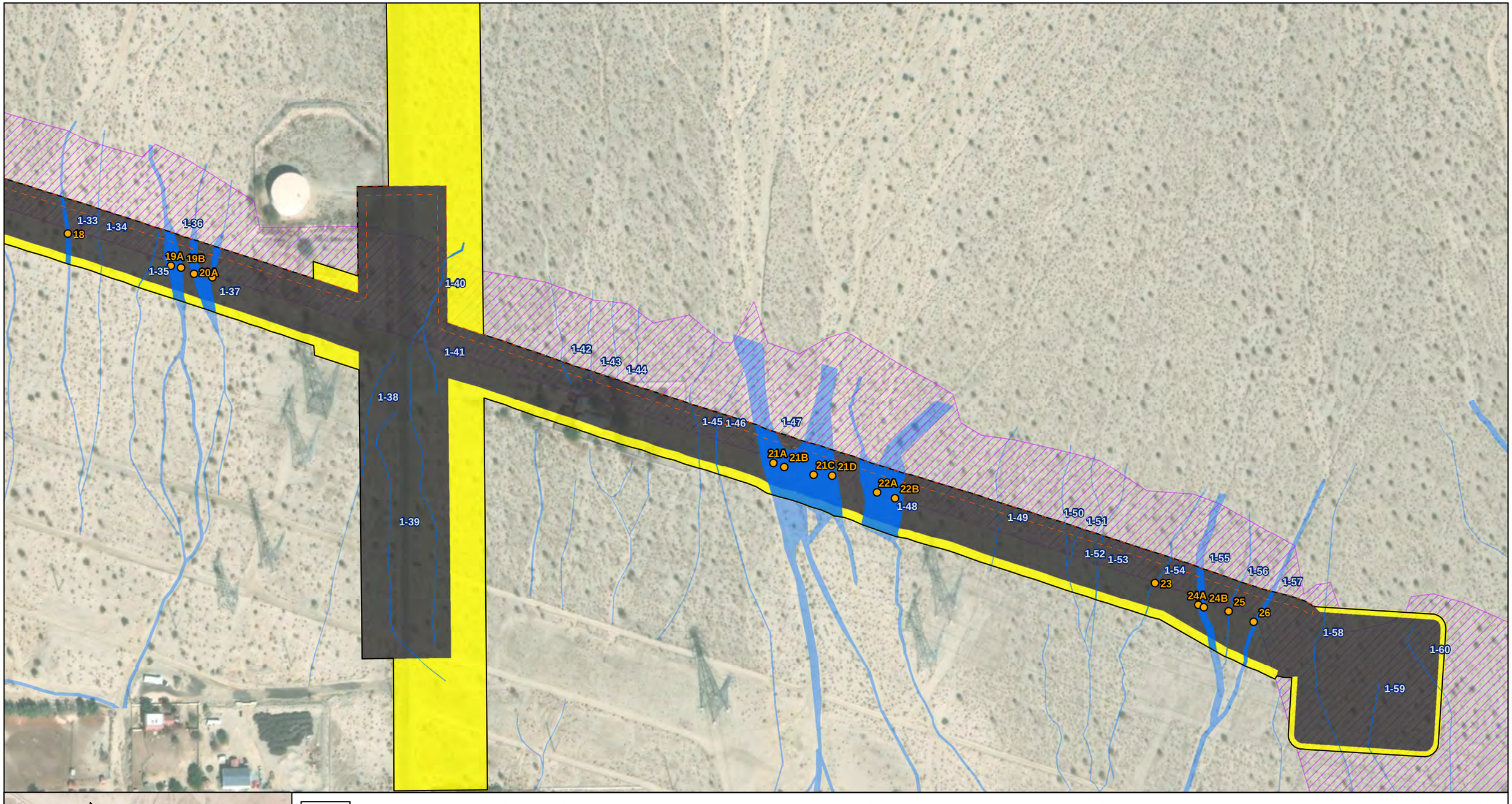
100 0 200 Feet

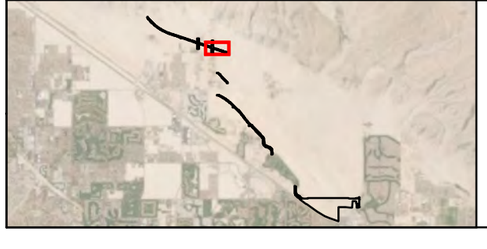
Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1D.

Aquatic Resources Delineation Map





Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway

(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location

Ordinary High Water Mark

100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1E.

Aquatic Resources Delineation Map

Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway
(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location

Ordinary High Water Mark

Wetland Sample Location

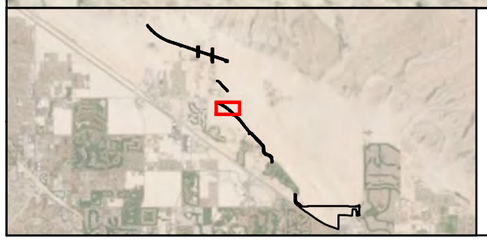
100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1F.

Aquatic Resources Delineation Map



Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway
(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

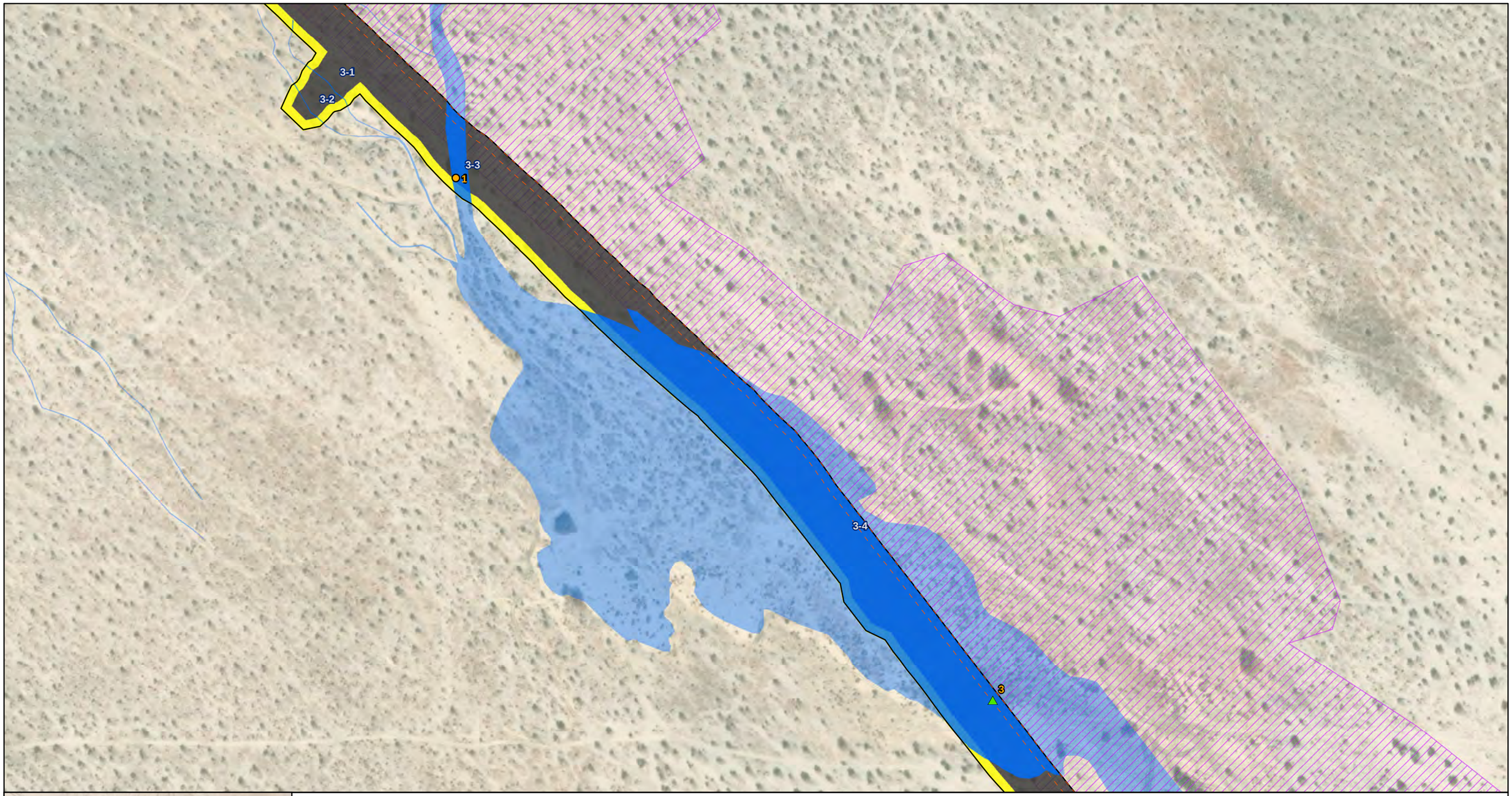
100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Figure 1G.

Aquatic Resources Delineation Map

Image Source: DigitialGlobe, 2018



Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway
(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location

Ordinary High Water Mark

Wetland Sample Location

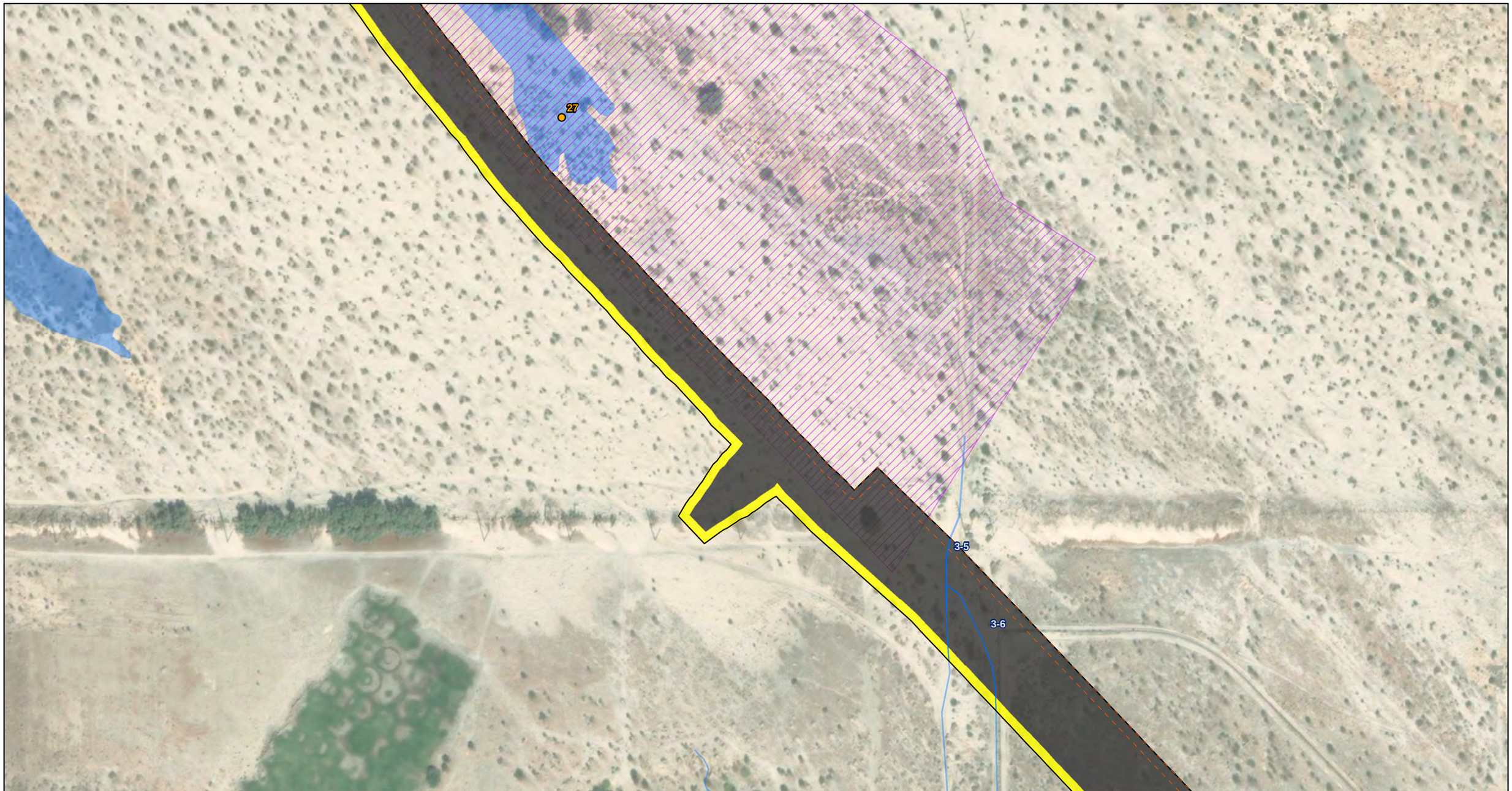
100 0 200 Feet

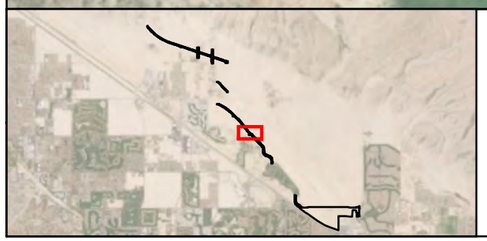
Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1H.

Aquatic Resources Delineation Map





Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Floodway
(8.83 ac of Non-wetland Waters of the U.S. in Floodway)

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location

Ordinary High Water Mark

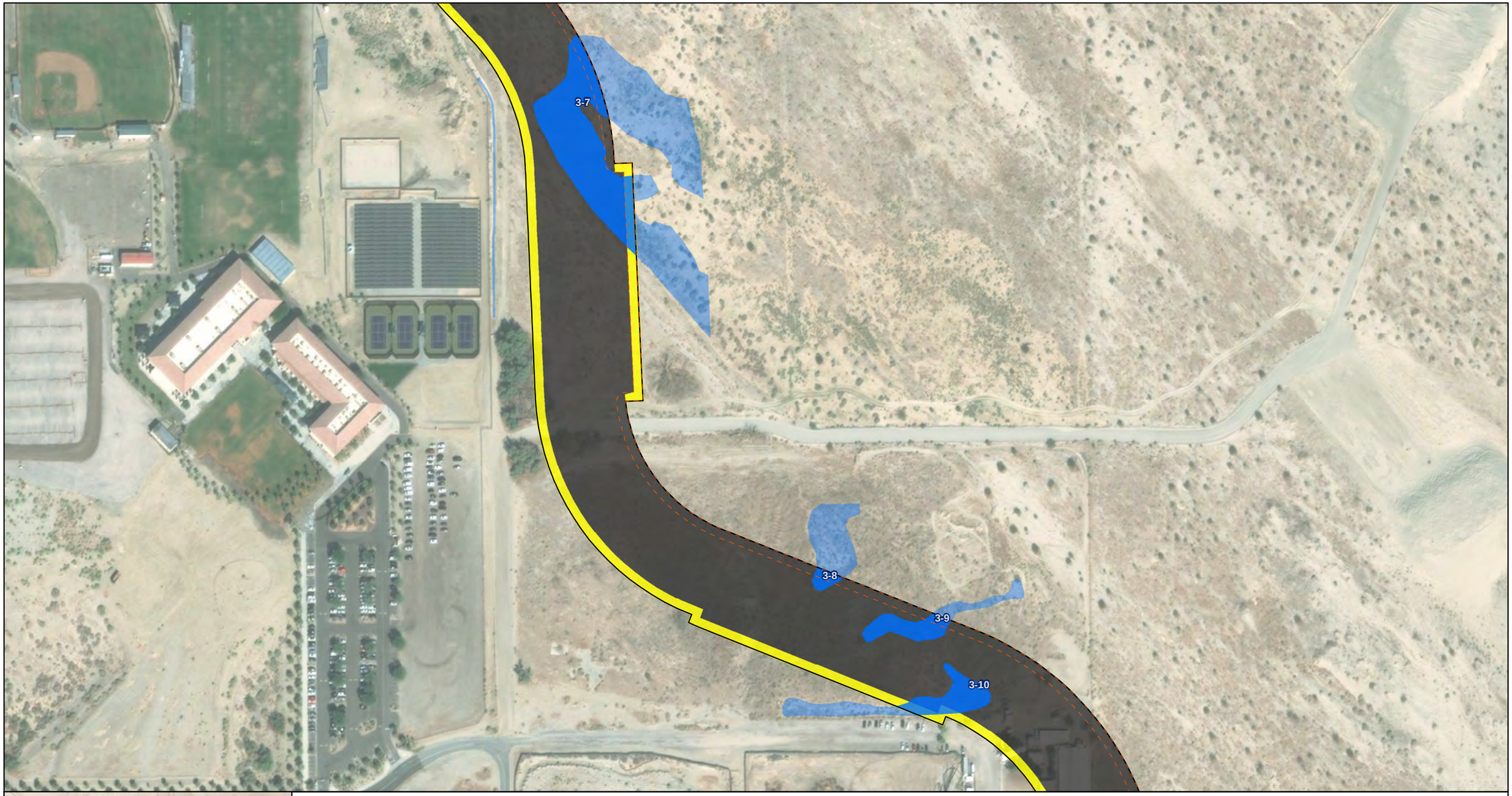
100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1I.

Aquatic Resources Delineation Map



Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

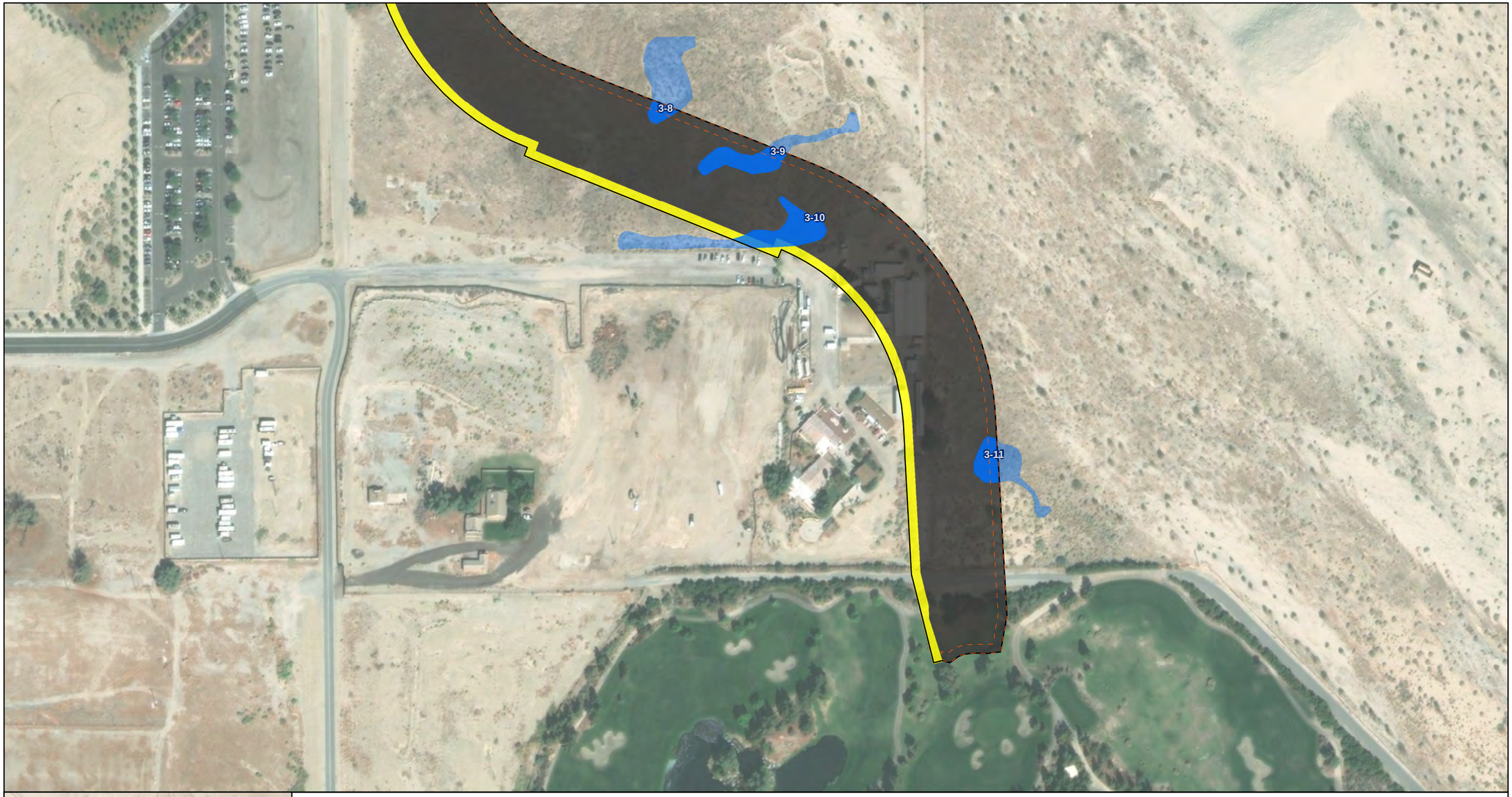
100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Figure 1J.

Aquatic Resources Delineation Map

Image Source: DigitialGlobe, 2018



Review Area

Permanent Disturbance Area

Temporary Disturbance Area

20-foot Maintenance Area

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

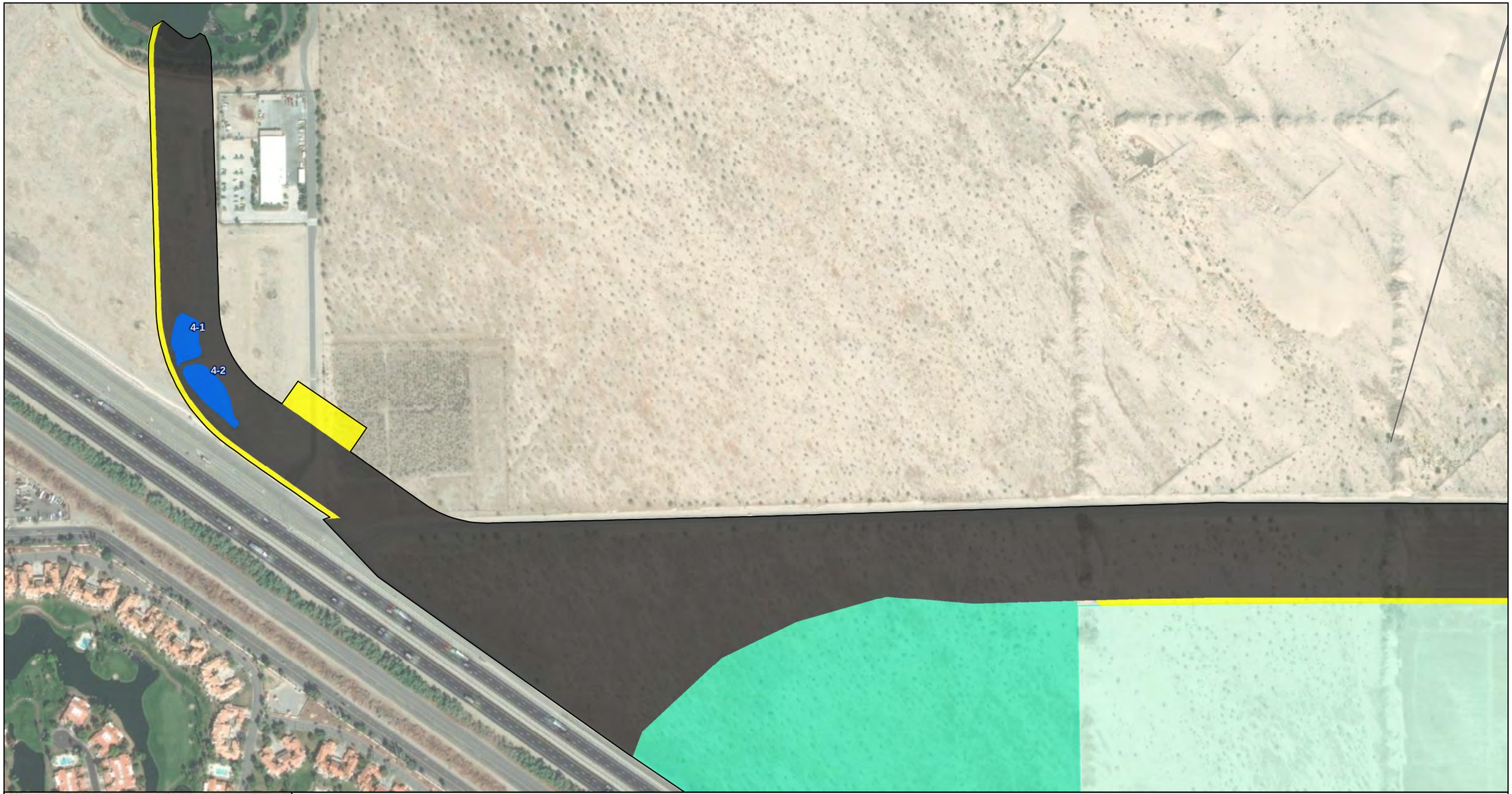
100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Figure 1K.

Aquatic Resources Delineation Map

Image Source: DigitialGlobe, 2018



Review Area

Permanent Disturbance Area

Temporary Disturbance Area

Temporary Soil Deposition Area

Temporary Concrete Batch Plant/Marshalling Yard

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

100 0 200 Feet

Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

Figure 1L.

Aquatic Resources Delineation Map

Review Area

Permanent Disturbance Area
Temporary Disturbance Area
Temporary Soil Deposition Area

Non-wetland Waters of the U.S.
Permanent: 10.6 ac (1.23 ac in 20-foot Maintenance Area)
Temporary: 4.5 ac

X-X Drainage Number

Sample Location
Ordinary High Water Mark

100 0 200 Feet

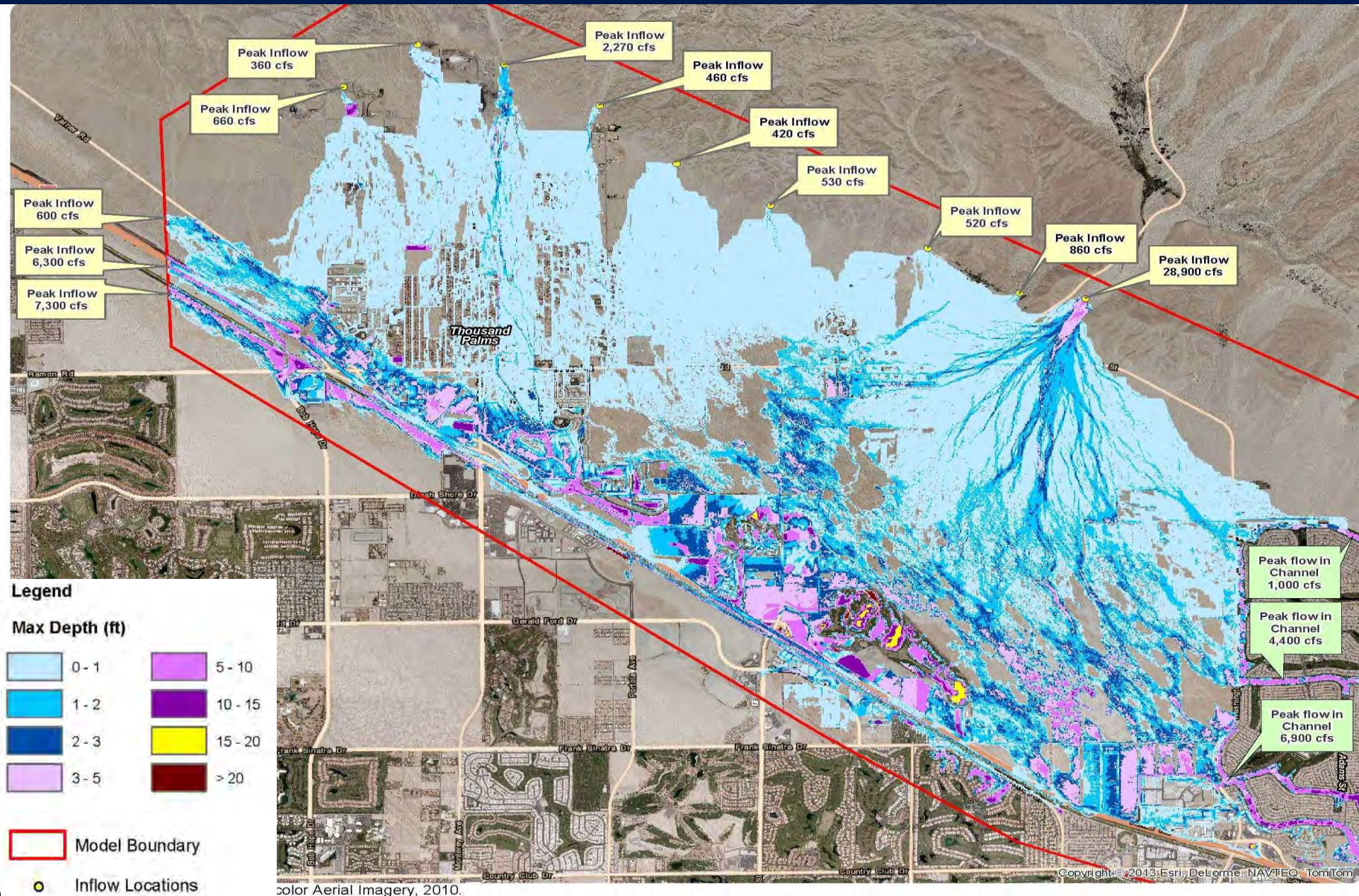
Data Source: Field Surveys Conducted by Justin Wood and Chris Huntley on December 19 and 20, 2018, February 22, March 18, 19, and September 16, 2019.

Image Source: DigitialGlobe, 2018

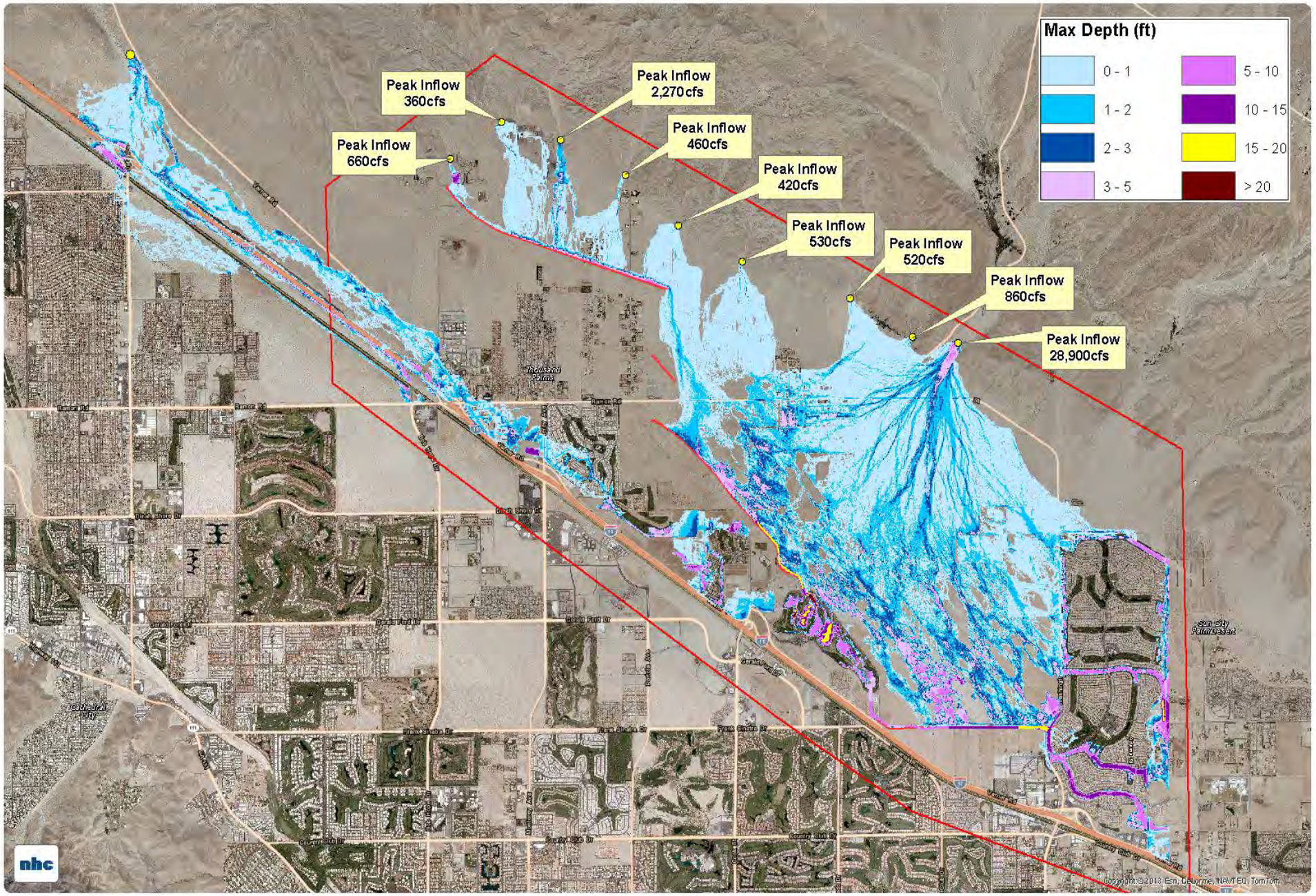
Figure 1M.

Aquatic Resources Delineation Map

Thousand Palms Flood Hazards



TPFCP with NCC Preferred



Attachment B

Mitigation Ratio Setting Checklists

Attachment 12501.2-SPD - Instructions for Completing Mitigation Ratio-Setting Checklist.

These instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. PMs **must** enter a separate justification for each adjustment within the checklist. PMs may deviate from the guidance provided herein if such deviations can be documented in the checklist with sufficient justification.

<table>
<tr><td>1</td><td colspan="4">Date: ____6/13/2021_____ Corps file no.: _____ Project Manager: _____

Impact site name: Indirect Impacts ORM impact resource type: river/stream Hydrology: ephemeral
Cowardin or HGM type: riverine _ Impact area (acres): 17.98 Impact distance (linear feet): 75,407

For impact site name, multiple discrete (as entered in ORM) impacts are to be evaluated using multiple checklists; however, multiple impacts to one habitat type (Cowardin or HGM) could be lumped together to determine a mitigation ratio using one checklist. For each proposed impact to waters of the U.S., the project manager (PM) should consider each factor and, if applicable, document consideration in response column(s) using applicable procedures or guidelines. For mitigation proposals with multiple mitigation sites and/or types, see QMS procedure 12501 (section 7.3).</td></tr>
<tr><td></td><td></td><td>Column A:
Mitigation site name: Floodway
Mitigation type: Preservation
Resource type: River/stream
Cowardin/HGM type: Riverine
Hydrology: Ephemeral</td><td>Column B (optional):
Mitigation site name: _____
Mitigation type: _____
Resource type: _____
Cowardin/HGM type: _____
Hydrology: _____</td><td>Column C (optional):
Mitigation site name: _____
Mitigation type: _____
Resource type: _____
Cowardin/HGM type: _____
Hydrology: _____</td></tr>
<tr><td>2</td><td>QUALITATIVE impact-mitigation comparison:

Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3.
Yes ☐ No ☐

Optional: use Table 1 (below).

Qualitative assessment of functional loss at the impact site versus expected functional gain at the mitigation site may warrant a lower or higher mitigation ratio. Adjustments for</td><td>Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10).

Starting ratio: 1:1
Ratio adjustment: -2
Baseline ratio: 1:3
PM justification: Functional gain would be more than the expected functional loss (see attached table)</td><td>Starting ratio: 1:1
Ratio adjustment: ___
Baseline ratio: __:__
PM justification:</td><td>Starting ratio: 1:1
Ratio adjustment: ___
Baseline ratio: __:__
PM justification:</td></tr>
</table>

	preservation-only mitigation, which provides no functional gain, should generally fall towards the high end of the range (towards 3-4). Preservation-only of non-aquatic habitats (upland buffer) may warrant adjustments higher than 4. Using the list of functions below, compare impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites. If, for most functions, I < M, then use a single adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. Add adjustment to starting ratio of 1:1 to obtain baseline ratio. If adjustment is less than 0 (negative), add absolute value of adjustment to right (impact) side of starting ratio; otherwise, add to left (mitigation) side. See examples in attachment 12501.3. For a suite of potential functions from HGM (alternate lists of functions may be used), see Table 1 (below).			
3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. In general, project managers should consider requiring a functional/condition assessment and using step 3 for projects where total permanent impacts exceed 0.5 acre or 300 linear feet. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. If a district-approved method is not available, use step 2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI spreadsheet (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__

	Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example below. Note: In an extreme case, the BAMI procedure could result in a ratio (and overall mitigation proposal) unacceptable to the Corps. For example, providing a very large but low quality mitigation site (low functional gain resulting a in a very high ratio) may result in functional gain equaling loss numerically, but this may not be acceptable because the required compensatory mitigation must be appropriate to the scope and degree of the impacts (see 33 CFR 320.4(r)(2)).			
4	**Mitigation site location**: Mitigation located outside impacted watershed generally warrants a higher mitigation ratio. The project manager will determine the appropriate Hydrologic Unit Code (HUC) to define the term "watershed" in this context. Is mitigation located outside of the impacted watershed? If yes, +1.0, if no, +0.	Ratio adjustment: 0 PM justification: impact and mitigation would be within the same watershed	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
5	**Net loss of aquatic resource surface area**: Different types of mitigation result in varying net losses of aquatic resource area. For definitions of mitigation types, see mitigation rule at 33 CFR 332.2. Re-establishment or establishment +0, rehabilitation, enhancement, preservation +1.0 (these three mitigation types result in a net loss of aquatic resource area in cases where permanent loss of waters of the U.S. is authorized and not offset by either re-establishment or establishment).	Note: If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Ratio adjustment: +1 PM justification: enhancement/preservation	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:** Out-of-kind mitigation may warrant a higher mitigation ratio. However, out-of-kind mitigation can be appropriate if the proposed mitigation habitat type serves the	Ratio adjustment: 0 PM justification: mitigation is in-kind	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	aquatic resource needs of the watershed/ecoregion. In considering out-of-kind mitigation, project managers should consider whether impacts or mitigation would consist of rare or regionally significant habitat types (e.g., vernal pools). Project manager will determine the relative values of different habitat types and document herein. Justification for the use of out-of-kind mitigation must be documented herein. Would mitigation result in: (A) conversion from a highly valuable and/or rare habitat type to a common type? Or (B) vice versa? Magnitude of adjustment should vary with value of habitats involved. Calculate ratio adjustment based on answers to questions (A) and (B): Y,N: +0.25 to +4.0; N,Y: -0.25 to -4.0; N,N: +0.			
7	**Risk and uncertainty:** Mitigation ratios should reflect the inherent uncertainty of mitigation. Factors to consider include: 1) permittee-responsible mitigation; 2) mitigation site did not formerly support targeted aquatic resources; 3) difficult-to-replace resources (see 33 CFR 332.3(e)(3) and (f)(2)); 4) modified hydrology (e.g., high-flow bypass); 5) artificial hydrology (e.g., pumped water source); 6) structures requiring long-term maintenance (e.g., outfalls, drop structures, weirs, bank stabilization structures); 7) planned vegetation maintenance (e.g., mowing, landclearing, fuel modification activities); 8) e.g., shallow, buried structures (riprap, clay liners), and 9) absence of long-term preservation mechanism. Note: this list is not all-inclusive. Each factor can range from +0.1 to +0.3 depending on the level of anticipated risk and the amount of maintenance or management required to sustain the compensatory mitigation project. Sum factor adjustments (+0 if no factors). Generally, uncertainty in banks and in	Ratio adjustment: 0 PM justification: Risk and uncertainty factors are minimal because minimal maintenance of mitigation is required and the CVMSHCP provides a framework for long-term management of the mitigation area.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	lieu fee programs is accounted for in the credit release process.			
8	**Temporal loss**: Constructed habitats take time to mature and replace aquatic functions; this typically warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. Project manager should estimate the time between when the authorized impacts occur and constructed mitigation is expected to replace lost functions, including the monitoring period. In cases where all performance standards are expected to be achieved prior to impacts, no temporal loss should be assessed (for permittee-responsible only). Similarly, in cases where interim performance standards are expected to be achieved, a lower ratio adjustment may be appropriate. Unexpected delays in compensatory mitigation project implementation should be handled as compliance actions. a. For scheduled, known delays between impacts and construction of mitigation: multiply delay (in months) by 0.05; b. To account for time required for full replacement of functions during monitoring period: generally, if mitigation is comprised of trees/woodlands or saltmarsh, +3; if shrubs, +2; if herbaceous, +1; c. Add adjustments from steps (a) and (b).	Ratio adjustment: 0 PM justification: No planned delay, impact and mitigation to be constructed simultaneously	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):** Project manager should enter the final mitigation ratio(s) arrived at after consideration of the above factors (either qualitative OR quantitative). Project manager should enter the extent of authorized impacts and required mitigation by area (acreage) and/or distance (linear feet), as well as the corresponding resource type (lake, non-tidal wetland, other, pond, stream/river/ocean, tidal	Column A: 1. Baseline ratio from step 2 or 3 = 1:3 2. Total adjustments = +1 3. Final ratio: 1:1 Proposed impact (total): 17.98 acre ___ linear feet to	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre

	wetland) and Cowardin or Hydrogeomorphic Method (HGM) classification type. To obtain the final mitigation ratio*: a. Take baseline ratio from step 2 or 3; b. Add ratio adjustments from steps 4-8; c. If total of adjustments is greater than 0 (positive), add total to left (mitigation) side of baseline ratio; d. If total of adjustments is less than 0 (negative), add ABS of total to right (impact) side of baseline ratio; Note 1: minimum ratio = 1:1 if step 2 used. If step 3 used, final ratio can be less than 1:1 assuming completed functional/condition assessment, in combination with other steps, justifies a ratio less than 1:1 (i.e., total of adjustments is negative). Note 2: Final ratio in each column should be as calculated. If desired, express ratio equal to X:1 (traditional format: for example, 1:4 = 0.25:1), but ONLY in step 9's PM comments and in step 10.	Resource type: River/stream Cowardin or HGM: Riverine Hydrology: Ephemeral Required mitigation: 17.98 acre ___ linear feet of Mitigation type: Enhancement/ Preservation Resource type: Same Cowardin or HGM: Same Hydrology: Same Additional PM comments: *Calculated ratio is 2:3 (or 0.66:1), but without functional assessment, 1:1 is min ratio allowed under 2008 mitigation rule.	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:** Summarize the checklist results, combining all required mitigation for this impact site.	PM summary: The final compensatory mitigation requirement for this impact site is the purchase of the floodway for the preservation of 17.98 acres of ephemeral stream habitat (1:1 ratio).		

*In the final determination of required mitigation, direct and indirect impacts should be considered:

a. Indirect impacts: Compensatory mitigation may be required to offset predictable indirect impacts. The PM should document any indirect impacts caused by the proposed/authorized activity.

b. Cumulative impacts: In some cases, cumulative impacts should be considered when determining if compensatory mitigation should be required. The extent of cumulative impacts should be documented using available information, such as analyses or data associated with a Special Area Management Plan (SAMP), Watershed Management Plan, land use/land cover scenario assessment, hydrologic modeling, etc. The information used should be fully cited herein and in the decision document. The assessment must focus on the proposed action's direct and indirect impacts (i.e., incremental impact of the proposed activity) in the context of the cumulative effects caused by past, present, and reasonably foreseeable actions, to reduce the proposed activity's contribution to cumulative effects in the region.

Step 2

Table 1 for step 2. Qualitative comparison of functions (functional loss vs. gain):

Function	Impact site	Mitigation site
Short- or long-term surface water storage	Small loss	Large gain
Subsurface water storage	No loss	No gain
Moderation of groundwater flow or discharge	Small loss	Large gain
Dissipation of energy	No loss	No gain
Cycling of nutrients	No loss	Large gain
Removal of elements and compounds	No loss	No gain
Retention of particulates	Small loss	Large gain
Export of organic carbon	No loss	No gain
Maintenance of plant and animal communities	Small loss	Large gain
Step 2 adjustment:		-2

Step 2 Table 1 instructions:

1. Describe amount of functional loss (impact) and gain (mitigation) in each respective column. Gain and loss can be described in text (for example, small loss, moderate loss, large loss, no loss, etc.) or symbolically (for example, +, ++, +++, 0, ---, --, -).
2. Note: alternate lists of functions may be used.
3. Note: a single adjustment should be used to account for all functions combined (see example 7 in attachment 12501.3)

Attachment 12501.2-SPD - Instructions for Completing Mitigation Ratio-Setting Checklist.

These instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. PMs **must** enter a separate justification for each adjustment within the checklist. PMs may deviate from the guidance provided herein if such deviations can be documented in the checklist with sufficient justification.

<table>
<tr><td>1</td><td colspan="4">Date:6/13/2021 Corps file no.: _____ Project Manager: _____

Impact site name: Reach 1 (Drainages 1-46) ORM impact resource type: _river/stream Hydrology: Ephemeral
Cowardin or HGM type: Riverine Impact area (acres): 1.39 Impact distance (linear feet): 8042

For impact site name, multiple discrete (as entered in ORM) impacts are to be evaluated using multiple checklists; however, multiple impacts to one habitat type (Cowardin or HGM) could be lumped together to determine a mitigation ratio using one checklist. For each proposed impact to waters of the U.S., the project manager (PM) should consider each factor and, if applicable, document consideration in response column(s) using applicable procedures or guidelines. For mitigation proposals with multiple mitigation sites and/or types, see QMS procedure 12501 (section 7.3).</td></tr>
<tr><td></td><td></td><td>Column A:
Mitigation site name: Floodway
Mitigation type: Preservation and enhancement
Resource type: River/stream
Cowardin/HGM type: Riverine
Hydrology: Ephemeral</td><td>Column B (optional):
Mitigation site name: _____
Mitigation type: _____
Resource type: _____
Cowardin/HGM type: _____
Hydrology: _____</td><td>Column C (optional):
Mitigation site name: _____
Mitigation type: _____
Resource type: _____
Cowardin/HGM type: _____
Hydrology: _____</td></tr>
<tr><td>2</td><td>QUALITATIVE impact-mitigation comparison:

Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3.
Yes ☒ No ☐

Optional: use Table 1 (below).

Qualitative assessment of functional loss at the impact site versus expected functional gain at the mitigation site may warrant a lower or higher mitigation ratio. Adjustments for</td><td>Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10).

Starting ratio: 1:1
Ratio adjustment: -2
Baseline ratio: 1:3
PM justification: Functional gain would be more than the expected functional loss (see attached table)</td><td>Starting ratio: 1:1
Ratio adjustment: ___
Baseline ratio: __:__
PM justification:</td><td>Starting ratio: 1:1
Ratio adjustment: ___
Baseline ratio: __:__
PM justification:</td></tr>
</table>

	preservation-only mitigation, which provides no functional gain, should generally fall towards the high end of the range (towards 3-4). Preservation-only of non-aquatic habitats (upland buffer) may warrant adjustments higher than 4. Using the list of functions below, compare impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites. If, for most functions, I < M, then use a single adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. Add adjustment to starting ratio of 1:1 to obtain baseline ratio. If adjustment is less than 0 (negative), add absolute value of adjustment to right (impact) side of starting ratio; otherwise, add to left (mitigation) side. See examples in attachment 12501.3. For a suite of potential functions from HGM (alternate lists of functions may be used), see Table 1 (below).			
3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. In general, project managers should consider requiring a functional/condition assessment and using step 3 for projects where total permanent impacts exceed 0.5 acre or 300 linear feet. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. If a district-approved method is not available, use step 2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI spreadsheet (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__

	Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example below. Note: In an extreme case, the BAMI procedure could result in a ratio (and overall mitigation proposal) unacceptable to the Corps. For example, providing a very large but low quality mitigation site (low functional gain resulting a in a very high ratio) may result in functional gain equaling loss numerically, but this may not be acceptable because the required compensatory mitigation must be appropriate to the scope and degree of the impacts (see 33 CFR 320.4(r)(2)).			
4	**Mitigation site location**: Mitigation located outside impacted watershed generally warrants a higher mitigation ratio. The project manager will determine the appropriate Hydrologic Unit Code (HUC) to define the term "watershed" in this context. Is mitigation located outside of the impacted watershed? If yes, +1.0, if no, +0.	Ratio adjustment: 0 PM justification: The impact and mitigation would be within the same watershed.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
5	**Net loss of aquatic resource surface area**: Different types of mitigation result in varying net losses of aquatic resource area. For definitions of mitigation types, see mitigation rule at 33 CFR 332.2. Re-establishment or establishment +0, rehabilitation, enhancement, preservation +1.0 (these three mitigation types result in a net loss of aquatic resource area in cases where permanent loss of waters of the U.S. is authorized and not offset by either re-establishment or establishment).	Note: If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Ratio adjustment: +1 PM justification: Enhancement/Preservation	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:** Out-of-kind mitigation may warrant a higher mitigation ratio. However, out-of-kind mitigation can be appropriate if the proposed mitigation habitat type serves the	Ratio adjustment: 0 PM justification: Mitigation is in-kind	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	aquatic resource needs of the watershed/ecoregion. In considering out-of-kind mitigation, project managers should consider whether impacts or mitigation would consist of rare or regionally significant habitat types (e.g., vernal pools). Project manager will determine the relative values of different habitat types and document herein. Justification for the use of out-of-kind mitigation must be documented herein. Would mitigation result in: (A) conversion from a highly valuable and/or rare habitat type to a common type? Or (B) vice versa? Magnitude of adjustment should vary with value of habitats involved. Calculate ratio adjustment based on answers to questions (A) and (B): Y,N: +0.25 to +4.0; N,Y: -0.25 to -4.0; N,N: +0.			
7	**Risk and uncertainty:** Mitigation ratios should reflect the inherent uncertainty of mitigation. Factors to consider include: 1) permittee-responsible mitigation; 2) mitigation site did not formerly support targeted aquatic resources; 3) difficult-to-replace resources (see 33 CFR 332.3(e)(3) and (f)(2)); 4) modified hydrology (e.g., high-flow bypass); 5) artificial hydrology (e.g., pumped water source); 6) structures requiring long-term maintenance (e.g., outfalls, drop structures, weirs, bank stabilization structures); 7) planned vegetation maintenance (e.g., mowing, land clearing, fuel modification activities); 8) e.g., shallow, buried structures (riprap, clay liners), and 9) absence of long-term preservation mechanism. Note: this list is not all-inclusive. Each factor can range from +0.1 to +0.3 depending on the level of anticipated risk and the amount of maintenance or management required to sustain the compensatory mitigation project. Sum factor adjustments (+0 if no	Ratio adjustment: 0 PM justification: Preservation of existing features within the same watershed. Risk and uncertainty factors are minimal because minimal maintenance of mitigation is required and the CVMSHCP provides a framework for long-term management of the mitigation area.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	factors). Generally, uncertainty in banks and in lieu fee programs is accounted for in the credit release process.			
8	**Temporal loss**: Constructed habitats take time to mature and replace aquatic functions; this typically warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. Project manager should estimate the time between when the authorized impacts occur and constructed mitigation is expected to replace lost functions, including the monitoring period. In cases where all performance standards are expected to be achieved prior to impacts, no temporal loss should be assessed (for permittee-responsible only). Similarly, in cases where interim performance standards are expected to be achieved, a lower ratio adjustment may be appropriate. Unexpected delays in compensatory mitigation project implementation should be handled as compliance actions. a. For scheduled, known delays between impacts and construction of mitigation: multiply delay (in months) by 0.05; b. To account for time required for full replacement of functions during monitoring period: generally, if mitigation is comprised of trees/woodlands or saltmarsh, +3; if shrubs, +2; if herbaceous, +1; c. Add adjustments from steps (a) and (b).	Ratio adjustment: 0 PM justification: No planned delay, impact and mitigation would occur simultaneously.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):** Project manager should enter the final mitigation ratio(s) arrived at after consideration of the above factors (either qualitative OR quantitative). Project manager should enter the extent of authorized impacts and required mitigation by area (acreage) and/or distance (linear feet), as well as the corresponding resource type (lake, non-	Column A: 1. Baseline ratio from step 2 or 3 = 1:3 2. Total adjustments = +1 3. Final ratio: 1 :1 Proposed impact (total): 1.39 acre ___ linear feet	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____

	tidal wetland, other, pond, stream/river/ocean, tidal wetland) and Cowardin or Hydrogeomorphic Method (HGM) classification type. To obtain the final mitigation ratio*: a. Take baseline ratio from step 2 or 3; b. Add ratio adjustments from steps 4-8; c. If total of adjustments is greater than 0 (positive), add total to left (mitigation) side of baseline ratio; d. If total of adjustments is less than 0 (negative), add ABS of total to right (impact) side of baseline ratio; Note 1: minimum ratio = 1:1 if step 2 used. If step 3 used, final ratio can be less than 1:1 assuming completed functional/condition assessment, in combination with other steps, justifies a ratio less than 1:1 (i.e., total of adjustments is negative). Note 2: Final ratio in each column should be as calculated. If desired, express ratio equal to X:1 (traditional format: for example, 1:4 = 0.25:1), but ONLY in step 9's PM comments and in step 10.	to Resource type: ____river/stream_____ Cowardin or HGM: _____ Hydrology: ___ephemeral_____ Required mitigation: 1.39 acre ___ linear feet of Mitigation type: enhancement/ preservation Resource type: same Cowardin or HGM: same Hydrology: same Additional PM comments: *Calculated ratio is 2:3 (or 0.66:1), but without functional assessment, 1:1 is min ratio allowed under 2008 mitigation rule.	Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:	Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:** Summarize the checklist results, combining all required mitigation for this impact site.	PM summary: The final compensatory mitigation requirement for this impact site is the purchase of the floodway for the preservation of 1.39 acres of ephemeral stream habitat (1:1 ratio).		

*In the final determination of required mitigation, direct and indirect impacts should be considered:

a. Indirect impacts: Compensatory mitigation may be required to offset predictable indirect impacts. The PM should document any indirect impacts caused by the proposed/authorized activity.

b. Cumulative impacts: In some cases, cumulative impacts should be considered when determining if compensatory mitigation should be required. The extent of cumulative impacts should be documented using available information, such as analyses or data associated with a Special Area Management Plan (SAMP), Watershed Management Plan, land use/land cover scenario assessment, hydrologic modeling, etc. The information used should be fully cited herein and in the decision document. The assessment must focus on the proposed action's direct and indirect impacts (i.e., incremental impact of the proposed activity) in the context of the cumulative effects caused by past, present, and reasonably foreseeable actions, to reduce the proposed activity's contribution to cumulative effects in the region.

Step 2

Table 1 for step 2. Qualitative comparison of functions (functional loss vs. gain):

Function	Impact site	Mitigation site
Short- or long-term surface water storage	Small loss	Large gain
Subsurface water storage	No loss	No gain
Moderation of groundwater flow or discharge	Small loss	Large gain
Dissipation of energy	No loss	No gain
Cycling of nutrients	Small loss	Small gain
Removal of elements and compounds	No loss	No gain
Retention of particulates	Small loss	Large gain
Export of organic carbon	No loss	No gain
Maintenance of plant and animal communities	Small loss	Large gain
Step 2 adjustment:		-2

Step 2 Table 1 instructions:

1. Describe amount of functional loss (impact) and gain (mitigation) in each respective column. Gain and loss can be described in text (for example, small loss, moderate loss, large loss, no loss, etc.) or symbolically (for example, +, ++, +++, 0, ---, --, -).
2. Note: alternate lists of functions may be used.
3. Note: a single adjustment should be used to account for all functions combined (see example 7 in attachment 12501.3)

Attachment 12501.2-SPD - Instructions for Completing Mitigation Ratio-Setting Checklist.

These instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. PMs **must** enter a separate justification for each adjustment within the checklist. PMs may deviate from the guidance provided herein if such deviations can be documented in the checklist with sufficient justification.

1	Date:6/13/2021 Corps file no.: _____ Project Manager: _____ Impact site name: Reach 1 (Drainages 47-60) ORM impact resource type: River/stream Hydrology: Ephemeral Cowardin or HGM type: Riverine Impact area (acres): 0.84 Impact distance (linear feet): 2000 For impact site name, multiple discrete (as entered in ORM) impacts are to be evaluated using multiple checklists; however, multiple impacts to one habitat type (Cowardin or HGM) could be lumped together to determine a mitigation ratio using one checklist. For each proposed impact to waters of the U.S., the project manager (PM) should consider each factor and, if applicable, document consideration in response column(s) using applicable procedures or guidelines. For mitigation proposals with multiple mitigation sites and/or types, see QMS procedure 12501 (section 7.3).			
		Column A: Mitigation site name: Floodway Mitigation type: Preservation/Enhancement Resource type: River/stream Cowardin/HGM type: Riverine Hydrology: Ephemeral	Column B (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____ Hydrology: _____	Column C (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____ Hydrology: _____
2	**QUALITATIVE impact-mitigation comparison**: Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3. Yes ☒ No ☐ Optional: use Table 1 (below). Qualitative assessment of functional loss at the impact site versus expected functional gain at the mitigation site may warrant a lower or higher mitigation ratio. Adjustments for	Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10). Starting ratio: 1:1 Ratio adjustment: +1 Baseline ratio: 2:1 PM justification: Impacts and mitigation sites are the same habitat type, with slightly higher function in the impact area than the overall floodway (see attached table)	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:

	preservation-only mitigation, which provides no functional gain, should generally fall towards the high end of the range (towards 3-4). Preservation-only of non-aquatic habitats (upland buffer) may warrant adjustments higher than 4. Using the list of functions below, compare impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites. If, for most functions, I < M, then use a single adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. Add adjustment to starting ratio of 1:1 to obtain baseline ratio. If adjustment is less than 0 (negative), add absolute value of adjustment to right (impact) side of starting ratio; otherwise, add to left (mitigation) side. See examples in attachment 12501.3. For a suite of potential functions from HGM (alternate lists of functions may be used), see Table 1 (below).			
3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. In general, project managers should consider requiring a functional/condition assessment and using step 3 for projects where total permanent impacts exceed 0.5 acre or 300 linear feet. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. If a district-approved method is not available, use step 2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI spreadsheet (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__

	Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example below. Note: In an extreme case, the BAMI procedure could result in a ratio (and overall mitigation proposal) unacceptable to the Corps. For example, providing a very large but low quality mitigation site (low functional gain resulting a in a very high ratio) may result in functional gain equaling loss numerically, but this may not be acceptable because the required compensatory mitigation must be appropriate to the scope and degree of the impacts (see 33 CFR 320.4(r)(2)).			
4	**Mitigation site location**: Mitigation located outside impacted watershed generally warrants a higher mitigation ratio. The project manager will determine the appropriate Hydrologic Unit Code (HUC) to define the term "watershed" in this context. Is mitigation located outside of the impacted watershed? If yes, +1.0, if no, +0.	Ratio adjustment: 0 PM justification: Impact and mitigation would be within the same watershed.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
5	**Net loss of aquatic resource surface area**: Different types of mitigation result in varying net losses of aquatic resource area. For definitions of mitigation types, see mitigation rule at 33 CFR 332.2. Re-establishment or establishment +0, rehabilitation, enhancement, preservation +1.0 (these three mitigation types result in a net loss of aquatic resource area in cases where permanent loss of waters of the U.S. is authorized and not offset by either re-establishment or establishment).	Note: If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Ratio adjustment: +1 PM justification: Enhancement/Preservation	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:** Out-of-kind mitigation may warrant a higher mitigation ratio. However, out-of-kind mitigation can be appropriate if the proposed mitigation habitat type serves the	Ratio adjustment: 0 PM justification: Mitigation is in-kind.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	aquatic resource needs of the watershed/ecoregion. In considering out-of-kind mitigation, project managers should consider whether impacts or mitigation would consist of rare or regionally significant habitat types (e.g., vernal pools). Project manager will determine the relative values of different habitat types and document herein. Justification for the use of out-of-kind mitigation must be documented herein. Would mitigation result in: (A) conversion from a highly valuable and/or rare habitat type to a common type? Or (B) vice versa? Magnitude of adjustment should vary with value of habitats involved. Calculate ratio adjustment based on answers to questions (A) and (B): Y,N: +0.25 to +4.0; N,Y: -0.25 to -4.0; N,N: +0.			
7	**Risk and uncertainty:** Mitigation ratios should reflect the inherent uncertainty of mitigation. Factors to consider include: 1) permittee-responsible mitigation; 2) mitigation site did not formerly support targeted aquatic resources; 3) difficult-to-replace resources (see 33 CFR 332.3(e)(3) and (f)(2)); 4) modified hydrology (e.g., high-flow bypass); 5) artificial hydrology (e.g., pumped water source); 6) structures requiring long-term maintenance (e.g., outfalls, drop structures, weirs, bank stabilization structures); 7) planned vegetation maintenance (e.g., mowing, landclearing, fuel modification activities); 8) e.g., shallow, buried structures (riprap, clay liners), and 9) absence of long-term preservation mechanism. Note: this list is not all-inclusive. Each factor can range from +0.1 to +0.3 depending on the level of anticipated risk and the amount of maintenance or management required to sustain the compensatory mitigation project. Sum factor adjustments (+0 if no	Ratio adjustment: 0 PM justification: Preservation of existing features are within same watershed. Risk and uncertainty factors are minimal because minimal maintenance of mitigation is required and the CVMSHCP provides a framework for long-term management of the mitigation area.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	factors). Generally, uncertainty in banks and in lieu fee programs is accounted for in the credit release process.			
8	**Temporal loss**: Constructed habitats take time to mature and replace aquatic functions; this typically warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. Project manager should estimate the time between when the authorized impacts occur and constructed mitigation is expected to replace lost functions, including the monitoring period. In cases where all performance standards are expected to be achieved prior to impacts, no temporal loss should be assessed (for permittee-responsible only). Similarly, in cases where interim performance standards are expected to be achieved, a lower ratio adjustment may be appropriate. Unexpected delays in compensatory mitigation project implementation should be handled as compliance actions. a. For scheduled, known delays between impacts and construction of mitigation: multiply delay (in months) by 0.05; b. To account for time required for full replacement of functions during monitoring period: generally, if mitigation is comprised of trees/woodlands or saltmarsh, +3; if shrubs, +2; if herbaceous, +1; c. Add adjustments from steps (a) and (b).	Ratio adjustment: 0 PM justification: No planned delay, impact and mitigation would occur simultaneously.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):** Project manager should enter the final mitigation ratio(s) arrived at after consideration of the above factors (either qualitative OR quantitative). Project manager should enter the extent of authorized impacts and required mitigation by area (acreage) and/or distance (linear feet), as well as the corresponding resource type (lake, non-	Column A: 1. Baseline ratio from step 2 or 3 = 2:1 2. Total adjustments = +1 3. Final ratio: 3:1 Proposed impact (total): 0.84 acre ___ linear feet	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____

	tidal wetland, other, pond, stream/river/ocean, tidal wetland) and Cowardin or Hydrogeomorphic Method (HGM) classification type. To obtain the final mitigation ratio*: a. Take baseline ratio from step 2 or 3; b. Add ratio adjustments from steps 4-8; c. If total of adjustments is greater than 0 (positive), add total to left (mitigation) side of baseline ratio; d. If total of adjustments is less than 0 (negative), add ABS of total to right (impact) side of baseline ratio; Note 1: minimum ratio = 1:1 if step 2 used. If step 3 used, final ratio can be less than 1:1 assuming completed functional/condition assessment, in combination with other steps, justifies a ratio less than 1:1 (i.e., total of adjustments is negative). Note 2: Final ratio in each column should be as calculated. If desired, express ratio equal to X:1 (traditional format: for example, 1:4 = 0.25:1), but ONLY in step 9's PM comments and in step 10.	to Resource type: river/stream Cowardin or HGM: Riverine Hydrology: ephemeral Required mitigation: 2.52 acre ___ linear feet of Mitigation type: enhancement/preservation Resource type: same Cowardin or HGM:same Hydrology: same Additional PM comments:	Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:	Required mitigation: ___ acre ___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:** Summarize the checklist results, combining all required mitigation for this impact site.	PM summary: The final compensatory mitigation requirement for this impact site is the purchase of the floodway for the preservation of 2.52 acres of ephemeral stream habitat (3:1 ratio).		

*In the final determination of required mitigation, direct and indirect impacts should be considered:

a. Indirect impacts: Compensatory mitigation may be required to offset predictable indirect impacts. The PM should document any indirect impacts caused by the proposed/authorized activity.

b. Cumulative impacts: In some cases, cumulative impacts should be considered when determining if compensatory mitigation should be required. The extent of cumulative impacts should be documented using available information, such as analyses or data associated with a Special Area Management Plan (SAMP), Watershed Management Plan, land use/land cover scenario assessment, hydrologic modeling, etc. The information used should be fully cited herein and in the decision document. The assessment must focus on the proposed action's direct and indirect impacts (i.e., incremental impact of the proposed activity) in the context of the cumulative effects caused by past, present, and reasonably foreseeable actions, to reduce the proposed activity's contribution to cumulative effects in the region.

Step 2

Table 1 for step 2. Qualitative comparison of functions (functional loss vs. gain):

Function	Impact site	Mitigation site
Short- or long-term surface water storage	Small loss	Small gain
Subsurface water storage	No loss	No gain
Moderation of groundwater flow or discharge	Moderate loss	No gain
Dissipation of energy	No loss	No gain
Cycling of nutrients	Small loss	Small gain
Removal of elements and compounds	No loss	No gain
Retention of particulates	Moderate loss	Small gain
Export of organic carbon	No loss	No gain
Maintenance of plant and animal communities	Small loss	Small gain
Step 2 adjustment:		+1

Step 2 Table 1 instructions:

1. Describe amount of functional loss (impact) and gain (mitigation) in each respective column. Gain and loss can be described in text (for example, small loss, moderate loss, large loss, no loss, etc.) or symbolically (for example, +, ++, +++, 0, ---, --, -).
2. Note: alternate lists of functions may be used.
3. Note: a single adjustment should be used to account for all functions combined (see example 7 in attachment 12501.3)

Attachment 12501.2-SPD - Instructions for Completing Mitigation Ratio-Setting Checklist.

These instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. PMs **must** enter a separate justification for each adjustment within the checklist. PMs may deviate from the guidance provided herein if such deviations can be documented in the checklist with sufficient justification.

1	Date:6/13/2021 Corps file no.: _____ Project Manager: _____ Impact site name: Reach 2 (Drainages 2-1-26) ORM impact resource type: _river/stream Hydrology: __ephemeral Cowardin or HGM type: Riverine Impact area (acres): 0.41 Impact distance (linear feet): 2319 For impact site name, multiple discrete (as entered in ORM) impacts are to be evaluated using multiple checklists; however, multiple impacts to one habitat type (Cowardin or HGM) could be lumped together to determine a mitigation ratio using one checklist. For each proposed impact to waters of the U.S., the project manager (PM) should consider each factor and, if applicable, document consideration in response column(s) using applicable procedures or guidelines. For mitigation proposals with multiple mitigation sites and/or types, see QMS procedure 12501 (section 7.3).			
		Column A: Mitigation site name: Floodway Mitigation type: Preservation Resource type: River/stream Cowardin/HGM type: Riverine Hydrology: Ephemeral	Column B (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____ Hydrology: _____	Column C (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____ Hydrology: _____
2	**QUALITATIVE impact-mitigation comparison**: Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3. Yes ☒ No ☐ Optional: use Table 1 (below). Qualitative assessment of functional loss at the impact site versus expected functional gain at the mitigation site may warrant a lower or higher mitigation ratio. Adjustments for	Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10). Starting ratio: 1:1 Ratio adjustment: -1 Baseline ratio: 1:2 PM justification: Functional gain would be more than the expected functional loss (see attached table).	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:

	preservation-only mitigation, which provides no functional gain, should generally fall towards the high end of the range (towards 3-4). Preservation-only of non-aquatic habitats (upland buffer) may warrant adjustments higher than 4. Using the list of functions below, compare impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites. If, for most functions, I < M, then use a single adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. Add adjustment to starting ratio of 1:1 to obtain baseline ratio. If adjustment is less than 0 (negative), add absolute value of adjustment to right (impact) side of starting ratio; otherwise, add to left (mitigation) side. See examples in attachment 12501.3. For a suite of potential functions from HGM (alternate lists of functions may be used), see Table 1 (below).			
3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. In general, project managers should consider requiring a functional/condition assessment and using step 3 for projects where total permanent impacts exceed 0.5 acre or 300 linear feet. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. If a district-approved method is not available, use step 2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI spreadsheet (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__

	Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example below. Note: In an extreme case, the BAMI procedure could result in a ratio (and overall mitigation proposal) unacceptable to the Corps. For example, providing a very large but low quality mitigation site (low functional gain resulting a in a very high ratio) may result in functional gain equaling loss numerically, but this may not be acceptable because the required compensatory mitigation must be appropriate to the scope and degree of the impacts (see 33 CFR 320.4(r)(2)).			
4	**Mitigation site location**: Mitigation located outside impacted watershed generally warrants a higher mitigation ratio. The project manager will determine the appropriate Hydrologic Unit Code (HUC) to define the term "watershed" in this context. Is mitigation located outside of the impacted watershed? If yes, +1.0, if no, +0.	Ratio adjustment: 0 PM justification: impact and mitigation would be within the same watershed	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
5	**Net loss of aquatic resource surface area**: Different types of mitigation result in varying net losses of aquatic resource area. For definitions of mitigation types, see mitigation rule at 33 CFR 332.2. Re-establishment or establishment +0, rehabilitation, enhancement, preservation +1.0 (these three mitigation types result in a net loss of aquatic resource area in cases where permanent loss of waters of the U.S. is authorized and not offset by either re-establishment or establishment).	Note: If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Ratio adjustment: +1 PM justification: Enhancement/Preservation	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:** Out-of-kind mitigation may warrant a higher mitigation ratio. However, out-of-kind mitigation can be appropriate if the proposed mitigation habitat type serves the	Ratio adjustment: 0 PM justification: Mitigation is in-kind and on site.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	aquatic resource needs of the watershed/ecoregion. In considering out-of-kind mitigation, project managers should consider whether impacts or mitigation would consist of rare or regionally significant habitat types (e.g., vernal pools). Project manager will determine the relative values of different habitat types and document herein. Justification for the use of out-of-kind mitigation must be documented herein. Would mitigation result in: (A) conversion from a highly valuable and/or rare habitat type to a common type? Or (B) vice versa? Magnitude of adjustment should vary with value of habitats involved. Calculate ratio adjustment based on answers to questions (A) and (B): Y,N: +0.25 to +4.0; N,Y: -0.25 to -4.0; N,N: +0.			
7	**Risk and uncertainty:** Mitigation ratios should reflect the inherent uncertainty of mitigation. Factors to consider include: 1) permittee-responsible mitigation; 2) mitigation site did not formerly support targeted aquatic resources; 3) difficult-to-replace resources (see 33 CFR 332.3(e)(3) and (f)(2)); 4) modified hydrology (e.g., high-flow bypass); 5) artificial hydrology (e.g., pumped water source); 6) structures requiring long-term maintenance (e.g., outfalls, drop structures, weirs, bank stabilization structures); 7) planned vegetation maintenance (e.g., mowing, landclearing, fuel modification activities); 8) e.g., shallow, buried structures (riprap, clay liners), and 9) absence of long-term preservation mechanism. Note: this list is not all-inclusive. Each factor can range from +0.1 to +0.3 depending on the level of anticipated risk and the amount of maintenance or management required to sustain the compensatory mitigation project. Sum factor adjustments (+0 if no factors). Generally, uncertainty in banks and in	Ratio adjustment: 0 PM justification: Preservation of existing features within same watershed. Risk and uncertainty factors are minimal because minimal maintenance of mitigation is required and the CVMSHCP provides a framework for long-term management of the mitigation area.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	lieu fee programs is accounted for in the credit release process.			
8	**Temporal loss**: Constructed habitats take time to mature and replace aquatic functions; this typically warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. Project manager should estimate the time between when the authorized impacts occur and constructed mitigation is expected to replace lost functions, including the monitoring period. In cases where all performance standards are expected to be achieved prior to impacts, no temporal loss should be assessed (for permittee-responsible only). Similarly, in cases where interim performance standards are expected to be achieved, a lower ratio adjustment may be appropriate. Unexpected delays in compensatory mitigation project implementation should be handled as compliance actions. a. For scheduled, known delays between impacts and construction of mitigation: multiply delay (in months) by 0.05; b. To account for time required for full replacement of functions during monitoring period: generally, if mitigation is comprised of trees/woodlands or saltmarsh, +3; if shrubs, +2; if herbaceous, +1; c. Add adjustments from steps (a) and (b).	Ratio adjustment: 0 PM justification: No planned delay, impact and mitigation would occur simultaneously.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):** Project manager should enter the final mitigation ratio(s) arrived at after consideration of the above factors (either qualitative OR quantitative). Project manager should enter the extent of authorized impacts and required mitigation by area (acreage) and/or distance (linear feet), as well as the corresponding resource type (lake, non-tidal wetland, other, pond, stream/river/ocean, tidal	Column A: 1. Baseline ratio from step 2 or 3 = 1:2 2. Total adjustments = +1 3. Final ratio: 1: 1 Proposed impact (total): 0.41 acre ___ linear feet to	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre

	wetland) and Cowardin or Hydrogeomorphic Method (HGM) classification type. To obtain the final mitigation ratio*: a. Take baseline ratio from step 2 or 3; b. Add ratio adjustments from steps 4-8; c. If total of adjustments is greater than 0 (positive), add total to left (mitigation) side of baseline ratio; d. If total of adjustments is less than 0 (negative), add ABS of total to right (impact) side of baseline ratio; Note 1: minimum ratio = 1:1 if step 2 used. If step 3 used, final ratio can be less than 1:1 assuming completed functional/condition assessment, in combination with other steps, justifies a ratio less than 1:1 (i.e., total of adjustments is negative). Note 2: Final ratio in each column should be as calculated. If desired, express ratio equal to X:1 (traditional format: for example, 1:4 = 0.25:1), but ONLY in step 9's PM comments and in step 10.	Resource type: river/stream Cowardin or HGM: Riverine Hydrology: ephemeral Required mitigation: 0.41 acre ___ linear feet of Mitigation type: enhancement/ preservation Resource type: same Cowardin or HGM: same Hydrology: same Additional PM comments:	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:** Summarize the checklist results, combining all required mitigation for this impact site.	PM summary: The final compensatory mitigation requirement for this impact site is the purchase of the floodway for the preservation of 0.41 acres of ephemeral stream habitat (1:1 ratio).		

*In the final determination of required mitigation, direct and indirect impacts should be considered:

a. Indirect impacts: Compensatory mitigation may be required to offset predictable indirect impacts. The PM should document any indirect impacts caused by the proposed/authorized activity.

b. Cumulative impacts: In some cases, cumulative impacts should be considered when determining if compensatory mitigation should be required. The extent of cumulative impacts should be documented using available information, such as analyses or data associated with a Special Area Management Plan (SAMP), Watershed Management Plan, land use/land cover scenario assessment, hydrologic modeling, etc. The information used should be fully cited herein and in the decision document. The assessment must focus on the proposed action's direct and indirect impacts (i.e., incremental impact of the proposed activity) in the context of the cumulative effects caused by past, present, and reasonably foreseeable actions, to reduce the proposed activity's contribution to cumulative effects in the region.

Step 2

Table 1 for step 2. Qualitative comparison of functions (functional loss vs. gain):

Function	Impact site	Mitigation site
Short- or long-term surface water storage	Small loss	Small gain
Subsurface water storage	No loss	No gain
Moderation of groundwater flow or discharge	Small loss	Small gain
Dissipation of energy	No loss	No gain
Cycling of nutrients	Small loss	Small gain
Removal of elements and compounds	No loss	No gain
Retention of particulates	Small loss	Small gain
Export of organic carbon	No loss	No gain
Maintenance of plant and animal communities	Small loss	Large gain
Step 2 adjustment:		-1

Step 2 Table 1 instructions:

1. Describe amount of functional loss (impact) and gain (mitigation) in each respective column. Gain and loss can be described in text (for example, small loss, moderate loss, large loss, no loss, etc.) or symbolically (for example, +, ++, +++, 0, ---, --, -).
2. Note: alternate lists of functions may be used.
3. Note: a single adjustment should be used to account for all functions combined (see example 7 in attachment 12501.3)

Attachment 12501.2-SPD - Instructions for Completing Mitigation Ratio-Setting Checklist.

These instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. PMs **must** enter a separate justification for each adjustment within the checklist. PMs may deviate from the guidance provided herein if such deviations can be documented in the checklist with sufficient justification.

<table>
<tr><td>1</td><td colspan="4">Date: 6/13/2021 Corps file no.: _____ Project Manager: _____

Impact site name: Reach 3 (Drainages 3-1 to 3-11) ORM impact resource type: River/stream Hydrology: Ephemeral
Cowardin or HGM type: Riverine Impact area (acres): 4.97 Impact distance (linear feet): 2355

For impact site name, multiple discrete (as entered in ORM) impacts are to be evaluated using multiple checklists; however, multiple impacts to one habitat type (Cowardin or HGM) could be lumped together to determine a mitigation ratio using one checklist. For each proposed impact to waters of the U.S., the project manager (PM) should consider each factor and, if applicable, document consideration in response column(s) using applicable procedures or guidelines. For mitigation proposals with multiple mitigation sites and/or types, see QMS procedure 12501 (section 7.3).</td></tr>
<tr><td></td><td></td><td>Column A:
Mitigation site name: Floodway
Mitigation type: Preservation
Resource type: River/stream
Cowardin/HGM type: Riverine
Hydrology: Ephemeral</td><td>Column B (optional):
Mitigation site name: _____
Mitigation type: _____
Resource type: _____
Cowardin/HGM type: _____
Hydrology: _____</td><td>Column C (optional):
Mitigation site name: _____
Mitigation type: _____
Resource type: _____
Cowardin/HGM type: _____
Hydrology: _____</td></tr>
<tr><td>2</td><td>QUALITATIVE impact-mitigation comparison:

Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3.
Yes ☐ No ☐

Optional: use Table 1 (below).

Qualitative assessment of functional loss at the impact site versus expected functional gain at the mitigation site may warrant a lower or higher mitigation ratio. Adjustments for</td><td>Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10).

Starting ratio: 1:1
Ratio adjustment: -2
Baseline ratio: 1:3
PM justification: Functional gain would be more than the expected functional loss (see attached table).</td><td>Starting ratio: 1:1
Ratio adjustment: ___
Baseline ratio: __:__
PM justification:</td><td>Starting ratio: 1:1
Ratio adjustment: ___
Baseline ratio: __:__
PM justification:</td></tr>
</table>

	preservation-only mitigation, which provides no functional gain, should generally fall towards the high end of the range (towards 3-4). Preservation-only of non-aquatic habitats (upland buffer) may warrant adjustments higher than 4. Using the list of functions below, compare impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites. If, for most functions, I < M, then use a single adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. Add adjustment to starting ratio of 1:1 to obtain baseline ratio. If adjustment is less than 0 (negative), add absolute value of adjustment to right (impact) side of starting ratio; otherwise, add to left (mitigation) side. See examples in attachment 12501.3. For a suite of potential functions from HGM (alternate lists of functions may be used), see Table 1 (below).			
3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. In general, project managers should consider requiring a functional/condition assessment and using step 3 for projects where total permanent impacts exceed 0.5 acre or 300 linear feet. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. If a district-approved method is not available, use step 2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI spreadsheet (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__

	Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example below. Note: In an extreme case, the BAMI procedure could result in a ratio (and overall mitigation proposal) unacceptable to the Corps. For example, providing a very large but low quality mitigation site (low functional gain resulting a in a very high ratio) may result in functional gain equaling loss numerically, but this may not be acceptable because the required compensatory mitigation must be appropriate to the scope and degree of the impacts (see 33 CFR 320.4(r)(2)).			
4	**Mitigation site location**: Mitigation located outside impacted watershed generally warrants a higher mitigation ratio. The project manager will determine the appropriate Hydrologic Unit Code (HUC) to define the term "watershed" in this context. Is mitigation located outside of the impacted watershed? If yes, +1.0, if no, +0.	Ratio adjustment: 0 PM justification: Impact and mitigation would be within the same watershed.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
5	**Net loss of aquatic resource surface area**: Different types of mitigation result in varying net losses of aquatic resource area. For definitions of mitigation types, see mitigation rule at 33 CFR 332.2. Re-establishment or establishment +0, rehabilitation, enhancement, preservation +1.0 (these three mitigation types result in a net loss of aquatic resource area in cases where permanent loss of waters of the U.S. is authorized and not offset by either re-establishment or establishment).	Note: If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Ratio adjustment: +1 PM justification: Enhancement/Preservation	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:** Out-of-kind mitigation may warrant a higher mitigation ratio. However, out-of-kind mitigation can be appropriate if the proposed mitigation habitat type serves the	Ratio adjustment: 0 PM justification: Mitigation is in-kind.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	aquatic resource needs of the watershed/ecoregion. In considering out-of-kind mitigation, project managers should consider whether impacts or mitigation would consist of rare or regionally significant habitat types (e.g., vernal pools). Project manager will determine the relative values of different habitat types and document herein. Justification for the use of out-of-kind mitigation must be documented herein. Would mitigation result in: (A) conversion from a highly valuable and/or rare habitat type to a common type? Or (B) vice versa? Magnitude of adjustment should vary with value of habitats involved. Calculate ratio adjustment based on answers to questions (A) and (B): Y,N: +0.25 to +4.0; N,Y: -0.25 to -4.0; N,N: +0.			
7	**Risk and uncertainty:** Mitigation ratios should reflect the inherent uncertainty of mitigation. Factors to consider include: 1) permittee-responsible mitigation; 2) mitigation site did not formerly support targeted aquatic resources; 3) difficult-to-replace resources (see 33 CFR 332.3(e)(3) and (f)(2)); 4) modified hydrology (e.g., high-flow bypass); 5) artificial hydrology (e.g., pumped water source); 6) structures requiring long-term maintenance (e.g., outfalls, drop structures, weirs, bank stabilization structures); 7) planned vegetation maintenance (e.g., mowing, landclearing, fuel modification activities); 8) e.g., shallow, buried structures (riprap, clay liners), and 9) absence of long-term preservation mechanism. Note: this list is not all-inclusive. Each factor can range from +0.1 to +0.3 depending on the level of anticipated risk and the amount of maintenance or management required to sustain the compensatory mitigation project. Sum factor adjustments (+0 if no factors). Generally, uncertainty in banks and in	Ratio adjustment: 0 PM justification: Preservation of existing features within same watershed. Risk and uncertainty factors are minimal because minimal maintenance of mitigation is required and the CVMSHCP provides a framework for long-term management of the mitigation area.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	lieu fee programs is accounted for in the credit release process.			
8	**Temporal loss**: Constructed habitats take time to mature and replace aquatic functions; this typically warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. Project manager should estimate the time between when the authorized impacts occur and constructed mitigation is expected to replace lost functions, including the monitoring period. In cases where all performance standards are expected to be achieved prior to impacts, no temporal loss should be assessed (for permittee-responsible only). Similarly, in cases where interim performance standards are expected to be achieved, a lower ratio adjustment may be appropriate. Unexpected delays in compensatory mitigation project implementation should be handled as compliance actions. a. For scheduled, known delays between impacts and construction of mitigation: multiply delay (in months) by 0.05; b. To account for time required for full replacement of functions during monitoring period: generally, if mitigation is comprised of trees/woodlands or saltmarsh, +3; if shrubs, +2; if herbaceous, +1; c. Add adjustments from steps (a) and (b).	Ratio adjustment: 0 PM justification: No planned delay, impact and mitigation would occur simultaneously.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):** Project manager should enter the final mitigation ratio(s) arrived at after consideration of the above factors (either qualitative OR quantitative). Project manager should enter the extent of authorized impacts and required mitigation by area (acreage) and/or distance (linear feet), as well as the corresponding resource type (lake, non-tidal wetland, other, pond, stream/river/ocean, tidal	Column A: 1. Baseline ratio from step 2 or 3 = 1:3 2. Total adjustments =+1 3. Final ratio: 1: 1 Proposed impact (total): 4.97 acre ___ linear feet to	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre

	wetland) and Cowardin or Hydrogeomorphic Method (HGM) classification type. To obtain the final mitigation ratio*: a. Take baseline ratio from step 2 or 3; b. Add ratio adjustments from steps 4-8; c. If total of adjustments is greater than 0 (positive), add total to left (mitigation) side of baseline ratio; d. If total of adjustments is less than 0 (negative), add ABS of total to right (impact) side of baseline ratio; Note 1: minimum ratio = 1:1 if step 2 used. If step 3 used, final ratio can be less than 1:1 assuming completed functional/condition assessment, in combination with other steps, justifies a ratio less than 1:1 (i.e., total of adjustments is negative). Note 2: Final ratio in each column should be as calculated. If desired, express ratio equal to X:1 (traditional format: for example, 1:4 = 0.25:1), but ONLY in step 9's PM comments and in step 10.	Resource type: River/stream Cowardin or HGM:Riverine Hydrology: Ephemeral Required mitigation: 4.97 acre ___ linear feet Of Mitigation type: Preservation Resource type: Same Cowardin or HGM: Same Hydrology: Same Additional PM comments: *Calculated ratio is 2:3 (or 1:1.5), but without functional assessment, 1:1 is min ratio allowed under 2008 mitigation rule.	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:** Summarize the checklist results, combining all required mitigation for this impact site.	PM summary: The final compensatory mitigation requirement for this impact site is the purchase of the floodway for the preservation of 4.97 acres of ephemeral stream habitat (1:1 ratio).		

*In the final determination of required mitigation, direct and indirect impacts should be considered:

a. Indirect impacts: Compensatory mitigation may be required to offset predictable indirect impacts. The PM should document any indirect impacts caused by the proposed/authorized activity.

b. Cumulative impacts: In some cases, cumulative impacts should be considered when determining if compensatory mitigation should be required. The extent of cumulative impacts should be documented using available information, such as analyses or data associated with a Special Area Management Plan (SAMP), Watershed Management Plan, land use/land cover scenario assessment, hydrologic modeling, etc. The information used should be fully cited herein and in the decision document. The assessment must focus on the proposed action's direct and indirect impacts (i.e., incremental impact of the proposed activity) in the context of the cumulative effects caused by past, present, and reasonably foreseeable actions, to reduce the proposed activity's contribution to cumulative effects in the region.

Step 2

Table 1 for step 2. Qualitative comparison of functions (functional loss vs. gain):

Function	Impact site	Mitigation site
Short- or long-term surface water storage	Small loss	Large gain
Subsurface water storage	No loss	No gain
Moderation of groundwater flow or discharge	Small loss	Large gain
Dissipation of energy	No loss	No gain
Cycling of nutrients	Small loss	Small gain
Removal of elements and compounds	No loss	No gain
Retention of particulates	Small loss	Large gain
Export of organic carbon	No loss	No gain
Maintenance of plant and animal communities	Small loss	Large gain
Step 2 adjustment:		-2

Step 2 Table 1 instructions:

1. Describe amount of functional loss (impact) and gain (mitigation) in each respective column. Gain and loss can be described in text (for example, small loss, moderate loss, large loss, no loss, etc.) or symbolically (for example, +, ++, +++, 0, ---, --, -).
2. Note: alternate lists of functions may be used.
3. Note: a single adjustment should be used to account for all functions combined (see example 7 in attachment 12501.3)

Attachment 12501.2-SPD - Instructions for Completing Mitigation Ratio-Setting Checklist.

These instructions contain specific numeric adjustments (discrete, e.g., +1.0, or ranges, e.g., +0.25 to +4.0) that were determined by the PDT after assessing a variety of impact-mitigation scenarios and determining adjustments for each step that, in combination with other step adjustments, produce a reasonable range of final mitigation ratios. For steps where a range of adjustments is provided, PMs are directed to the attached examples for additional guidance. PMs **must** enter a separate justification for each adjustment within the checklist. PMs may deviate from the guidance provided herein if such deviations can be documented in the checklist with sufficient justification.

1	Date: 6/13/2021 Corps file no.: _____ Project Manager: _____ Impact site name: Reach 4 (Drainages 41 to 4-10) ORM impact resource type: River/stream Hydrology: Ephemeral Cowardin or HGM type: Riverine Impact area (acres): 3.01 Impact distance (linear feet): 2446 For impact site name, multiple discrete (as entered in ORM) impacts are to be evaluated using multiple checklists; however, multiple impacts to one habitat type (Cowardin or HGM) could be lumped together to determine a mitigation ratio using one checklist. For each proposed impact to waters of the U.S., the project manager (PM) should consider each factor and, if applicable, document consideration in response column(s) using applicable procedures or guidelines. For mitigation proposals with multiple mitigation sites and/or types, see QMS procedure 12501 (section 7.3).			
		Column A: Mitigation site name: Floodway Mitigation type: Preservation Resource type: River/stream Cowardin/HGM type: Riverine Hydrology: Ephemeral	Column B (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____ Hydrology: _____	Column C (optional): Mitigation site name: _____ Mitigation type: _____ Resource type: _____ Cowardin/HGM type: _____ Hydrology: _____
2	**QUALITATIVE impact-mitigation comparison**: Has a Corps-approved functional/condition assessment been obtained? If not, complete step 2; otherwise, complete step 3. Yes ☒ No ☐ Optional: use Table 1 (below). Qualitative assessment of functional loss at the impact site versus expected functional gain at the mitigation site may warrant a lower or higher mitigation ratio. Adjustments for	Note: steps 2 and 3 are mutually exclusive. If step 2 is used, then complete the rest of the checklist (steps 4-10). Starting ratio: 1:1 Ratio adjustment: -2 Baseline ratio: 1:3 PM justification: Functional gain would be more than the expected functional loss (see attached table).	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:	Starting ratio: 1:1 Ratio adjustment: ___ Baseline ratio: __:__ PM justification:

	preservation-only mitigation, which provides no functional gain, should generally fall towards the high end of the range (towards 3-4). Preservation-only of non-aquatic habitats (upland buffer) may warrant adjustments higher than 4. Using the list of functions below, compare impact (functional loss) and proposed mitigation (functional gain) at impact (I) and mitigation (M) sites. If, for most functions, I < M, then use a single adjustment less than 0 and equal or greater than -2.0; if I = M, then use adjustment of 0; or if I > M, then use adjustment greater than 0 and less than or equal to 4. Add adjustment to starting ratio of 1:1 to obtain baseline ratio. If adjustment is less than 0 (negative), add absolute value of adjustment to right (impact) side of starting ratio; otherwise, add to left (mitigation) side. See examples in attachment 12501.3. For a suite of potential functions from HGM (alternate lists of functions may be used), see Table 1 (below).			
3	**QUANTITATIVE impact-mitigation comparison**: Use step 3 if a Corps-approved functional/condition assessment been obtained. In general, project managers should consider requiring a functional/condition assessment and using step 3 for projects where total permanent impacts exceed 0.5 acre or 300 linear feet. Acceptable functional/condition assessment methods must be aquatic resource-based, standardized, comparable from site to site, peer-reviewed, unmodified, and approved by the applicable Corps District. If a district-approved method is not available, use step 2.	Note: steps 2 and 3 are mutually exclusive. If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Complete the rest of the checklist (steps 4-10 or steps 4 and 6-10, as appropriate). Baseline ratio from BAMI spreadsheet (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__	Baseline ratio from BAMI procedure (attached): __:__

	Use Before-After-Mitigation-Impact (BAMI) spreadsheet (attachment 12501.4) (if a district-approved functional/condition method is not available, use step 2 instead). See example below. Note: In an extreme case, the BAMI procedure could result in a ratio (and overall mitigation proposal) unacceptable to the Corps. For example, providing a very large but low quality mitigation site (low functional gain resulting a in a very high ratio) may result in functional gain equaling loss numerically, but this may not be acceptable because the required compensatory mitigation must be appropriate to the scope and degree of the impacts (see 33 CFR 320.4(r)(2)).			
4	**Mitigation site location**: Mitigation located outside impacted watershed generally warrants a higher mitigation ratio. The project manager will determine the appropriate Hydrologic Unit Code (HUC) to define the term "watershed" in this context. Is mitigation located outside of the impacted watershed? If yes, +1.0, if no, +0.	Ratio adjustment: 0 PM justification: Impact and mitigation would be within the same watershed.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
5	**Net loss of aquatic resource surface area**: Different types of mitigation result in varying net losses of aquatic resource area. For definitions of mitigation types, see mitigation rule at 33 CFR 332.2. Re-establishment or establishment +0, rehabilitation, enhancement, preservation +1.0 (these three mitigation types result in a net loss of aquatic resource area in cases where permanent loss of waters of the U.S. is authorized and not offset by either re-establishment or establishment).	Note: If step 3 is used, steps 3 and 5 may also be mutually exclusive. If a functional/condition assessment method is used that explicitly accounts for area (such as HGM), steps 3 and 5 are mutually exclusive; however, if a method is used that does *not* explicitly account for area (such as CRAM), then both steps should be used. Ratio adjustment: +1 PM justification: Enhancement/Preservation	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
6	**Type conversion:** Out-of-kind mitigation may warrant a higher mitigation ratio. However, out-of-kind mitigation can be appropriate if the proposed mitigation habitat type serves the	Ratio adjustment: 0 PM justification: Mitigation is in-kind.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	aquatic resource needs of the watershed/ecoregion. In considering out-of-kind mitigation, project managers should consider whether impacts or mitigation would consist of rare or regionally significant habitat types (e.g., vernal pools). Project manager will determine the relative values of different habitat types and document herein. Justification for the use of out-of-kind mitigation must be documented herein. Would mitigation result in: (A) conversion from a highly valuable and/or rare habitat type to a common type? Or (B) vice versa? Magnitude of adjustment should vary with value of habitats involved. Calculate ratio adjustment based on answers to questions (A) and (B): Y,N: +0.25 to +4.0; N,Y: -0.25 to -4.0; N,N: +0.			
7	**Risk and uncertainty:** Mitigation ratios should reflect the inherent uncertainty of mitigation. Factors to consider include: 1) permittee-responsible mitigation; 2) mitigation site did not formerly support targeted aquatic resources; 3) difficult-to-replace resources (see 33 CFR 332.3(e)(3) and (f)(2)); 4) modified hydrology (e.g., high-flow bypass); 5) artificial hydrology (e.g., pumped water source); 6) structures requiring long-term maintenance (e.g., outfalls, drop structures, weirs, bank stabilization structures); 7) planned vegetation maintenance (e.g., mowing, landclearing, fuel modification activities); 8) e.g., shallow, buried structures (riprap, clay liners), and 9) absence of long-term preservation mechanism. Note: this list is not all-inclusive. Each factor can range from +0.1 to +0.3 depending on the level of anticipated risk and the amount of maintenance or management required to sustain the compensatory mitigation project. Sum factor adjustments (+0 if no factors). Generally, uncertainty in banks and in	Ratio adjustment: 0 PM justification: Preservation of existing features are within same watershed. Risk and uncertainty factors are minimal because minimal maintenance of mitigation is required and the CVMSHCP provides a framework for long-term management of the mitigation area.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:

	lieu fee programs is accounted for in the credit release process.			
8	**Temporal loss**: Constructed habitats take time to mature and replace aquatic functions; this typically warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. Project manager should estimate the time between when the authorized impacts occur and constructed mitigation is expected to replace lost functions, including the monitoring period. In cases where all performance standards are expected to be achieved prior to impacts, no temporal loss should be assessed (for permittee-responsible only). Similarly, in cases where interim performance standards are expected to be achieved, a lower ratio adjustment may be appropriate. Unexpected delays in compensatory mitigation project implementation should be handled as compliance actions. a. For scheduled, known delays between impacts and construction of mitigation: multiply delay (in months) by 0.05; b. To account for time required for full replacement of functions during monitoring period: generally, if mitigation is comprised of trees/woodlands or saltmarsh, +3; if shrubs, +2; if herbaceous, +1; c. Add adjustments from steps (a) and (b).	Ratio adjustment: 0 PM justification: No planned delay, impact and mitigation would occur simultaneously.	Ratio adjustment: PM justification:	Ratio adjustment: PM justification:
9	**Final mitigation ratio(s):** Project manager should enter the final mitigation ratio(s) arrived at after consideration of the above factors (either qualitative OR quantitative). Project manager should enter the extent of authorized impacts and required mitigation by area (acreage) and/or distance (linear feet), as well as the corresponding resource type (lake, non-tidal wetland, other, pond, stream/river/ocean, tidal	Column A: 1. Baseline ratio from step 2 or 3 = 1:3 2. Total adjustments = +1 3. Final ratio: 1:1 Proposed impact (total): 3.01 acres ___ linear feet to	Column B: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre	Column C: 1. Baseline ratio from step 2 or 3 = __:__ 2. Total adjustments = ___ 3. Final ratio: __ : __ Remaining impact: _____ Required mitigation: ___ acre

	wetland) and Cowardin or Hydrogeomorphic Method (HGM) classification type. To obtain the final mitigation ratio*: a. Take baseline ratio from step 2 or 3; b. Add ratio adjustments from steps 4-8; c. If total of adjustments is greater than 0 (positive), add total to left (mitigation) side of baseline ratio; d. If total of adjustments is less than 0 (negative), add ABS of total to right (impact) side of baseline ratio; Note 1: minimum ratio = 1:1 if step 2 used. If step 3 used, final ratio can be less than 1:1 assuming completed functional/condition assessment, in combination with other steps, justifies a ratio less than 1:1 (i.e., total of adjustments is negative). Note 2: Final ratio in each column should be as calculated. If desired, express ratio equal to X:1 (traditional format: for example, 1:4 = 0.25:1), but ONLY in step 9's PM comments and in step 10.	Resource type: River/stream Cowardin or HGM: ____ Hydrology: Ephemeral Required mitigation: 3.01acres ___ linear feet of Mitigation type: Enhancement/ Preservation Resource type: Same Cowardin or HGM: Same Hydrology: Same Additional PM comments: *Calculated ratio is 2:3 (or 0.66:1), but without functional assessment, 1:1 is min ratio allowed under 2008 mitigation rule.	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:	___ linear feet of Mitigation type: _____ Resource type: _____ Cowardin or HGM: _____ Hydrology: _____ Additional PM comments:
10	**Final compensatory mitigation requirements:** Summarize the checklist results, combining all required mitigation for this impact site.	PM summary: The final compensatory mitigation requirement for this impact site is the purchase of the floodway for the preservation of 3.01 acres of ephemeral stream habitat (1:1 ratio).		

*In the final determination of required mitigation, direct and indirect impacts should be considered:

a. Indirect impacts: Compensatory mitigation may be required to offset predictable indirect impacts. The PM should document any indirect impacts caused by the proposed/authorized activity.

b. Cumulative impacts: In some cases, cumulative impacts should be considered when determining if compensatory mitigation should be required. The extent of cumulative impacts should be documented using available information, such as analyses or data associated with a Special Area Management Plan (SAMP), Watershed Management Plan, land use/land cover scenario assessment, hydrologic modeling, etc. The information used should be fully cited herein and in the decision document. The assessment must focus on the proposed action's direct and indirect impacts (i.e., incremental impact of the proposed activity) in the context of the cumulative effects caused by past, present, and reasonably foreseeable actions, to reduce the proposed activity's contribution to cumulative effects in the region.

Step 2

Table 1 for step 2. Qualitative comparison of functions (functional loss vs. gain):

Function	Impact site	Mitigation site
Short- or long-term surface water storage	Small loss	Large gain
Subsurface water storage	No loss	No gain
Moderation of groundwater flow or discharge	Small loss	Large gain
Dissipation of energy	No loss	No gain
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Export of organic carbon	No loss	No gain
Maintenance of plant and animal communities	Small loss	Large gain
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Step 2 Table 1 instructions:

1. Describe amount of functional loss (impact) and gain (mitigation) in each respective column. Gain and loss can be described in text (for example, small loss, moderate loss, large loss, no loss, etc.) or symbolically (for example, +, ++, +++, 0, ---, --, -).
2. Note: alternate lists of functions may be used.
3. Note: a single adjustment should be used to account for all functions combined (see example 7 in attachment 12501.3)

C.5 Coachella Valley Conservation Commission Consistency Determination Letter

August 3, 2021

David Wilson
Engineering Project Manager
Coachella Valley Water District
75-519 Hovley Lane East
Palm Desert, CA 92211

RE: Consistency determination for CVCC 21-001 Thousand Palms Flood Control Project in the Thousand Palms Conservation Area[1]

Dear Mr. Wilson:

The Coachella Valley Conservation Commission (CVCC) has received your request for a consistency determination regarding the final alignment of the Coachella Valley Water District's (CVWD) Thousand Palms Flood Control Project (Project)[2] in the Thousand Palms Conservation Area (TPCA). The Project constitutes a Covered Project under Section 7.3.1 of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP or Plan); the take of any covered species has already been authorized through the issuance of the CVMSHCP permits and will not count against the conservation and take authorization tables for the Conservation Area as listed in section 4.3.11. The Project nonetheless warrants special consideration given the required measures pertaining to its construction and its effect on the Conservation Area. This consistency determination serves to document that those required measures are being met and to further ensure the Project complies with all relevant Avoidance, Minimization, and Mitigation measures and Land Use Adjacency Guidelines, as described in Plan sections 4.4 and 4.5, respectively.

The TPCA constitutes the largest unfragmented habitat area on the valley floor. It encompasses the former Coachella Valley Fringe Toed Lizard Preserve, the sand source in the Indio Hills, and key desert riparian and sand-dependent habitat. In addition, it serves as a key sand source within the Valley, and a sand transport corridor for sand generated in the Little San Bernardino Mountains. The TPCA, along with the West Deception Canyon Conservation Area and Indio Hills/Joshua Tree National Park Linkage Conservation Area, provides an almost uninterrupted corridor into the protected habitat in Joshua Tree National Park and beyond. It contains core habitat for Coachella Valley fringe-toed lizard, flat-tailed horn lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. Alongside neighboring Conservation Areas, it contains enough core habitat for Mecca aster to support a self-sustaining population. The desert fan palm oasis woodlands provide the largest concentration of habitat for the southern yellow bat in the CVMSHCP area.

[1] This revised version updates and replaces the original analysis submitted on July 13, 2021.
[2] The Project was formerly referred to as the Whitewater River Flood Control Project throughout the CVMSHCP.

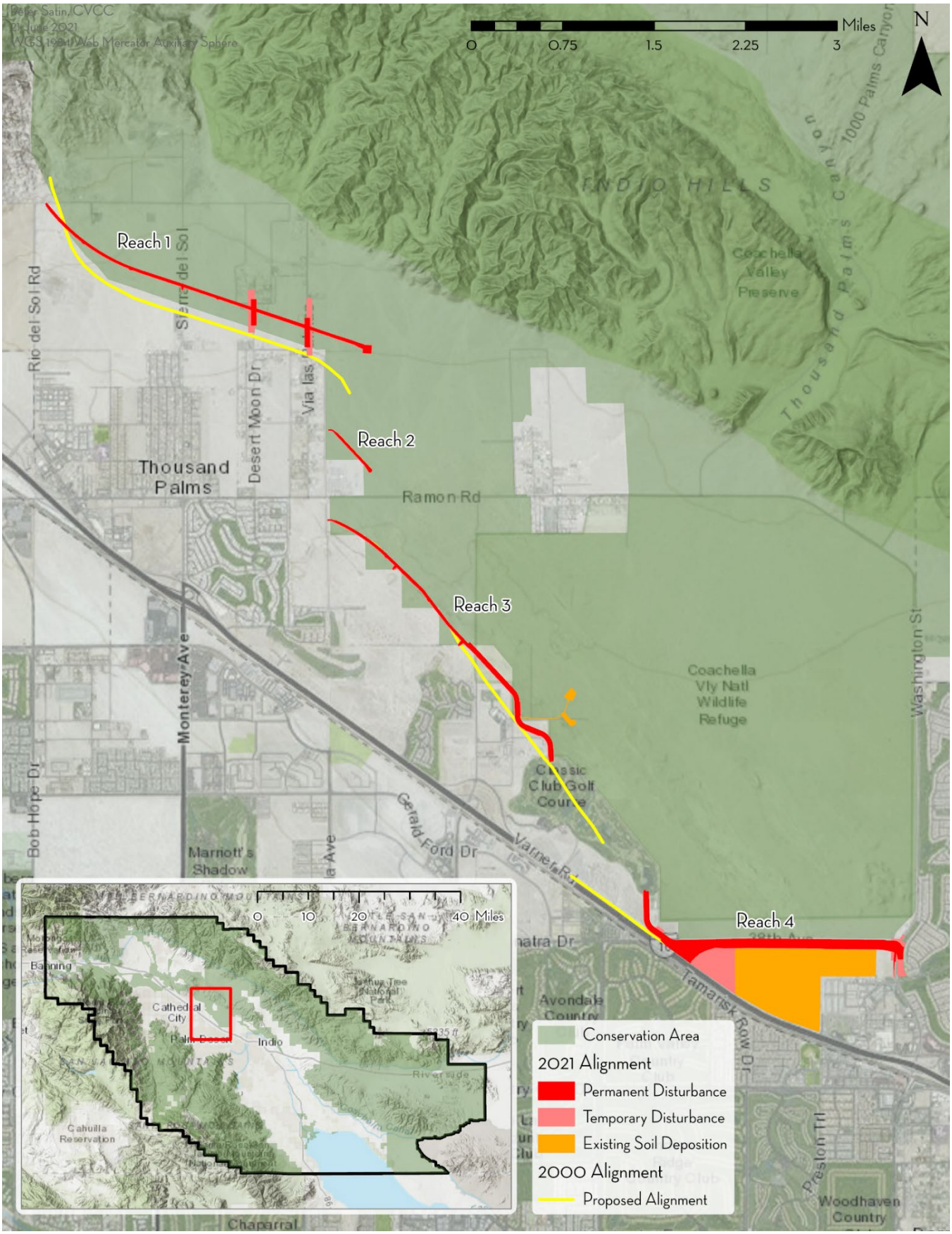

Figure 1: Thousand Palms Flood Control Project alignments in the Thousand Palms Conservation Area.

The CVMSHCP has contemplated the construction of the Project since its inception, noting that it would help direct fluvial-borne sand within the TPCA such that aeolian sand transport processes could transport it downwind. At the time of the Plan's implementation, the final Project design had not been determined, but it was acknowledged that the final alignment "may cause a minor adjustment of the Conservation Area boundary such that the levees will not be in the Conservation Area, but will define the edge of the area." CVWD has since finalized the levee's alignment (Figure 1), which has, in fact, shifted since the original TPCA boundary was drawn. It is therefore necessary to adjust the Conservation Area's boundaries accordingly and to adjust the Conservation Objectives, acres of authorized disturbance, and remaining acres to be conserved so as to reflect the reduced total area of the Conservation Area.

The Project alignment as approved in the 2000 Environmental Initial Study/Environmental Impact Report considered each of the four reaches, but was developed prior to the expansion of both regional electrical utility corridors and urban development[3]. As originally considered, Reach 1 would be located in what is now the right-of-way for the Southern California Edison Devers-Palo Verde 500-kV No. 2 Transmission Line project, and Reach 3 would be situated on lands now occupied by Xavier High School. For these reasons, CVWD has proposed relocating Reach 1 into the existing TPCA boundary, as well as shifting Reach 3 further east, away from established development. CVCC utilized the revised 2021 alignment to draw a new boundary and calculate new acreage totals.

To determine the new TPCA boundary, CVCC first assessed how the Conservation Area's existing boundary would shift under both the 2000 alignment and the 2021 alignment. A 50-foot buffer was drawn around each alignment, and the boundary was re-drawn such that the TPCA was immediately adjacent to the buffered northeastern face of the levee. Any portion south and west of either alignment was excised from the total area. In cases where the alignments did not completely bisect the existing boundary, a shortest-distance straight line to that boundary was used to demarcate the new boundary. Under both alignments, portions of the original TPCA boundary beneath Reaches 2 and 3 are removed, while the 2021 alignment further removes an additional portion under Reach 1 (Figure 2). Reach 4 did not impact the boundary alignment under either scenario. The total acreage for both was then summed and compared to confirm that the 2021 alignment constituted only a minor adjustment from the 2000 alignment, in accordance with the CVMSHCP (Table 1). The 2021 alignment results in an additional 183 acres (0.70%) removed from the TPCA as compared to the 2000 alignment. The boundary areas not impacted by the levees remain unchanged (Figure 3).

Table 1: Gross acreage comparison among the original Thousand Palms Conservation Area boundary, the 2000 levee alignment boundary, and the 2021 levee alignment boundary.

	Total Acreage	*Difference from original (ac)*	*Difference from original (%)*
Original boundary	25,900	-	-
2000 alignment boundary	25,782	-118	-0.46
2021 alignment boundary	25,599	-301	-1.16

[3] This paragraph has been revised at the request of CVWD to clarify the need for deviation from the 2000 alignment.

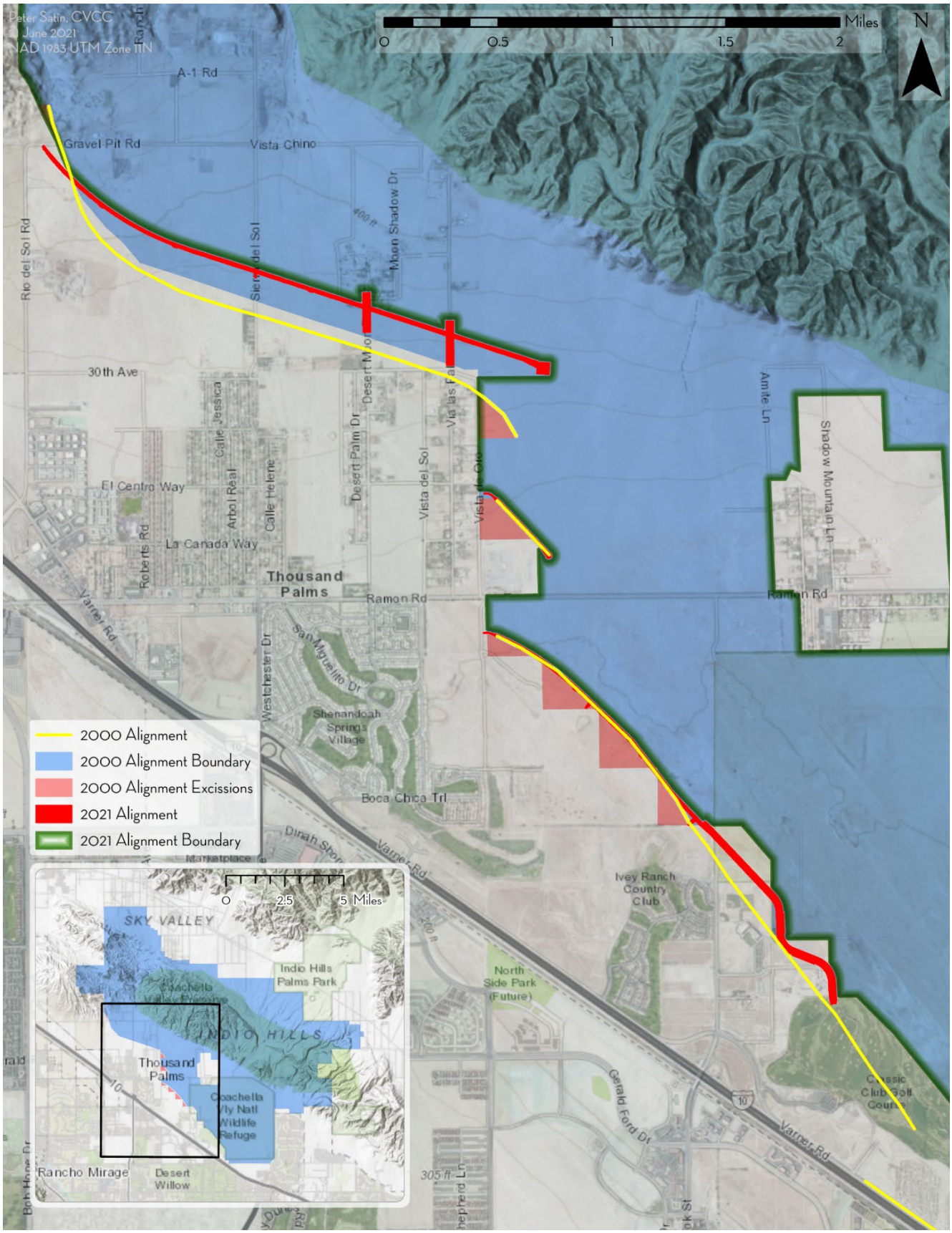

Figure 2: Comparing the boundary adjustments under each alignment. The area under Reaches 2 and 3 is removed in both cases, while the area removed in Reach 1 expands under the 2021 alignment.

In revising Conservation Objectives, acres of authorized disturbance, and acres of remaining habitat, CVCC used 1996 property ownership as a baseline to determine available land under the new TPCA alignment. From that remaining acreage, CVCC applied a 9:1 ratio of conservation of available habitat to authorized disturbance for each of the Covered Species. Finally, the proportion of Conservation Objective minimums to available habitat under the original boundary was calculated to determine revised minimum Conservation Objectives (Table 2). This process corrected certain instances where the original conservation to disturbance ratio was less than 9:1, and where some Conservation Objectives required more conservation than was actually available.

Even after adjusting the Conservation Area boundary, portions of Reach 1 located in Sections 7 and 8, Township 4 South, Range 6 East, and running through parcels designated as Rural Residential by the County of Riverside, may be subject to specific Site Planning Standards as described in section 4.3.11. CVWD has indicated that, in acquiring the necessary property to construct the Project, parcels will be subdivided so as to utilize only the minimum portion of the original parcel required for the Project footprint, located outside the TPCA. The remaining portion within the adjusted TPCA boundary will be available for other uses and shall continue to be subject to the Site Planning Standards.

Section 5.2.1.4 of the CVSHCP requires CVWD to acquire 550 acres of conservation land within the TPCA floodway to mitigate for the Project, and further that CVWD make a contribution to the CVMSHCP endowment fund sufficient to cover the long-term cost of management and monitoring of these lands[4]. It is CVCC's understanding that CVWD has identified these acres, and their acquisition and protection will take place concurrent with the acquisition of land for the Project footprint. Should any portion of the 550 acres remain unprotected at the initiation of Project ground disturbance, CVCC recommends CVWD prepare an acquisition plan outlining the remaining parcels to be acquired and the timeline projected for their acquisition. CVCC encourages early consultation and coordination to ensure this requirement is met. CVCC acknowledges that CVWD has already met its financial obligation under the CVMSHCP.

While the TPCA's boundary has been adjusted to exclude entirely the permanent disturbance caused by the levees, portions of the Project, especially along Reach 1, will involve temporary impacts to the Conservation Area, and are therefore subject to the CVMSHCP's Avoidance, Minimization, and Mitigation requirements as described in section 4.4. Specific attention shall be paid to those measures pertaining to biological corridors, burrowing owl, sand transport, Le Conte's thrasher, Palm Springs pocket mouse, and Coachella Valley round-tailed ground squirrel. Furthermore, the Project's immediate proximity to the TPCA necessitates the implementation of any and all relevant Land Use Adjacency Guidelines detailed in section 4.5.

CVCC has determined that the Project as proposed by CVWD is consistent with the CVMSHCP Conservation Objectives for the Thousand Palms Conservation Area. The 2021 alignment constitutes only a minor adjustment from the originally contemplated 2000 alignment. Parcels subject to Site Planning Standards will be subdivided such that portions remaining within the TPCA will still be available for conservation and/or development consistent with CVMSHCP requirements. The 550 acres of mitigation have been identified and will be protected during the

[4] This contribution is included as part of CVWD's total endowment contribution of $3,583,400.

land acquisition phase of the Project, while the funding of the long-term management of these acres has already been fulfilled. The Project represents a net benefit to conservation in the TPCA. The levees will serve to retain sand within the system which would otherwise be transported outside the conservation area. Loss of this sand would put the long-term sustainability of the sand dune ecosystem in the TPCA at risk. Acquisition of 550 acres will ensure that sand source and habitat areas are permanently conserved. The Project's overall consistency with the CVMSHCP is predicated on its meeting the above requirements; should CVCC determine at any point that the Project has failed to implement any of the required measures discussed above, it reserves the right to revoke this consistency determination.

Please do not hesitate to reach out to me if you have any questions regarding this analysis, either by phone at 760.346.1127 or by email at psatin@cvag.org.

Sincerely,

Peter Satin
Regional Planner

CC: William Patterson, CVWD
Steve Bigley, CVWD
Carrie Oliphant, CVWD
Heather Pert, CDFW
Carly Beck, CDFW
Jenness McBride, USFWS
Alicia Thomas, USFWS
Katie Barrows, CVCC

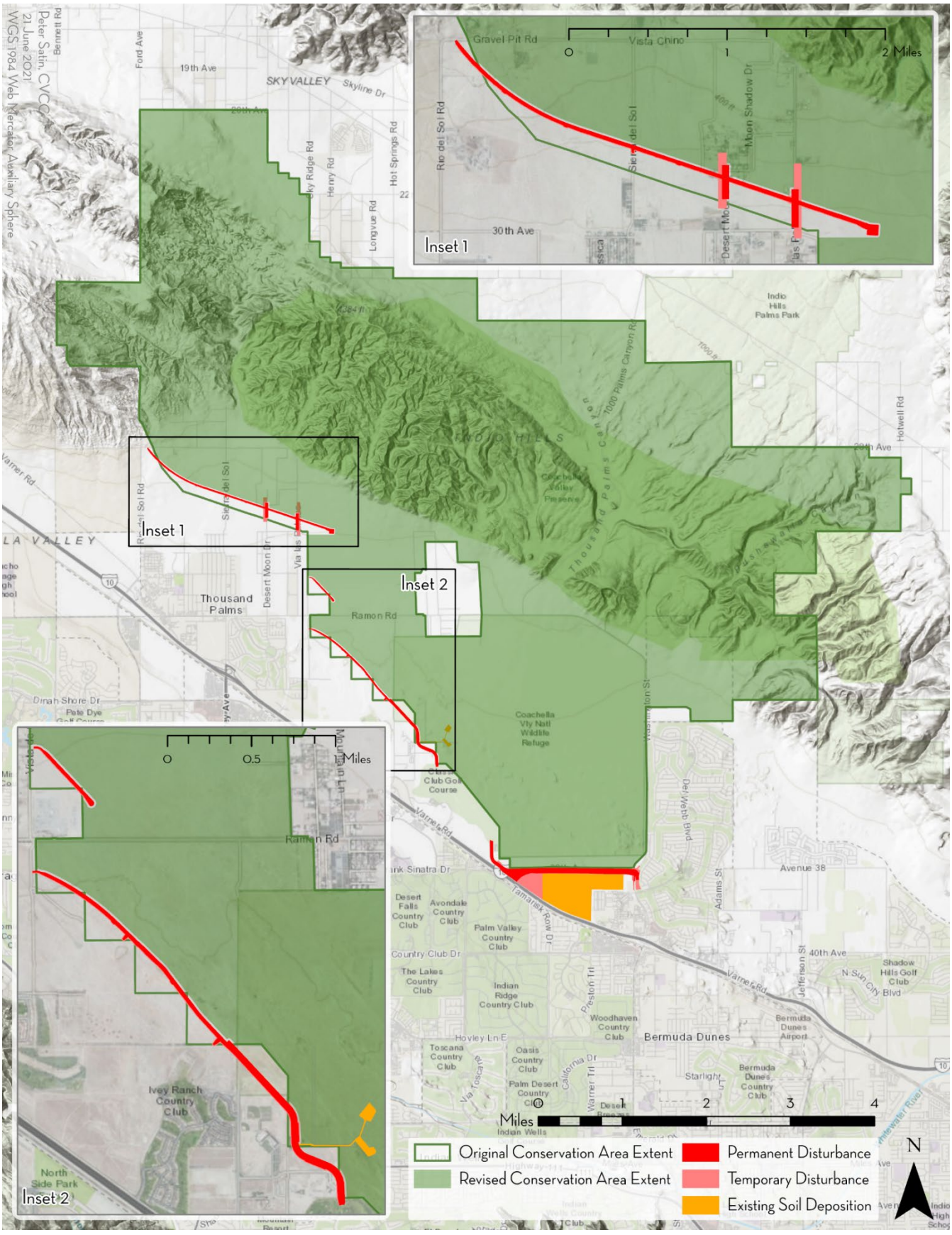

Figure 3: Revised Thousand Palms Conservation Area boundary under the 2021 alignment of the Thousand Palms Flood Control project.

Table 2: Revised acreage totals for authorized disturbance, remaining conservation to be acquired, and Conservation Objectives for the Thousand Palms Conservation Area.

Conservation Objective	Total Acres in Conservation Area	Acres of Existing Conservation Lands	Acres of Disturbance Authorized	Remaining Acres to be Conserved	Conservation Objective Minimum
Conserve Core Habitat for CV Milkvetch	4,322	3,285	104	933	919
Conserve Core Habitat for Mecca aster	11,763	8,776	299	2,688	2,688
Conserve Core Habitat for CV giant sand-treader cricket	3,860	3,029	83	748	733
Conserve refugium locations for desert pupfish	($15m^2$)	($15m^2$)	N/A	0	N/A
Conserve Core Habitat for CV fringe-toed lizard	3,860	3,029	83	748	733
Conserve Core Habitat for flat-tailed horned lizard (predicted)	4,046	3,167	88	791	776
Conserve Other Cons. Habitat for Le Conte's thrasher	10,848	6,626	422	3,800	3,785
Conserve Core Habitat for CV round-tailed ground squirrel	8,391	5,065	333	2,993	2,977
Conserve Core Habitat for Palm Springs pocket mouse	11,530	7,598	393	3,539	3,523
Conserve active desert dunes	420	403	2	15	15
Conserve active desert sand fields	3,443	2,627	82	734	720
Conserve mesquite hummocks	57	57	0	0	N/A
Conserve Sonoran cottonwood-willow riparian forest	4	4	0	0	N/A
Conserve desert dry wash woodland	748	710	4	34	34
Conserve desert fan palm oasis woodland	136	136	0	0	N/A
Conserve sand source areas	13,137	8,937	420	3,780	3,780
Conserve fluvial & aeolian sand transport areas	12,429	7,847	458	4,124	4,124
Conserve Linkages	25,554	16,784	877	7,893	0

C.6 Flood Control Biological Opinion

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

In Reply Refer to:
FWS-ERIV-2022-0033479

September 27, 2022
Sent Electronically

Sallie Diebolt
Chief, Arizona Branch
Regulatory Division
U.S. Army Corps of Engineers
Los Angeles District
3636 N. Central Ave, Suite 900
Phoenix, Arizona 85012-1939

Attention: Michael Langley, Regulatory Project Manager

Subject: Biological Opinion for the Thousand Palms Flood Control Project, Thousand Palms, Riverside, California

Dear Sallie Diebolt:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the proposed issuance of a Section 404 permit, pursuant to the Clean Water Act (CWA), by the U. S. Army Corps of Engineers (Corps) to Coachella Valley Water District (CVWD) authorizing the construction, operation, and maintenance of the Thousand Palms Flood Control Project (Project) in Thousand Palms, California, Riverside County. We received your request on December 10, 2021, to initiate formal consultation on the Project's effects to federally listed species. This biological opinion analyzes the Project's effects on the federally endangered Coachella Valley milk-vetch *(Astragalus lentiginosus* var. *coachellae),* the federally threatened Coachella Valley fringe-toed lizard (*Uma inornata)*, and designated critical habitat for each species, in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq*.).

In your request for consultation, your agency determined that the proposed Project may affect, but is not likely to adversely affect the federally threatened Mojave desert tortoise (*Gopherus agassizii*; desert tortoise). The Project is located within the range of desert tortoise; however, no designated critical habitat or modeled habitat occurs within the Project area. A Project habitat assessment (Aspen 2021) identified a potential area of suitable habitat near a portion of the Project, but that the quality of habitat is low due to fine sandy soil substrates that would not support burrows, the proximity to developments and roads, and active off-highway vehicle (OHV) use. Aspen (2021) conducted multiple surveys and did not observe live desert tortoises nor sign within the Project's study area. In addition, CVWD will implement conservation measures to avoid and minimize effects to desert tortoises during Project construction, operation, and maintenance activities. Due to the low potential for desert tortoise to occur within the action area and the proposed conservation measures, we concur with your determination that the proposed action is not likely to adversely affect desert tortoise. We will not address desert tortoise further in this biological opinion, with the exception of including conservation measures agreed upon by the Corps and CVWD in the event that a desert tortoise occurs within the action area.

The proposed Project would occur on Federal, public, and private lands of varying ownership and designations, including lands managed through the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP or Plan) administered by the Coachella Valley Conservation Commission (CVCC), a joint powers authority of elected representatives. The CVMSHCP (CVAG 2007a) is a regional habitat management plan which established 21 Conservation Areas (CA) throughout the Coachella Valley and identified target conservation objectives to protect 27 Covered Species, modeled habitat, natural communities, essential ecological processes, and biological corridors that may be found within each CA. The Plan provides Take of Covered Species or the loss of their habitat to Permittees or other approved entities of the Plan, as long as compliance with the Plan requirements is achieved. The Service issued our section 10(a)(1)(B) permit TE-104604-0 (Service 2008a; Service Permit) for the Plan on October 1, 2008. The Service also completed formal intra-agency consultation analyzing the effects of our issuance of the Service Permit and provided a non-jeopardy determination in the biological and conference opinion for the Plan on July 3, 2008 (Service 2008b).

Because CVWD is a CVMSHCP Permittee and the proposed Project is a Covered Activity, take of covered species including Coachella Valley fringe-toed lizard has been provided through the Plan and the Service Permit (Service 2008a), provided that CVWD ensures the proposed Project is compliant with the requirements of the Plan. Because take of plants is not prohibited under the Act, incidental take for Coachella Valley milk-vetch cannot be authorized under the Service Permit (Service 2008a). Requirements for CVWD Covered Activities are outlined in Section 7.3.1 of the CVMSHCP, and Table 7-6, item (t), which specifies that the required avoidance and minimization measures for the Project are "subject to the terms and conditions of Section 7 consultation" (CVAG 2007a). In 2021, CVCC determined that the proposed Project's design updated from the original 2000 description is consistent with the CVMSHCP (CVCC 2021). Therefore, our analysis in this biological opinion focuses on the effects of the Federal action proposed by the Corps (the issuance of a Section 404 CWA permit to CVWD), per the requirements of the CVMSHCP and the following term and condition of the Service Permit (Service 2008a):

"Where Covered Activities result in the incidental take of Covered Species within the U.S. Army Corps of Engineers' (Corps) jurisdictional wetlands or other waters of the United States, or where Covered Activities are federally funded or require a Federal permit or authorization, such incidental take is authorized by this Permit provided that appropriate authorization is first secured from the Corps or any other applicable Federal agency with jurisdiction. Pursuant to and consistent with Section 14.8 of the IA [Implementation Agreement], where Covered Activities require section 7 consultation under the Act, exemption for any associated incidental take by the applicable Federal agency shall be provided through future consultation, while authorization for any associated incidental take of Covered Species by the Permittees, Third Parties Granted Take Authorization, and/or Participating Species Entities shall be provided through this Permit."

This biological opinion is based on information provided in the following documents and communications: (1) Biological Assessment: Thousand Palms Flood Control Biological Assessment (Aspen 2021); (2) Consistency determination for Coachella Valley Conservation Commission 21-001: Thousand Palms Flood Control Project in the Thousand Palms Conservation Area (CVCC 2021); (3) Geomorphic Assessment of Sand Transport Impacts for the Thousand Palms Flood Control Project (Lancaster 2021); (4) Thousand Palms Flood Control Biological Resources Technical Report (Aspen 2016); (5) Biological opinion for the Intra-Service formal section 7 consultation for issuance of a section 10(a)(1)(B) (TE-104604-0) incidental take permit under the Act for the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP), Riverside County, California (Service 2008b); (6) section 10(a)(1)(B) (TE-104604-0) Fish and Wildlife Permit for the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP), Riverside County (Service 2008a); (7) Coachella Valley Multiple Species

Habitat Conservation Plan (CVAG 2007a); (8) written, telephone, and electronic mail correspondence received during the consultation time period; and (9) pertinent literature contained in our files. A record of this consultation is available at the Palm Springs Fish and Wildlife Office.

CONSULTATION HISTORY

The proposed Project was formerly the Whitewater Basin Flood Control Project. In 1993, the Corps conducted a feasibility study to develop seven preliminary project alternatives for reducing high intensity flooding within the community of Thousand Palms. The Service began informally consulting with the Corps in June 1997, to identify biological resources within the study area and the potential impacts of each alternative. In August 1999, the Service evaluated the potential impacts of a Corps Preliminary Preferred (CCP) alternative in a draft Coordination Act Report (CAR) with concerns that the CCP would result in significant adverse impacts to biological resources. The Corps and Service coordinated to develop a new CCP alternative, and the Service issued a non-jeopardy biological opinion (1-6-00-F-46) (Service 2000) for Coachella Valley milk-vetch, Coachella Valley fringe-toed lizard, desert tortoise, and designated critical habitat for fringe-toed lizard to the Corps on September 12, 2000. The Corps published a final Environment Assessment/Mitigation Negative Declaration analysis in 2000; however, the project described in the biological opinion was never implemented. Over time, land use change and development adjacent to the proposed project site precluded implementation of the initial project design. The Corps proposed an updated design of the project to the Service in October 2004.

On July 3, 2008, the Service issued the biological and conference opinion analyzing the effects of our issuance of a section 10(a)(1)(B) permit for the Coachella Valley Multiple Species Habitat Conservation Plan (Service 2008b). A finding of no jeopardy was made for all of the species included in the biological and conference opinion. The CVMSHCP anticipated CVWD's Whitewater Flood Control Project as a Covered Activity.

In 2011, the Corps began a Supplemental Environmental Assessment/Mitigation Negative Declaration analysis for the project to examine land use change and new development in the project area. Due to Federal restrictions, the analysis remained an internal document in its Preliminary Draft phase and was never finalized. The Corps anticipated preparing a draft Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) to analyze an updated design for the project in 2014, now called the Thousand Palms Flood Control Project (Project). Proposed updates to the 2000 design included the incorporation of both channels and retention basins into some levee structures, additional permanent disturbance to Coachella Valley fringe-toed lizard and milk-vetch designated critical habitat, and increased disturbance to fluvial and aeolian sand source and transport processes beyond what was anticipated in the 2000 biological opinion. In 2014 and 2016, the Service responded to the Corps' Notices of Intent (NOI) regarding preparation of a draft EIS/EIR. The Service recommended the Corps reinitiate section 7 consultation to analyze the effects of new modifications to the Project not addressed in the initial 2000 biological opinion or associated incidental take statement, and that the Corps coordinate with the Service to prepare the EIS/EIR.

On November 16, 2020, the Corps contacted the Service to discuss early coordination for formal consultation, including technical assistance for the draft biological assessment (BA). The Corps, Service, and CVWD held a preliminary coordination call on December 16, 2020. The Corps submitted a draft BA to the Service for comments on February 16, 2021. Due to anticipated Project impacts occurring directly on the Coachella Valley National Wildlife Refuge (CVNWR), a unit of the Service's National Wildlife Refuge System (NWRS) managed by the Sonny Bono Salton Sea National Wildlife Refuge Complex (Refuge Complex), the Palm Springs Fish and Wildlife Office (PSFWO) contacted the Refuge Complex to determine whether the Refuge Complex or PSFWO would conduct the section 7 consultation, as the NWRS usually leads formal consultations regarding impacts to lands within its system. The Refuge

Complex requested PSFWO lead and complete the consultation. Both PSFWO and the Refuge Complex coordinated on initial Service comments for the draft BA and submitted our review to the Corps on March 24, 2021. The Corps, CVWD, and both Service field offices held a coordination call on April 6, 2021, to discuss and clarify the BA. In May 2021, the Refuge Complex also accepted a formal invitation from the Corps to join as a cooperating agency to coordinate regulatory requirements pertaining to the National Environmental Policy Act (NEPA).

The Corps, CVWD, and both Service offices continued coordination to review recommendations for conservation measures for the draft BA that would also be consistent with measures proposed in NEPA regulatory documents. During this time, the PSFWO also collaborated with California Department of Fish and Wildlife (CDFW), collectively the Wildlife Agencies under the CVMSHCP, to coordinate with CVCC, the Corps, and the CVWD on the CVMSHCP consistency determination process for the Project. Discussions held during monthly CVMSHCP coordination calls and stand-alone meetings focused on identifying and clarifying regulatory authorities and requirements for the Project under the CVMSHCP and section 7 consultation. CVCC issued their determination finding the proposed Project consistent with the CVMSHCP on July 13, 2021 (CVCC 2021). In their determination, CVCC clarified how the Project's construction would redefine the boundary of the Thousand Palms Conservation Area, so that the Project's footprint was no longer within the Conservation Area. The consistency determination also further detailed avoidance and minimization measures CVWD would be required to implement during construction, operation, and maintenance of the Project.

On August 4, 2021, the Corps, CVWD, PSWFO, and Refuge Complex held a section 7 coordination call where the Service's recommendations for the BA were confirmed, and CVWD determined their next action items would be incorporating Service recommendations into the final BA with an anticipated timeline of initiating formal consultation in December 2021. On December 10, 2021, the Corps requested initiation of formal section 7 consultation for the Project as a new project due to modifications to their regulatory role and changes in funding sources that had occurred since the 2000 biological opinion was issued. The Service acknowledged our receipt of the initiation request and requested additional information on specific components of the Project description.

The Corps and CVWD submitted the requested information to the Service in March 2022. On April 22, 2022, the Service requested a 30-day extension, which was accepted by the Corps on April 25, 2022. Then the Service requested another 30-day extension on May 26, 2022, to review and incorporate the information provided in March 2022, which was accepted by the Corps on May 27, 2022. On June 24, 2022, the Service provided portions of the draft biological opinion from the Corps, Refuge Complex, and CVWD to review. We received comments on July 25, 2022. We addressed those comments and provided a complete draft biological opinion on August 8, 2022. Then, the Corps provided comments on August 29, 2022, and we had a meeting to discuss on September 6, 2022. On September 9, 2022, the Corps provided final comments on the draft biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Project Description

The proposed action is the issuance of a Section 404 Clean Water Act permit by the Corps that would authorize CVWD to construct, operate, and maintain a flood control system within the community of Thousand Palms, California to provide flood protection and improve public safety. The Project would manage the conveyance of water flows from heavy storm events through a series of linear flood control structures and stormwater conveyance facilities. According to the biological assessment (Aspen 2021), the

Project would consist of four segments (reaches) composed of levees and/or channels, depending on the intended function of a reach, and other ancillary infrastructure. Reach 1 would convey stormwater containing sediment from the Indio Hills to Reach 2, where some sediments would be naturally deposited in the naturally-occurring primary alluvial deposition area as stormwater flows continue towards Reach 3. Then, Reach 3 would convey flows into the existing floodway at the Classic Club Golf Course. Finally, Reach 4 would convey storm flows through the existing channel in the Del Webb/Sun City residential development located on the east side of Washington Street.

Project components during the construction and operations and maintenance (O&M) phases include:

- Construction of levees and channels for Reaches 1 through 4,
- Establishment of temporary work areas,
- Conveyance system development including improvements to existing systems at Classic Club Golf Course and the Sun City residential development, and construction of a proposed conveyance system to direct stormwater flows under Washington Street,
- Acquisition of a 550-acre floodway located within the primary alluvial deposition area near Reach 2,
- Re-alignment of Avenue 38,
- A Sand Migration Management Plan (SMMP) to replenish accumulated sediments within the aeolian habitat located within CVNWR, and
- Applicant-proposed conservation measures

The following description organizes these Project components according to the work phase during which they are anticipated to occur.

Construction

CVWD anticipates construction would begin on the downstream end of the Project with the construction of Reach 4, to ensure that stormwater flows that may occur during construction will flow into existing conveyance facilities (Aspen 2021). Additional components built during this period include the Washington Street Crossing and improvements to the existing stormwater collection basins at its terminus; connector facilities and culverts at the terminus of Reach 3 and upstream end of Reach 4 to direct flows through the existing Classic Club Gulf Course conveyance system; the realignment of utility and sewer infrastructure at Reach 4; and two road crossings for Desert Moon Drive and Via Las Palmas at Reach 1. CVWD anticipates these activities will occur over 12 months. The next construction period consists of constructing the remaining reaches, beginning with Reach 3, and ending with Reach 1 for a duration of 12 months. The entire construction phase is expected to last approximately 27 months.

At the completion of construction, CVWD would conduct site closeout activities including clean-up of all construction material and debris, recontouring the work area, and restoration of temporary disturbance areas including decompaction of temporary work areas to facilitate revegetation.

Flood Control Structures (Reaches)

CVWD would construct four flood control structures (reaches) to divert and manage the flow of stormwater originating at the base of the Indio Hills throughout the city of Thousand Palms. The reaches would have similar general structural features, such as levees and channels made of soil cement or other

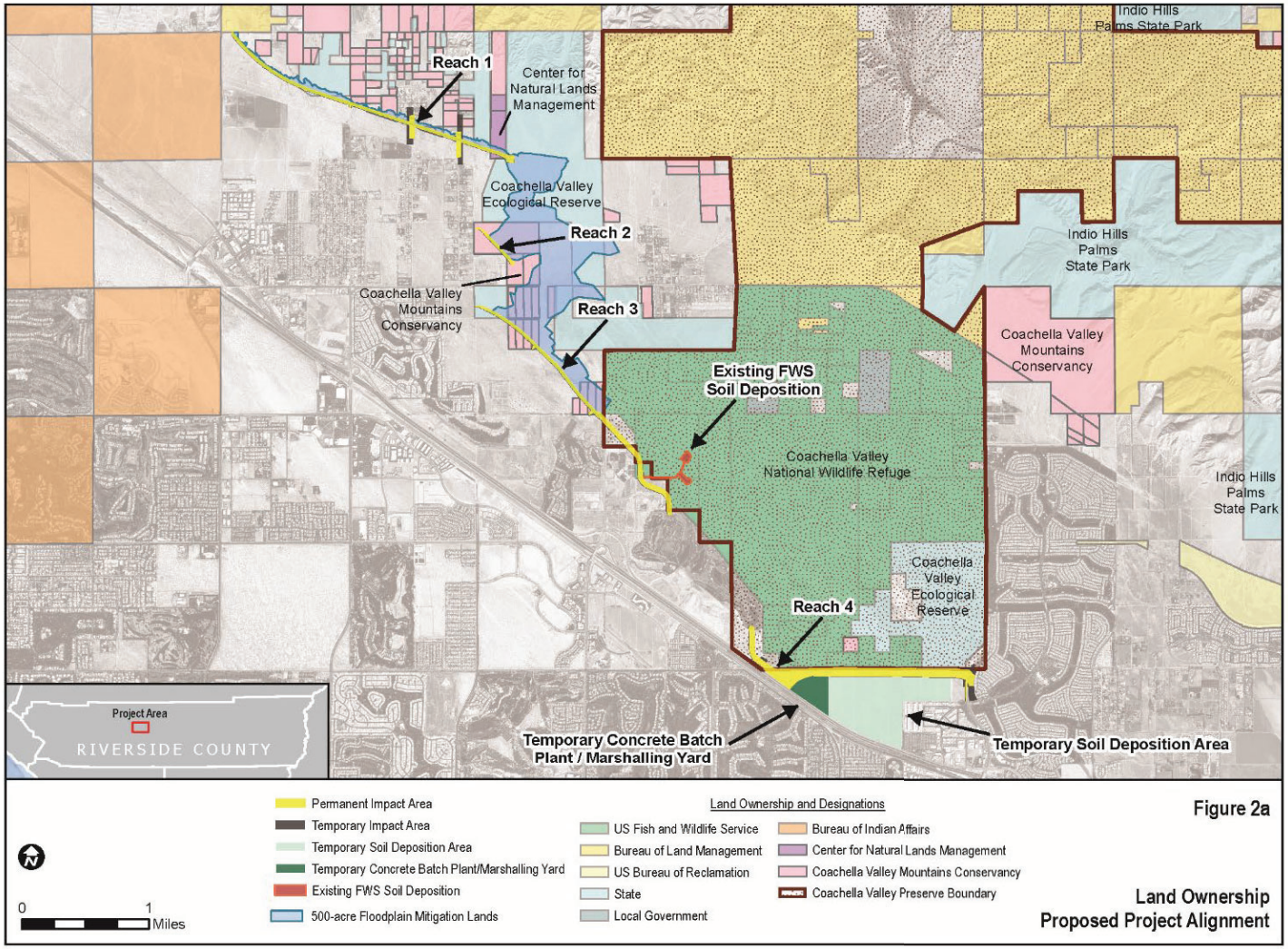

Figure 1: Thousand Palms Flood Control Proposed Project Alignment - Land Ownership (Aspen 2021)

materials, and each reach would have additional unique features depending upon their placement and purpose in the flood control system. Appropriate fencing to stabilize sand formations, sediment, and/or prevent erosion may be installed as needed in accordance with a Sand Migration Management Plan conservation measure (CM 3) approved by the Service and Corps.

Reach 1

Reach 1 would divert heavy stormflows originating from Indio Hills toward a 550-acre floodway at the terminal end of the reach. Reach 1 would be located on the south side of 28th Avenue, near the 28th Avenue and Rio del Sol Road intersection, and cross three existing roadways: Sierra del Sol, Desert Moon Drive, and Via Las Palmas. The reach would parallel and be adjacent to the west side of an existing Southern California Edison (SCE) utility corridor and cross residential and commercial private lands. CVWD would acquire these private properties to construct Reach 1. Reach 1 would be approximately 12,700 feet in length with a surface area of 63.28 acres. The structural build would consist of an underground levee toe and an elevated levee embankment.

In addition, CVWD would construct a 1.20-acre excavated sediment basin with riprap protection on its upstream (east) side at the end of the reach to accumulate sediments from stormwater. The sediment basin would trap sediment, slow the velocity of stormwater flow across the Coachella Valley Preserve (Preserve), and avoid effects associated with erosion or channel migration. The sediment basin would also induce deposition of fluvially-transported sediment within the sand corridor for natural transport onto the Preserve.

An existing reservoir (Reservoir 4602), located west of Via Las Palmas and north of the proposed Reach 1, contains existing onsite flood control facilities that would be used to manage stormflows emanating from the Project and would require additional flood protection improvements.

Road crossings would be constructed over Reach 1 to maintain existing travel routes (Figure 1). CVWD would design culverts for these road crossings to minimize disruptions to fluvial sediment transport. Stormwater diverted by these road crossings would flow into the sediment basin in a southeast direction toward Reach 2.

Reach 2

Reach 2 would divert stormwater flows from Reach 1 in a southeasterly direction to protect the SCE Mirage Substation from flooding. Reach 2 would be a 1,700-feet-long levee comprised of a levee toe and embankment. An access road of the same length would be constructed along the top of the embankment and on the west (downstream) side of the reach to support operation and maintenance activities. The total area of Reach 2 would be 5.63 acres. Reach 2 would have a low profile of 5 feet sited within the wind corridor and aligned with the direction of prevailing winds to minimize interference with aeolian sand transport processes. Reach 2 would capture large storm events from Reach 1 and direct flow toward Reach 3.

Reach 3

Reach 3 would direct stormwater flows from Reach 2 into an existing conveyance system located on the Classic Club Golf Course adjacent to the western boundary of CVNWR and ultimately into Reach 4. Reach 3 would be comprised of an approximately 6,500-foot levee and a 5,300-foot-long incised trapezoidal channel lined with soil cement. Reach 3 would have a surface area of 46.7 acres. The reach would cross conservation lands administered by CDFW, private lands parcels owned by Xavier College

Preparatory High School and other entities, and portions of CVNWR. Construction of Reach 3 would include an underground levee toe and levee embankment. The levee would transition into an incised trapezoidal conveyance channel to direct storm flows. Sediments deposited from heavy storm events will be periodically removed and returned to the active sand corridor. The levee design would be consistent with CVNWR's updated sand management plan (CM 3) to replenish and sustain the natural aeolian processes and habitat within CVNWR.

Reach 4

Reach 4 would be designed to receive stormwater flows from the existing conveyance system described above in the Reach 3 section and direct flows easterly to the existing terminal conveyance facilities near the Sun City residential development. The reach would be a 98.03-acre, 10,300-foot-long incised trapezoidal channel and constructed within the existing Avenue 38 alignment directly adjacent to the southern boundary of the CVNWR. The channel would be constructed perpendicular to the wind corridor and direct stormwater to a proposed conveyance system at Washington Street, then end at the existing Sun City conveyance system. Construction of Reach 4 would require realigning Avenue 38 to be directly adjacent to the southern (downstream) side of the Reach.4

Construction of Reach 4 would begin with the realignment of Avenue 38. The avenue would be closed to prevent public access into the work area. Construction access to the Project site would occur on existing roads that would be widened to a minimum of 20 feet to accommodate heavy equipment. Additional temporary access roads would be constructed to transport excavated and backfill material between the construction areas for each reach and temporary work site located at the western end of Avenue 38 near Interstate 10.

Blow sand from an active sand dune along CVNWR's southern boundary periodically accumulates within the current alignment of Avenue 38 and may need to be removed prior to construction activities for Reach 4. The CVNWR has an existing arrangement with the County of Riverside to collect blow sand from the road and return the material to a sand dispersal site within the wind corridor on the CVNWR (Service 2013a). The Applicant will follow CVNWR management's guidance to clear accumulated blow sand from Avenue 38 to prepare the worksite.

Additional site preparation activities for the construction of Reach 4 include the removal and relocation of utility infrastructure (e.g., distribution poles and sewer facilities) within an existing utility right-of-way directly located at the southern Refuge boundary. Asphalt and other non-usable material removed from Avenue 38 would be delivered to appropriate landfill or recycling facilities. Following site preparation within the right-of-way and original Avenue 38 footprint, excavation and construction activities for Reach 4 would occur.

Floodway

CVWD would acquire a 550-acre floodway located on the western (downstream) side of Reach 1 as part of a habitat compensation package further described below in the Conservation Measures section of this biological opinion. The floodway is within a primary alluvial depositional area that spans the area between Reaches 1 and 3 (Figure 1). The floodway is within the active sand corridor and aids in directing fluvial sediments deposited from stormwater to the aeolian habitat areas downwind. The floodway would be conserved to prevent development within the alluvial fan and limit further disruptions to sand transport within the aeolian system. This land would also serve to provide compensatory mitigation under the Section 404 permit to be issued by the Corps. Compensatory mitigation activities within this area

(preservation and enhancement of aquatic resources) would be consistent with future anticipated management activities by the CVCC under the CVMSHCP.

Realignment of Avenue 38

Avenue 38 currently lies directly adjacent to the southern boundary of CVNWR. Additionally, an existing utility right-of-way for electrical transmission and underground sewer pipelines is also located along the southern boundary. CVWD would construct Reach 4 within the current footprint of Avenue 38, such that the northern (upstream) side of Reach 4 would be directly adjacent to the southern boundary of the CVNWR. The new footprint of Avenue 38 would be realigned and constructed directly adjacent to the southern (downstream) boundary of Reach 4. The realigned Avenue 38 would be a four-lane route, 76 feet wide, 7600 feet long, and with a surface area of approximately13 acres. The Riverside County Board of Supervisors previously approved the realignment of Avenue 38 as a county project which would move Avenue 38 adjacent and south of Reach 4. Realignment of the road would occur as a component of the proposed Project, where CVWD would build two of the four proposed lanes, including shoulders and gutters.

Washington Street Conveyance System

CVWD would construct a conveyance system to direct stormwater flows from Reach 4 under Washington Street to the flood system terminus at the Sun City residential development. The conveyance system would be approximately 5 acres or less and include the following components:

1. An excavated basin and culverts under the Washington Street crossing;
2. A road crossing placed over the basin to maintain Washington Street's original traffic route;
3. Widening activities on the southbound side of Washington Street near the intersection with the realigned Avenue 38, to provide public access to Avenue 38; and
4. Improvements to the existing Sun City collection basin to accommodate stormwater flows from the flood control system.

Temporary Work Areas

CVWD would establish temporary work areas immediately south of the existing Avenue 38 alignment near Interstate 10. The temporary work areas will include a 213.40-acre temporary soil depositional area and a 37.04-acre area to establish a batch cement plant for creating soil cement for the construction of the reaches.

These temporary work areas would avoid effects to sand transport and habitat to the maximum extent possible. In these temporary work areas, vegetation would be cleared using a drive and crush method to preserve vegetative root structures so that native plants may reestablish. All temporary work areas would be restored upon completion of construction activities. These activities may include removing all construction related material and debris, recontouring the work area, and de-compacting compressed soils in temporary work areas to facilitate revegetation.

Existing Access and Road Improvements

During construction, existing roadways would be used for access by personnel, vehicles, and construction equipment. These roads include Varner Road, Rio Del Sol Road, Sierra Del Sol, Desert Moon Drive, Via Las Palmas, East Ramon Road, Shadow Valley Drive, Avenue 38, and Washington Street, as well as local connector roads. CVWD will coordinate with regional NWRS and CVNWR management on any

improvements to existing recreational roads that may be needed to access portions of the CVNWR, such as segments of the equestrian trail that currently also serve as a utility right-of-way along the northern boundary of the CVNWR.

Removal of Blow Sand

Blow sand is transported by natural aeolian processes past the extent of sand dune habitat within CVNWR, accumulating on roadways and other infrastructure areas. CVNWR has an ongoing agreement with Riverside County to remove and deposit accumulated sand existing sites within the CVNWR to replenish the blow sand ecosystem. During site preparation and construction, the Applicant will clear blow sand that accumulates in Project construction areas and deposit acceptable material in existing approved sand dispersal areas on the CVNWR. These sand dispersal sites were evaluated and selected for their location (Figure 1) and capacity within the natural wind corridor to effectively redistribute sand back into the aeolian habitat system processes (Service 2013a). Management of sand and sediments will be conducted in accordance with CVNWR guidance.

Operations and Maintenance (O&M)

CVWD anticipates operations and maintenance activities would include routine and emergency repair of flood control structures; sand management to remove accumulated sediment from flood infrastructure and place in dispersal areas; and vegetation removal to maintain integrity of flood infrastructure.

Structural Repair

Structural repair would occur as needed, e.g., after significant high volume flash floods. Occasional excavation would be conducted to rebuild or reinforce underground levee toes, as needed. New fill material or soil cement would be added to components of the reaches to repair damage, particularly after large storm events.

Sand Management

Aeolian processes currently transport blow sand beyond CVNWR and onto surrounding development and infrastructure. CVWD anticipates approximately 0.50 feet of sand would accumulate per year in Reach 3 and one foot per year in Reach 4. Sand is expected to accumulate within the channel components of the entire flood control system more quickly than along the levee components, where most of the sand would continue to be blown downwind. CVWD will clear levees of accumulated sand approximately once per year and after major flood events as needed. Sand removal and frequency will be based on the rate of sand accumulation in the flood system. Sand removal and frequency will be directed by CVNWR.

Vegetation Removal

Maintenance activities would also include the chemical or mechanical removal of vegetation to maintain structural integrity, access, and compliance with Corps levee requirements. Root systems from vegetation can degrade the integrity of the flood control structures. The earthen segments of the levees would be periodically sprayed/treated with a dust palliative (soil stabilizer) consisting of a high purity grade co-polymer emulsion to reduce wind-driven erosion and prevent the colonization of vegetation or weeds on the levees. An Integrated Weed Management Plan would specify weed inventory and monitoring, pre-construction and ongoing weed treatments, preventative measures, and control methods.

Table 1. Project Disturbance Area (Acres) (Aspen 2021)

	Temporary	Permanent	Total
Total Project Disturbance Area			
Reach 1	17.98	43.04	**61.02**
Reach 2	0.97	4.66	**5.63**
Reach 3	6.19	40.51	**46.7**
Reach 4	10.77	87.26	**98.03**
New Soil Deposition Site	213.40	0.00	**213.40**
Concrete Batch Plant/ Marshaling Yard	37.04	0.00	**37.04**
Grand Total	**286.35**	**175.47**	**461.82**
Coachella Valley National Wildlife Refuge (USFWS)[1,2]			
Reach 1	0.00	0.00	**0.00**
Reach 2	0.00	0.00	**0.00**
Reach 3	0.67	8.34	**9.05**
Reach 4	0.00	0.00	**0.00**
New Soil Deposition Site	0.00	0.00	**0.00**
Subtotal	**0.67**	**8.38**	**9.05**
Coachella Valley Ecological Reserve (State lands)			
Reach 1	1.03	6.88	**7.91**
Reach 2	0.00	0.00	**0.00**
Reach 3	0.46	2.32	**2.78**
Reach 4	0.00	0.00	**0.00**
New Soil Deposition Site	0.00	0.00	**0.00**
Subtotal	**1.49**	**9.20**	**10.69**
Coachella Valley Preserve[1]			
Reach 1	15.02	40.35	**55.37**
Reach 2	8.60	4.40	**13.00**
Reach 3	3.54	23.19	**26.73**
Reach 4	0.00	0.00	**0.00**
New Soil Deposition Site	0.00	0.00	**0.00**
Subtotal	**27.16**	**67.94**	**95.10**

1- Federal lands: Impacts are not additive as they occur within the greater Coachella Valley Preserve. Impacts to Preserve lands in Reach 3 and Reach 4 are likely smaller as the most updated shapefiles for this area do not reflect land use changes that have occurred including the development of the Classic Club Golf Course.

Conservation Measures

The Corps and CVWD proposes to implement the following conservation measures (CM) as part of the proposed action to avoid, minimize, and offset effects to federally listed species, designated critical habitat, and biological resources. In addition, the Corps and CVWD will ensure the implementation of required Avoidance and Minimization Measures and Land Use Adjacency Guidelines as required by Section 4 of the CVMSHCP.

CM 1. Minimize Impacts to Sand

This measure shall apply to the construction and O&M phases of the Project. CVWD shall develop and implement best management practices (BMPs) in accordance with the Sand Migration Management Plan (CM 3) to avoid and minimize impacts to sand and sand transport. BMPs shall include, but not be limited to, the following:

1. Fencing or other temporary or permanent barriers shall be designed, oriented, and installed to minimize impacts to sand and sand transport.

2. Construction activities that would create temporary or permanent barriers shall be avoided and minimized to the extent feasible.

3. Application of water to control dust shall be minimized to the extent necessary to meet air quality and other Project requirements. Water sources (e.g., hydrants, tanks, etc.) shall be checked periodically by biological monitors to ensure they are not impacting sand mobility (e.g., by leaking or consistently overfilling trucks, causing wet ground where sand is immobile).

4. Areas of active dunes shall be avoided. If active dunes cannot be avoided, disturbance to the dune sand shall be minimized through implementation of additional appropriate conservation measures (CM 2 and 3).

CM 2. Sand Removal, Distribution, and Disposal

The Corps and CVWD will ensure that all Project components shall be regularly inspected for the accumulation of blow sand material. Material shall be removed as necessary to maintain capacity of Project components and avoid the use of accumulated sand as habitat for sensitive species in the Project area. CVWD will coordinate with CVNWR to create a SMMP (CM 3) to determine responsibilities, roles, schedules, and protocol. Sand substrate shall be evaluated for suitability to replenish sand dune habitat throughout the CVNWR. If suitable, the material shall be deposited on predetermined locations within the natural wind corridor, specifically in areas where winds are the strongest and as far upwind as possible. Immediate upwind or downwind obstructions shall be avoided when distributing sand in the wind corridor. Sand shall be placed in low-level, non-compacted mounds across the entire width of the wind corridor, generally in a line roughly perpendicular to the wind direction maximizing aeolian transport onto the Preserve and CVNWR. Material that is determined to be unsuitable to replenish habitat on the Preserve shall be disposed appropriately.

CM 3. Prepare and Implement a Sand Migration Management Plan (SMMP)

CVWD will prepare and implement a SMMP to guide the management of the sand resources during construction, operations, and maintenance of the Project. An Adaptive Management Plan will be included as a component of the SMMP.

The SMMP shall be prepared and submitted to the Corps, Service, and other appropriate agencies for review and approval at least 60 days prior to construction of the Project. CVWD shall ensure that personnel involved in sand removal and other activities that affect sand and sand transport are familiar with the requirements and guidelines in the SMMP. The SMMP shall include specific guidance on the implementation of sand removal, distribution, and disposal (CM 2), including but not limited to:

1. Inspection schedules for accumulation of sand in all Project levees and channels, including inspections after precipitation events.

2. Requirements for pre-activity biological surveys to remove sand including surveys of sand removal areas and areas of associated disturbance, sand distribution sites and access roads, and biological monitoring for sand removal and distribution activities. Based on the results of pre-activity surveys, CVWD or its contractor shall monitor no-disturbance buffer areas, other access areas, and activity restrictions to minimize potential impacts to any sensitive resources or special-status species.

3. Guidelines on determining if removed sand is suitable for placement in a sand distribution site. The guidelines shall include specific parameters that define suitable versus unsuitable sand. Procedures for conducting sampling and analysis of sand shall be included, as applicable.

4. Cleanup requirements for trash abatement and accidental spills.

5. Procedures and guidelines for the distribution of sand, including parameters for selection of sand distribution sites, appropriate placement of sand (as described in CM 2), and procedures for disposal of unsuitable material.

6. Maps showing the locations of the sand distribution site(s), including approved access routes and turn-around areas. Disturbance areas at sand distribution sites shall be the minimum size necessary. Maps will clearly indicate the boundaries of sand distribution sites, including GPS points and any physical landmarks, and will be updated as needed.Traffic cones, traffic delineators, staking and flagging or other markers will be put in place for the duration of each sand distribution event to clearly mark these boundaries on the ground. Markers will be completely removed at the end of the sand distributionevent. The SMMP shall also include the requirement for all Project-related activities to occur within marked boundaries, on approved access routes, and turn-around areas.

7. The SMMP shall include the BMPs identified or developed under CM 1.

CM 4. Biologists Roles and Responsibilities

CVWD shall assign Authorized/Acceptable Biologists to perform pre-construction biological surveys at each Project work area and access route, and in the 200-foot area surroundingeach work site where legal access is possible. See CM 11 through 14 for additional required species-specific authorizations.

This measure shall apply to the pre-construction and construction phases of the Project.

Lead Biologist/Field Contact Representative. CVWD shall appoint a Lead Biologist in coordination with the Corps, no less than 60 days prior to the start of any ground-disturbing activities, including those occurring prior to site mobilization (e.g., geotechnical borings, etc.). The Lead Biologist will be the Field Contact Representative (FCR) and responsible for overseeing compliance with all conservation measures. The FCR will have demonstrated expertise with the biological resources within the action area. CVWD will provide the qualifications of the proposed FCR to the Corps and Service for approval at least 30 days prior to pre-construction activities. The Lead Biologist/FCR will be CVWD's primary point of contact to the Corps, Service, and other agencies regarding any biological resource issues, implementation of related mitigation measures, and permit conditions during Project construction and post-construction activities. The Lead Biologist shall also be qualified as an Authorized/Acceptable Biologist as described below. In addition, the Lead Biologist will be responsible for supervising and training biological monitors and preparing monitoring reports and documentation.

The Lead Biologist will hold a bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field; have at least three years of experience in field biology and at least one year of direct field experience with biological resources found in or near the Project area. The Lead Biologist shall possess the appropriate education and experience to successfully accomplish the assigned biological resources tasks of an Authorized/Acceptable Biologist as described below.

Designated Desert Tortoise Biologist. CVWD shall appoint a Designated Desert Tortoise Biologist qualified and approved as a Desert Tortoise Authorized/Acceptable Biologist as described below to oversee specific activities for desert tortoise described in CM 14.

Desert Tortoise Authorized Biologist/Acceptable Biologist. CVWD shall appoint at least one Authorized Biologist approved by the Service, who is also considered an Acceptable Biologist under the CVMSHCP, to conduct pre-construction surveys (CM 6), monitor construction and O&M activities (CM 5), implement desert tortoise conservations (CM 14), and potentially oversee desert tortoise conservation measures in the role of a Designated Desert Tortoise Biologist.

For each proposed Desert Tortoise Authorized/Acceptable Biologist, CVWD will submit documentation of a proposed biologist's qualifications to the Corps and Service for evaluation and approval that the applicant meets the minimum qualifications at least 60

days prior to planned work. Documentation shall include a resume, contact information for at least three references, and detailed descriptions of work experience and training performing each duty of an Authorized/Acceptable Biologist relevant to Project activities described in this biological opinion in accordance with the Service's *Desert Tortoise Field Manual* (Service 2009b). An Authorized/Acceptable Biologist must meet the following minimum qualifications:

1. Possess a bachelor's degree or higher in biological sciences, zoology, botany, ecology, or a closely related field.

2. Have three years of experience in field biology, with at least 1 year of field experience with biological resources found in or near the Project area.

3. Possess a thorough and current knowledge of desert tortoise behavior, natural history, ecology, and physiology

4. Demonstrate substantial field experience and training to safely and successfully conduct their required duties for desert tortoise conservation measures described in CM 14.

Qualified Biologist(s). CVWD shall appoint at least one Qualified Biologist approved by the Service and Corps to conduct pre-construction surveys (CM 6) and monitor construction and O&M activities (CM 5) for the federally listed or CVMSHCP Covered species they are assigned. A Qualified Biologist will be present to conduct Project activities and conservation measures described in this biological opinion including surveying, biological monitoring, relocating Coachella Valley fringe-toed lizard (CM 13), salvaging Coachella Valley milk-vetch (CM11), and/or monitoring common ravens (*Corvus corax*) (CM 15). The Qualified Biologist is responsible for being aware of the latest information on Service protocols and guidelines for each assigned species. The Qualified Biologist is also required to have the appropriate qualifications and authorizations for each assigned species to complete Project activities as further described in CM 11 through 15.

CVWD will submit a resume for each proposed Qualified Biologist, with at least three references and contact information, to the Corps and Service for confirmation that the applicant meets the minimum qualifications at least 60 days prior to planned work. The Qualified Biologist(s) must meet the following minimum qualifications:

1. Possess a bachelor's degree or higher in biological sciences, zoology, botany, ecology, or a closely related field.

2. Have three years of experience in field biology, with at least 1 year of field experience with biological resources found in or near the Project area.

3. Possess a thorough and current knowledge of special-status wildlife species behavior, natural history, ecology, and physiology.

4. Demonstrate substantial field experience and training to safely and successfully conduct their required duties, especially surveying, and successfully relocating or salvaging species.

CM 5. Conduct Biological Monitoring and Reporting

This measure applies to the construction phase of the Project. Refer to CM 17 for additional information on biological monitoring during the O&M phase of the Project. Roles of biologists as described in CM 4 will include a Lead Biologist/FCR (that is also an Authorized Biologist/Acceptable Biologists Designated Desert Tortoise Biologist, at least one or more Desert Tortoise Authorized/Acceptable Biologist(s), and a Qualified Biologist(s) approved to oversee other federally listed species.

CVWD shall assign approved Authorized/Acceptable Biologist for desert tortoises and Qualified Biologists for Coachella Valley fringe-toed, milk-vetch, or other appropriate species to the Project as biological monitors to monitor all work activities during the construction phase. A Designated Desert Tortoise Biologist who is an approved Desert Tortoise Authorized/Acceptable Biologist will also be present to oversee and conduct desert tortoise specific measures (CM 14).

Monitors are responsible for ensuring that impacts to special-status species, native vegetation, wildlife habitat, and sensitive or unique biological resources, including desert dune and sand field habitat are avoided, or minimized to the fullest extent safely possible. Monitors are also responsible to ensure that work activities are conducted in compliance with conservation measures and other Project requirements.

CVWD shall provide training to biologists conducting monitoring, in addition to WEAP (CM 7) and prior to the monitor commencing field duties, on biological resources present or potentially present on the Project, as well mitigation measures, permit requirements, Project protocols, and the duties and responsibilities of biological monitoring.

Biologists shall inform construction crews daily of any environmentally sensitive areas (ESAs), nest buffers, or other resource issues or restrictions that affect the work sites for that day. Biological monitors shall communicate with construction supervisors and crews as needed (e.g., at daily tailgate safety meetings (“tailboards”), by telephone, text message, or email) to provide guidance to maintain compliance with mitigation measures, and permit conditions. CVWD shall ensure that adequate numbers of monitors are assigned to effectively monitor work activities and that communications from biological monitors are promptly directed to crews at each work site for incorporation into daily work activities. If biological monitors are unavailable for a tailboard meeting, the construction supervisors shall communicate all ESAs, nest buffers, or other resource restrictions to crews during the meeting. CVWD shall ensure that biological monitors are provided with an accurate daily construction work schedule as well as updated information on any alterations to the daily construction work schedule. CVWD shall ensure that biological monitors are provided with up-to-date biological resource maps and construction maps in hardcopy or digital format.

Monitors shall be familiar with the biological resources present or potentially present, ESAs, nest buffers, and any other resource issues at the site(s) they are monitoring, as well as the applicable conservation measures. Monitors shall exhibit diligence in their monitoring duties and refrain from any conduct or potential conflict of interest that may compromise their ability to effectively carry out their monitoring duties.

Biological monitor duties and responsibilities. Throughout the duration of construction, Authorized/Acceptable Biologist(s) shall conduct biological monitoring of all work activities in the Project area, including work sites, staging areas, access roads, and any area subject to Project disturbance. All pre-construction activities (e.g., for geotechnical borings, etc.) and post-construction restoration (if any) shall also be monitored by a biological monitor or Lead Biologist. Refer to CM 17 for a description of biological monitor duties and responsibilities during the O&M phase of the Project.

Each day, prior to work activities at each site, a biological monitor shall conduct clearance surveys ("sweeps") for sensitive plant or wildlife resources that may be located within or adjacent to the construction areas. If sensitive resources are found, the biological monitor shall take appropriate action as defined in all conservation measures. Work activities shall not commence at any work site until the clearance survey has been completed and the biological monitor communicates to the contractor that work may begin.

Biological monitors shall clearly mark sensitive biological resource areas with staking, flagging, or other appropriate materials that are readily visible and durable. The monitors will inform work crews of these areas and the requirements for avoidance and will inspect these areas at appropriate intervals for compliance with regulatory terms and conditions. The biological monitors shall ensure that work activities are contained within approved disturbance area boundaries at all times.

Biological monitors shall have the authority and responsibility to halt any Project activities that are not in compliance with applicable conservation measures or other Project requirements, or that will have an unauthorized adverse effect on biological resources.

Handling, translocation, release from entrapment, or other interaction with wildlife shall be performed consistent with conservation measures and required authorizations (including CDFW and Service permits), and other Project requirements (and only done by biologists approved to handle a species, as described in CM 4).

Biological monitors shall use handling measures that are safe, practicable, and consistent with mitigation measures and permit conditions, to actively or passively relocate wildlife out of harm's way. On a daily basis, biological monitors shall inspect construction areas where animals may have become trapped, including equipment covered with bird exclusion netting (if any), and release any trapped animals. Daily inspections shall also include areas with high vehicle activity (e.g., staging areas), to locate animals in harm's way and relocate them if necessary. If safety or other considerations prevent biological monitors from aiding trapped wildlife or wildlife in harm's way, CVWD shall consult

with the construction contractor, CDFW, wildlife rehabilitator, or other appropriate party to obtain aid for the animal, consistent with applicable mitigation measures.

At the end of each workday, biological monitors shall verify that all excavations, open tanks, trenches, pits, or similar wildlife entrapment hazards have been covered or have ramps installed to prevent wildlife entrapment and communicate with work crews to ensure these structures are installed and functioning properly.

Biological monitors shall inspect any wildlife exclusion fencing daily to ensure that it remains intact and functional. Any need for repairs to exclusion fencing shall be immediately communicated to the responsible party, and repairs shall be carried out in a timely manner, generally within one workday.

CVWD shall prepare and implement a procedure for communication among biological monitors and construction crews, to ensure timely notification (i.e., daily, or sooner, as needed) to crews of any resource issues or restrictions.

Monitoring activities shall be thoroughly and accurately documented on a daily basis. CVWD shall develop protocols for documentation of monitoring prior to the initiation of construction to include:

All special status species observations, including location of observation, location and description of Project activities in the vicinity, and any avoidance or other measures taken to avoid the species. In addition, all special-status species observations shall be reported to the California Natural Diversity Database (CNDDB).

Bird nesting activities and buffers will be established according to the buffers identified in the nesting bird management plan in coordination with the appropriate regulatory agencies and the Service. All non-compliance incidents, including nest buffer incursions, with resolution or remedial actions taken.

All reporting requirements for Project activities will be fulfilled as described throughout the biological opinion.

CM 6. Conduct Pre-construction Surveys

CVWD will plan and conduct pre-construction surveys to identify locations of special-status plants, wildlife, and nesting birds occurring within the Project area and in adjacent buffer areas. Specific pre-construction survey methods or protocols will vary according to the resources which may be present at any given site, and according to season. At minimum, CVWD shall ensure the completion of pre-construction surveys 10 days prior to beginning work in any given area and repeat the surveys if the work site remains inactive for a period of 10 days or more. During nesting season, an Authorized/Acceptable Biologist shall complete nesting bird surveys no more than 4 days prior to beginning work at any given area and repeat the surveys regularly so long as work continues at the site during the nesting season.

Pre-construction survey reports shall document survey methodology and results. Each pre-construction survey report shall include a list of biological resources detected at each site during the pre-construction survey along with any relevant additional details of sightings of special-status species (e.g., size, gender, apparent health, reproductive status, etc.).

CVWD also shall conduct pre-construction "sweeps" of each work site immediately prior to construction or ground disturbance work ensuring that any special-status resources present have been identified, and to note any vulnerable wildlife that may have entered the site. Based on the results of pre-construction surveys and sweeps, CVWD or its contractor shall monitor no-disturbance buffer areas or other access or activity restrictions to minimize potential impacts to the resources.

CM 7. Worker Environmental Awareness Program (WEAP)

CVWD shall prepare and implement a Project WEAP to educate on-site workers about the Project's sensitive environmentalissues. Contents of the WEAP will be coordinated with the Service prior to finalizing it. The WEAP shall be administered by the Lead Biologist or Qualified Biologist to all personnel on-site during and throughout Project construction. If the WEAP presentation is recorded on video, it may be administered by any competent Project personnel. A construction worker may work in the field along with a WEAP-trained crew for up to 5 days prior to attending the WEAP. CVWD shall maintain a list of all personnel who have completed the WEAP training. Employees will sign a statement indicating that they have completed the education program and understand fully its provisions and the specific measures, terms, and conditions included in the EIS/EIRand the biological opinion.

The WEAP shall consist of a training presentation with supporting written materials provided to all participants. The WEAP training shall include at a minimum:

1. Overview of the Project, the jurisdictions the Project route passes through or adjacent to (e.g., CVMSHCP/Natural Community Conservation Plan [NCCP] and Preserve), and any special requirements of those jurisdictions.

2. Overview of the federal and state endangered species acts, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, including the definition of "take," and the consequences of non-compliance with these acts including potential penalties (up to $25,000 in fines and 6 months in prison) for taking a federally listed species. Review of the take statement authorized for the Project and applicable locations.

3. Overview of the Project mitigation in the final EIS and biological permit requirements included in the biological assessment, the biological opinion, and any other resource agency agreements or authorizations, as well as the consequences of non-compliance with these requirements. They would also be informed of the environmental commitments, specific measures, terms, and conditions (when delivered).

4. Sensitive biological resources and potential impacts on the Project site and adjacent areas, including nesting birds, federally listed species, other special-status plants and wildlife, and sensitive habitats known or likely to occur on the Project site. Project requirements for protecting these resources and the consequences of non-compliance.

5. Sand habitats and sand transport, Project requirements for protecting these resources,and the consequences of non-compliance.

6. Construction restrictions such as limited operating periods, ESAs, and buffers.

7. Avoidance of invasive plant introductions to the Project site and surrounding areas, and description of the Project's Integrated Weed Management Plan (CM 10) and associated compliance requirements for workers on the site.

8. Function, responsibilities, and authority of biological and environmental monitors and how they interact with construction crews.

9. Requirements to remain within authorized work areas and approved roads with examples of the flagging and signage used to designate these areas and roads, and the consequences of non-compliance.

10. Procedures for obtaining clearance from a biological monitor to enter a work site and begin work (including moving or mobilizing equipment), and the requirement to wait for that clearance.

11. One-hour hold (or other method CVWD will use to halt work when necessary to maintain compliance) and the requirement for compliance.

12. ESAs and associated restrictions, and other restrictions such as no grading areas, flagging or signage designations, and consequences of non-compliance.

13. Nest buffers and associated restrictions and the consequences of non-compliance. Procedures and timeframes for halting work and removing equipment when a new buffer is established. Discussion of nest deterrents when no active nests are found during surveys.

14. Explanation that wildlife must not be harmed or harassed. Procedures for covering pipes, securing excavations, and installing ramps to prevent wildlife entrapment. Contact procedures if dead, injured, or entrapped animals are encountered.

15. General safety protocols such as hazardous substance spill prevention, containment, and cleanup measures; fire prevention and protection measures; designated smoking areas (if any) and cigarette disposal; safety hazards that may be caused by plants and animals; and procedure for dealing with rattlesnakes in or near work areas or access roads.

16. Printed training materials, including photographs and brief descriptions of all special- status plants and animals that may be encountered on the Project, including behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures.

17. Contact information for CVWD, construction management, and contractor environmental personnel, and who to contact with questions.

18. Training acknowledgment form to be signed by each worker indicating that they understand and will abide by the guidelines, and a hardhat sticker so WEAP attendance may be easily verified in the field.

Focused WEAP. An abbreviated version of WEAP training (focused WEAP) may be used for individuals who are exclusively delivery drivers or visitors to the Project site, and will be provided by a Qualified Biologist, biological monitor, or environmental field staff prior to those individuals entering or working on the Project. Short-term visitors (total of 5 days or less per year) to the Project site who will be riding with and in the company of WEAP-trained Project personnel for the entire duration of their visit are not required to attend WEAP or focused WEAP training.

WEAP Refreshers. Lead Biologists or Qualified Biologists will periodically present brief WEAP refresher presentations to educate construction crews and other personnel maintain awareness of environmental sensitivities and requirements. A 5- to 10-minute informal talk will be presented at each of the Project's main contractor/ subcontractor tailboards at least once a week. The biologist will note the date, contractor or subcontractor, tailboard location and time, and topics discussed during the WEAP refresher and include this information in their daily monitoring log.

CM 8. Minimize Native Vegetation and Habitat Loss

The final design of the Project shall minimize disturbance and removal of native vegetation and habitat including sand habitat to the extent safe and feasible.

Vegetation removal within work areas will be minimized. Construction activities will implement mowing or drive and crush method during site preparation rather than grading. Stockpiling of soils and salvaged topsoil will be located in previously disturbed areas and will avoid native vegetation and habitat and be stored in way to avoid attracting wildlife.

Prior to any construction equipment or crew mobilization at each work site, work areas will be marked with staking or flagging to identify the limits of work and will be verified by Project environmental staff. Staking and flagging will clearly indicate the work area boundaries. Where staking cannot be used, traffic cones, traffic delineators, or other markers will be used. Staking and flagging or other markers will be in place during construction activities at each work site and will be refreshed as needed. All work activities, vehicles, and equipment will be confined to approved roads and staked and flagged or marked work areas.

CM 9. Use Native Species for Revegetation of Temporary Disturbance Areas

During construction, CVWD will revegetate temporarily disturbed areas where necessary for erosion control, prevention of the spread of weeds, or mitigation of visual impacts. Only native species appropriate for the area and habitat type shall be used. Non-native species will not be planted. Within appropriate habitat, native plants that provide foraging opportunities for CoachellaValley fringe-toed lizard and desert tortoise shall be included in seed mixes, as determined by a Qualified Biologist.

CVWD will coordinate with CVNWR on all restoration activities within CVNWR lands to ensure that the restoration activities align with NWRS guidelines and management objectives.

CM 10. Prepare and Implement an Integrated Weed Management Plan

CVWD and the Corps shall prepare and implement an Integrated Weed Management Plan (IWMP) describing the proposed methods of preventing or controlling the spread of non-native plants or new weed infestations. Pre-construction activities (e.g., for geotechnical borings, etc.), construction, equipment or crew mobilization, or ground disturbing activities shall not proceed until the IWMP is completed and implemented. The IWMP will be incorporated into the O&M Plan (CM 17).

For the purposes of the IWMP, "weeds" shall include designated noxious weeds, as well as any other non-native weeds or pest plants identified on the weed lists of the California Department of Food and Agriculture or the California Invasive Plant Council. The IWMP shall be implemented throughout construction and O&M. The IWMP shall includethe information in the following paragraphs:

Background. The background section shall provide an assessment of the Project's potential to spread non-native weeds into new areas or introduce new non-native weeds into the Project site. This section must list non-native and invasive weeds anticipated to occur within the action area, identify threat rankings, and potential consequences of the spread non-native plants. This assessment shall include, but is not limited to, weeds that (1) are rated high or moderate for negative ecological impact in the California Invasive Plant Inventory Database; (2) aid and promote the spread of wildfires such as cheatgrass (Bromus tectorum L.), Sahara mustard (*Brassica tournefortii*), and medusa head (*Euphorbia caput-medusae*); and (3) stabilize sand dunes and fields (such as Sahara mustard). This section shall identify goals for control of each species (e.g., eradication, suppression, or containment) likely to be found within the Project area.

Pre-construction weed inventory. CVWD shall inventory the entire Project site, including all areas subject to ground-disturbing activities. Weed occurrences shall be mapped and described according to density and area covered. The map shall be updated at least once a year during the construction phase.

Pre-construction weed treatment. Weed infestations identified in the pre-construction weed inventory shall be evaluated for Project-related spread. The IWMP shall identify

any infestations to be controlled or eradicated prior to Project construction or weed management requirements (e.g., avoidance of soil transport and site-specific vehicle washing where threat or spread potential is high). Control and monitoring of pre-construction weed treatment sites will follow methods identified in appropriate sections of the IWMP.

Prevention. The IWMP shall specify methods to minimize potential transport of weed seeds onto the Project site or from one section of the Project site to another. The Project site may be divided into "weed zones" based on known or likely invasive weeds on the Project site. The IWMP will specify inspection procedures for construction materials and equipment entering the Project area. All vehicles and construction equipment will be inspected and cleaned at entry points to the Project site, and beforeleaving work sites where weed occurrences must be contained locally. All vehicles and construction equipment shall be cleaned of dirt and mud that could contain weed seeds, roots, or rhizomes.

All vehicles shall be washed off-site when possible. If off-site washing is infeasible, on-sitecleaning stations will be set up at specified locations to clean equipment before it enters the work area. Wash stations shall be located away from native habitat or special-status species occurrences. Wastewater from cleaning stations will not be allowed to run off thecleaning station site. When vehicles and equipment are washed, a daily log shall be kept stating the location, date and time, types of equipment, methods used, and personnel present.

Erosion control materials (e.g., straw wattles, hay bales) must be certified free of weed seeds before they are brought onto the site. The IWMP must prohibit on-site storage or disposal of mulch or green waste that may contain weed material. Mulch or green waste shall be removed from the site in a covered vehicle to prevent seed dispersal and transported to a licensed landfill or composting facility.

The IWMP shall specify guidelines for any soil, sand, gravel, mulch, or fill material to be imported into the Project area, transported from site to site within the Project area, or transported from the Project area to an off-site location to prevent the introduction or spread of weeds to or from the Project area.

Monitoring. The IWMP shall specify methods to survey for weeds during construction and O&M and shall specify qualifications of botanists responsible for weed monitoring and identification. The plan must include a monitoring schedule to ensure timely detection and immediate control of weed infestations to prevent further spread. Surveying and monitoring for weed infestations shall occur at least two times per year to coincide with the early detection period for early season and late season weeds (i.e., species germinating in winter and flowering in late winter or spring, and species germinating later in the season and flowering in summer or fall). It also must include methods for marking invasive weeds on the Project site and recording and communicating these locations to staff. The monitoring section shall also describe methods for post-eradication monitoring to evaluate success of control efforts and any need for follow-up control.

Control. The IWMP must specify manual and chemical weed control methods to be employed. The IWMP shall include only weed control measures with a demonstrated record of success for target weeds based on the best available information. The plan shall describe methods for scheduling and implementing control activities when any weed infestation is located to ensure effective and timely weed control. Weed infestations must be controlled or eradicated as soon as possible upon discovery, and before they go to seed to prevent further spread. All proposed weed control methods must minimize the extent of any disturbance to native vegetation, limit ingress and egress to defined routes, and avoid damage from herbicide use or other control methods to any ESAs identified within or adjacent to the Project site.

Weed infestations shall be treated at a minimum of once annually until eradication, suppression, or containment goals are met. For eradication, when no new seedlings or resprouts are observed for three consecutive, normal rainfall years, the weed occurrence can be considered eradicated and weed control efforts may cease for the site.

Manual control shall specify well-timed removal of weeds or their seed heads with hand tools; seed heads and plants must be disposed of in accordance with guidelines from the Riverside County Agricultural Commissioner if such guidelines are available.

The chemical control section must include specific and detailed plans for any herbicide use. It must indicate where herbicides will be used, which herbicides will be used and specify techniques to be used to avoid drift or residual toxicity to native vegetation or special-status plants and wildlife. Only state-approved herbicides may be used. Herbicide treatment will be implemented by a Licensed Qualified Applicator. Herbicides shall not be applied during or within 72 hours of predicted rain. Only water-safe herbicides shall be used in riparian areas or within channels (engineered or not) where they could run off into downstream areas.

Herbicides shall not be applied when wind velocities exceed 6 miles per hour. All herbicide applications will follow U.S. Environmental Protection Agency label instructions and be in accordance with federal, state, and local laws and regulations.

Reporting schedule and contents. The IWMP shall specify a reporting schedule and contents of each report that shall be prepared by CVWD to document weed control efforts.

CM 11. Minimize and Mitigate Impacts to Special-status Plants

At least one Qualified Biologist approved by the Corps and Service (CM 4) shall be present to oversee and conduct the following activities for Coachella Valley milk-vetch**.**

Pre-construction surveys. CVWD shall conduct focused pre-construction surveys for federal and state listed and other special-status plants. All special-status plant species (including listed threatened or endangered species, CVMSHCP covered species, and species of concern) impacted by Project activities shall be documented in pre-construction survey reports. Surveys shall be conducted during the appropriate season in all suitable habitat located within the Project areas and within 200 feet of disturbance

areas. Surveys shall be conducted by a qualified botanist. The field surveys and reporting must conform to current CDFW botanical field survey protocol or more recent updates, if available. The results will be submitted to the Service within 30 days of completing the surveys. The reports shall describe any conditions that may have prevented target species from being located or identified, even if they are present as dormant seed or below-ground rootstock (e.g., poor rainfall, recent grazing, or wildfire). In some cases, follow-up surveys may be necessary to adequately evaluate impacts. Pre-construction field survey reports shall include maps showing locations of survey areas and special-status plants.

Mitigation. CVWD shall mitigate impacts to any state or federally listed plants or California Rare Plant Ranks 1 or 2 ranked plants on federal lands or species that are not covered by the CVMSHCP that may be located on the Project disturbance areas where effects to soils, vegetation, or sand transport could affect special-status plants through one or a combination of the following strategies:

Avoidance. Where feasible, Project work areas shall be located to avoid or minimize impacts to special-status plants. Effective avoidance through Project design shall include a buffer area surrounding each avoided occurrence, where Project activities will not occur. The buffer area shall be clearly staked, flagged, and signed for avoidance prior to ground disturbance and maintained throughout the construction phase. The buffer zone shall be of sufficient size to prevent disturbance to plants from construction activities, erosion, inundation, or dust. The size of the buffer will depend upon the proposed use of the immediately adjacent lands and the plant's ecological requirements (e.g., sunlight, moisture, shade tolerance, water availability, edaphic physical and chemical characteristics) to be specified by a Qualified Biologist or botanist. At minimum, the buffer for tree or shrub species shall be equal to twice the drip line (i.e., two times the distance from the trunk to the canopy edge) to protect and preserve root systems. The buffer for herbaceous species shall be a minimum of 50 feet from the perimeter of the occupied habitat or the individual. If a smaller buffer is necessary due to other Project constraints, CVWD and the Corps shall develop and implement site-specific monitoring and implement other measures to avoid the take of the species if possible, in coordination with the Service and CDFW.

Avoidance of special-status plants is the preferred strategy wherever feasible. Where avoidance is not feasible, and the Project would directly or indirectly affect more than 10 percent of a local occurrence on federal lands or to non-covered species, by either number of plants or extent of occupied habitat, CVWD shall prepare and implement a mitigation plan to consist of off-site compensation, salvage or horticultural propagation, and off-site introduction.

Off-site compensation. CVWD shall provide compensation lands for impacts to federal lands or for non-covered species consisting of habitat occupied by the impacted special-status plants at a 1:1 ratio of acreage and number of plants for any occupied habitat affected by the Project. Occupied habitat will be calculated on the Project site and compensation lands as including each special-status plant occurrence and a surrounding 100-foot buffer area. Off-site compensation shall be incorporated into the Project's

Habitat Compensation Plan (CM 16). Compensation acreage for special-status plants may be included as "nested" or "layered" within the 550-acre floodway and designated to offset other impacts such as habitat loss for special-status wildlife if the floodway provides similar ecological value and function as the impacted habitat.

Monitoring. Annual monitoring and documentation of salvaged plants shall include, but not be limited to, details of plants salvaged, stored, and transplanted (salvage and transplanting locations, species, number, size, condition, etc.); adaptive management efforts implemented (date, location, type of treatment, results, etc.); and evaluation of success of transplantation.

Horticultural propagation and off-site introduction. If salvage and translocation is not believed to be feasible for special-status plants, then CVWD shall consult with Rancho Santa Ana Botanic Garden, or another qualified entity, to develop an appropriate experimental propagation and translocation strategy based on the life history of the species affected. The Habitat Compensation Plan shall include at minimum: (a) collection and salvage measures for plant materials (e.g., cuttings), seed, or seed banks, to maximize success likelihood; (b) details regarding storage of plant, plant materials, or seed banks; (c) location of the proposed propagation facility, and proposed methods; (d); time of year that the salvage and other practices will occur (e) success criteria; and (f) a detailed monitoring program, commensurate with the Habitat Compensation Plan's goals.

CM 12. Ensure Wildlife Impact Avoidance and Minimization and Prepare a Wildlife Protection and Translocation Plan.

CVWD shall implement the following measures during the construction and O&M phases of the Project to avoid or minimize impacts to wildlife resources. A Wildlife Protection and Translocation Plan (WPTP) will be prepared to provide guidance and protocols when avoiding or handling sensitive species that are located within the proposed Project area. The following section summarizes some of the guidelines to be included within the WPTP. The WPTP will be prepared in coordination with representatives from the different Conservation Areas.

Minimize traffic impacts. CVWD shall specify and enforce a maximum 15-mile per hour vehicle speed limit on access roads within the Project area and vicinity, not including publicroadways. Scrapers may need to operate at higher speeds while excavating soils. No Project-related pedestrian or vehicle traffic shall be permitted outside defined work site boundaries as marked on the site according to CM 8.

Minimize impacts to nocturnal wildlife. CVWD shall restrict work to daylight hours, as feasible, to avoid nighttime activities that may impact nocturnal species. Exceptions may be made during the application of slurry or concrete during periods of high heat. Night lighting, if and when used, shall be designed, installed, and maintainedto prevent side casting of light towards surrounding habitat.

Avoid use of toxic substances. Soil bonding and weighting agents used for dust suppression on unpaved surfaces shall be non-toxic to wildlife and plants.

Minimize noise and vibration impacts. To minimize disturbance to wildlife nesting or breeding activities in surrounding habitat, unnecessary noise, and vibration (e.g., blaring radios, etc.) shall be avoided.

Water. Potable and non-potable water sources such as tanks, ponds, and pipes shall be covered or otherwise secured to prevent animals from entering. Prevention methods may include storing all water within closed tanks, covering open storage ponds or tanks with 2-centimeter netting, or other means, as applicable. Waterapplied to dirt roads and construction areas for dust abatement shall use the minimal amount needed to meet safety and air quality standards and avoid puddling. Water sources (e.g., hydrants, tanks, etc.) shall be checked periodically by biological monitors to ensure they are not creating open water sources by leaking or consistently overfilling trucks.

Worker guidelines. All trash and food-related waste shall be contained in vehicles or covered trash containers and removed from the site regularly. Workers shall not feed wildlife or bring pets to the Project site. Except for law enforcement personnel, workers or visitors shall not bring firearms or weapons to the site.

Wildlife netting or exclusion fencing. CVWD may install temporary or permanent netting or fencing around equipment, work areas, or Project facilities to prevent wildlife exposure to hazards such as toxic materials or vehicle strikes or prevent birds from nesting on equipment or facilities. Bird deterrent netting shall be maintained free of large holes and be deployed and secured on the equipment in a manner that, in so far as possible, prevents wildlife from becoming trapped inside the netted area or within the excess netting. The biological monitor shall inspect netting daily. The biological monitor shall inspect exclusion fences weekly and shall inform CVWD of any needed repairs; CVWD shall promptly repair any damage to the exclusion fencing.

Wildlife entrapment. Project-related excavations greater than 6 inches deep shall be secured to prevent wildlife entry and entrapment. Holes and trenches shall be back filled, securely covered, or fenced. Excavations that cannot be fully secured shall incorporate appropriate wildlife ramps at a slope of no more than a 3:1 ratio (horizontal: vertical, equivalent to a 33.3 percent or 18.4-degree slope), or other means to allow trapped animals to escape. Biological monitors shall provide guidance to construction crews to ensure that wildlife ramps or other means are sufficient to allow trapped animals to escape. At the end of each workday, a biological monitor shall document excavations have been secured or provided with appropriate means for wildlife escape.

Project structures that pose a wildlife entrapment hazard and have sides with a slope steeper than 1:1, including but not limited to channels and basins, shall incorporate permanent wildlife ramps into the structure design. Structures with a slope of 1:1 or less steep do not require wildlife ramps. For structures that require wildlife ramps, at least one ramp shall be provided for each channel, basin, or other structure. Channels shall have one or more ramps for every half-mile of contiguous channel length. Basins or similar structures shall have one or more ramps for every one-half acre of area. A biologist shall review the wildlife ramp design prior to implementation to ensure that it is sufficient to

allow trapped animals to escape. Wildlife ramps installed in permanent structures shall be maintained during the O&M phase to ensure continued functionality.

All pipes or other construction materials or supplies shall be covered or capped in storage or laydown areas. No pipes or tubing shall be left open either temporarily or permanently, except during use or installation. Any construction pipe, culvert, or other hollow materials shall be inspected for wildlife before it is moved, buried, or capped.

Dead animals. Dead animals of non-special-status species found on Project roads or work areas shall be reported to the appropriate local animal control agency within 24 hours. A biological monitor shall safely move the carcass out of the road or work area as needed. Dead animals of special-status species found on Project roads or work areas shall be reported to CDFW within 1 workday and the carcass handled as directed by CDFW.

Injured wildlife. CVWD shall create and implement guidelines for dealing with injured or entrapped wildlife found on or near the Project area, whether or not the injuries are Project-related, and provide these guidelines to all biological monitors. CVWD shall ensure that one or more Qualified Biologists receive training in the safe and proper handling and transport of injured wildlife and are provided with the appropriate equipment. These trained and equipped monitors shall be available to capture and transport injured wildlife to a local wildlife rehabilitator or veterinarian as needed. If an animal is entrapped, a Qualified Biologist shall free the animal if feasible, or work with construction crews to free the animal, in compliance with applicable safety regulations and Project requirements. If biological monitors cannot free the animal or the animal is too large or dangerous for monitors to handle, CVWD shall contact and work with a local wildlife rehabilitator, animal control, CDFW, or other qualified party to obtain assistance for the animal as soon as possible. CVWD shall bear the costs of veterinary treatment and rehabilitation for any injured wildlife found on or near Project areas and any wildlife injured by Project activities. Additionally, any entrapped or injured special-status species found in Project areas shall be reported to the appropriate agency within 1 workday.

Sidewinders, rattlesnakes, and other snake guidelines: Prior to the start of construction, CVWD shall prepare and implement guidelines within the WPTP for handling sidewinders, rattlesnakes, or other snakes found in or near Project areas and provide these guidelines to all biological monitors, safety staff, and other personnel. Killing or harming rattlesnakes or other wildlife is not authorized. In the WPTP, CVWD will coordinate with CVNWR to develop protocol aligned with any NWRS guidelines for handling or translocation wildlife while working within CVNWR lands.

CM 13. Conduct Coachella Valley Fringe-toed Lizard Surveys, Monitoring, and Avoidance

This measure will be applied to pre-construction, construction, and O&M phases of the proposed Project. Surveys for Coachella Valley fringe-toed lizard shall be conducted during the appropriate seasons (May 1 through the end of summer) and conditions. The duration of the surveys shall coincide with the duration of construction activities in potential habitat for the species during the summer season. Surveys shall be conducted in appropriate habitat in all Project disturbance areas and within 500 feet of these areas on

federal lands, and as required by CM 6. Results of the surveys shall be submitted to the Service within 30 days of completion.

Biological monitoring will occur as specified in CM 5. The monitor shall be a Qualified Biologist with the appropriate experience, permits, and approval to handle Coachella Valley fringe-toed lizard (CM 4).

In areas of high habitat suitability, CVWD will install appropriate exclusionary fencing that effectively does not allow fringe-toed lizards to enter work areas if required by the Service. The fence or barrier will be maintained as needed to ensure its effectiveness. Any lizards found within the barrier will be relocated short distances to suitable habitat outside of the work areas by the Qualified Biologist according to the approved Relocation Plan. The Relocation Plan will include detailed protocol for clearance surveys, appropriate exclusion barrier options and installation, handling criteria, and release site selection, monitoring and reporting requirements, and other pertinent information.

To the extent feasible, all construction activities within suitable habitat will be conducted during the active season between April 1 and October 31. Construction activities in suitable habitat may be extended beyond the active season in coordination with the Service.

CM 14. Conduct Desert Tortoise Monitoring and Avoidance

CVWD will assign a Designated Desert Tortoise Biologist also approved as an Authorized Biologist/Acceptable Biologist for desert tortoise (CM 4) to oversee Project activities and ensure that no take of desert tortoises will occur.

Within suitable habitat for desert tortoise, a Designated Desert Tortoise Biologist shall survey the Project area for desert tortoise burrows and sign within 5 days preceding construction activities for the Project. Follow-up surveys shall also be conducted within 14 days preceding additional construction after a gap in significant construction activities of 60 calendar days or more. Surveys shall include 100 percent of the area and a surrounding buffer of 200 feet.

The Designated Desert Tortoise Biologist will be available to accompany each work crew to ensure that any desert tortoises, burrows, and habitat potentially encountered are not disturbed during these activities to the greatest extent possible. The Designated Desert Tortoise Biologist will have the authority to halt work activities. If a desert tortoise is found in a work area, the desert tortoise shall be allowed to passively traverse the site while construction in the immediate area is halted. If a live desert tortoise is in imminent danger of harm, and a Designated Desert Tortoise Biologist is not readily available, a crew member will notify the Designated Desert Tortoise Biologist.

Project personnel shall inspect for desert tortoises under parked vehicles or equipment prior to moving same (CM 7 and CM 12). If a desert tortoise is found beneath a vehicle or equipment, the vehicle or equipment shall not be moved or started until the desert tortoise has moved on its own accord to a safe distance away.

CM 15. Raven Monitoring, Management, and Reporting Plan

In coordination with the Corps, Service, and CDFW, CVWD shall prepare and implement a Raven Monitoring, Management, and Reporting Plan (Raven Plan). The purpose of the Raven Plan shall be to minimize Project-related predator subsidies and prevent increases in raven numbers or activity within desert tortoise habitat during construction and O&M phases. The Plan shall address all Project components and their potential effects on raven numbers and activity. If monitoring leads to any documented raven predation on desert tortoises, based on occurrence of desert tortoise remains beneath active raven nests in or adjacent to the Project site, CVWD will report that information to the Service immediately. CVWD will not implement raven control (i.e., destroy ravens or their nests). Regardless of raven monitoring results, CVWD shall be responsible for all other aspects of raven management described in the Raven Plan, such as avoidance and minimization of Project-related trash, water sources, or perch/roost/nest sites that could contribute to increased raven numbers. In addition, CVWD shall contribute to the Service Regional Raven Management Program to offset the cumulative contributions of the Project to desert tortoise impacts from increased raven numbers. CVWD shall:

1. **Prepare and Implement a Raven Monitoring, Management, and Reporting Plan** that shall include, but not be limited to, the following components. The Plan shall be reviewed and approved by the Service and CDFW prior to the start of construction activities.

    a. Identify all potential Project activities, structures, components, and other effects that could provide predator subsidies or attractants, including potential sources of food and water, and nesting materials, as well as nest or perch sites. These will include but will not be limited to waste food material, road-killed animals, water storage, potential pooling from leaks, dust control, or wastewater, debris from brush clearing, and perch or roost sites on Project facilities.
    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities.
    c. Appoint a Qualified Biologist and specify a program including monitoring schedule, field methods, and reporting procedure to monitor raven presence in the Project vicinity and detect any evidence of raven predation on desert tortoises.

2. **Contribute to the Service Regional Raven Management Program.** No later than 30 days prior to the start of construction, CVWD shall contribute to the Service Regional Raven Management Program by making a one-time payment of $105 per acre of long-term or permanent Project disturbance to the national Fish and Wildlife Federation Renewable Energy Action Team raven control account.

CM 16. Compensate for Habitat Loss

The CVWD will acquire and protect approximately 550 acres of floodway lands as habitat for special-status plants and wildlife, located within theThousand Palms Conservation

Area. The floodway lands will be transferred to the CVCC for conservation and management under the CVMSHCP in support of the goals and objectives of the CVMSHCP. CVWD will ensure acquisition and protection of approximately 32 acres of aeolian sand habitat that contribute to the recovery of Coachella Valley fringe- toed lizard and suitable for other aeolian sand dependent species. Additionally, CVWD will acquire 24.9 acres of land within CVNWR's approved acquisition boundary to offset the impacts to NWRS lands (see Figure 5). Acquired lands are required to be of equal or greater acreage than those disturbed due to construction and be comprised of ecologically equivalent habitat to support sensitive species. Four parcels totaling 24.9 acres have been preliminarily identified as appropriate acquisition parcels. CVWD will coordinate with NWRS staff to finalize timelines, approval, acquisition, ownership transfers, and any other realty needs to fulfill all relevant NWRS-specific land acquisition requirements. Habitat compensation will be accomplished by acquisition of mitigation land or conservation easements or by providing funding for specific land acquisition, endowment, restoration, and management actions.

CVWD shall be responsible for the acquisition, initial protection, and habitat improvement of compensation lands. Alternatively, CVWD may provide funding to Coachella Valley Association of Governments (CVAG) for the acquisition of mitigation lands. The compensation lands will be placed under conservation management to be funded through the terms described herein. The requirements of this mitigation measure shall be fully accomplished within 5 years from the completion of Project construction or as otherwise agreed upon by the Service, CVWD, Corps, and CVAG.

Compensation Land Selection Criteria. Criteria for the acquisition, initial protection and habitat improvement, and long-term maintenance and management of compensation lands for impacts to biological resources shall include all of the following:

1. Compensation lands shall provide habitat value that is equal to or better than the quality and function of the habitat impacted by the Project, taking into consideration soils, vegetation, topography, human-related disturbance, wildlife movement opportunity, proximity to other protected lands, management feasibility, sand source and sand transport, and other habitat values;

2. To the extent that proposed compensation habitat may have been degraded by previous uses or activities, the site quality and nature of degradation must support the expectation that it will regenerate naturally when disturbances are removed;

3. Be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency, or a non-governmental organization dedicated to habitat preservation;

4. Not have a history of intensive recreational use or other disturbance that might cause future erosion or other habitat damage, and make habitat recovery and restoration infeasible;

5. Invasive species that might jeopardize habitat recovery and restoration, either on or immediately adjacent to the parcels under consideration, must not occur at higher density than found on the lands affected directly and indirectly by the proposed Project;

6. Not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat;

7. Must provide wildlife movement value equal to that on the Project site, based on topography, presence and nature of movement barriers or crossing points, location inrelationship to other habitat areas, management feasibility, and other habitat values; and

8. Have water and mineral rights included as part of the acquisition, unless CDFW and the Service agree in writing to the acceptability of land without these rights.

CM 17. Prepare and Implement an Operations and Maintenance Plan

This conservation measure shall apply to the O&M phase of the Project for private and federal lands. CVWD, in coordination with the Corps, shall implement the existing Operations and Maintenance Plan (O&M Plan) or create a new O&M Plan and submit to the Service and CDFW for review prior to construction activities. As described in the CVMSHCP/NCCP (page 7-29), the O&M Plan will minimize impacts to CVMSHCP/NCCP covered species and natural communities and protect non-covered special status species. Additionally, the O&M Plan will also minimize impacts to species and native habitat that are not covered by the CVMSHCP/NCCP, including sand habitat.

The O&M Plan shall include, but is not limited to:

1. **Pre-maintenance biological surveys and monitoring.** The O&M Plan shall specify the types of O&M activities (e.g., clearing of accumulated sand, deposition of sand, vegetation clearing, etc.) requiring pre-maintenance biological surveys. Depending on the results of the survey, biological monitoring during the O&M activity may be required to avoid or minimize impacts to special-status species and habitat.

2. **Minimize impacts.** The O&M Plan shall incorporate CM 8 through CM 11.

3. **Weed control.** The O&M Plan shall incorporate the Integrated Weed Management Plan (CM 10).

4. **Nesting birds.** The O&M Plan shall incorporate a Nesting Bird Management Plan

5. **Restrict OHV access.** The O&M Plan shall include methods to restrict unauthorized use of the Project facilities, with emphasis on restricting OHV access, to avoid and minimizeimpacts to special-status species and sensitive habitats, including sand habitats. Any OHV restrictions (e.g., fencing) will be

designed to minimize OHV access while maintaining biological connectivity and wildlife movement and sand transport.

CM 18. Adaptive Management Plan

The Applicant will coordinate with CVNWR and other resource agencies to develop an Adaptive Management Plan that maximizes the Project's contribution to aeolian sand transport into the Preserve. The plan will address roles and responsibilities, protocols for continued monitoring of habitat, and other relevant parameters during the life of the Project. CVWD will meet with the Corps and Service to assess habitat quality and ecological processes within the Preserve to determine if any changes to operation and maintenance activities are needed.

Action Area

Regulations implementing the Act (50 CFR § 402.02) describe the action area as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For the purposes of this consultation, we consider the action area to be an approximately 11,966-acre area that includes portions of Thousand Palms community and the following Project components (Figure 2):

1. The Project footprint defined as all Project components associated with construction and O&M of the flood control system, including:

    a. Four proposed flood control structures;

    b. A 551-acre floodway acquisition;

    c. The Avenue 38 realignment;

    d. Two existing conveyance systems at the Classic Club Golf Course and Del Webb/Sun City residential development, and an additional conveyance system constructed at Washington Street;

    e. An existing sand deposition site within Coachella Valley National Wildlife Refuge (CVNWR); and

    f. Temporary work areas including a staging area, cement plant site, and temporary sand deposition site.

2. The Study Area defined as the Project footprint and a surrounding 500-foot buffer for Coachella Valley fringe-toed lizard surveys and 200-foot buffer for other species surveys;

3. Unit 4 of designated critical habitat for Coachella Valley milk-vetch;

4. The Indio Hills/Whitewater River sand source area north of Ramon Road and the occupied habitat south of Ramon Road within designated critical habitat for Coachella Valley fringe-toed lizard Figure 3); and

5. Habitats associated with the Thousand Palms sand transport system, including species-occupied aeolian habitats, the Thousand Palms wind corridor, and sand transport areas supporting fluvial and aeolian processes located within the Coachella Valley Preserve (Figure 4).

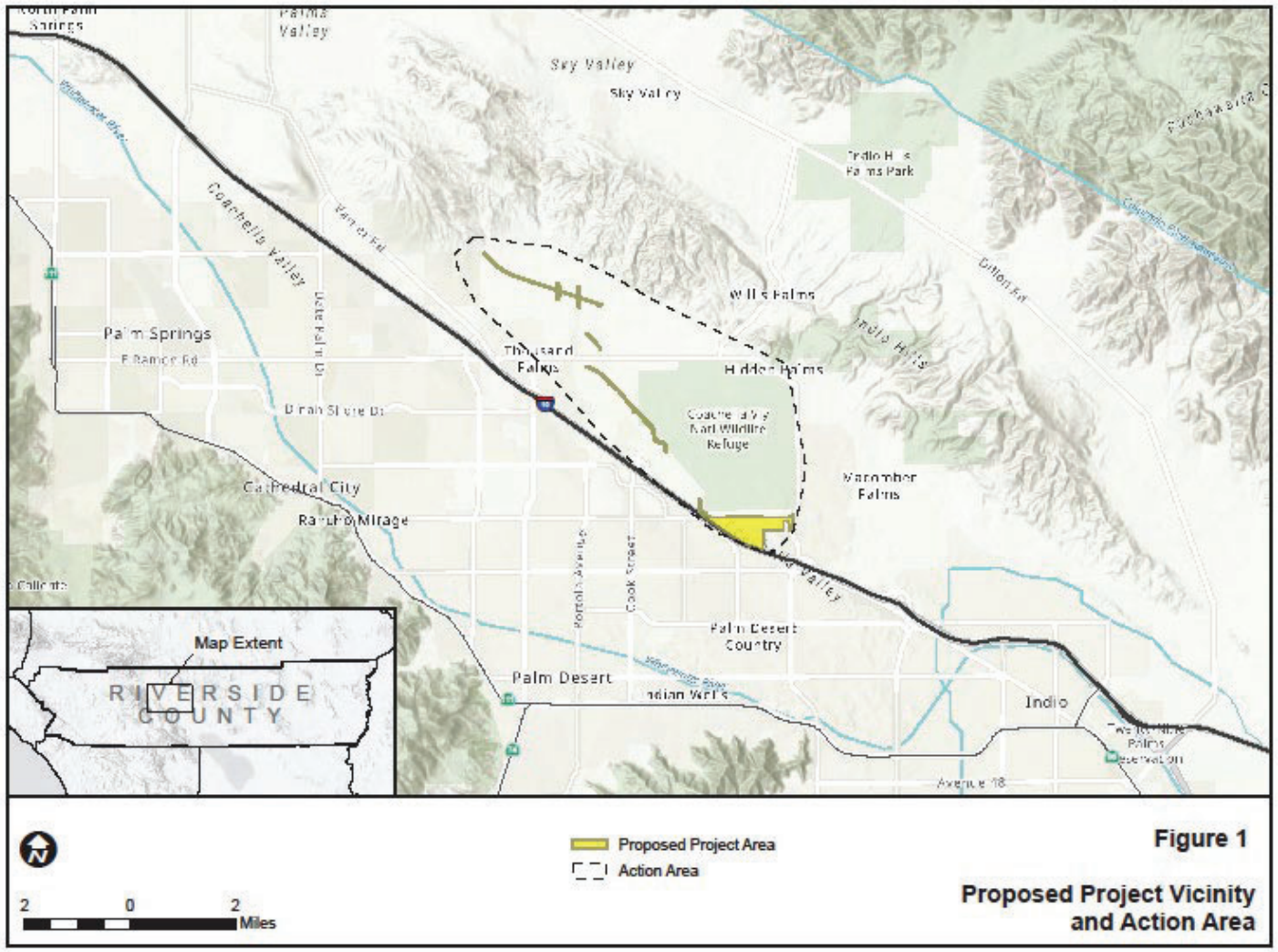

Figure 2: Thousand Palms Flood Control - Action Area (Aspen 2021).

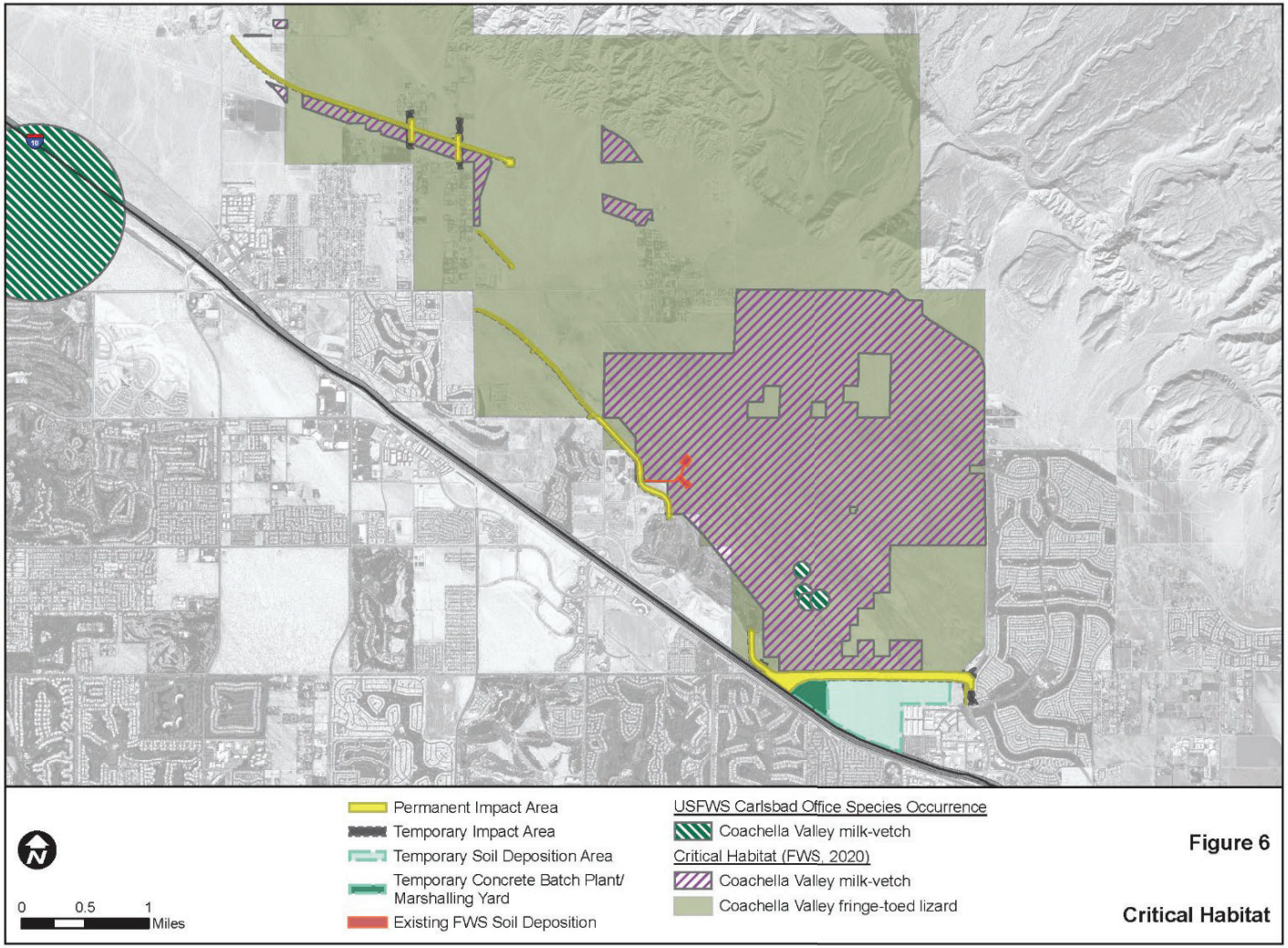

Figure 3: Designated Critical Habitat within Project Area (Aspen 2021).

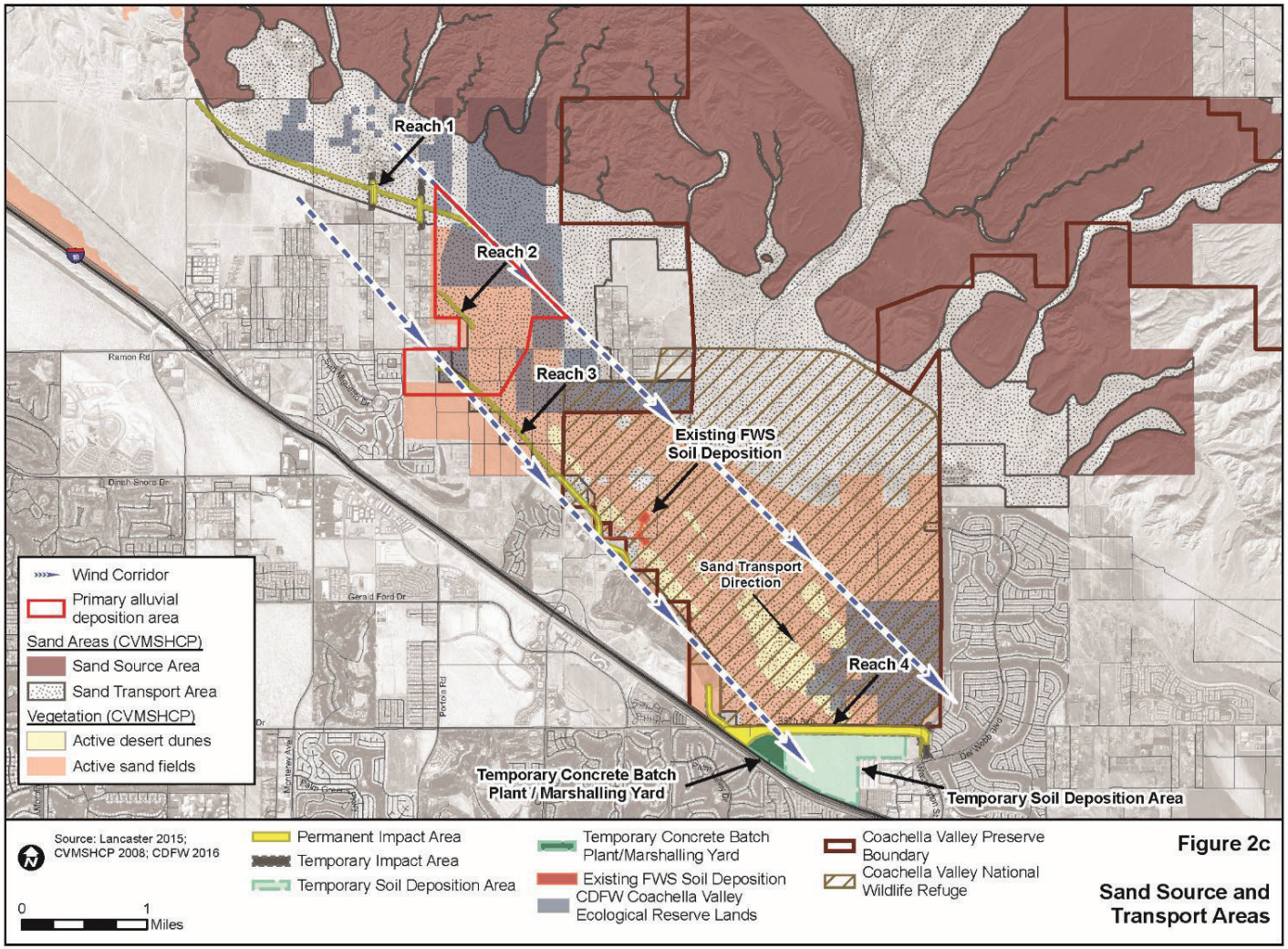

Figure 4: Thousand Palms Sand Transport System (Aspen 2021).

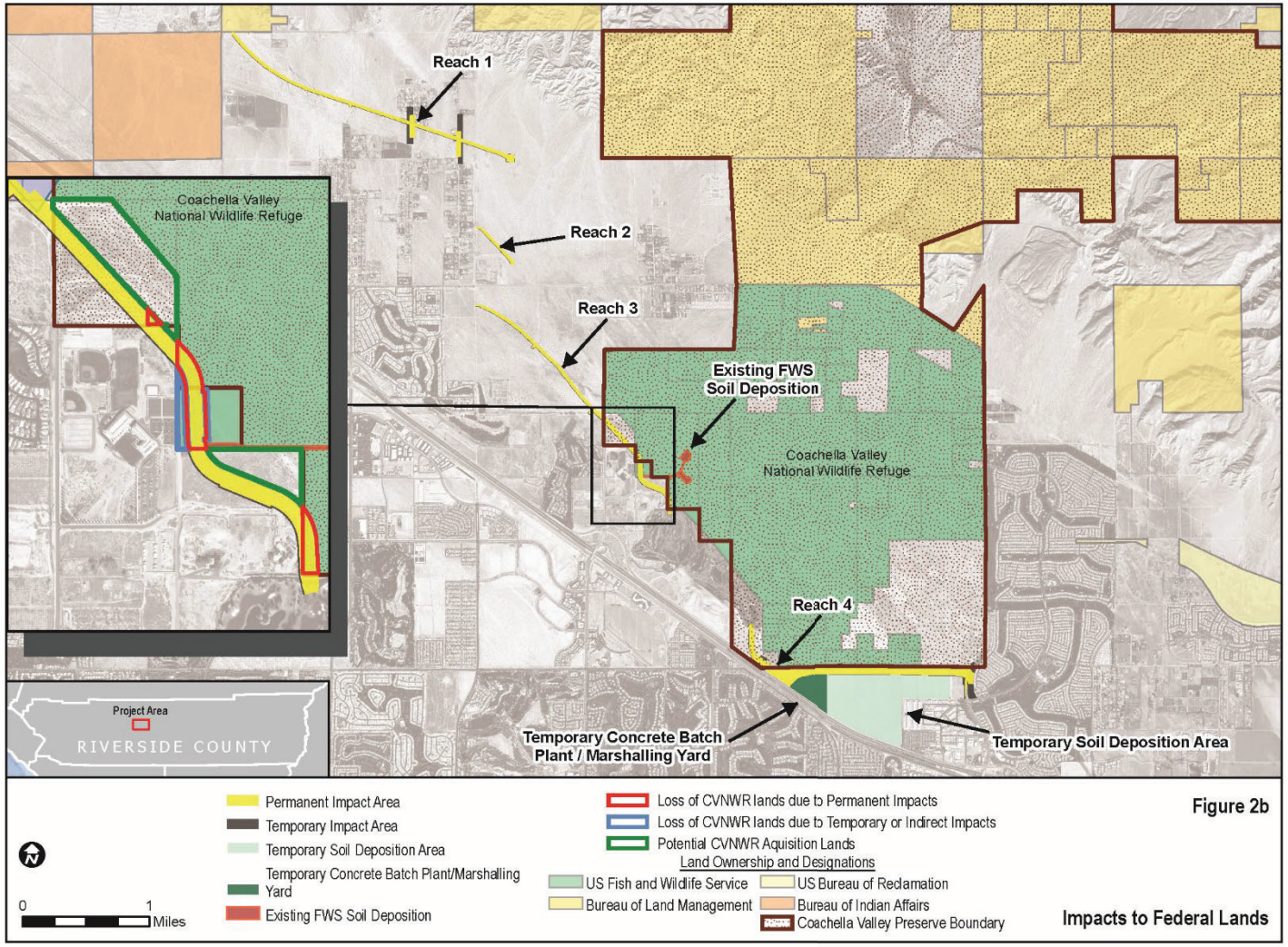

Figure 5: Impacts to Federal Lands (Aspen 2021).

ANALYTICAL FRAMEWORK FOR THE SECTION 7(A)(2) DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the Effects of the Action, which are all consequences to listed species caused by the proposed action that are reasonably certain to occur; and (4) the Cumulative Effects, which evaluate the effects of future, non-Federal activities in the action area on the species.

For the section 7(a)(2) determination regarding jeopardizing the continued existence of the species, the Service begins by evaluating the effects of the proposed Federal action and the cumulative effects. The Service then examines those effects against the current status of the species to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the species in the wild.

Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. "Destruction or adverse modification" of critical habitat means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species (50 CFR § 402.02).

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: (1) the status of critical habitat, which describes the condition of all designated critical habitat in terms of its physical and biological features, the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the environmental baseline, which analyzes the condition of the designated critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the effects of the action, which analyze all consequences to critical habitat caused by the proposed action that are reasonably certain to occur and their influence on the recovery role of the affected designated critical habitat units; and (4) cumulative effects, which evaluate the effects of future non-Federal activities in the action area on the physical and biological features of critical habitat and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the designated critical habitat are evaluated in the context of the condition of all designated critical habitat, taking into account any cumulative effects, to determine if the consequences of the proposed action are likely to appreciably reduce the value of critical habitat as a whole for the conservation of the species.

STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

Coachella Valley Milk-vetch

The Coachella Valley milk-vetch was listed as endangered on October 6, 1998, and critical habitat was designated on February 13, 2013. Please refer to our 5-year review for Coachella Valley milk-vetch (Service 2009a) and the final listing rule (Service 1998; 63 FR 53596) for a detailed discussion on the taxonomic history and description of this taxon. Coachella Valley milk-vetch and its critical habitat were afforded protection under the Act in recognition of the plant's imperiled status from habitat losses caused by urban development and human modifications to the sand transport system that maintains the unique ecosystem the species relies upon. Please refer to the final critical habitat rule (Service 2013a; 78 FR 10450) for a description of the species' sand-dependent habitat. No recovery plan has been completed for Coachella Valley milk-vetch.

Reproduction

The date of first flowering for milk-vetch may be as early as December and continues into May, though most flowering occurs in March and April (Service 2009a). The first date of fruit may be as early as February. At maturity, seed pods dry and fall to the ground, where they are dispersed by wind. As such, wind transport corridors between populations facilitate gene flow and population growth. While Coachella Valley milk-vetch is capable of self-pollination through offshoots, seed production is highly dependent on pollinators (Service 2009a). Pollinators may include bees in the family Megachilidae and the western honeybee (*Apis mellifera*) (Service 2009a). Annual variations in precipitation substantially affect the number of Coachella Valley milk-vetch seeds that may germinate and mature into standing plants that successfully reproduce (Service 2008a). Likewise, in perennial individuals that may reproduce via self-pollination, the capacity for dormant root crowns to sprout new shoots is substantially dependent on levels of annual winter rains.

Numbers

Overall, the number of above-ground Coachella Valley milk-vetch plants varies widely from year to year, depending on the environmental conditions, making assessments of total individual numbers difficult. Additionally, detecting changes in population trends over time is difficult because the number of seeds in a given area that germinate and produce standing plants can vary widely depending on environmental conditions. Therefore, the number of standing plants at any given time is only a partial indication of population size because the other portion of the population is the seed bank in the substrate that can persist dormant for a number of years (Service 2009a). Abundance may be correlated with sufficient rainfall to germinate seeds and active sand movement to scarify seeds. These conditions are characteristic of active sand dunes

and ephemeral sand fields, which support the highest densities of Coachella Valley milk-vetch (UCR 2020a).

Numbers also vary by location, with higher numbers found on the ephemeral sand fields within the Whitewater Floodplain Conservation Area south of the Union Pacific railroad and between Indian Canyon Road and Gene Autry Trail, and just west of Windy Point (UCR 2020b). Fewer numbers of plants occur farther east on the CVMSHCP Thousand Palms Conservation Area, possibly due to finer sand particles and/or reduced average rainfall (UCR 2020b). At habitats with reduced sand movement, including stabilized sand fields and mesquite dunes, this species is much rarer and less predictable in its occurrence (UCR 2022).

Distribution

The Coachella Valley milk-vetch is restricted to active sand dunes, ephemeral sand fields, stabilized sand fields, and mesquite dunes in the Coachella Valley between Cabazon and Indio. At the time of listing, the distribution was effectively the same as the known historical distribution. However, a large percentage of the sand dune system that was once contiguous through the Coachella Valley has been converted to urban land uses, which has fragmented the sand habitats and compromised the ecosystem processes of sand transport that sustain these habitats (UCR 2022).

Recovery

No approved final or draft recovery plan exists for the Coachella Valley milk-vetch. However, the conservation goals for the species outlined in the CVMSHCP (CVAG 2007a), which encompasses most of the species' range, are relevant for identifying recovery goals, including permanent protection and management of known populations that will continue to contribute to the recovery and conservation of Coachella Valley milk-vetch.

Synopsis

The Coachella Valley milk-vetch is currently persisting in the Coachella Valley, but population estimates or trends are difficult to quantify because of the year-to-year variation in numbers of above-ground plants. Increased urbanization has reduced available habitat and compromised the sand transport system resulting in a reduction of available habitat. Conservation goals in the CVMSHCP include conservation of about 53 percent of modeled habitat for this taxon in the Conservation Areas and protection of essential ecological processes (sand source/transport and hydrological systems), which will increase the amount of conserved habitat and reduce threats from urbanization and alteration of sand transport systems range wide. Additionally, the CVMSHCP includes implementation of avoidance, minimization, and mitigation measures, and management and monitoring programs on non-Federal lands, which will help ensure the persistence of Coachella Valley milk-vetch within suitable habitat areas.

Designated Critical Habitat for Coachella Valley Milk-vetch

The Service designated approximately 9,603 acres as critical habitat for the Coachella Valley milk-vetch on August 13, 2013. In the final rule, we described the principal biological or

physical features that are essential to the conservation of the species; these include sand formations associated with the sand transport system in Coachella Valley (Service 2013b). These sand formations have the following features:

1. Unconsolidated sands stored within rivers and tributaries in the San Bernardino, Little San Bernardino, and San Jacinto Mountains and Indio Hills. The unconsolidated sands stored in these rivers and tributaries are not occupied by Coachella Valley milk-vetch but represent the original source of the loose sand that forms the sand dunes and flats that are occupied by this plant.

2. Unconsolidated sands deposited on the alluvial fans of the San Bernardino, Little San Bernardino, and San Jacinto Mountains and Indio Hills. The unconsolidated sands deposited on these alluvial fans are not occupied by Coachella Valley milk-vetch; instead, these sands are transported by wind and water to form the fluvial and aeolian sand dunes and flats that are occupied by this plant.

3. Suitable flooding regimes to transport unconsolidated sands from rivers and tributaries to the alluvial fans of the San Bernardino, Little San Bernardino, and San Jacinto Mountains and Indio Hills.

4. Suitable wind and flooding regimes to transport unconsolidated sands deposited on the alluvial fans of the San Bernardino, Little San Bernardino, and San Jacinto Mountains and Indio Hills to the fluvial and aeolian depositional areas, including areas west of Edom Hill/Willow Hole reserve, areas west of Coachella Valley Preserve, and the Whitewater Floodplain area that are occupied by Coachella Valley milk-vetch.

5. Aeolian sands on active, stabilized, and shielded sand dunes or fields, and sandy alluvial sites in washes within the San Gorgonio/Whitewater River aeolian sand transport system, Mission Creek/Morongo Wash aeolian sand transport system, and the Thousand Palms aeolian sand transport system that are occupied by Coachella Valley milk-vetch.

Critical habitat was designated in the following four units: Unit 1 – San Gorgonio River/Snow Creek System (1,335 acres), Unit 2 – Whitewater River System (2,150 acres), Unit 3 – Upper Mission Creek/Morongo Wash System (2,266 acres), and Unit 4 – Thousand Palms System (3,851 acres). For detailed information on the designated critical habitat for Coachella Valley milk-vetch, refer to the final rule (Service 2013b).

Coachella Valley Fringe-toed Lizard

The Coachella Valley fringe-toed lizard was listed as endangered on September 25, 1980, due to loss and degradation of suitable sand habitats from urban development and agricultural activities (Service 1980; 45 FR 63812). Critical habitat was designated concurrently with the listing. The State of California also listed the Coachella Valley fringe-toed lizard as threatened in 1980. For more information on the species' listing and critical habitat status, species description, habitat affinities, and life history, please refer to our 5-year review (Service 2010a).

Additionally, the 5-year review (Service 2010a) identified threats throughout the species range, including urban development, nonnative invasive plant species, obstructions to sand transport

systems, and OHVs. New threats were also identified, including small population size, alteration of hydrology, and climate change (Service 2010a). A recent study that synthesized long-term monitoring data to assess the status of fringe-toed lizards concluded Sahara mustard to be a primary threat to lizard populations within the action area, particularly Thousand Palms aeolian habitat (Barrows and Heacox 2021).

Reproduction

Reproduction occurs in the spring (typically beginning in March), shortly after adults emerge from winter dormancy, and extends through mid-August. Courtship lasts until the end of May (Service 2008b). A few weeks after mating, females dig burrows and deposit two to four eggs that hatch between June and early October (Thelander 1994). Sexual maturity is reached after 2 trends years and life expectancy is about 5 years (TNC 1985).

Numbers

Despite almost 20 years of monitoring by various parties, range wide population abundance for the species within established CVMSHCP Conservation Areas remain largely unknown. However, reliable estimates and trends of population abundance within survey plots are known, and those numbers fluctuate widely based on annual precipitation. For example, during droughts, individual lizard numbers within the Thousand Palms Conservation Area dropped to levels near zero but rebounded during periods of average rainfall (Barrows 2006, UCR 2020b). The methodology used for surveys did not have the sensitivity to determine densities or census population sizes. More recent surveys indicate a "decoupling" of this precipitation/population dynamic and there is speculation that Sahara mustard (*Brassica tournefortii*) cover, an invasive nonnative annual plant, is emerging as an environmental variable that may inhibit population growth (UCR 2020b). Sahara mustard promotes compaction of active sand dunes, leading to conversion of dunes to more compacted forms of sand habitat (e.g., stabilized sand fields) over time. Mean density of lizards has also been found to vary among types of sand formations within aeolian habitat, and the conversion of sand formations may affect numbers and distribution of lizards (Barrows and Heacox 2021). Data collected within a long-term plot in the Whitewater Floodplain Conservation Area for the past 29 years suggest a downward population trend (Fisher *et al*. 2020). While there are yearly fluctuations of individuals within the plot, the number of lizards detected in the plot have steadily declined from a high of 333 lizards in 1985 to a low of 24 lizards in 2014, with 88 lizards found in 2020 (Fisher *et al*. 2020). Reasons for this decline may be the result of reduced reproductive output due to lower-than-normal precipitation over the last several years (Fisher *et al*. 2020). A decline in lizard numbers can also be attributed to habitat fragmentation (Barrows and Allen 2010) and altered sand transport and fluvial processes (Griffiths *et al*. 2002). Declining numbers of lizards in fragmented populations has resulted in a loss of genetic diversity and connectivity across the range (Vandergast *et al*. 2019).

Distribution

The Coachella Valley fringe-toed lizard is restricted to the Coachella Valley and was found historically from near Cabazon at the northwestern extreme of the Coachella Valley to near Thermal at the southeastern extreme. These lizards are restricted to aeolian sand habitats (e.g.,

sand dunes, ephemeral sand fields, and stabilized shielded sand fields) and have developed morphological and behavioral adaptations to these unique habitats (Service 2010a). About 10 percent of these sand habitats remain in the Coachella Valley (Barrows *et al*. 2008). In our 5-year review, we identified 59 known occurrences of the lizard that were presumed extant (Service 2010a). Of these, 41 occurrences were within Conservation Areas designated under the CVMSHCP. Since publication of our 5-year review, occurrences within the East Indio Hills Conservation Area are no longer detected. This Conservation Area is located on the eastern extent of the current range of the species. If lizards were indeed extirpated from this Conservation Area, it would indicate a reduction in the distribution of the lizard has occurred since the time of listing (Service 1980) and our 5-year review (Service 2010a). The species is currently distributed in seven fragmented populations, which has resulted in a restricted gene flow among these populations (Vandergast *et al*. 2019).

Recovery

The approved recovery plan for the Coachella Valley fringe-toed lizard (Service 1985) does not describe recovery (delisting) criteria but does contain recovery objectives that provide an equivalent function. The primary objective of the recovery plan is to secure two or more protected areas with self-sustaining lizard populations. The best data currently available indicate that long-term survival of at least three or four viable populations with self-sustaining ecosystem processes is necessary for long-term maintenance of many species (Murray *et al*. 1999, Noss *et al*. 2002, Frankham *et al*. 2005). The reserve design of the CVMSHCP is based on this model and there are currently five conservation areas designated that support persistent, but fragmented, populations of this species totaling about 12,998 acres of modeled habitat on non-Federal lands and protection of sand source/transport and hydrological systems (UCR 2020a). Population fragmentation has led to a decline in overall genetic diversity and increasing genetic differentiation among populations over the past 20 years (Vandergast *et al*. 2019). Based on the most recent genetic research, diversity appears to be maintained in some sites, while it has decreased in others, which may be an indication of bottlenecks or sustained small local population sizes and reduced or absent gene flow (Vandergast *et al*. 2019). A key recovery objective for this species is to maintain genetic diversity. However, evidence suggests that fragmentation and increasing drought frequency have altered the genetic cohesiveness of the species, and the genetic diversity maintained in individual fragments is lower than in the total metapopulation (Vandergast *et al*. 2019). This general trend is at odds with the recovery objective intended to maintain genetic diversity.

Synopsis

Coachella Valley fringe-toed lizard continues to be widespread on most of the remaining protected habitat identified on non-Federal lands in the CVMSHCP. However, there have been local extirpations due to drought, habitat fragmentation, and altered sand transport and fluvial processes. The distribution of the species is now likely restricted to seven fragmented populations within a much-reduced area of suitable habitat. Drought and fragmentation of habitat have most likely led to a reduction in effective population sizes in all protected areas.

Conservation goals in the CVMSHCP include conservation of modeled habitat, which includes protection of essential ecological processes (sand source/transport and hydrological systems), on non-Federal lands that supports seven persistent, but fragmented, populations, which will reduce threats due to habitat loss in the Coachella Valley. The CVMSHCP also includes avoidance, minimization and mitigation measures, and management and monitoring programs for this species on non-Federal lands, which will help ensure the persistence of the lizard within suitable habitat.

Designated Critical Habitat for Coachella Valley Fringe-toed Lizard

Critical habitat for the Coachella Valley fringe-toed lizard was designated in 1980 at a total of approximately 11,789 acres within the Thousand Palms Canyon watershed, including canyons and alluvial fans along the southern edge of the western Indio Hills (Service 1980).

Approximately 7,509 acres of designated critical habitat do not contain suitable occupied habitat for the species but are important to continuing the geological processes necessary for aeolian ecosystem functioning, including the generation and maintenance of sand dunes and related aeolian sand habitats required to support fringe-toed lizards. These two areas of designated critical habitat, the Indio Hills/Whitewater River, and Thousand Palms Canyon sand sources, are located north and northeast Ramon Road, respectively. Our final rule noted that each area supplied 50 percent of sand to occupied designated critical habitat south of Ramon Road (Service 1980). Critical habitat south of Ramon Road is generally considered occupied. Approximately 10,380 acres of designated critical habitat occur within the Thousand Palms Conservation Area. Based on a GIS analysis using assessor parcel data, about 77 percent of those acres are under federal, state, or non-profit ownership and are being conserved and/or managed consistent with the CVMSHCP (CVAG 2007a).

ENVIRONMENTAL BASELINE

The regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline (50 CFR § 402.02).

Previous Consultations in the Action Area

The Service completed a programmatic biological opinion (Service 1995) in May 12, 1995, analyzing the effects of ongoing maintenance and repair activities for Southern California Gas (SoCal Gas) natural gas pipeline system on lands throughout the California deserts managed by Bureau of Land Management (BLM), the Corps, National Park Service (NPS), and private lands that may have Coachella Valley fringe-toed lizard, desert tortoise, least Bell's vireo (*Vireo bellii*

pusillus), southwestern willow flycatcher (*Empidonax traillii extimus*), and the Yuma clapper rail (*Rallus longirostris yumanensis*). Pursuant to 50 CFR 402.10(d), a conference opinion for the project's effects upon flat-tailed horned lizard (*Phrynosoma mcallii*), Coachella Valley milk-vetch, and triple-ribbed milk-vetch *(Astragalus tricarinatus*) was also incorporated into the biological opinion. The Service provided a non-jeopardy determination for all listed and proposed species analyzed in the consultation. The proposed action did not affect designated critical habitat for least Bell's vireo and southwestern willow flycatcher. The Service also determined that the proposed action was not likely to adversely modify or destroy designated critical habitat for desert tortoise or Coachella Valley fringe-toed lizard. Critical habitat for Yuma clapper rail, flat-tailed horned lizard, Coachella Valley milk-vetch, and triple-ribbed milk-vetch had not been listed or proposed at the time of consultation.

The Corps consulted with the Service on a previously proposed description of the Project, at the time known as the Whitewater Flood Control Project. A non-jeopardy biological opinion, issued September 12, 2000, analyzed impacts to Coachella Valley fringe-toed lizard and its designated critical habitat, Coachella Valley milk-vetch, and desert tortoise.

The Service issued a biological and conference opinion on July 3, 2008, analyzing the effects of the Service's issuance of a section 10(a)(1)(B) incidental take permit for 27 species under the CVMSHCP. We concluded the level of anticipated take within the CVMSHCP planning area was not likely to result in jeopardy for all species under the consultation, including Coachella Valley fringe-toed lizard and Coachella Valley milk-vetch.

In 2010, we issued the BLM a biological opinion that analyzed effects on the Coachella Valley fringe-toed lizard and Coachella Valley milk-vetch from implementing the Desert Conservation Area Plan Amendment for the Coachella Valley (Service 2010b). We concluded that this program-level plan would not result in an appreciable reduction in the numbers, reproduction, or distribution of Coachella Valley milk-vetch or Coachella Valley fringe-toed lizard throughout their ranges (Service 2010b).

On January 11, 2011, the Service issued a non-jeopardy determination for a biological and conference opinion analyzing the effects of the Devers Palo Verde No. 2 Transmission Line Project on Stephens' kangaroo rat (*Dipodomys stephensi*), Coachella Valley milk-vetch, Coachella Valley fringe-toed and its designated critical habitat, desert tortoise and its designated critical habitat, and proposed threatened flat-tailed horned lizard.

Land Use and Designation

The Project is within the Thousand Palms Conservation Area of the CVMSHCP. The Thousand Palms Conservation Area is approximately 25,900 acres and represents the largest remaining area of unfragmented aeolian habitat within the Coachella Valley.

The action area contains approximately 6,131 acres of modeled habitat identified by the CVMSHCP for Coachella Valley milk-vetch, consisting of approximately 6,105 acres of core habitat and approximately 26 acres of additional conserved habitat for Coachella Valley milk-vetch (CVAG 2007b). The conservation objectives for Coachella Valley milk-vetch habitat within the Thousand Palms Conservation Area is to conserve at least 985 total acres of core habitat. Approximately 5,747.92 acres of modeled core habitat for Coachella Valley fringe-toed

lizard are found within the action area (CVAG 2007c). The conservation objective for Coachella Valley fringe-toed lizard habitat within the Thousand Palms Conservation Area is to conserve a minimum of 818 acres of core habitat.

The Thousand Palms Conservation Area also protects occupied habitat for both species, unoccupied areas supporting ecological processes that sustain the Indio Hills/Thousand Palms sand transport system, and natural communities of active desert dunes, active desert sand fields, mesquite hummocks, Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, Sonoran cottonwood-willow riparian forest, desert dry wash woodland, and desert fan palm oasis woodland (CVAG 2007a). Within the Conservation Area is the Thousand Palms Reserve, one of three reserves for Coachella Valley fringe-toed lizards identified by the CVMSHCP. The reserve contained approximately 5,200 acres (66 percent) of occupiable habitat.

The Project action area also includes a mosaic of conserved lands administered by multiple agencies. The Coachella Valley Ecological Reserve is a 1900-acre property at the base of the Indio Hills managed by CDFW and located within designated critical habitat for Coachella Valley fringe-toed lizards and Coachella Valley milk-vetch. CDFW acquired the property in 1983 to protect fluvial and blow sand habitat for Coachella Valley fringe-toed lizards and other aeolian species.

Coachella Valley National Wildlife Refuge is a unit of the Service's National Wildlife Refuge System (NWRS), administered by the Sonny Bono Salton Sea National Wildlife Refuge. CVNWR was established in 1985 to conserve 3,709 acres of unfragmented dune habitat in Coachella Valley for the purpose of protecting the Coachella Valley milk-vetch and Coachella Valley fringe-toed lizard (Service 2014).

CVNWR and portions of the aforementioned areas are included within the greater Coachella Valley Preserve System established by the Service's Coachella Valley Fringe-toed Lizard Habitat Conservation Plan in 1985 (preceding the CVMSHCP). The Coachella Valley Preserve is an administrative unit of BLM and jointly managed by the Center for Natural Lands Management (CNLM), CDFW, Service, and BLM (Service 2014). The Preserve is divided into the Willow Hole/Edom Hill Reserve, Whitewater Floodplain Reserve, and the Thousand Palms Reserve, together totally approximately 17,000 acres of Coachella Valley fringe-toed lizard habitat. Thousand Palms Reserve, located within the action area, has approximately 5,200 acres (66 percent) of occupiable habitat and is considered the largest contiguous acreage of blow sand habitat for Coachella Valley fringe-toed lizard within the Coachella Valley Preserve System (Service 2008b).

Habitat Characteristics

The action area is within the largest unfragmented area of Coachella Valley aeolian habitat (CVAG 2007a), which is sustained by fluvial and aeolian sediment transport within the Thousand Palms sand transport system. This sand transport system is driven by large storm or flash flood events that fluvially transport sediment originating from Indio Hills and within natural channel sand deposits to depositional floodplain areas where aeolian forces may then transport sand particles downwind where it accumulates into aeolian sand formations.

Vegetation and habitat communities within the action area include creosote bush scrub, burro-weed scrub, aeolian dune habitats (sand fields, active desert dunes, ephemeral sand dunes, stabilized sand fields, sand dunes, sand hummocks, and sandy plains), fluvial sand plains, and ruderal areas. The southwestern portion of the Project area outside the Coachella Valley Preserve boundary is dominated by ruderal disturbance and windrows of *Taramix* spp. (Service 2014, Aspen 2021). The majority of aeolian habitat within the action area is within the approved boundary of Coachella Valley National Wildlife Refuge. The CVNWR is immediately surrounded by intensive development, including a large residential resort community, a hotel entertainment venue, a high school campus, and Interstate 10.

Recent urbanization and agricultural development in the Coachella Valley have significantly impacted the blow sand ecosystem. Development has occurred directly on sand fields, effectively disturbing occupied habitat and in the corridor, thereby partially blocking the aeolian transport of sand within the Thousand Palms Conservation Area. Development has also led to a reduction in groundwater, which in turn has reduced the abundance of mesquite (*Prosopis* spp.) hummocks that naturally aided in aeolian habitat development by capturing blow sand and establishing new dune development (Service 2009a).

Status of the Species in the Action Area

Coachella Valley Milk-vetch

The action area contains both occupied and unoccupied aeolian habitat for Coachella Valley milk-vetch.

Reaches 1 and 2 are located near habitat that facilitates the fluvial and aeolian processes necessary to sustain occupied sand habitat for Coachella Valley milk-vetch (Service 2013b). Reaches 3 and 4 of the Project are immediately adjacent to occupied habitat where individuals are frequently found during annual plant species monitoring (UCR 2021a). The number and distribution of plants that may germinate during an annual growth season responds to yearly rainfall levels (UCR 2021b). Across the portion of species range, the number of plants found during a given year may vary substantially among CVMSHCP Conservation Areas and among types of sand formation (e.g., active dunes, ephemeral sand fields) within a single Conservation Area. Therefore, the population density of milk-vetch throughout the action area cannot be precisely quantified. Additionally, the number of plants that may germinate in a given year are only a partial indication of the overall population size, as the seed bank may contain viable seed that remain dormant for up to 8 years until conditions allow germination (Service 2009a). Long-term monitoring surveys determine Coachella Valley milk-vetch density estimates from counts of plants along transects throughout the Plan area (UCR 2012). In 2019, the density of plants found within the CVMSHCP area ranged from 0 to 90 plants per 0.1 hectare across all plots. In 2020, the highest density found at a site was estimated to be approximately 30 plants per 0.1 hectare (UCR 2021b). Within these annual ranges, number of plants found at each plot varied substantially. No plants were found throughout the CVMSHCP monitoring area in 2021 (UCR 2022). These survey data corresponded with levels of precipitation that occurred each year.

CVWD conducted multiple special-status plant surveys from 2000 to 2016. Habitat assessments for milk-vetch were conducted in 2003. Project surveys and additional observation sources

confirmed milk-vetch does not occupy the sand source areas near Reaches 1 and 2. During surveys in 2010, an individual was observed within the dune habitat adjacent to Reach 4. No milk-vetch plants were found adjacent to Reach 4 during surveys in 2013, which aligns with the long-term monitoring data for the same year which found no plants within the Coachella Valley National Wildlife Refuge (UCR 2020b). In 2016, Project surveys found no occurrences of milk-vetch in the same section of the Reach 4 (Aspen 2021). The 2016 long-term monitoring data estimated a density of approximately 2.4 plants per 0.1 hectare on plots further west of the 2010 observation within the active dune near Reach 4.

Coachella Valley Milk-vetch Critical Habitat

The action area is within Unit 4 of designated critical habitat for Coachella Valley milk-vetch. Unit 4 contains a total area of 3,851 acres providing the physical and biological features needed to sustain milk-vetch. The northern portion of the habitat, generally considered to be the area above Ramon Road, approximately 206 acres of unoccupied habitat were designated to protect the fluvial sand transport system within the Thousand Palms Conservation Area. Ephemeral washes carry substrates from alluvial sand source areas in Unit 4 to alluvial fan areas where they can be dispersed to occupied habitat areas further south via the wind corridor (Service 2013b). The remaining habitat is considered occupied and provides the physical and biological features necessary to support milk-vetch including stabilized sand dunes, active and stabilized sand fields, ephemeral sand fields, and fluvial and deposits on floodplain terraces of active washes.

Unit 4 comprises approximately 48 percent of total occupied designated critical habitat for Coachella Valley milk-vetch. This unit is essential because it supports large numbers of the Coachella Valley milk-vetch that contribute to the overall genetic diversity of the species (Meinke *et al*. 2007). Unit 4 also serves as an important buffer to excessive losses in other parts of the range due to its location in the southeastern portion of the species range which is hydrologically independent and physically isolated from the other units (Service 2013b). The primary threats impacting this area of designated critical habitat are loss of occupied habitat; the increasing establishment of Sahara mustard; degradation of fluvial and aeolian ecosystem process area; the loss of mesquite hummocks that help establish sand dunes; groundwater level declines; and OHV activity (Service 2009a).

Coachella Valley Fringe-toed Lizard

Coachella Valley fringed-toed lizards are known to occupy several aeolian habitat types including active dunes, stabilized sand fields, and ephemeral sand fields. The Thousand Palms Coachella Valley fringe-toed lizard population is the largest and most robust population in the species range (Service 2010a). Each of the Project's reaches are located within habitat with potential to support Coachella Valley fringe-toed lizards, including sand transport areas initially considered unoccupied at the time of listing for designated critical habitat (Aspen 2016). Suitable habitat near Reaches 1 and 2 are considered marginal by a Project habitat assessment in (Aspen 2021). Previous Project studies have also found few if any lizards; however, multiple occurrences of fringe-toed lizards in these areas have been documented and reported. Reaches 3 and 4 are located within habitat of moderate-to-high suitability, and occurrences of lizards have been consistently observed in the active dunes and stabilized sand fields adjacent to the reaches.

Additional observations reported numerous occurrences in the vicinity of each Project reach (Aspen 2021). Habitat assessments and focused surveys within the Project study area yielded observations of fringe-toed lizards near Reach 3 in 2010 and Reach 4 in 1997, 2003, and 2015 (Aspen 2021).

Reaches 1 and 2 are not anticipated to be occupied by Coachella Valley fringe-toed lizards, despite being located in sand source and transport habitat. Project field surveys, habitat assessments, and monitoring for an adjacent transmission line also did not report occurrences of the species within these reaches (Aspen 2021). Suitable habitat for the species exists near Reach 4 and portions of Reach 3. Project surveys over the course of several years consistently detected occurrences of fringe-toed lizards within these reaches (Aspen 2021).

Coachella Valley fringe-toed lizard populations are known to fluctuate widely per year. While no fringe-toed lizard density estimates are available for the action area, a recent analysis estimated density throughout the CVMSHCP area based on long-term monitoring data from 68 plots placed in clusters. The estimated mean density of fringe-toed lizards throughout active sand dune habitat within one plot cluster declined from 6.15 to 3.75 lizards per 0.1 hectare from 2019 to 2021 (Barrows and Heacox 2021). University of California Riverside (UCR; 2021) reported an increase in fringe-toed lizard density from 2.56 to 4.98 lizards per 0.1 hectare during that same period in ephemeral sand fields. These sand formation types changed within this time period, specifically formations once considered active dunes had converted to stabilized sand fields through environmental and anthropogenic factors. These findings illustrate how fringe-toed lizard populations fluctuate naturally in numbers and distribution throughout the species range, among sand formation types within an area of habitat. The density of fringe-toed lizards estimated in the CVMSHCP area may not align with density estimates in the action area or at any given year during the duration of the Project. For this reason, the exact number of Coachella Valley fringe-toed lizards that will occupy the action area during the life of the Project is not known or practicably determinable.

Coachella Valley Fringe-toed Lizard Critical Habitat

The action area occurs within the Thousand Palms Conservation Area, which contains approximately 11,789 acres of designated critical habitat for Coachella Valley fringe-toed lizard. Designated critical habitat within the action area supports occupied and unoccupied habitat that provide ecological processes necessary for sustaining aeolian habitat for fringe-toed lizards. This habitat is also characterized by existing residential development and transportation corridors. Reaches 1 and 2 are within designated critical habitat that serve as sand source and transport areas but are not expected to support fringe-toed lizards (Service 1985, Service 2010a). Reaches 3 and 4 are located near occupied designated critical habitat on conserved lands.

The primary threats affecting designated critical habitat within the action area are similar to those identified for milk-vetch, including occupied habitat loss, degradation of the sand transport system, OHV use, and loss of mesquite hummocks that once aided dune formation (Service 2010a).

The Service designated critical habitat for Coachella Valley fringe-toed lizard in 1980 and identified sand transport areas north of Ramon Road as unoccupied habitat, not suitable to

support the species but provided critical ecological processes to the occupied habitat south of Ramon Road. Since then, occurrences of fringe-toed lizards have been documented in the fluvial transport areas near Reach 1 and 2 near the Indio Hills sand transport route and to the northeast near the Thousand Palms Canyon sand source area (Aspen 2016). Fringe-toed lizard habitat relies on the same sand transport processes described in the Effects on Designated Critical Habitat for Coachella Valley milk-vetch. Lancaster (2021) estimated that water and sediment from Indio Hills channels are directed south or southwest towards the upwind part of the sand transport corridor in the area of Ramon Road. A distributary channel of the Thousand Palms fan also routes water and sediment southwest to this area, although the study's model suggests that the majority of the flow is directed to the south and southeast, where it enters the dune area (Lancaster 2021).

EFFECTS OF THE ACTION

Regulations implementing the Act (50 CFR § 402.02) define the effects of the action as all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR § 402.17).

The regulations for section 7(a)(2) note that "a conclusion of reasonably certain to occur must be based on clear and substantial information, using the best scientific and commercial data available" [50 CFR § 402.17(a)]. When considering whether activities caused by the proposed action (but not part of the proposed action) or activities reviewed under cumulative effects are reasonably certain to occur, we consider factors such as (1) past experiences with activities that have resulted from actions that are similar in scope, nature, and magnitude to the proposed action; (2) existing plans for the activity; and (3) any remaining economic, administrative, and legal requirements necessary for the activity to go forward.

Effects from Construction Activities

Coachella Valley Milk-vetch

Coachella Valley milk-vetch occupies aeolian habitat throughout CVNWR and is known to occur near Reaches 3 and 4 (Aspen 2016, UCR 2020b). Activities associated with construction of the flood control system include site clearing, grading, trenching, backfilling, and other ground-disturbance through the use of trucks, backhoes, loaders, dozers, scrapers, compactors, graders, excavators, compactors, and other heavy equipment (Aspen 2020). These Project activities may injure or kill individual milk-vetch plants by uprooting, crushing, or burying them. The increased presence of vehicular and pedestrian traffic from worksite personnel could result in trampling and crushing of plants. Seeds of milk-vetch may also be destroyed, crushed, removed, or buried. Because the density and distribution of milk-vetch plants within the action area is highly variable each year, the exact number of individuals that will be directly impacted by these Project activities cannot be quantified. Because no estimates of the Coachella Valley milk-vetch seed bank within the action area are available, the number of viable seed that may be impacted is unknown. However, CVNWR is expected to support a robust seed bank, and

standing plants have been repeatedly observed near Reaches 3 and 4 throughout long-term monitoring efforts (UCR 2021a).

CVWD proposes a number of conservation measures to avoid and minimize impacts to Coachella Valley milk-vetch and its habitat. The siting and extent of the Project components have been designed to have the most minimal footprint needed to feasibly complete Project objectives (CM 8). In areas where removal of vegetation may be required for site preparation, mowing or drive and crush methods will be preferred over grading to preserve belowground root structures of plants. Prior to commencing Project activities, pre-construction surveys will be conducted at each work site to identify and mark or flag areas of sensitive plants for avoidance. CVWD will select qualified biologists to conduct pre-construction surveys in all suitable milk-vetch habitat within a 200-foot buffer of Project disturbance areas and roads, in accordance with CDFW botanical survey protocols (CM 4 and CM 5). Areas with milk-vetch plants will be flagged and staked to an appropriate buffer to prevent impacts to plants (CM 11), and ongoing biological monitoring will occur during construction (CM 7). In areas where milk-vetch plants cannot be reasonably avoided, conservation strategies including salvage, horticultural propagation, or habitat compensation of lands of equal or greater ecological value may be used where appropriate, in accordance with an approved mitigation plan for sensitive plant species submitted to the Corps, Service, and appropriate agencies for approval prior to ground disturbance (CM 11).

Coachella Valley Fringe-toed Lizard

Ground-disturbing activities associated with construction have potential to harass, injure, or kill lizards. Site clearing, grading, excavation, and similar activities may injure or kill lizards by direct strikes, burying, or crushing. Increased pedestrian and vehicular traffic may result in injury or death to lizards by trampling or crushing. Direct injury or death may also result from potential entrapment hazards such as open trenches or piled construction supplies. Increased personnel, activity, and equipment during construction may create hazardous attractants or subsidies for fringe-toed lizards and/or their predators including common ravens, that may increase lizards' risks of injury or death.

CVWD will implement conservation measures to reduce risks of injury and death to fringe-toed lizards, including educating work personnel about species, habitat, and Project requirements (CM 7); enforcing low speed limits of 15 miles per hour to avoid additional impacts to species and habitat (CM 12); and covering or removing potential entrapment hazards (CM 12). CVWD will also implement management of ravens (CM 15) and reduce subsidies by other potential predators including food sources and perching opportunities for loggerhead shrikes (*Lanius ludovicianus*).

CVWD will assign Service-approved Authorized Biologists to oversee Project activities for Coachella Valley fringe-toed lizards (CM 4 and CM 13). The Authorized Biologists will conduct pre-construction surveys in each work area prior to the start of work activities (CM 6 and CM 13). Appropriate exclusion fencing may be installed in work areas to reduce injuries or deaths of fringe-toed lizards from Project activities (CM 13). CVWD will develop an agency-approved Wildlife Relocation Plan describing that Coachella Valley fringe-toed lizards would be moved out of harm's way from within fenced areas and as needed (CM 13).

CVWD anticipates that the Project will result in disturbance of 461.82 acres of suitable Coachella Valley fringe-toed lizard habitat (Table 1). Of this total, 452.77 acres are on private lands within and outside of the Thousand Palms Conservation. Because the Project is a Covered Activity deemed consistent with the CVMSHCP, CVWD has take authorization for disturbances to private lands under the Plan, provided that Project activities remain consistent with the Plan. Within the anticipated 452.77 acres of disturbance to private lands, CVWD anticipates that 93.97 acres will occur on lands within the current Thousand Palms Conservation Area boundary. The 2008 biological opinion issued for the CVMSHCP anticipated and analyzed approximately 93 acres of fringe-toed habitat within the Conservation Area to be loss to development, without jeopardizing the continued existence of the species. CVWD will implement Plan requirements including Avoidance and Minimization Measures and Land Use Adjacency Guidelines outlined in the Consistency Determination (CVCC 2021) and Section 4 and Section 7.3.1 of the CVMSHCP. Of the 9.05 remaining acres that occur on Federal lands, CVWD will implement the same applicable aforementioned conservation measures. We anticipate that these measures will minimize the potential impacts of habitat disturbance or loss to Coachella Valley fringe-toed lizard.

In addition, CVWD shall provide compensation lands for impacts to Coachella Valley fringe-toed lizard (CM 16).

Relocation of Coachella Valley Fringe-toed Lizard

The Applicant will implement conservation measures during construction and O&M activities to avoid and minimize risks of injury or death to Coachella Valley fringe-toed lizards. Pre-construction surveys will be conducted to determine absence or presence of fringe-toed lizards in the Project area (CM 6). Qualified Biologists approved to oversee and handle lizards will conduct biological monitoring during construction. For areas within suitable occupied habitat, exclusion fencing for lizards may be installed around active work areas to conduct clearance surveys to move lizards out of harm's way. Protocol and guidance for these activities will be included in an agency-approved Relocation Plan (CM 13) for Coachella Valley fringe-toed lizards. Capture and handling also has the potential to result in injury or death. Clearance survey and relocation activities will be conducted only by approved Qualified Biologists familiar with tracking and handling Coachella Valley fringe-toed lizards. The Relocation Plan will include detailed protocol for clearance surveys, appropriate exclusion barrier options installation, handling, and release site selection for construction and O&M activities (CM 13 and CM 18).

Currently, there is limited research available regarding the long-term outcome of Coachella Valley fringe-toed lizards relocated short-distances from capture sites. No standardized protocol for clearing and relocating fringe-toed lizards exists (Vandergast *et al*. 2019); however, some common methods have been demonstrably successful (Hollenbeck *et al*. 2010, Fisher *et al*. 2020). Methods for locating lizards have included walking transects for visual point count surveys of individual lizards, walking transects to track individual fringe-toed lizard tracks imprinted on blow sand, or by the use of pitfall traps. Pitfall traps or specialized lassos have been used to physically capture lizards. We anticipate that the potential for death or injury of fringe-toed lizards due to capture and handling would be minimized or avoided by the proposed conservation measures provisioning that these activities will be conducted only by approved Qualified Biologists in accordance with guidance provided in the approved Relocation Plan.

Past studies have shown that reptiles translocated greater distances beyond their capture sites often do not survive in recipient areas long-term (McCoy *et al*. 2014). In a study on genetic diversity and connectivity of the species after long-distance translocation, Vandergast *et al*. (2019) translocated fringe-toed lizards to Stebbins Dune from a location approximately 4.97 miles to the north. The team located and captured 42 lizards at the original site, with no mortalities due to capturing and handling reported, though their methods were not specified. Captured individuals were released in suitable habitat at Stebbins Dune. A year later the team recaptured four lizards during surveys at the recipient site. The only translocated individual recaptured was an adult female translocated as a juvenile. Genetic testing revealed some of the captures were likely offspring of some of the translocated individuals, suggesting that recruitment after translocation may be successful. The low number of translocated lizards captured within a year of translocation could not be fully explained, though one suggestion is that the strong homing instincts of male fringe-toed lizards may cause them to roam after translocation, thus increasing their exposure and susceptibility to risks (McCoy *et al*. 2014). Gravid females and juveniles may have a higher survival rate than mature males.

We anticipate that the proposed conservation measure to clear, exclude, and relocate lizards out of harm's way will minimize immediate risks of take to individual lizards during Project activities. The installation of exclusion fencing along the linear components of the work area may involve the use of heavy equipment for digging trench lines and other disturbances. The effects of using heavying equipment are similar to those discussed previously Additionally, certain fencing material and components may encourage subsidies that attract predators, such as perching opportunities for birds, or subsidies such as accumulated loose sand that attract lizards to the area. To avoid and minimize these potential risks, CVWD will coordinate with the CVNWR to develop an approved Relocation Plan prior to construction that describes appropriate exclusion fencing methods, locations, material, and length of time to remain installed.

CVWD anticipates moving Coachella Valley fringe-toed lizards out of harm's way relatively short distances to suitable habitat. In short-term studies, Coachella Valley fringe-toed lizards were estimated to have average home ranges of approximately 7125.71 square feet for adult males and 5435.77 square feet for adult females (Fisher *et al*. 2020). We anticipate short-distance relocation of lizards to suitable habitat will reduce the potential risks of injury or death from work activities; increase the probability that a relocated individual will have previously been in contact with other individuals occupying areas near the release site, thereby reducing territorial conflicts; and increase probability of relocated individuals to find unoccupied habitat patches still within their home range to reduce chances of prolonged roaming. Due to these conservation measures, we anticipate that the impacts to relocated and resident individuals from relocation activities would be minimized.

Non-Native Species

Heavy equipment, vehicles, and fill materials can be potential vectors for the introduction and/or further spread of non–native plant species within the Project site. Certain ground disturbing activities may also create conditions that favor establishment of non–native plants. Sahara mustard is an invasive plant well-established within the Thousand Palms aeolian habitat. In addition to competing with native species for resources, Sahara mustard can change habitat qualities by converting the loose active sand dunes milk-vetch and fringe-toed lizards both

require for their life histories into compacted, stabilized sand fields. CVNWR has ongoing efforts to eradicate or manage the spread of Sahara mustard throughout the dune system, yet the prolific growth and reproductive capabilities of the plant make eradication difficult (Service 2014). Sahara mustard plants dispersed an estimated 2.43 million seeds per acre into milk-vetch habitat at the CVNWR in 2005 (Meinke *et al*. 2007). Plants often die after seeding, become uprooted by wind, and tumble for distances throughout the aeolian habitat, further spreading seeds.

CVWD will develop an approved Integrated Weed Management Plan (IWMP) (CM 10) prior to any ground disturbing activities to minimize the potential to introduce or further spread of Sahara mustard and other invasive plant species throughout the area. Strategies employed during Project construction and O&M include assessing current conditions and identifying susceptible areas and risk facts; pre-construction weed treatment of existing weeds; preventative actions such as washing undercarriages of vehicles and heavy equipment; and annual monitoring and adaptive management.

Coachella Valley Milk-vetch

The introduction of invasive species, particularly Sahara mustard, would contribute to further compaction and stabilization of active sand dunes. Coachella Valley milk-vetch seeds require scarification from blow sand within dunes and other aeolian processes to germinate (Meinke *et al*. 2007). The stabilization of active dunes would reduce available blow sand, reducing the potential for proper scarification and dispersal of seeds. Germination of new plants may then decline, affecting the recruitment, distribution, and reproduction of the species in the action area.

Coachella Valley Fringe-toed Lizard

As the density of Sahara mustard increases, mean densities of Coachella Valley fringe-toed lizards decrease (Barrows and Heacox 2021). Several mechanisms may contribute to this effect. Sahara mustard can decrease the abundance of native plants that fringe-toed lizards may utilize. The loss of native plants will also reduce the abundance of arthropods, particularly ants, that fringe-toed lizards consume as food. Active dunes with increasing densities of Sahara mustard can experience increased compaction, eventually transitioning dune habitat into stabilized sand fields. Stabilized sand fields are known to support the lowest fringe-toed lizard densities among other aeolian habitats (Barrows and Heacox 2021).

O&M Effects

CVWD anticipates operation and maintenance activities for the Project would include structural repair to the flood control structures, scheduled vegetation removal to maintain integrity of the flood control structures, and sand management activities as outlined in the Sand Migration Management Plan (CM 3). To reduce impacts of O&M activities to listed species, CVWD will implement conservation measures including avoiding loss or disturbance to aeolian sediment (CM 1, 2, and 3), avoiding disturbances to vegetation (CM 8, 9, and 10), conducting biological monitoring during work activities (CM 7), and assigning Authorized/Acceptable and Qualified Biologists to monitor work (CM 4), exclusion, and relocation activities conducted in accordance

with an approved Relocation Plan (CM 13). In addition, CVWD will develop an Operations and Management Plan (CM 17) in coordination with CVNWR.

Coachella Valley Milk-vetch

Structural repairs to the levee and channel components may involve occasional excavation to repair underground features, such as levee toes. Additional fill material may be required to reinforce the flood control structures. Excavation and similar ground disturbing activities can cause direct injury or death to plants or disturb the seed bank, as previously described. Once the flood control system is constructed, CVWD anticipates that disturbance would be confined to the final footprint of the Project and that there will be no additional ground disturbance impacting adjacent habitat for milk-vetch.

CVWD must comply with federal requirements for maintaining levees and dams, including preventing establishment of vegetation that may compromise integrity of the structures.

The levees are designed to capture accumulated sediment that will be collected on a regular schedule and deposited in a selected location within CVNWR to be redistributed naturally within the aeolian system. The accumulated sediment could potentially contain milk-vetch seeds from stormwater flowing through natural fluvial routes. Milk-vetch plants could potentially germinate in these areas of accumulated sediment along the levee reaches.

Sand management measures (CM 1 and CM 2) and the SMMP (CM 3) are expected to minimize potential risks to milk-vetch by preventing opportunities for plants to establish within the flood control infrastructure and enhancing habitat conditions to encourage the species to continue establishing throughout appropriate areas of occupied habitat. A sand collection schedule that reduces opportunities for milk-vetch to inhabit sediment depositions will be determined in coordination with CVNWR. Other plant and habitat conservation employed during construction will continue for O&M activities to reduce impacts to milk-vetch habitat measures (CM 8 through CM 11).

Coachella Valley Fringe-toed Lizard

Excavations conducted during structural repairs can result in injury or death to fringe-toed lizards as discussed previously. The accumulated sediment captured along flood control structures may attract fringe-toed lizards to the area. Heavy equipment and vehicles used for sand removal activities can also result in injury or death of lizards, if they are present within the flood control infrastructure. CVWD will implement conservation measures for minimizing or avoiding effects to fringe-toed lizards including having Qualified Biologists present during activities (CM 4). Qualified Biologists will conduct pre-construction surveys (CM 6) in each work area prior to the start of O&M activities that may affect fringe-toed lizards or habitat. Exclusion fencing installed during construction may be retained in some work areas to prevent lizards from accessing the flood structures, in accordance with fencing strategy detailed in the Relocation Plan (CM 13). For some O&M activities, fringe-toed lizards could potentially be moved out of harm's way only by Qualified Biologists as described in the Relocation Plan (CM 13).

Protocols and schedules for removing sand from the levees will reduce the likelihood that fringe-toed lizards colonize those portions of accumulated sand within the channels and levees. The SMMP will establish and implement conservation measures discussed in this biological opinion to minimize effects to fringe-toed lizards that may occur during sand removal activity.

Effect on Designated Critical Habitat

Coachella Valley Milk-vetch Critical Habitat

The Project would disturb 14.32 acres of designated critical habitat for Coachella Valley milk-vetch as a result of the construction of Reaches 1 and 3 as described in Table 2. Construction of Reach 1 would temporarily disturb 2.65 acres and permanently remove 4.47 acres for a total of 7.12 acres of the unoccupied alluvial sand deposits. A portion of Reach 1 is within an unoccupied sand source area of designated critical habitat. However, the majority of the Reach 1 is outside of designated critical habitat, but adjacent to a fluvial sand transport pathway within critical habitat. The disturbance would be caused by the construction of road crossings over Reach 1 that would be sited within two existing roads to maintain current traffic routes. The design of the road crossing and culverts is expected to allow stormwater and sediment flow to continue in this area without disruption. Construction of Reach 3 crosses would temporarily disturb 0.66 acres and permanently remove 6.54 acres for a total of 7.20 acres of occupied designated critical habitat.

Table 2. Project Effects to Coachella Valley Milk-vetch Designated Critical Habitat

Disturbance in Critical Habitat			Federal Land (acres)		All Land[1] (acres)	
	Temporary	Permanent	**Total**	Temporary	Permanent	**Total**
Reach 1 (Unoccupied)	0.0	0.0	0.0	2.65	4.47	7.12
Reach 2 (Unoccupied)	0.0	0.0	0.0	0.00	0.00	0.00
Reach 3 (Occupied)	0.0	0.0	0.0	0.66	6.54	7.20
Reach 4 (Occupied)	0.0	0.0	0.0	0.00	0.00	0.00
Grand Total	0.0	0.0	**0.0**	3.31	11.01	**14.32**

[1]All Land (acres) column is a total of Project disturbance occurring within Coachella Valley milk-vetch designated critical habitat and includes values within the Federal Land (acres) column.

Coachella Valley Fringe-toed Lizard Critical Habitat

The Project would disturb 93.97 acres of designated critical habitat as described in Table 3. The construction of Reaches 1 and 2 would temporarily disturb 0.97 acres and permanently remove 51.01 acres for a total of 51.98 acres of unoccupied designated critical habitat. CVWD proposes to acquire and conserve a 550-acre floodway within the primary alluvial area located between Reaches 1 and 3 to offset loss of unoccupied habitat and increase the acreage of the fluvial habitat contained within the sand transport system. The construction of Reaches 3 and 4 would temporarily disturb 0.64 acres and permanently remove 41.35 acres for a total of 41.99 acres of occupied critical habitat. CVWD will implement conservation measures to minimize disturbance or effects to designated critical habitat. The Project's components were designed to leave the smallest footprint as needed to feasibly perform Project's goals (CM 8). CVWD will coordinate

with CVNWR to restore temporarily disturbed areas as needed (CM 9). Impacts to sand within the aeolian system will be minimized through the development and implementation of best management practices (CM 1) and sand distribution activities (CM 2) detailed in an approved SMMP (CM 3).

Table 3. Project Disturbance to Coachella Valley Fringe-toed Lizard Designated Critical Habitat

Project Components in Critical Habitat	Federal Land (acres)			All Land[1] (acres)		
	Temporary	Permanent	**Federal Total**	Temporary	Permanent	**All Lands Total[2]**
Reach 1 (Unoccupied)	0.0	0.0	0.0	NA	46.35	46.35
Reach 2 (Unoccupied)	0.0	0.0	0.0	0.97	4.66	5.63
Reach 3 (Occupied)	0.64	6.70	7.34	NA	41.25	41.25
Reach 4 (Occupied)	0.0	0.74	0.74	0.0	0.74	0.74
Total	0.64	7.44	**8.08**	0.97	93.00	**93.97**

[1]All Land (acres) column is a total of Project disturbance occurring within Coachella Valley fringe-toed designated critical habitat and includes values within the Federal Land (acres) column
[2]Calculated from Biological Assessment (Aspen 2021) Tables 2 and 10 and Project GIS data

Sand Dispersal

Reaches 1 and 2 would route sand through fluvial and aeolian transport areas, with Reach 1 beginning near the Indio Hills sand source. The placement of anthropogenic structures within this area could disrupt the natural ecological processes that move sand throughout aeolian desert habitat downstream. The current Project design would aid and improve these natural processes (CM 7).

Unit 4 of Coachella Valley milk-vetch designated critical habitat is important because its sand source is generated in the same place where sand transport occurs (Service 2013a). Substrate from the Indio Hills is an important sand source. A secondary sand source are alluvial deposits on the floor of natural channels and washes originating at the Indio Hills. Flash flood events from the hills can erode sand from the alluvial deposits on channel floors and introduce them as substrate into the aeolian system.

Reach 1 would be within a network of Indio Hills channel routes identified by Lancaster (2021) that naturally flow downstream through the community of Thousand Palms towards the Morongo Wash. CWVD anticipates that Reach 1 would enhance the delivery of both sand sources to aeolian habitat downstream (Aspen 2021 and Lancaster 2021). The reach has been designed as a levee wall sited along the eastern edge of the natural fluvial pathway to intercept stormwater and prevent it from flowing east towards a nearby neighborhood. This feature also helps capture sediment that may otherwise be lost outside of the natural transport pathways. The stormflow moves sediment downstream through a natural fluvial corridor flanked on either side by roadways and development. Lancaster (2021) estimated that Reach 1 receives 15.2 acre-feet of sediment from the tributary channel. As much as 9.2 acre-feet of sediment would become trapped along Reach 1 as stormwater flows along the levee, and 6.0 acre-feet of sediment would

likely continue to be transported downstream to the primary depositional zone located near Reach 2 to contribute to aeolian processes.

Reach 2 would be relatively small in length and height, intended to protect flows from Reach 1 from flowing west without disrupting the natural wind corridor (Figure 4). The reach would also allow unobstructed access for stormwater flow to reach the primary depositional floodplain area where deposited sediment would be swept into circulation by aeolian forces. Lancaster (2021) estimated that the placement of Reach 1 would provide an additional 2.2 acre-feet of sediment to the alluvial floodplain near Reach 2.

Reaches 3 and 4 would be designed to divert stormwater and capture sediment that may otherwise be lost from the system. This sediment would be collected from the reaches for redistribution into the aeolian habitat as part of the SMMP (CM 3). The SMMP will describe preferred methodology for sorting and identifying sand particles from the accumulated sand. Material deemed unsuitable for redistribution would be deposited in an approved area or facility.

The flood control system would be designed to retain, redistribute, and replenish sand and sediment within the Thousand Palms sand transport system. CVWD will coordinate with the Corps, Service, and other appropriate agencies to develop and implement the SMMP for collecting accumulated sand and depositing sand at predetermined locations within the wind corridor for redistribution into the aeolian sand system. CVNWR has an existing sand redistribution program where blow sand from a large active dune along the CVNWR's boundary adjacent to Avenue 38 are removed from the roadway by the County of Riverside for public safety and to replenish sand within CVNWR (Service 2013a). The SMMP will adapt and enhance this existing management action to capture sand blown beyond the extent of the remaining aeolian habitat and recirculate it within the sand transport system.

Effects on Recovery

Coachella Valley Milk-vetch

A recovery plan has not been established for Coachella Valley milk-vetch. Conservation and recovery of the species and its habitat is largely accomplished through the implementation of the CVMSHCP. In the Thousand Palms Conservation Area, Conservation Objectives identified for Coachella Valley milk-vetch include conserving at least 985 acres of core habitat (CVAG 2007a). The Service's 5-year review (2009a) identified the recovery priority for milk-vetch as "12C," indicating the subspecies is facing a moderate degree of threats, low recovery potential, and conflicts with construction and development.

The number of plants that germinate in a year is highly variable and dependent upon rainfall. Additional factors affecting recruitment of new plants include abundance of pollinators, wind transport to disperse seeds throughout appropriate habitat, and blow sand movement to scarify seeds for germination. Seed production is highly dependent upon bees as pollinators, particularly non-native honeybees (*Apis mellifera*) (Meinke *et al*. 2007). The current spatial distribution of milk-vetch has remained the same since the species was listed as endangered (Service 2009a). Threats to recovery of milk-vetch include habitat fragmentation, competition with nonnative plants, and off-highway vehicle trespass.

Based on the Project description, including the conservation measures proposed to avoid and minimize adverse impacts, the Project is consistent with the CVMSHCP rough step acreage required to conserve Coachella Valley milk-vetch habitat within the Thousand Palms Conservation Area (CVCC 2021). The conservation measures proposed are adequate for offsetting anticipated impacts to the seed bank, plants, pollinators, and sand transport processes. The Project overall is expected to provide a positive net benefit to the sand transport processes that sustain habitat conditions required by milk-vetch. Therefore, we conclude that the Project is not likely to lead to an appreciable decline in reproduction, numbers, or distribution of Coachella Valley milk-vetch. We also do not anticipate the Project will appreciably increase or contribute to the current identified threats to milk-vetch recovery.

Coachella Valley Fringe-toed Lizard

The recovery plan for the Coachella Valley fringe-toed lizard (Service 1985) identifies recovery objectives for the taxon that function as formal recovery criteria. The single primary objective of the recovery plan is to secure two or more protected areas that support self-sustaining populations of fringe-toed lizards. The CVMSHCP includes the Thousand Palms Reserve as one of three reserve areas intended to conserve fringe-toed lizards within the Preserve (Service 2008b). The Thousand Palms Reserve is considered the largest remaining contiguous extant habitat for fringe-toed lizards and is also expected to likely support the most robust population of the species (Service 2008c, Service 2010a). CVWD will implement conservation measures to avoid and minimize loss of fringe-toed lizards and habitat. Based on these measures and the Project's overall anticipated positive net benefit to aeolian habitat supporting the fringe-toed population in the Thousand Palms Conservation Area, we anticipate that the Project aligns with the recovery objective by sustaining the fringe-toed lizard population in this protected area and enhancing habitat conditions. Therefore, we conclude that the proposed action is not likely to result in an appreciable loss of numbers, disruption to reproduction, or changes in distribution of the Coachella Valley fringe-toed lizard.

CUMULATIVE EFFECTS

Cumulative effects are effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR § 402.02). 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 Act. The Service has no information regarding any future State, local, private, or certain tribal actions that are reasonably certain to occur in the action area that would have an adverse effect on either Coachella Valley milk-vetch or Coachella Valley fringe-toed lizard that would result in a loss to reproduction, numbers, and distribution in the action area.

CONCLUSION

After reviewing the current status of the Coachella Valley milk-vetch, Coachella Valley fringe-toed lizard, and designated critical habitats for each species; the environmental baseline for the action area; the effects of the proposed activities; and the cumulative effects, we have determined that the proposed action considered in this biological opinion is not likely to jeopardize the continued existence of the Coachella Valley milk-vetch or Coachella Valley fringe-toed lizard.

We have also determined the action is not likely to destroy or adversely modify designated critical habitat for either species. We have reached this conclusion for the following reasons described in the sections below.

Coachella Valley Milk-vetch

Based on the status and distribution of the Coachella Valley milk-vetch and our analysis of the effects of the Project, we conclude that the proposed action is not likely to appreciably reduce the numbers, reproduction, or distribution of the species.

Numbers

Some Project activities have potential to injure or kill Coachella Valley milk-vetch plants. Due to the variability in the number of milk-vetch plants that may germinate in any given year, the exact number of plants that may be affected throughout the life of the Project cannot be quantified. However, the Project area is expected to support a robust seed bank, particularly in active dune areas near Reach 3 and Reach 4. These reaches have been sited to avoid direct encroachment upon occupied dune habitat. The Project design and proposed conservation measures, including avoidance and/or salvage of plants, would likely minimize risks to milk-vetch plants and the seed bank. The Project would increase overall sediment circulating within the Thousand Palms sand transport system, improve the conditions and capacity of the aeolian sand habitat to continue supporting plants and a viable seed bank for the Thousand Palms population, and contribute to the overall numbers of milk-vetch range wide.

Reproduction

Seed production for Coachella Valley milk-vetch is largely dependent upon non-native bee pollinators (Meinke *et al*. 2007). The Applicant has proposed conservation measures that will avoid impacts to habitat that could potentially affect abundance of pollinators. Reproductively mature milk-vetch plants located in impact areas will be avoided or salvaged during all phases of the Project (CM 11) to allow continued production of seed. Increased compaction of aeolian habitat can prevent the movement of loose blow sand needed for milk-vetch seeds to be scarified for successful germination. Disturbances to aeolian sand habitats will be minimized and avoided to prevent compaction of active dunes (CM 1, 2, and 3) and to prevent spread of invasive plants that may contribute to compaction (CM 8, 9, 10, and 11). Implementation of the SMMP (CM 3) will help return sand into the sand transport system to maintain ecological processes and suitable habitat necessary for flowering mature plants and recruitment of new plants. We anticipate the Project will not disrupt or alter the reproductive capacity of milk-vetch within the action area or range wide.

Distribution

The Project is not likely to appreciably reduce the current distribution and extent of Coachella Valley milk-vetch within the action area or range wide. The Project is expected to provide an overall positive net benefit to improving the Thousand Palms sand transport system. The enhancement of ecological processes in this system will likely improve conditions within the current distribution of milk-vetch by creating and increasing sand formations conducive to

growth of plants; and by maintaining the natural aeolian processes needed to disperse seed, replenish the seed bank, and establish milk-vetch in new areas of suitable habitat.

Coachella Valley Milk-vetch Designated Critical Habitat

The area within Unit 4 of designated critical habitat is considered essential habitat because it supports large numbers of Coachella Valley milk-vetch that contribute to the overall genetic diversity of the species (Meinke *et al*. 2007). This unit also serves as an important buffer to excessive losses in other parts of the range due to its location in the southeasternmost portion of the species range which is hydrologically independent and physically isolated from the other units (Service 2013b). The total direct disturbance to designated critical habitat is 14.32 acres (see Table 2). We conclude that the proposed action is not likely to cause adverse modification or destruction that appreciably diminishes the value of critical habitat for both the survival and recovery of Coachella Valley milk-vetch based on the following:

1. Reach 1 would disturb 7.12 acres of unoccupied designated critical habitat providing fluvial and aeolian processes. These processes are needed to sustain the physical and biological features that would be disturbed by the construction of some Project components. The disturbance would be a relatively small percentage, approximately 3.45 percent (7.12 disturbed acres of 206 total unoccupied acres), of total unoccupied habitat, and would occur mostly within existing disturbance currently containing two active roadways. Some Project components would be built along portions of the boundaries of unoccupied habitat. We anticipate that the conservation measures will adequately minimize edge effects that may adversely modify this area of critical habitat. Overall, the Project features in Reach 1 are expected to improve the function of this area of habitat by aiding and restoring natural fluvial transport. We do not anticipate that the proposed action will appreciably diminish the acreage of unoccupied critical habitat.

2. Reach 3 would disturb 7.20 acres of occupied designated critical habitat featuring the physical and biological features of specific sand formation features required to support milk-vetch. The disturbance would be a relatively small percentage (7.28 percent) of unoccupied habitat and would occur mostly within existing disturbance currently containing two active roadways. The Applicant anticipates that acreage of occupied designated critical habitat would not be disturbed or reduced due to the siting and design of the Project. Some Project components would be located adjacent to the boundary of occupied critical habitat. Effects to these adjacent boundary edges of designated critical habitat will be adequately minimized by conservation measures.

3. CVWD will acquire a 550-acre floodway within unoccupied critical habitat to offset the loss of ecological functions that may occur from the Project components (Reach 1 and Reach 2) built within unoccupied critical habitat. The acquisition will prevent future development on the floodway, conserve, and protect designated critical habitat and the ecological processes provided to the Thousand Palms sand transport system. Therefore, we do not expect the proposed action to appreciably reduce or disrupt the ecological functions provided by unoccupied critical habitat.

Coachella Valley Fringe-toed Lizard

Based on the status and distribution of the Coachella Valley fringe-toed lizard and the likely effects of the Project, we conclude that the proposed action is not likely to appreciably reduce the likelihood of survival and recovery of the fringe-toed lizard by reducing the reproduction, numbers, or distribution of the species.

Numbers

The Applicant will conduct clearance surveys and install appropriate fencing or barriers to exclude fringe-toed lizards from work areas to avoid the injury or death of individuals. The Project would be designed to minimize encroachment in occupied habitat. The Applicant has proposed adequate conservation measures, commiserate to levels of anticipated disturbance, to avoid or minimize adverse effects to habitat affected and adjacent habitat that support fringe-toed lizards. We do not anticipate that the proposed action will appreciably diminish the numbers of Coachella Valley fringe-toed lizard.

Reproduction

We anticipate that most reproductively mature fringe-toed lizards will be captured and relocated out of harm's way during clearance surveys conducted by approved Authorized/Acceptable Biologists. We expect disruptions to reproduction would be minimized and avoided by allowing relocated lizards to remain in suitable habitat within their home ranges and implementation of conservation measures that minimize disturbances to lizards and habitats.

Distribution

The Thousand Palms Conservation Area within the action area is considered the most intact contiguous area of suitable habitat for Coachella Valley fringe-toed lizards. CVWD will minimize effects to occupied aeolian habitat through implementation of the conservation measures. Project components constructed outside the boundary of the Conservation Area minimizes encroachment and avoids fragmentation of protected habitat within Thousand Palms, including designated critical habitat and modeled habitat. Operations of the proposed flood control system is expected to replenish sediment and sand that would otherwise be lost to designated critical habitat and modeled habitat for fringe-toed lizards found within the boundary of the Conservation Area. The Project is not likely to reduce suitable habitat, degrade quality of habitat, or contribute to habitat fragmentation. We conclude that the proposed action is not likely to appreciably diminish distribution of fringe-toed lizards within the action area or range wide.

Coachella Valley Fringe-toed Lizard Designated Critical Habitat

We conclude that the proposed action is not likely to destroy or adversely modify critical habitat for both the survival and recovery of Coachella Valley fringe-toed lizards. The Final Rule for the listing of designated critical habitat identified the area south of Ramon Road and north of Interstate 10 as occupied habitat having the physical and biological components of habitat essential for the survival and recovery of the species.

1. The Project would disturb approximately 93.97 acres of designated critical habitat for fringe-toed lizards. The boundary of designated critical habitat aligns with modeled core habitat for fringe-toed lizard identified by the CVMSHCP. In our biological opinion for the CVMSHCP, we anticipated that approximately 93 acres of fringe-toed lizard modeled habitat within the Thousand Palms Conservation Area (based on the original boundary of the Conservation Area prior to its anticipated realignment resulting from the Project) would be loss due to development. The Project's anticipated disturbance within Coachella Valley fringe-toed lizard critical habitat is closely in step with the disturbance analyzed in our non-jeopardy biological opinion (Service 2008b).

2. The Project has been designed to minimize encroachment of occupied designated critical habitat for fringe-toed lizards. Reaches 3 and 4 would disturb 41.99 acres of critical habitat. These reaches are adjacent to the boundaries of critical habitat within previously disturbed areas. The Applicant will implement conservation measures to reduce effects to critical habitat at these boundary areas and beyond.

3. Portions of the Project footprint are sited within unoccupied designated critical habitat areas identified as providing ecological processes to sustain occupied habitat for fringe-toed lizard. Two flood control structures would disturb 51.98 acres of unoccupied critical habitat. The Applicant will also implement conservation measures during the construction and O&M of these Project components to avoid and minimize effects. Due to the relatively small disturbance of habitat and the adherence to conservation measures, we anticipate that the Project will not appreciably reduce the acreage of unoccupied habitat.

4. The loss of unoccupied designated critical habitat acreage will be offset by the acquisition and conservation of a 550-acre floodplain parcel area that naturally contributes to fluvial and aeolian processes within the aeolian habitat. We conclude that the action is not likely to appreciably diminish the ecological value of the unoccupied habitat.

5. The Project is expected to provide a net benefit to designated critical habitat by enhancing the overall conditions and functions of the aeolian habitat by increasing sediment circulating within the Thousand Palms sand transport system. We anticipate the proposed action will not likely result in adverse modification or destruction of designated critical habitat for Coachella Valley fringe-toed lizard.

INCIDENTAL TAKE STATEMENT

INTRODUCTION

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act **prohibit the take of endangered and threatened animal species**, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm in the definition of "take" in the Act means an act which actually kills or injures wildlife. Such [an] act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential

behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the proposed protective measures and the terms and conditions of an incidental take statement and occurs as a result of the action as proposed.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the CVWD for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: (1) fails to assume and implement the terms and conditions, or (2) fails to require the CVWD to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or CVWD must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Coachella Valley Milk-vetch

The Act does not prohibit the take of listed plant species, consequently, section 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of listed plants on non-Federal areas in violation of State law or regulation. The Native Plant Protection Act (chapter 10, section 1908) and California Endangered Species Act (chapter 1.5, section 2080) prohibit the take of State-listed plants.

Coachella Valley Fringe-toed Lizard

The Service has a reasonable basis to conclude that take would occur incidentally as a result of the anticipated lawful activity. Coachella Valley fringe-toed lizards are known to occupy areas that will be affected by Project activities. We anticipate individuals within and near the Project footprint would be subject to take in forms and extents described below.

Relocation

CVWD will conduct clearance surveys on both Federal and CVMSHCP-administered lands for Coachella Valley fringe-toed lizards for active work zones within areas identified as highly suitable habitat (CM 13). The CVMSHCP does not provide specific avoidance and minimization measures for Coachella Valley fringe-toed lizards, including relocation and clearance activities. Because these activities were not analyzed in the biological opinion (Service 2008b) and Incidental Take Permit (Service 2008a) for the Plan, this Project biological opinion evaluates the effects of the activity and its anticipated take.

We anticipate clearance surveys will result in take of Coachella Valley fringe-toed lizards in the form of capture. The number of Coachella Valley fringe-toed lizards that will occupy the Project

area during the construction and the initial 30-year O&M period is not known or practicably determinable due to reasons described previously in the biological opinion. Annual numbers of fringe-toed lizards are expected to vary throughout the Project work areas based on shifting environmental factors including rainfall, sand deposition patterns, and aeolian formation structure. Therefore, we cannot quantify the number of individuals that will be captured, handled, and relocated. We do not want to limit the ability of the Applicant to avoid and minimize the direct injury or death of fringe-toed lizard during Project activities. Thus, all take in the form of capture for the purpose of relocation is exempted for Coachella Valley fringe-toed lizard juveniles, adults, and eggs found during clearance surveys.

Clearance surveys and relocation activities will be conducted by Qualified Biologists (CM 4) familiar with most recent recommended protocols for capturing, handling, and translocating Coachella Valley fringe-toed lizards, in accordance with a Relocation Plan (CM 13). The Applicant will develop the Relocation Plan in coordination with the Corps, Service, and other appropriate agencies. The agencies will also review and approve the final Relocation Plan. Because of these conservation measures, we do not expect these activities to result in direct injury or death of any relocated fringe-toed lizards when conservation measures are properly implemented. Therefore, the threshold for take in the form of injury or death due to activities associated with clearance surveys and relocation will be exceeded if any fringe-toed lizards are injured or killed during handling and relocation activities.

Construction and O&M

As previously discussed, this Project is a revised Covered Activity under the CVMSHCP that CVCC has determined to be consistent with the requirements of the Plan. We addressed the status of the Coachella Valley milk-vetch and Coachella Valley fringe-toed lizard along with the effects of implementing the CVMSHCP, including its Covered Projects, in our biological opinion (Service 2008b) in which we concluded that the level of anticipated take in the CVMSHCP area was not likely to result in jeopardy to those species. We do not anticipate additional activities potentially resulting in take to Coachella Valley fringe-toed lizard during construction and O&M activities occurring on private lands that were not previously evaluated in the biological opinion (Service 2008b) for the CVMSHCP. Therefore, CVWD has incidental take authorization for activities associated with construction and O&M effects on private lands through the 10(a)(1)(B) (TE-104604-0) Incidental Take Permit (Service 2008b) issued for the Plan, subject to the Project's continued consistency and the terms and conditions of this biological opinion per Section 7 of the CVMSHCP. Therefore, we extend CVWD's take authorization of Coachella Valley fringe-toed lizard to the Corps for the effects to Plan-administered lands associated with their proposed action.

The proposed action's effects to Federal lands were not analyzed within the Plan biological opinion (Service 2008b) and are evaluated within this biological opinion. Construction and O&M activities involving earth-moving, ground disturbance, heavy equipment, and increased vehicular traffic may result in take of fringe-toed lizards in the form of injuring or killing. CVWD has proposed to implement conservation measures on private and federal lands to avoid and minimize risks of incidental take. CVWD will implement biological monitoring to avoid lizards that may be encountered during work activities. CVWD has also proposed measures to exclude, monitor, and move fringe-toed lizards within the work area out of harm's way. As described earlier, we anticipate that some fringe-toed lizards of any age and their eggs within the

461.82 acres of suitable habitat affected by the Project may not be found during clearance surveys and may potentially remain in the work areas exposed to some Project-related effects, including injury or death. However, we anticipate that the risks to Coachella Valley fringe-toed lizards will be sufficiently minimized or avoided because Qualified Biologists approved to handle fringe-toed lizards will oversee relocation and ensure implementation of conservation measures. As described previously, the number of Coachella Valley fringe-toed lizards within work areas that may be exposed to take during the life of the Project is not practicably determinable. Fringe-toed lizard densities can vary annually in numbers and distribution within any area of suitable occupied habitat. Therefore, we will use an appropriate surrogate to quantify anticipated incidental take of Coachella Valley fringe-toed lizards, as described below.

The regulations for section 7(a)(2) clarify that the Service may use surrogates to express the amount or extent of anticipated take when "exact numerical limits on the amount of anticipated incidental take may be difficult" (80 FR 26832). The implementing regulations [50 CFR § 402.14(i)(1)(i)] require that the Service meet three conditions for the use of a surrogate. To use a surrogate, the Service must:

1. Describe the causal link between the surrogate and take of the listed species.

2. Describe why it is not practical to express the amount of anticipated take or to monitor take-related impacts in terms of individuals of the listed species.

3. Set a clear standard to determine when the proposed action has exceeded the anticipated amount or extent of the take:

The numbers and distribution of Coachella Valley fringe-toed lizards within the action area vary widely each year depending on annual rainfall. These factors can also vary at finer scales within the Project footprint, based on the structure of sand formations within aeolian habitat. Additionally, due to the species' small size, cryptic burrowing behavior under the surface of sand dunes and the physical features of aeolian habitats, detecting all individual lizards and eggs injured or killed due to Project activities would be difficult. For these reasons, the exact number of individual Coachella Valley fringe-toed lizards that may occupy the action area and potentially be subject to take during the life of the Project (including construction and O&M) is not practicably determinable.

Additionally, the distribution of fringe-toed lizards within occupied habitat may also vary yearly by type of aeolian habitat formation (e.g., stabilized sand fields vs. active dunes), and these habitat types can occur in shifting mosaics over time within the action area due to the nature of aeolian processes. Therefore, we will use acres of suitable Coachella Valley fringe-toed lizard habitat, referenced in the biological assessment (Aspen 2021), as a surrogate for individual Coachella Valley fringe-toed lizards. For the purposes of this biological opinion, suitable habitat includes designated critical habitat, modeled habitat identified by the CVMSHCP, and all areas determined to be suitable habitat by the Applicant's habitat assessments (see Table 4). Of this suitable habitat, we will also distinguish between Federal and private, unoccupied and occupied habitat, and areas of designated critical habitat. We will not distinguish between the Applicant's ranking of habitat quality (i.e., low-high), as all rankings of suitable habitat may potentially be occupied or used by fringe-toed lizards in some manner at a given point during the life of the

Project, based on life-stage of lizards, environmental conditions, population dynamics, or other factors that may vary over time.

Because recovery of disturbed vegetation in arid environments can take several decades to recover, often beyond the anticipated operational life of the Project, we consider all ground-disturbing effects associated with the Project to be permanent. A review of post-disturbance restoration efforts in the Sonoran and Mojave desert found that the re-establishment of vegetation cover back to equivalent conditions prior to disturbance typically occurred within 100 years in most cases (Abella 2010), though restoration to some desert disturbances were shown to significantly recover within 33 to 40 years (Vasek *et al*. 1975, Abella 2010). Therefore, permanent, and temporary disturbance associated with Project components and activities will be combined in our disturbance calculations for the purposes of this incidental take statement.

Construction

Based on the Project description, we anticipate that the Project activities associated with the construction phase would disturb 461.82 acres of suitable Coachella Valley fringe-toed lizard habitat (Table 1). Of that total, CVWD has incidental take authorization for the Project granted through the CVMSHCP for effects on 452.77 acres of private land, provided that the Project activities remain consistent with the CVMSHCP. Because CVCC has determined that the Project as currently described is consistent with the Plan, we extend CVWD's take authorization to the Corps for effects on their associated action to private lands. If Project activities result in disturbance on private lands beyond 452.77 acres, the threshold for incidental take on private lands will be exceeded. We also anticipate the proposed action would disturb 9.05 acres of Federal lands, consisting of 7.63 acres within the CVNWR and an additional 1.42 acres of NWRS lands. If Project activities result in disturbance to additional acres of suitable fringe-toed lizard habitat beyond these aforementioned amounts and extent per Federal or CVMSHCP lands respectively, the threshold for incidental take of Coachella Valley fringe-toed lizard during the Project construction phase will be exceeded.

O&M

Based on the Project description, we anticipate that all O&M activities associated with the Project would occur within the extent of the Project's 461.82-acre anticipated footprint. Therefore, if O&M activities result in additional disturbance to suitable habitat for Coachella Valley fringe-toed lizard beyond the aforementioned amounts and extents of either Federal or private lands, the threshold of incidental take of Coachella Valley fringe-toed lizard attributed to the Project's operations and maintenance activities will be exceeded.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined the effect of the anticipated incidental take is not likely to result in jeopardy to the Coachella Valley fringe-toed lizard.

The Project is expected to provide net benefits to the Thousand Palms aeolian habitat system by retaining sediment that would otherwise be lost during heavy flood events, thereby increasing the volume of sediment circulating within the habitat system by 9 to 14 percent (Lancaster 2021). This increase in sediment volume is anticipated to sustain and improve aeolian habitat

conditions. Due to these proposed conservation measures and the anticipated net benefit of the project, we conclude that the Project would also not likely result in adverse modification or destruction of designated critical habitat for either species.

REASONABLE AND PRUDENT MEASURES

We have determined that the following reasonable and prudent measures are necessary and appropriate to minimize the effect of incidental take on the Coachella Valley fringe-toed lizard.

RPM 1. For Project activities impacting private lands, the Corps and CVWD shall fully implement the requirements of the CVMSHCP, and the Project's conservation measures throughout the life of the Project.

RPM 2. For Project activities impacting Federal lands, the Corps shall fully implement the requirements of the Project' biological opinion throughout the life of the Project.

RPM 3. The Corps and CVWD shall monitor and report the level of incidental take of Coachella Valley fringe-toed lizard to the Service throughout the life of the Project and report on the effectiveness of the Project's conservation measures to reduce the impact of incidental take.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Corps and Coachella Valley Water District must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

TC 1.1 To implement reasonable and prudent measure number 1, the Corps, CVWD, and all of their agents and contractors, will ensure implementation of all avoidance and minimization requirements of Section 7.3.1 of the CVMSHCP and the updated Consistency Determination (CVCC 2021), and the non-discretionary conservation measures. The Corps and CVWD will monitor and report to the Service the levels of incidental take, effectiveness of Project conservation measures, and other monitoring and reporting requirements described within the CVMSHCP and the biological opinion to the Service throughout the life of the Project.

TC 1.2 To implement reasonable and prudent measure number 2, the Corps and CVWD will ensure the implementation of all non-discretionary conservation measures described within the biological opinion. Additionally, the Corps will coordinate with CVNWR to ensure that all NWRS-specific requirements are met for activities impacting NWRS lands.

REPORTING REQUIREMENTS

Pursuant to 50 CFR § 402.14(i)(3), the Corps must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. We have determined that the following measures are necessary to monitor and report on project impacts:

During the pre-construction and construction phases, CVWD and the Corps will provide monthly compliance reports that detail information on any of the following instances:

1. When the federally listed species under consultation of this biological opinion are killed, injured, or handled;

2. When individuals of other listed species or CVMSHCP Covered Species were killed, injured, or handled;

3. When any areas, ecological processes, or physical and biological features of designated critical habitat for a listed species are disturbed, modified, or destroyed;

4. The circumstances of such incidents; and

5. All actions undertaken to prevent similar instances from re-occurring.

Within 90 days of the completion of construction activities, the Corps in coordination with CVWD, must provide a report to the Service that provides details on the effects of Project construction on Coachella Valley milk-vetch, Coachella Valley fringe-toed lizard, and designated critical habitat for each species. Throughout the Project's O&M phase, the Corps and CVWD shall prepare and provide to the Service an annual report by January 31 of each year of the Project. As part of these reports, the Corps and CVWD must describe the monitoring efforts that occurred during the reporting period. We request that the Corps and CVWD provide us with any recommendations that would facilitate the implementation of the protective measures while maintaining protection of the Coachella Valley fringe-toed lizard or Coachella Valley milk-vetch. The annual report shall document but not be limited to the following:

1. Any activities determined by the Qualified Biologist to be out of compliance with Project specifications and conservation measures outlined in this biological opinion, and with the corrective measures implemented to bring the Project back into compliance.

2. The total amount and location of Coachella Valley fringe-toed lizard modeled habitat disturbed by O&M activities.

3. The total amount of lizards relocated from Project activities.

DISPOSITION OF SICK, INJURED, OR DEAD SPECIMENS

The Palm Springs Fish and Wildlife Office (PSFWO) is to be notified immediately at 760-322-2070 if any Coachella Valley fringe-toed lizards are found sick, injured, or dead in the Project area. Immediate notification means verbal and written notice within 1 workday, and must include the date, time, and location of the carcass, and any other pertinent information. Care must be taken in handling sick or injured individuals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state.

The PSFWO should also be notified immediately at 760-322-2070 if any endangered or threatened species not addressed in this biological opinion is found dead or injured within the action area during

the life of the project. The same reporting requirements also shall pertain to any healthy individual(s) of any threatened or endangered species found in the action area and handled to remove the animal to a more secure location.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations (CR) are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

CR 1. We recommend that the Corps and CVWD coordinate with us, CVCC, UCR Center for Conservation Biology (CCB), and/or other partners to contribute to ongoing long-term monitoring efforts of Coachella Valley milk-vetch, Coachella Valley fringe-toed lizard, and habitat under the CVMSHCP. We recommend monitoring efforts evaluate the Project's long-term impacts to the following:

a. Fluvial and aeolian processes within the Thousand Palms Conservation Area

b. Aeolian Habitat Condition

c. Coachella Valley fringe-toed lizard population response to relocation

d. Protocol and success of salvaging and/or propagating Coachella Valley milk-vetch

REINITIATION NOTICE

Reinitiation of consultation is required and will be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:

1. If the amount or extent of taking specified in the incidental take statement is exceeded;

2. If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

3. If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or

4. If a new species is listed or critical habitat designated that may be affected by the identified action.

Sincerely,

SCOTT SOBIECH

Digitally signed by SCOTT SOBIECH
Date: 2022.09.30 14:14:28 -07'00'

Scott A. Sobiech
Field Supervisor

LITERATURE CITED

Abella, S. R. 2010. Disturbance and plant succession in the Mojave and Sonoran Deserts of the American Southwest. International Journal of Environmental Research and Public Health 7:1248-1284.

[Aspen] Aspen Environmental Group. 2016. Thousand Palms Flood Control Project Biological Resources Technical Report. Prepared for: Coachella Valley Water District, Palm Springs Field Office, Palm Springs, CA and U.S. Army Corps of Engineers, Arizona Field Office.

[Aspen] Aspen Environmental Group. 2021. Biological Assessment, Thousand Palms Flood Control Project, Riverside County, California. Prepared for: Coachella Valley Water District, Palm Springs Field Office, Palm Springs, CA and U.S. Army Corps of Engineers, Regulatory Division, Arizona Field Office.

[Aspen] Aspen Environmental Group. 2022. Thousand Palms Flood Control Project. Draft Environmental Impact Statement / Environmental Impact Report. March 2022. Prepared for: Coachella Valley Water District, Palm Springs Field Office, Palm Springs, CA and U.S. Army Corps of Engineers, Regulatory Division, Arizona Field Office.

Barrows, C.W. 2006. Population dynamics of a threatened sand dune lizard. The Southwest Naturalist 51(4):514–523.

Barrows, C.W. and S.A. Heacox, 2021. Forty years later: monitoring and status of the endangered Coachella Valley fringe-toed lizard. California Fish And Game, 107, pp. 243-257

Barrows, C. W. and M.F. Allen. 2010. Patterns of occurrence of reptiles across a sand dune landscape. Journal of Arid Environments 74:186-192.

Barrows, C.W., K.L. Preston, J.T. Rotenberry, and M.F. Allen. 2008. Using occurrence records to model historic distributions and estimate habitat losses for two psammophilic lizards. Biological Conservation 141:1885–1893.

[CVAG] Coachella Valley Association of Governments. 2007a. Final recirculated Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan. September 2007. Palm Desert, CA.

[CVAG] Coachella Valley Association of Government. 2007b. Geospatial Dataset: CVMSHCP Desert Tortoise Modeled Habitat. Polygon shapefile. March 28, 2022.

[CVAG] Coachella Valley Association of Governments. 2007c. Implementation Agreement for the Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan. September 2007. Amended 2016. Palm Desert, CA.

[CVCC] Coachella Valley Conservation Commission. 2021. Consistency determination for Coachella Valley Conservation Commission 21-001: Thousand Palms Flood Control Project in the Thousand Palms Conservation Area. July 2021. Palm Desert, CA.

Fisher, M., A. Muth, and R.F. Johnson. 2020. A Long-term Study of Home Range of Coachella Fringe-Toed Lizards, *Uma inornata*. Journal of Herpetology 54(2):174-182.

Griffiths, P.G., R.H. Webb, N. Lancaster, C.A Kaehler, and S.C. Lundstrom. 2002. Long-term sand supply to Coachella Valley fringe-toed lizard habitat in the Northern Coachella Valley, California. Water-Resources Investigations Report 2002. 2:4013.

Hollenbeck, E., B.D. Hollingsworth, and M.A. Stepek. 2010. Colorado Desert Fringe-toed Lizard Assessment for the Freeman Properties California State Parks and Recreation in Imperial County Contract C0754011 Final Report.

Lancaster, N. 2021. Geomorphic Assessment of Sand Transport Impacts for the Thousand Palms Flood Control Project – Document Review. Draft Final Report prepared for Aspen Environmental Group. Prepared by Division of Earth and Ecosystems Sciences, Desert Research Institute.

McCoy, E.D., N. Osman, B. Hauch, A. Emerick, and H.R. Mushinsky. 2014. Increasing the chance of successful translocation of a threatened lizard: Animal Conservation 17(1):56–64.

Meinke, R.J., K. Amsberry, R.E. Currin, S.C. Meyers, and B. Knaus. 2007. Evaluating the biological conservation status of the Coachella valley milkvetch (*Astragalus lentiginosus* var. *coachellae*). Native Plant Conservation Program. Pp.11-19.

[TNC] The Nature Conservancy. 1985. Coachella Valley Fringe-toed Lizard Habitat Conservation Plan. Coachella Valley Fringe-toed Lizard Habitat Conservation Plan Steering Committee.

Thelander, C.G. 1994. Life on the edge: a guide to California's endangered natural resources. Biosystem Books. Pp. 268–271.

[UCR] University of California, Riverside. 2012. Coachella Valley Multiple Species Habitat Conservation Plan, Aeolian Sand Communities and Species Monitoring Protocols . Prepared for the Coachella Valley Conservation Commission. Riverside, CA.

[UCR] University of California, Riverside. 2020a. Coachella Valley Multiple Species Habitat Conservation Plan/ Natural Community Conservation Plan. 2019 Annual Report. Prepared by the University of Riverside Center for Conservation Biology. Prepared for Coachella Valley Conservation Commission. Riverside, CA

[UCR] University of California, Riverside. 2020b. Coachella Valley Multiple Species Habitat Conservation Plan, Aeolian Sand Species Trends. Prepared for the Coachella Valley Conservation Commission. Riverside, CA.

[UCR] University of California, Riverside. 2021a. Coachella Valley Multiple Species Habitat Conservation Plan/ Natural Community Conservation Plan. 2020 Annual Report. Prepared by the University of Riverside Center for Conservation Biology. Appendix V:

Aeolian Sand Species Monitoring Report 2020. Prepared for Coachella Valley Conservation Commission. Riverside, CA.

[UCR] University of California, Riverside. 2021b. Coachella Valley Multiple Species Habitat Conservation Plan, Aeolian Sand Species Trends. Prepared for the Coachella Valley Conservation Commission. Riverside, CA.

[UCR] University of California, Riverside. 2022. Coachella Valley Multiple Species Habitat Conservation Plan/ Natural Community Conservation Plan. Annual Report 2021. Prepared by the University of Riverside Center for Conservation Biology. Appendix VII: Coachella Valley Milk-vetch Monitoring Report 2021. Prepared for Coachella Valley Conservation Commission. Riverside, CA.

[Service] U.S. Fish and Wildlife Service. 1980. Endangered and Threatened Wildlife and Plants; Listing as Threatened with Critical Habitat for the Coachella Valley Fringe-Toed Lizard. Final Rule. Federal Register 45:63812-63820.

[Service] U.S. Fish and Wildlife Service. 1985. Coachella Valley Fringe-toed Lizard Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 60 pp.

[Service] U.S. Fish and Wildlife Service. 1995. Biological Opinion for Ongoing Maintenance Activities on Southern California Gas Company's Pipeline System in the Southern California Deserts (6840 CA-063.50 CA-930.6); Ref. No. 1-8-95-F-28, dated November 25, 1995. Carlsbad Fish and Wildlife Office, Carlsbad, CA.

[Service] U.S. Fish and Wildlife Service. 1998. Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Five Desert Milk-vetch Taxa From California; Final rule. Federal Register 63:53596-53615.

[Service] U.S. Fish and Wildlife Service. 2000. Biological Opinion on the Whitewater River Flood Control Project, Riverside County, California; Ref. No. 1-8-95-F-28, dated November 25, 1995. Carlsbad Fish and Wildlife Office, Carlsbad, CA.

[Service] U.S. Fish and Wildlife Service. 2008a. Federal Fish and Wildlife Permit section 10(a)(1)(B) (TE-104604-0) under the Endangered Species Act for the Coachella Valley Multiple Species Habitat Conservation Plan, Riverside County, California. Sacramento, CA.

[Service] U.S. Fish and Wildlife Service. 2008b. Intra-Service Formal Section 7 Consultation for Issuance of a Section 10(a)(1)(B) (TE-104604-0) Incidental Take Permit under the Endangered Species Act for the Coachella Valley Multiple Species Habitat Conservation Plan, Riverside County, California; Ref. No. FWS-ERIV-2008B0132/2008F0124, dated October 10, 2008. Carlsbad Fish and Wildlife Office, Carlsbad, CA.

[Service] U.S. Fish and Wildlife Service. 2009a. *Astragalus lentiginosus* var. *coachellae* (Coachella Valley milk-vetch) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Carlsbad, CA.

[Service] U.S. Fish and Wildlife Service. 2009b. Desert Tortoise (Mojave Population) Field Manual: Gop*herus agassizii*. Region 8, Sacramento, CA.

[Service] U.S. Fish and Wildlife Service. 2010a. Coachella Valley fringe-toed lizard (*Uma inornata)* 5-Year Review. U.S. Fish and Wildlife Service, Carlsbad, CA.

[Service] U.S. Fish and Wildlife Service. 2010b. Biological Opinion Re-initiation of Endangered Species Act Consultation on the Effects of the California Desert Conservation Area Plan Amendment for the Coachella Valley, Riverside County, California; Ref. No. FWS-ERIV-10B0278-10F0649, dated June 30, 2010. Carlsbad Fish and Wildlife Office, Carlsbad, CA.

[Service] U.S. Fish and Wildlife Service. 2013a. Biological Opinion for the Establishment of a Sand Relocation Site at the Coachella National Wildlife Refuge, Riverside, County; March 26, 2013. Sonny Bono Salton Sea National Wildlife Refuge. Calipatria, California.

Service] U.S. Fish and Wildlife Service. 2013b. Endangered and threatened wildlife and plants; designation of critical habitat for *Astragalus lentiginosus* var. *coachellae* (Coachella Valley milk-vetch); Final rule. Federal Register 78:10450-10497.

[Service] U.S. Fish and Wildlife Service. 2014. Sonny Bono Salton Sea National Wildlife Refuge Complex: Sonny Bono Salton Sea NWR, Coachella Valley NWR. Final Comprehensive Conservation Plan.

Vandergast, A.G., D.A. Wood, M. Fisher, C. Barrows, A. Mitelberg, and J.G. Smith. 2019. Sampling across 20 years (1996–2017) reveals loss of diversity and genetic connectivity in the Coachella Valley fringe-toed lizard (*Uma inornata*): U.S. Geological Survey Open-File Report 2019–1105, 20 p.

Vasek, F. C, H. B. Johnson, and G. D. Brum. 1975. Effects of power transmission lines on vegetation of the Mojave Desert. Madroño 23(3):114-130.