Appendix F2
Streambed Delineation

ESA

Streambed Delineation for the
Cadiz Groundwater Conservation and Storage Project,
San Bernardino County, California

Job#: 10-030

Prepared by:
Circle Mountain Biological Consultants, Inc.
P.O. Box 3197
Wrightwood, California 92397
PH: (760) 249-4948
FAX: (760) 249-4948
Email: circlemtn@yahoo.com
Contacts: Ed LaRue, Sharon Dougherty

Prepared for:
Santa Margarita Water District
26111 Antonio Parkway
Rancho Santa Margarita, California 92688
PH: (949) 459-6400

I hereby certify that the statements furnished herein, including attached exhibits, present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me or under my direct supervision. I certify that I have not signed a nondisclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.

_____

Circle Mountain Biological Consultants, Inc.
Author and Field Investigator: Edward L. LaRue, Jr.

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Executive Summary

There are approximately 70 streambed crossings perpendicular to the 45-linear mile± proposed Water Conveyance Pipeline and a more dense desert vegetation area running along the eastern side of the pipeline alignment that may be affected by Pipeline installation. There are two major wash systems and minor tributaries running northeast-to-southwest through the proposed wellfield and conceptual spreading basin areas that also may be affected by construction of extraction wells and associated interconnecting pipelines. Once engineering plans are finalized, the information presented herein could be used as supporting data for completion of a 1601-03 Streambed Alteration Agreement with the California Department of Fish and Game.

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Cadiz Valley Water Conservation, Recovery, and Storage Project,
San Bernardino County, California

1.0. Introduction

1.1. Purpose and Need for Study. Circle Mountain Biological Consultants, Inc. (CMBC) was contacted by ESA Southern California Water Group (ESA) on behalf of the Santa Margarita Water District (SMWD) to perform various biological resource studies in support of the Cadiz Valley Water Conservation, Recovery, and Storage Project (proposed Project) located in San Bernardino County, California (see **Figure 1**). Among other resources, CMBC collected data along all dry washes, drainages, and water courses (herein "streambeds") encountered along both the proposed water conveyance pipeline and connection to the Colorado River Aqueduct (CRA) (proposed pipeline) and in the proposed wellfield and conceptual spreading basin areas (wellfield areas), referred to as "crossings." This information could be used later, once engineering plans are finalized, as baseline data for obtaining a 1601-03 Streambed Alteration Agreement from California Department of Fish and Game (CDFG).

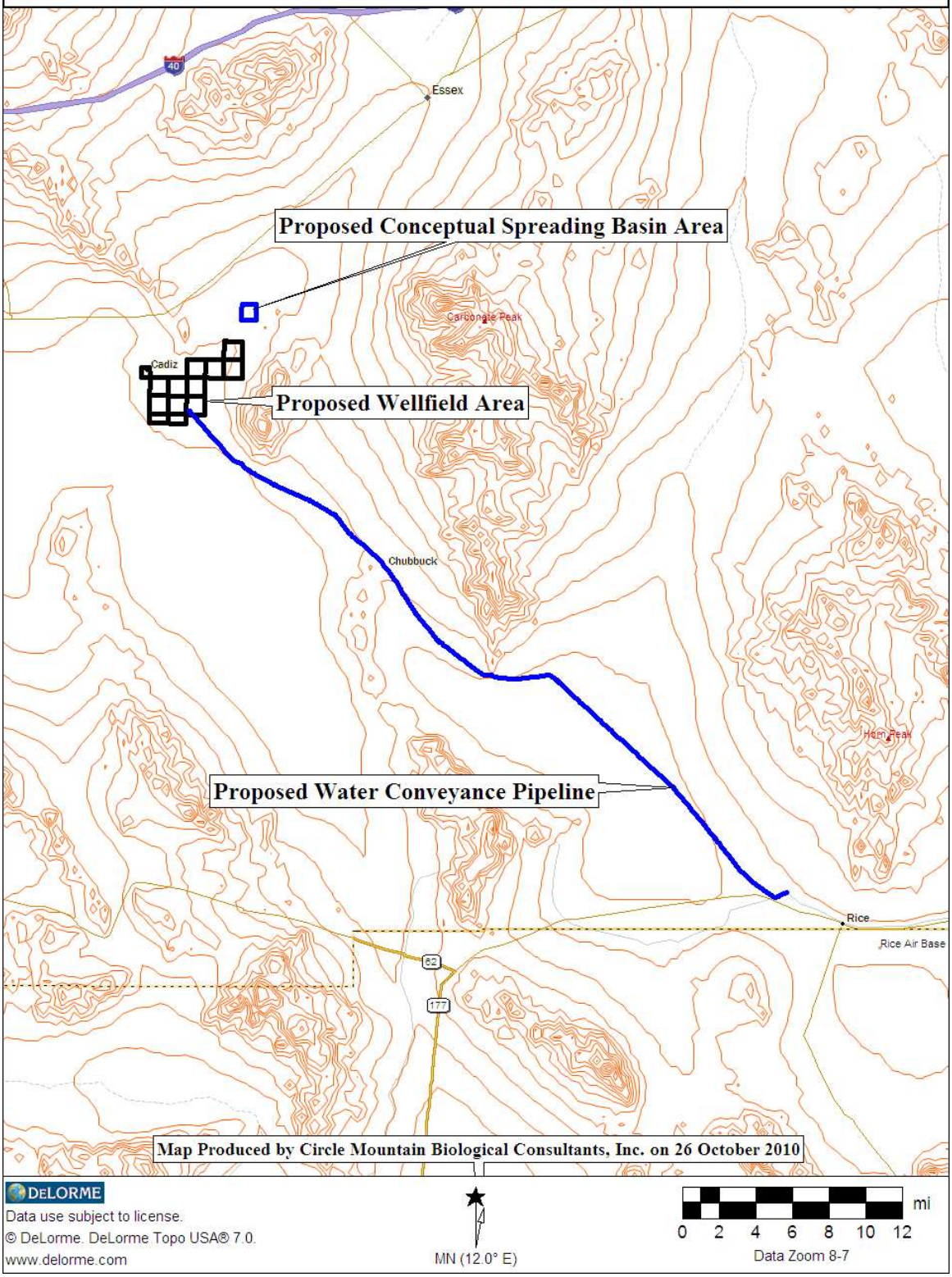
1.2. Project Location. ESA provided the following project location description for the proposed Project. The facilities to be constructed for the Project would be located at the confluence of the Fenner , Cadiz and Bristol Watersheds approximately 220 miles east of Los Angeles, 75 miles southwest of Needles, and 65 miles northeast of Twentynine Palms. The Fenner Valley is a large northeast to southwest trending valley that intersects Cadiz Valley at the Fenner Gap located between the Marble and Ship mountains (Metropolitan Water District 2001).

The Fenner groundwater basin is within a topographically closed drainage system that includes three main drainage basins: Bristol, Cadiz, and Fenner (GeoScience 2010). These basins are considered one drainage system because all surface and groundwater within these basins drains to a central lowland area (i.e. Bristol and Cadiz dry lakes). The Bristol, Cadiz, and Fenner basin system is separated from the surrounding drainage basins by topographic divides (generally mountain ranges).

The total area of the Bristol, Cadiz and Fenner groundwater basin system is approximately 2,710 square miles. Fenner Watershed is approximately 1,100 square miles. Groundwater flow within the Fenner Basin flows through Fenner Gap to the Bristol Dry Lake and Cadiz Dry Lake. The elevation of Bristol Dry Lake is approximately 600 feet above mean sea level**.** The Fenner Valley is bounded by granitic mountain ranges reaching heights over 7,500 feet. The Fenner Gap is at 900 feet.

The alluvial sediments of the valley are underlain by granites and metamorphic rocks, forming a rock-bounded basin overlain with sands and gravels several hundred feet thick. Groundwater ranges from approximately 270 feet below ground surface on the northeastern portion of the project to 140 feet below ground surface in the southwest, becoming shallower with proximity to the dry lakes (GeoScience 1999).

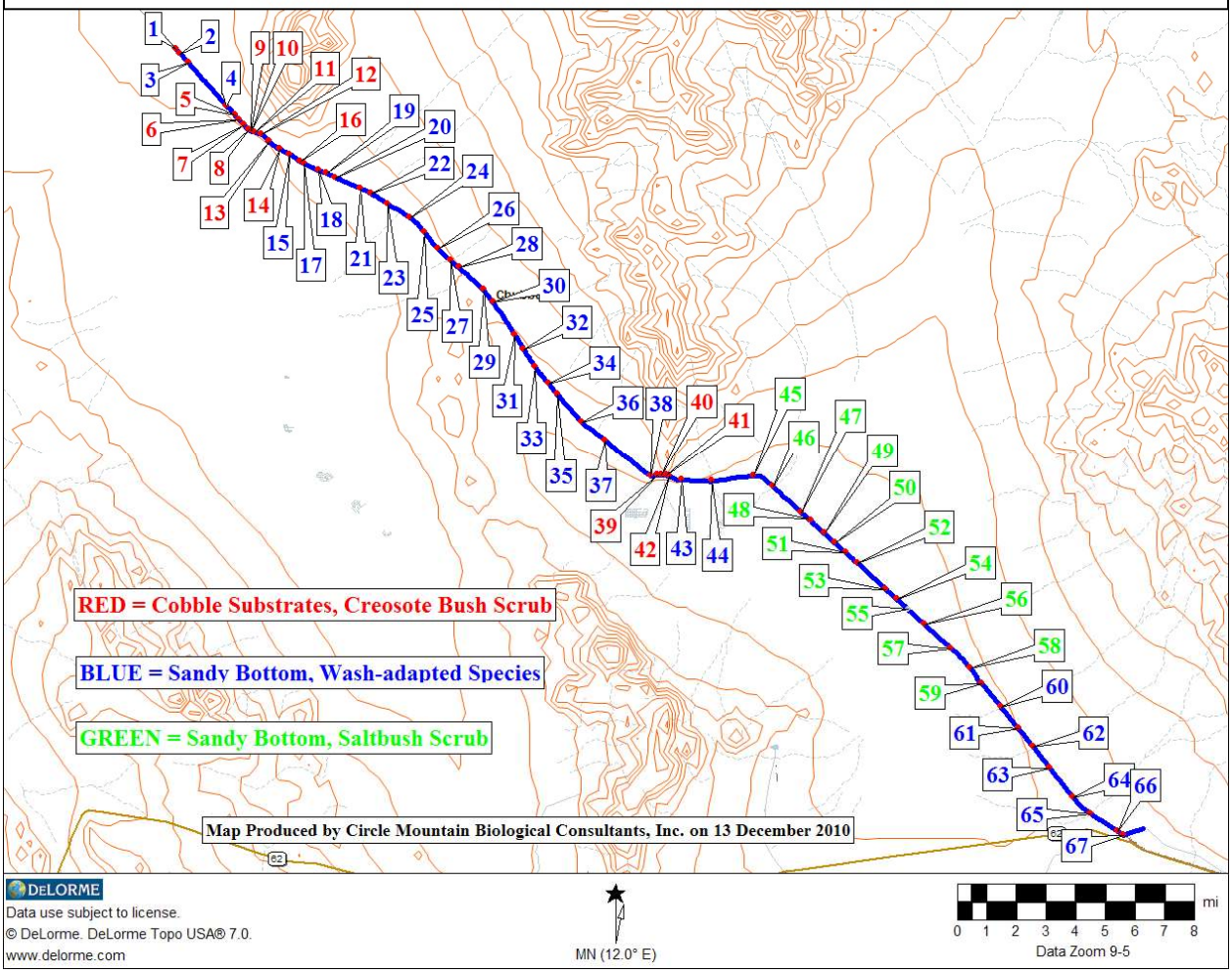
Figure 1. Cadiz Project: Vicinity Map



2.0. Methods

2.1. Field Surveys for Pipeline. Focused surveys for desert tortoise, burrowing owl, and other biological resources were performed by Ed LaRue of CMBC and seven contract biologists between 20 September and 17 October 2010, for a total of 756 hours (see Circle Mountain Biological Consultants, Inc. 2010 for full details). As streambeds were encountered, LaRue recorded the following information at each crossing: dominant perennial shrubs; estimated widths at each streambed crossing; UTM coordinates; and, in most places, photographs. The 67 streambed crossings associated with the proposed pipeline are sequentially listed from north-to-south as 1 through 67 and are mapped in **Figure 2**. These data are presented in **Table 1** on pages 6 and 7.

Figure 2. Cadiz Project: Stream Crossings along Pipeline



2.2. Field Surveys for Wellfield and Conceptual Spreading Basin Areas. Unlike the Pipeline alignment, along which transects were parallel to the Arizona and California Railroad Company (ARZC) rail line and each streambed was crossed one time, the proposed wellfield and conceptual spreading basin areas (wellfield areas) were surveyed along a series of transects spaced at 100 intervals, as depicted below in **Figure 3**. As such, streambeds were crossed at multiple locations. As with the Pipeline crossings, LaRue recorded the following information for the wellfield areas crossings mapped in **Figure 4**, which shows the 24 specific point locations where data were collected: USGS section number; dominant perennial shrubs; UTM coordinates; and photographs. These data are presented in **Table 2** on page 9.

Figure 3. Transect Coverage at Wellfield Areas

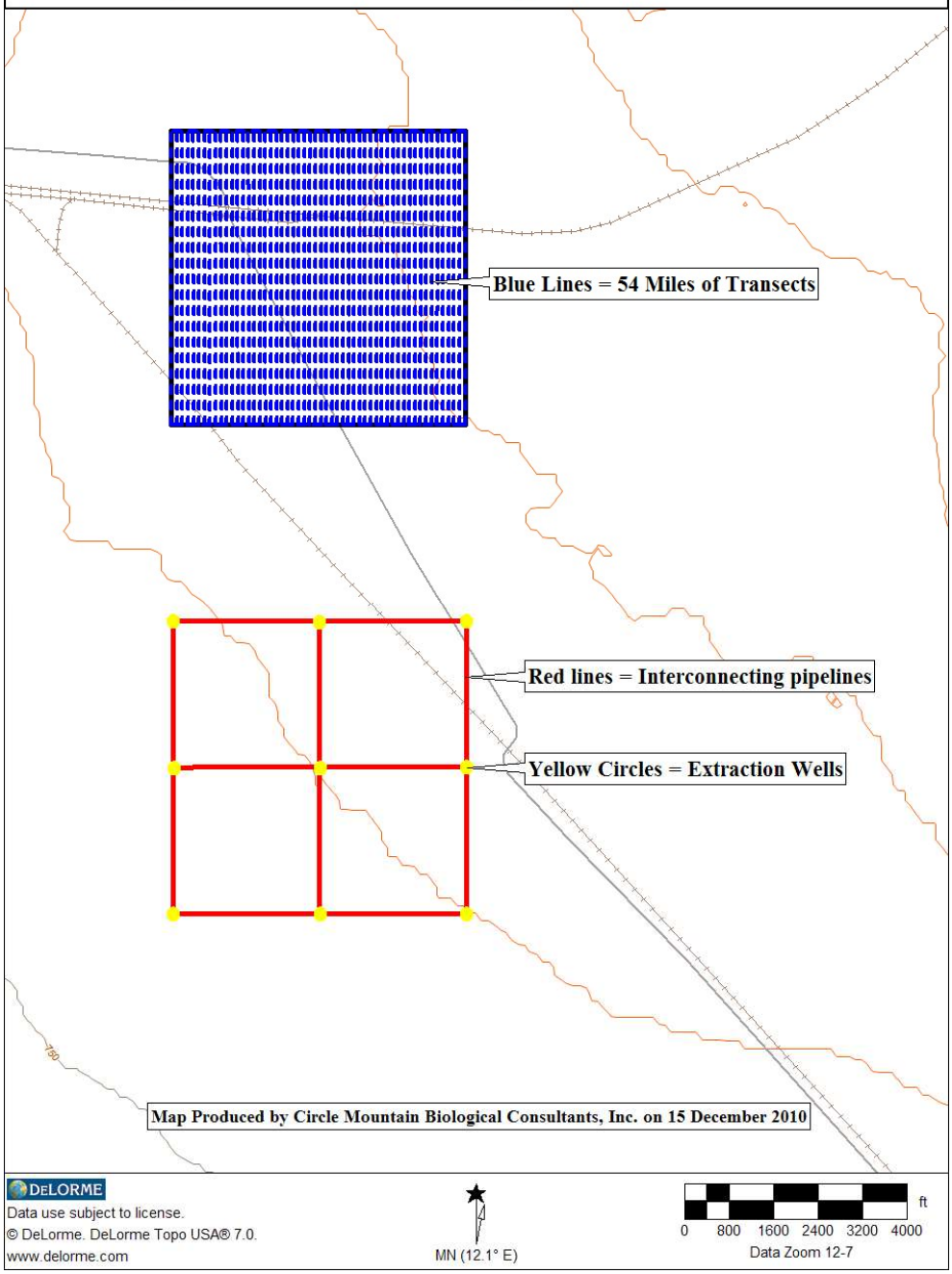
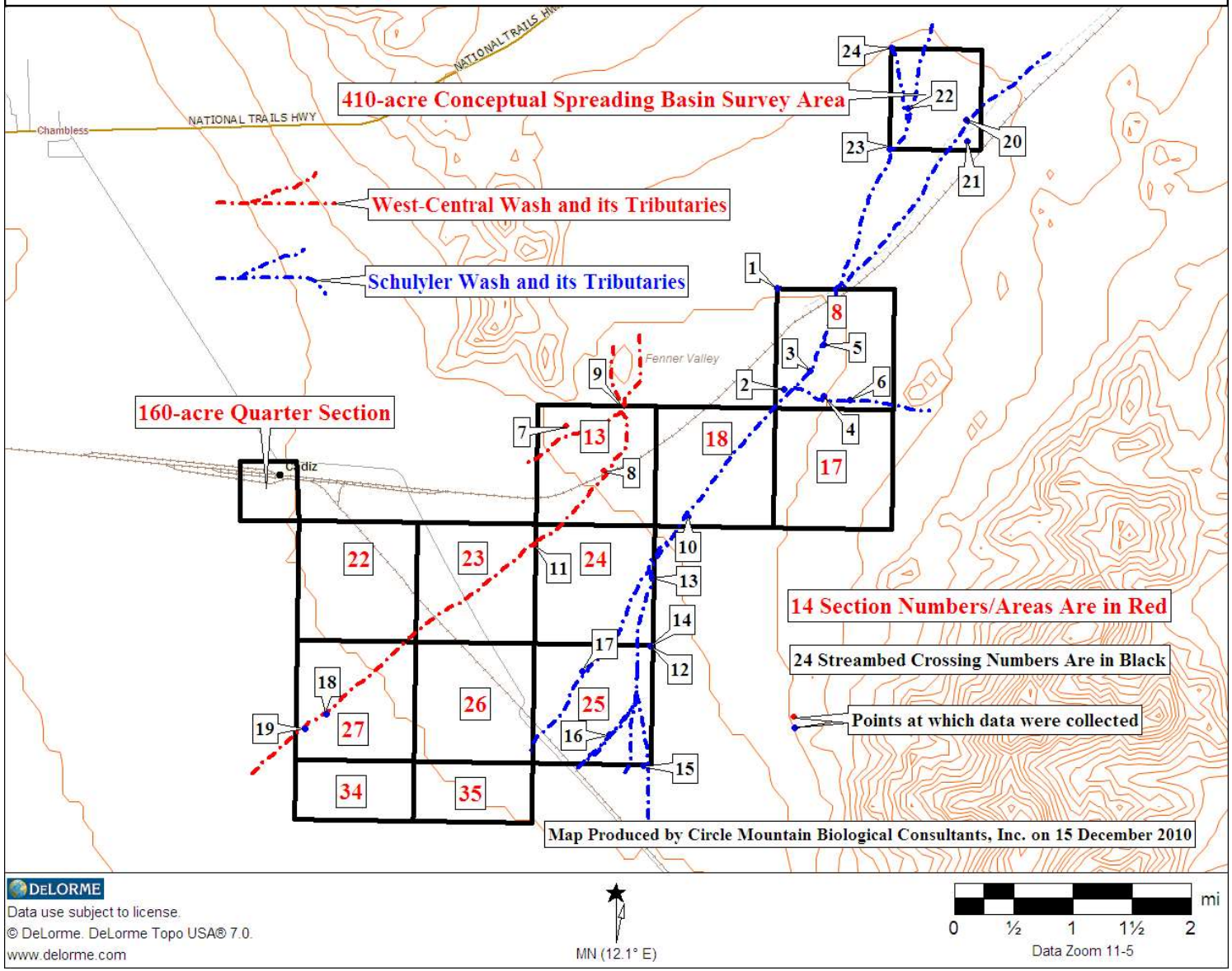


Figure 4. Cadiz Pipeline: Stream Crossings within Wellfield Areas



3.0. Results

3.1. Proposed Pipeline. CMBC identified 67 streambed crossings (e.g., No. 1 through 67 in column 1 below) along the proposed Pipeline that have the potential to be impacted by pipeline installation and project development. There may be a few other streambeds that would be affected but CMBC considers this assessment to include a majority of them and presents an accurate representation of the types of streams occurring in the Project area.

In Table 1, UTM coordinates where each streambed crosses under the ARZC rail line, which coincides with the proposed pipeline, are given in columns two and three. The two types of crossings under the ARZC rail line include bridge-like trestles (including wood, cement, and a combination of the two; see **Exhibit 51** in Appendix B) and either single- or double-holed corrugated pipes, referred to as "culvert" in Table 1 (see **Exhibits 4** and **33** in Appendix B). The estimated width at each crossing is given in column 5. The six-digit codes used to signify the two or three dominant perennial plants at each crossing are listed in the sixth column and defined in Appendix A. CMBC photographed 58 of these 67 crossings, which are mapped in **Figure 6** and included in Appendix B, with exhibit numbers given in the final column.

Table 1. Data for 67 Streambed Crossings along Proposed Pipeline

No.	UTM Coordinates (NAD 83)		Culvert Type	Wash Width (feet)	Dominant Perennials Blue = Sandy, wash-adapted species Red = Cobble, creosote bush scrub Green = Sandy, saltbush scrub	Exhibit No. App. B
	Easting	Northing				
1	640169	3817371	Trestle	60	CHR PAN, AMB DUM, PSO SPI	1
2	640521	3817064	Trestle	30	PSO SPI, ENC FRU, CHR PAN	2
3	640917	3816554	Trestle	100	CHR PAN, PSO SPI, HYM SAL	3
4	643011	3814280	Trestle	70	PSO SPI, PET THU, HYM SAL	None
5	643482	3813774	Trestle	6	HYM SAL, LAR TRI	None
6	643706	3813527	Trestle	15	HYP EMO, BEB JUN, HYM SAL	None
7	643957	3813251	Trestle	50	HYP EMO, BEB JUN, HYM SAL	None
8	644252	3813002	Culvert	6	AMB DUM, LAR TRI	None
9	644325	3812957	Culvert	5	ABM DUM, LAR TRI	4
10	644413	3812923	Culvert	4	AMB DUM, ENC ACT, BEB JUN	5
11	644571	3812878	Culvert	6	LAR TRI, AMB DUM, ENC ACT	6
12	644921	3812773	Trestle	60	HYM SAL, BEB JUN, ENC ACT	7
13	645330	3812412	Trestle	30	BEB JUN, ENC ACT, HYP EMO	8
14	645933	3811995	Trestle	40	ENC ACT, BEB JUN, LAR TRI	9
15	646476	3811705	Trestle	80	PSO SPI, BEB JUN HYM SAL	10
16	647047	3811343	Culvert	6	BEB JUN, HYM SAL, AMB DUM	11
17	647270	3811210	Trestle	15	BEB JUN, HYM SAL	12
18	648048	3810868	Culvert	10	AMB, DUM, LAR TRI	13
19	648446	3810704	Trestle	40	HYM SAL, AMB DUM, PSO SPI	14
20	648970	3810488	Trestle	50	HYM SAL, AMB DUM, LAR TRI	15
21	650345	3809914	Trestle	30	AMB DUM, LAR TRI, HYM SAL	16
22	655268	3806126	Trestle	40	AMB DUM, LAR TRI	17
23	655746	3805737	Trestle	20	HYM SAL, AMB DUM, LAR TRI	18
24	653035	3808399	Trestle	10	AMB DUM, HYM SAL, LAR TRI	19
25	653835	3807632	Trestle	15	LAR TRI, ENC ACT, HYM SAL	20

Table 1. (cont.) Data for 67 Streambed Crossings along Proposed Pipeline

No.	UTM Coordinates (NAD 83)		Culvert Type	Wash Width (feet)	Dominant Perennials Blue = Sandy, wash-adapted species Red = Cobble, creosote bush scrub Green = Sandy, saltbush scrub	Exhibit No. App. B
	Easting	Northing				
26	654583	3806760	Trestle	25	AMB DUM, LAR TRI	21
27	655281	3806135	Trestle	50	LAR TRI, AMB DUM	22
28	655754	3805743	Trestle	70	HYM SAL, PET THU, LAR TRI	23
29	657099	3804566	Trestle	20	LAR TRI, HYM SAL, PET THU	24
30	657622	3803889	Trestle	40	HYM SAL, AMB DUM, LAR TRI	25
31	658843	3802157	Trestle	45	AMB DUM, LAR TRI	None
32	659330	3801394	Trestle	60	LAR TRI, AMB DUM, HYM SAL	26
33	659943	3800440	Trestle	35	HYM SAL, AMB DUM, LAR TRI	27
34	660693	3799566	Trestle	20	HYM SAL, AMB DUM, LAR TRI	28
35	661219	3798975	Trestle	15	AMB DUM, LAR TRI	29
36	662549	3797507	Trestle	40	HYM SAL, LAR TRI, AMB DUM	30
37	663785	3796529	Trestle	10	HYM SAL, LAR TRI, AMB DUM	None
38	666318	3794638	Trestle	50	PSO SPI, HYM SAL, BEB JUN	31
39	666681	3794666	Culvert	5	BEB JUN, ENC ACT, AMB DUM	None
40	666905	3794680	Culvert	60	BEB JUN, HYM SAL, ENC ACT	32
41	667185	3794645	Culvert	15	ENC ACT, LAR TRI, BEB JUN	33
42	667312	3794607	Culvert	10	ENC ACT, HYM SAL, AMB DUM	34
43	668009	3794413	Trestle	20	PSO SPI, HYM SAL, BEB JUN	35
44	669635	3794376	Trestle	10	PSO SPI, HYM SAL, LAR TRI	36
45	671892	3794732	Trestle	35	ATR POL, HYM SAL	37
46	672950	3794169	Trestle	60	HYM SAL, ATR POL, AMB DUM	38
47	674522	3792810	Trestle	20	ATR POL, LAR TRI, HYM SAL	39
48	675055	3792355	Trestle	30	HYM SAL, AMB DUM, LAR TRI	40
49	675796	3791709	Trestle	40	HYM SAL, ATR POL, AMB DUM	41
50	676385	3791199	Trestle	15	LAR TRI, AMB DUM, HYM SAL	42
51	676995	3790673	Trestle	8	ATR POL, AMB DUM	43
52	677605	3790139	Trestle	70	ATR POL, LAR TRI, TAM RAM	44
53	679195	3788768	Trestle	15	PSO EMO, ATR CAN, AMB DUM	45
54	679835	3788220	Trestle	30	ATR POL, SUA MOQ, AMB DUM	46
55	680410	3787716	Trestle	30	ATR CAN, SUA MOQ, ATR POL	None
56	681355	3786900	Trestle	10	ATR POL, HYM SAL, AMB DUM	47
57	682812	3785645	Trestle	60	ATR POL, AMB DUM, LAR TRI	48
58	683843	3784569	Trestle	40	HYM SAL, LAR TRI, AMB DUM	49
59	684514	3783761	Trestle	60	AMB DUM, ATR POL, HYM SAL	50
60	685577	3782490	Trestle	50	HYM SAL, AMB DUM, LAR TRI	51
61	686525	3781341	Trestle	80	AMB DUM, HYM SAL, LAR TRI	52
62	687334	3780383	Trestle	90	LAR TRI, PSO SPI	53
63	688247	3779276	Trestle	80	PSO SPI, AMB DUM, LAR TRI	54
64	689566	3777697	Trestle	50	PSO SPI, HYM SAL	55
65	690550	3776865	Trestle	80	PSO SPI, HYM SAL, ASC ERO	56
66	692048	3775919	Trestle	50	PSO SPI, HYM SAL, ENC FRU	57
67	692359	3775727	Trestle	8	STE PAU, AMB DUM, ENC FRU	58

The 67 streambed crossings along the proposed pipeline may be categorized into three general types of washes based on substrates and associated plant communities. The following color codes are used in Table 1 and **Figures 2** and **6** to distinguish among these three types of washes:

There are 37 Blue Washes, which are typically wide (10 to 100+ feet), sandy-bottomed streambeds vegetated by wash-adapted species such as smoke trees (*Psorothamnus spinosus*), wash rabbitbrush (*Chrysothamnus paniculatus*), rayless encelia (*Encelia fructescens*), cheesebush (*Hymenoclea salsola*), and sandpaper plant (*Petalonyx thurberi*). As shown in Figure 2, they occur along the pipeline alignment north of Ship Mountains, between Ship and Old Woman mountains, and along the southern reaches of the proposed pipeline. With the exception of crossing #18 (**Exhibit 13**), all of these washes pass under bridge-like trestles.

There are 15 Red Washes, which are typically narrow (5 to 60 feet), with rocky-to-cobble substrates. These streambeds are typically vegetated by upland species associated with creosote bush scrub, including creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), sweetbush (*Bebbia juncea*), desert lavender (*Hyptis emoryi*), and Acton encelia (*Encelia actoni*). As shown in Figures 2 and 6, these washes are either associated with Ship Mountains or Old Woman Mountains, which are responsible for the associated cobble substrates. Most of these crossings pass through one- or two-holed corrugated pipe culverts.

Finally, there are 15 Green Washes, which are like the red washes except they have sandy bottoms and are vegetated by saltbush scrub rather than creosote bush scrub. These are intermediate in widths (10 to 70 feet) and vegetated by allscale (*Atriplex polycarpa*), four-winged saltbush (*Atriplex canescens*), Torrey's sea-blight (*Suaeda moquinii*), and indigo bush (*Psorothamnus emoryi*), among some of the same plants found along red washes. All of these streambed crossings are located east of Danby Lake, and all pass beneath trestles rather than culverts.

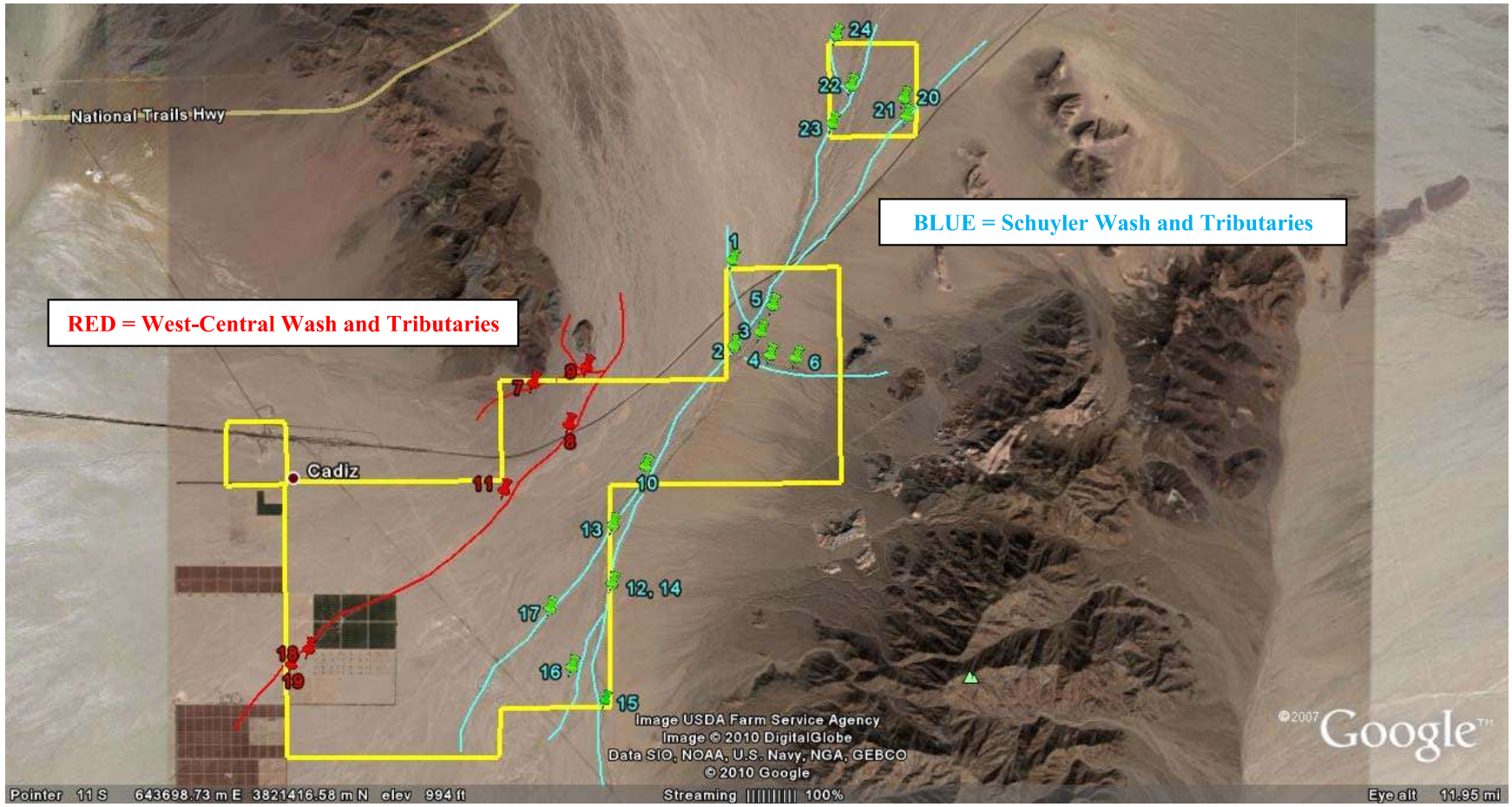
In summary, there are approximately 70 washes and drainages crossing the pipeline alignment. All of these streams flow east-to-west, and in many places have created washes and washlets along the eastern side of the ARCZ railroad. This flow of water impeded by the existing rail line has resulted in a parallel zone of more dense desert perennial plants, including many of wash-adapted species associated with the "blue washes" described above. Where these washes are associated with trestles beneath the train tracks, they serve as focal points for many common and several sensitive animal species.

3.2. Proposed Wellfield and Conceptual Spreading Basin Areas. Table 2 lists the information collected in September and October 2010 for each of 24 streambed crossings that were assessed within the wellfield and conceptual spreading basin areas (wellfield reas) and sequentially numbered 1 through 24 in the first column. USGS section numbers are given in column 2, which are also shown in Figure 4, above. UTM coordinates where data were collected are given in columns three and four. The six-digit codes used to signify the dominant perennial plants at each crossing are listed in the fifth column and defined in Appendix A. CMBC photographed each of these 24 crossings, which are mapped in Figure 4 above, included in Appendix C, with exhibit numbers given in the final column and mapped in **Figure 7** in Appendix C.

Table 2. Data for 24 Streambed Crossings within Proposed Wellfield and Conceptual Spreading Basin Areas Blue = Schulyler Wash, Red = West-Central Wash					
No.	**USGS Section No.**	**UTM Coordinates (NAD 83)**		**Dominant Perennials**	**Exhibit No. App. C**
		Easting	**Northing**		
1	8	643210	3823435	ACA GRE, PSO SPI, HYM SAL, AMB DUM	1
2	8	643323	3822074	PSO SPI, CHR PAN, ACA GRE, HYM SAL	2
3	8	643680	3822336	PSO SPI, CHR NAU, ACA GRE, HYM SAL	3
4	8	643864	3821996	PSO SPI, ENC FRU, HYM SAL, CHR NAU	4
5	8	643856	3822691	PSO SPI, CHR NAU, HYM SAL, ACA GRE	5
6	8	644225	3821946	BEB JUN, HYP EMO, PSO SPI, CHR NAU	6
7	13	640385	3821525	PSO SPI, HYM SAL, LAR TRI	7
8	13	640915	3820925	HYM SAL, BEB JUN, LAR TRI	8
9	13	641178	3821820	PSO SPI, HYM SAL, ENC FRU, LAR TRI	9
10	18	642051	3820341	CHR NAU, PSO SPI, HYM SAL, ENC FRU	10
11	23	639973	3819925	PSO SPI, HYM SAL, LAR TRI, AMB DUM	11
12	24	641566	3818600	PSO SPI, HYM SAL, AMB DUM, ACA GRE	12
13	24	641570	3819510	PSO SPI, CHI LIN, ACA GRE, ENC FRU	13
14	25	641559	3818597	PSO SPI, HYM SAL, ACA GRE, ISO ARB	14
15	25	641491	3816988	PSO SPI, HYM SAL, ACA GRE, ISO ARB	15
16	25	641030	3817395	PSO SPI, HYM SAL, ACA GRE, ISO ARB	16
17	25	640664	3818247	PSO SPI, HYM SAL, ACA GRE, ISO ARB	17
18	27	637179	3817612	PSO SPI, ENC ACT, HYM SAL, PET THU	18
19	27	636899	3817407	PSO SPI, ENC ACT, HYM SAL, PET THU	19
20	Basin	645745	3825748	PSO SPI, CHR PAN, PET THU	20
21	Basin	645758	3825465	HYM SAL, PSO SPI, CHR NAU, PET THU	21
22	Basin	644949	3825890	ACA GRE, PSO SPI	22
23	Basin	644710	3825340	ACA GRE, LAR TRI, PSO SPI	23
24	Basin	644710	3826695	PSO SPI, HYM SAL, LAR TRI	24

All of the streambed crossings in the wellfield and conceptual spreading basin areas are like those shown in blue font for the pipeline alignment, indicating they are generally well-developed drainages, with sandy bottoms, and wash-adapted plant species. The 24 streambed crossings include 18 that are associated with Schulyler Wash, which runs through the conceptual spreading basin and USGS Sections 8, 18, 24, and 25 (denoted above in blue font) and the remaining 6 crossings associated with a "West-Central" wash system passing through USGS Sections 13, 23, and 27 (denoted above in red font). **Figure 5** is an aerial photograph that schematically depicts the locations of the wellfield areas, each of the 24 crossings where data were collected, and the two major wash systems and their tributaries.

Figure 5. Aerial Photograph of Wellfield Areas, 24 Streambed Crossings, and Two Main Wash Systems



4.0. Conclusions and Recommendations

There are approximately 70 streambed crossings perpendicular to the 45-linear mile± proposed water conveyance pipeline and CRA connection and a "greenbelt" area running along the eastern side of the proposed pipeline alignment that may be affected by pipeline installation. There are two major wash systems and minor tributaries running northeast-to-southwest through the wellfield and conceptual spreading basin areas that also may be affected by construction of extraction wells and associated interconnecting pipelines (shown in Figure 3). Once engineering plans are finalized, the information presented herein could be used as supporting data for completion of a 1601-03 Streambed Alteration Agreement with the CDFG.

5.0. Literature Cited

Beauchamp, R. 1986. *A Flora of San Diego County, California.* Sweetwater River Press. National City, CA.

CH2MHill. 2010. Cadiz Groundwater Conservation and Storage Project.

Circle Mountain Biological Consultants, Inc. 2010. Focused survey for desert tortoise, habitat evaluation for burrowing owl, and general biological resource assessment for the Cadiz Groundwater Conservation and Storage Project, San Bernardino County, California. Unpublished report completed by Ed LaRue for ESA Southern California Water Group on behalf of Cadiz Inc. Job #10-030. Wrightwood, CA.

GeoScience. 2010. Geohydrologic Assessment of the Fenner Gap Area.

GeoScience Support Services Inc. 1999 Cadiz Groundwater Storage and Dry-Year Supply Program Draft Environmental Planning Technical Report for Groundwater Resources, Volume I.

Hickman, J. Editor. 1993. *The Jepson Manual: Higher Plants of California.* University of California Press. Berkeley, CA.

Holland, R. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Sacramento, CA.

Jaeger, E. 1969. *Desert Wild Flowers.* Stanford University Press. Stanford, CA.

Metropolitan Water District of Southern California. 2001. Cadiz Groundwater Storage and Dry-Year Supply Program Final Environmental Report and Final Environmental Impact Statement Volume I.

Munz, P. 1974. *A Flora of Southern California.* University of California Press. Berkeley, CA.

Sawyer, J. and T. Keeler-Wolf. 1995. *A Manual of California Vegetation.* California Native Plant Society. Sacramento, CA.

Appendix A. Plant Species Detected

Plant codes in Tables 1 and 2 correspond to the common and scientific names for dominant perennial plants listed below that characterize each streambed crossing. Those plant species that are protected by pertinent County and/or State ordinances are signified by "(SC)" following the common name.

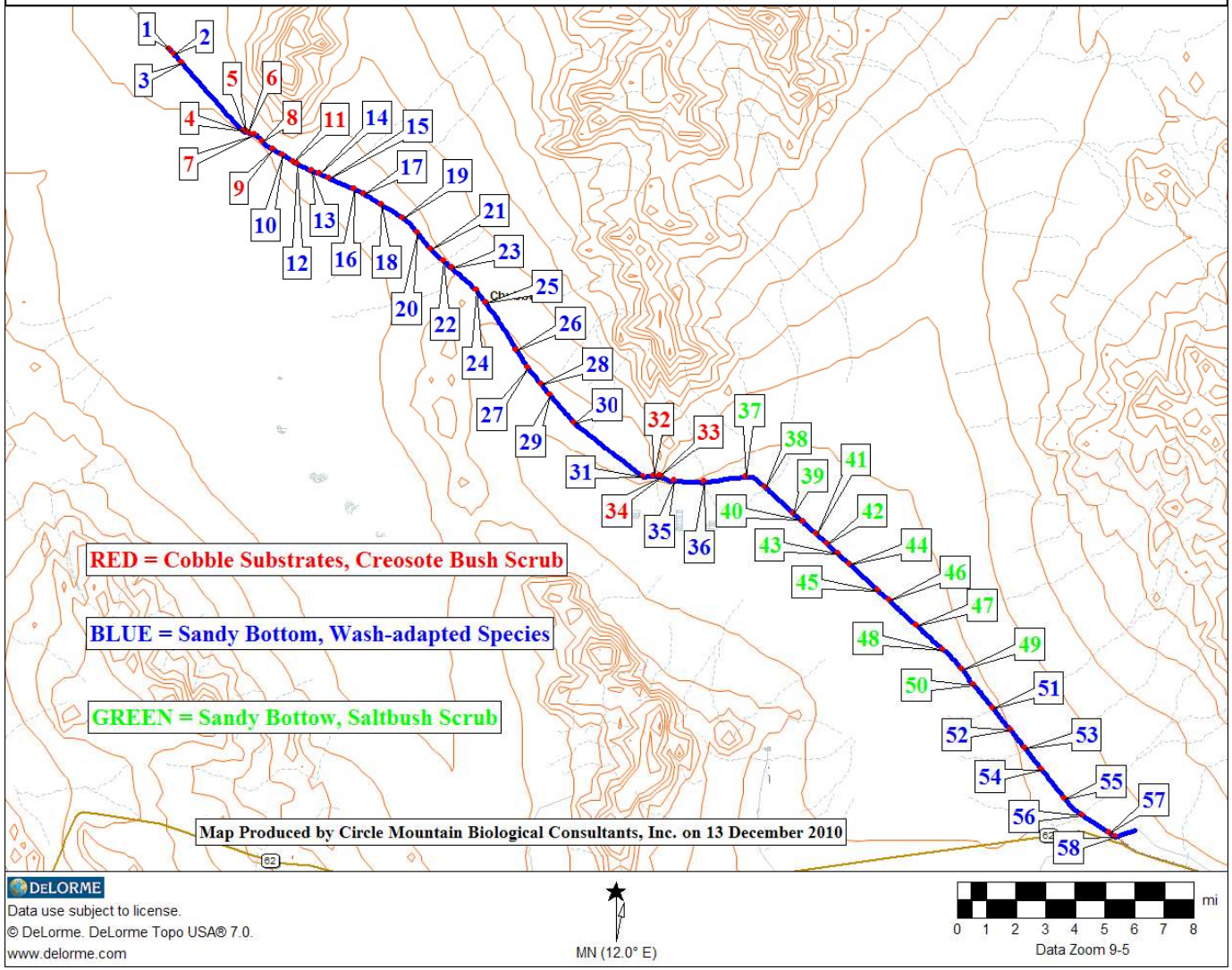
ANGIOSPERMAE: DICOTYLEDONES	DICOTS	CODES
Asclepiadaceae	**Milkweed family**	
Asclepias erosa	Milkweed	ASC ERO
Asteraceae	**Sunflower family**	
Ambrosia dumosa	Burrobush	AMB DUM
Bebbia juncea	Sweetbush	BEB JUN
Chrysothamnus paniculatus	Wash rabbitbrush	CHR PAN
Encelia actoni	Acton encelia	ENC ACT
Encelia fructescens	Rayless encelia	ENC FRU
Hymenoclea salsola	Cheesebush	HYM SAL
Stephanomeria pauciflora	Desert milk aster	STE PAU
Bignoniaceae	**Bigonia family**	
Chilopsis linearis ssp. *arcuata*	Desert willow	CHI LIN
Capparaceae	**Caper family**	
Isomerus arborea	Bladderpod	ISO ARB
Chenopodiaceae	**Goosefoot family**	
Atriplex canescens	Four-winged saltbush	ATR CAN
Atriplex polycarpa	Allscale	ATR POL
Suaeda moquinii	Torrey's sea-blight	SUA MOQ
Fabaceae	**Pea family**	
Acacia greggii	Catclaw acacia (SC)	ACA GRE
Psorothamnus (Dalea) emoryi	Indigo bush	PSO EMO
Psorothamnus spinosus	Smoke tree (SC)	PSO SPI
Lamiaceae	**Mint family**	
Hyptis emoryi	Desert lavender	HYP EMO
Loasaceae	**Stick-leaf family**	
Petalonyx thurberi	Sandpaper plant	PET THU
Tamaricaceae	**Tamarisk family**	
**Tamarix ramosissima*	Tamarisk	TAM RAM
Zygophyllaceae	**Caltrop family**	
Larrea tridentata	Creosote bush	LAR TRI

* - indicates a non-native (introduced) species.
c.f. - compares favorably to a given species when the actual species is unknown.

Some species may not have been detected because of the seasonal nature of their occurrence. Common names are taken from Beauchamp (1986), Hickman (1993), Jaeger (1969), and Munz (1974).

Appendix B. Photographic Exhibits along Proposed Pipeline Alignment

Figure 6. Cadiz Project: Exhibit Locations for Stream Crossings along Pipeline



As in the text, Figures 2 and 6, and Table 1 the following color codes are used to indicate sandy washes with wash-adapted species, sandy washes vegetated by saltbush scrub, and cobble-bottomed washes vegetated by creosote bush scrub.

Exhibit 1. Stream Crossing #1 (all photographs are facing east-to-west; see Figure 6 for locations of all exhibits).

Exhibit 2. Stream Crossing #2.

Exhibit 3. Stream Crossing #3.

Exhibit 4. Stream Crossing #9.

Exhibit 5. Stream Crossing #10.

Exhibit 6. Stream Crossing #11.

Exhibit 7. Stream Crossing #12.

Exhibit 8. Stream Crossing #13.

Exhibit 9. Stream Crossing #14.

Exhibit 10. Stream Crossing #15.

Exhibit 11. Stream Crossing #16.

Exhibit 12. Stream Crossing #17.

Exhibit 13. Stream Crossing #18.

Exhibit 14. Stream Crossing #19.

Exhibit 15. Stream Crossing #20.

Exhibit 16. Stream Crossing #21.

Exhibit 17. Stream Crossing #22.

Exhibit 18. Stream Crossing #23.

Exhibit 19. Stream Crossing #24.

Exhibit 20. Stream Crossing #25.

Exhibit 21. Stream Crossing #26.

Exhibit 22. Stream Crossing #27.

Exhibit 23. Stream Crossing #28.

Exhibit 24. Stream Crossing #29.

Exhibit 25. Stream Crossing #30.

Exhibit 26. Stream Crossing #32.

Exhibit 27. Stream Crossing #33.

Exhibit 28. Stream Crossing #34.

Exhibit 29. Stream Crossing #35.

Exhibit 30. Stream Crossing #36.

Exhibit 31. Stream Crossing #38.

Exhibit 32. Stream Crossing #40.

Exhibit 33. Stream Crossing #41.

Exhibit 34. Stream Crossing #42.

Exhibit 35. Stream Crossing #43.

Exhibit 36. Stream Crossing #44.

Exhibit 37. Stream Crossing #45.

Exhibit 38. Stream Crossing #46.

Exhibit 39. Stream Crossing #47.

Exhibit 40. Stream Crossing #48.

Exhibit 41. Stream Crossing #49.

Exhibit 42. Stream Crossing #50.

Exhibit 43. Stream Crossing #51.

Exhibit 44. Stream Crossing #52.

Exhibit 45. Stream Crossing #53.

Exhibit 46. Stream Crossing #54.

Exhibit 47. Stream Crossing #56.

Exhibit 48. Stream Crossing #57.

Exhibit 49. Stream Crossing #58.

Exhibit 50. Stream Crossing #59.

Exhibit 51. Stream Crossing #60.

Exhibit 52. Stream Crossing #61.

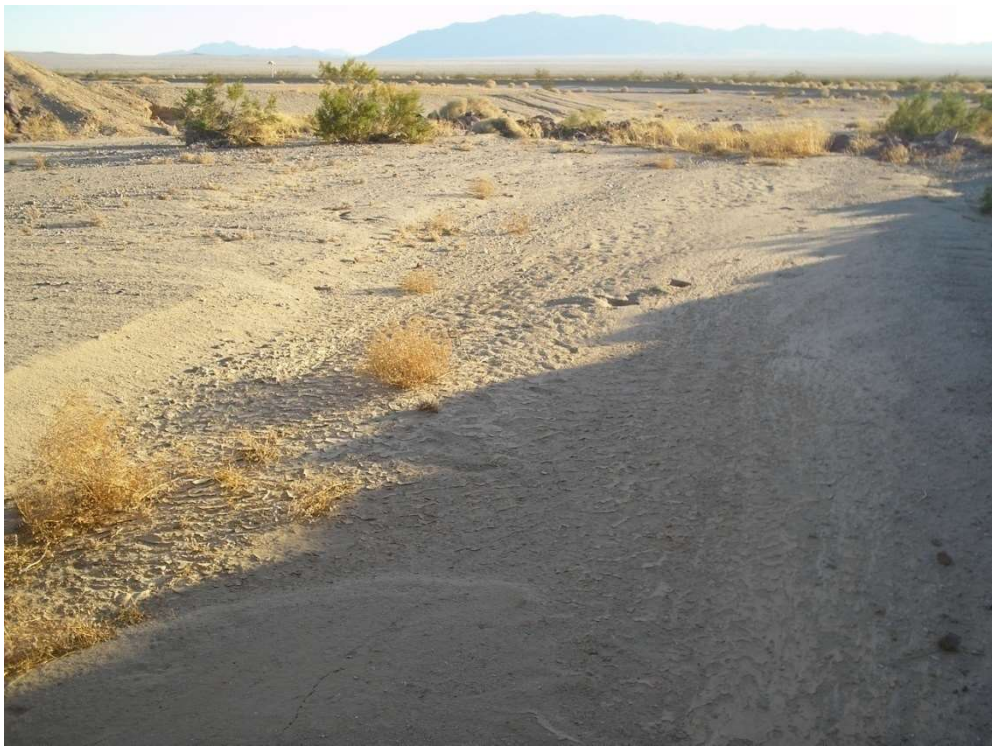


Exhibit 53. Stream Crossing #62.

Exhibit 54. Stream Crossing #63.

Exhibit 55. Stream Crossing #64.

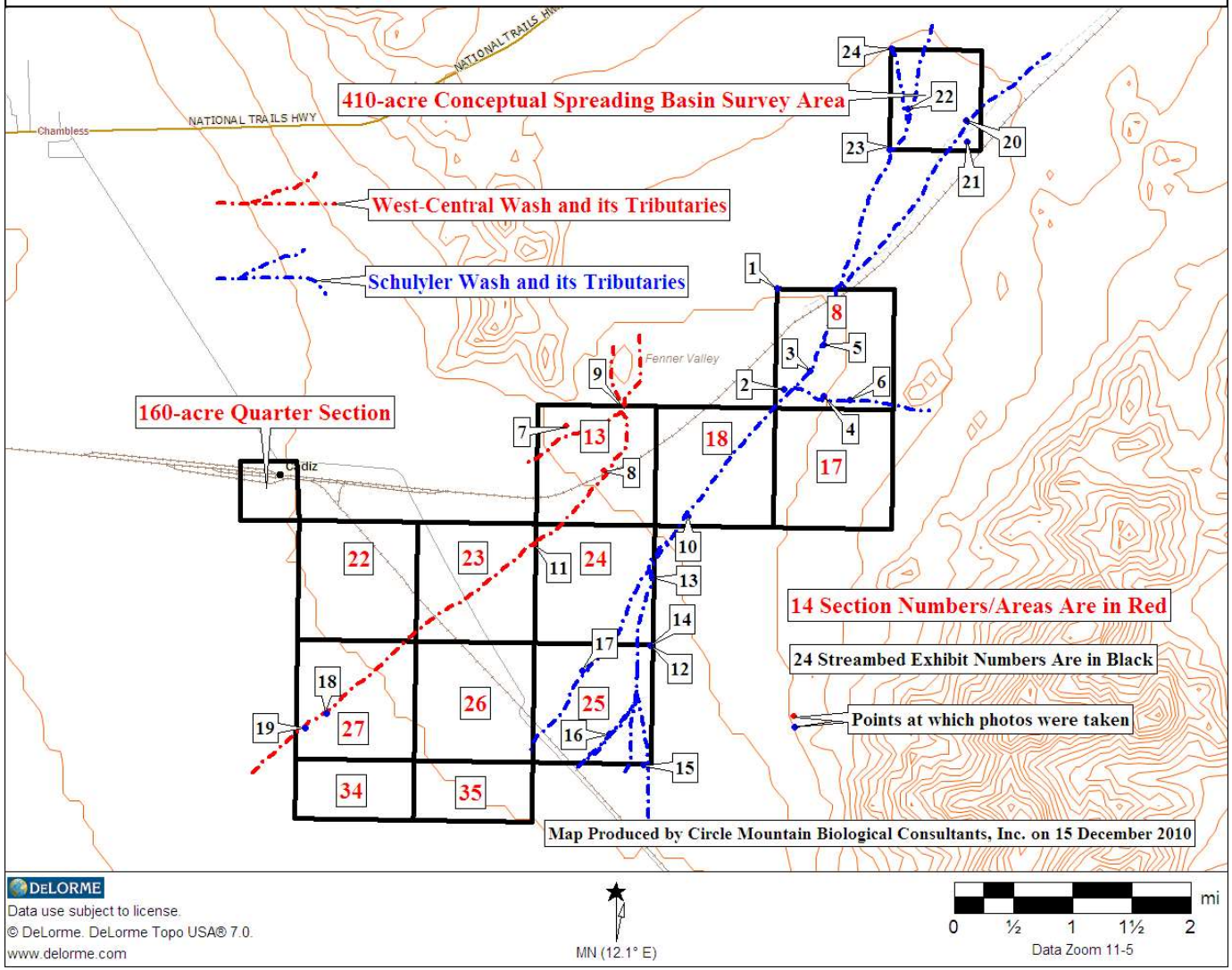
Exhibit 56. Stream Crossing #65.

Exhibit 57. Stream Crossing #66.

Exhibit 58. Stream Crossing #67.

Appendix C. Photographic Exhibits within Wellfield and Conceptual Spreading Basin Areas

Figure 7. Photographic Exhibit Locations for Wellfield Areas



As in the text, Figures 4 and 7, and Table 2 blue font is used to indicate those photograph exhibits in and along Schulyler Wash and red font is used to indicate those exhibits taken along the West-Central wash system.

Exhibit 1. Stream Crossing #1 in Section 8, facing northwest to southeast (see Figure 7 for locations of all exhibits).

Exhibit 2. Stream Crossing #2 in Section 8, facing south to north.

Exhibit 3. Stream Crossing #3 in Section 8, facing south to north.

Exhibit 4. Stream Crossing #4 in Section 8, facing northwest to southeast.

Exhibit 5. Stream Crossing #5 in Section 8, facing southwest to northeast.

Exhibit 6. Stream Crossing #6 in Section 8, facing southeast to northwest.

Exhibit 7. Stream Crossing #7 in Section 13, facing southwest to northeast.

Exhibit 8. Stream Crossing #8 in Section 13, facing south to north.

Exhibit 9. Stream Crossing #9 in Section 13, facing north to south.

Exhibit 10. Stream Crossing #10 in Section 18, facing south to north.

Exhibit 11. Stream Crossing #11 in Section 23, facing northeast to southwest.

Exhibit 12. Stream Crossing #12 in Section 24, facing south to north.

Exhibit 13. Stream Crossing #13 in Section 24, facing north to south.

Exhibit 14. Stream Crossing #14 in Section 25, facing northeast to southwest.

Exhibit 15. Stream Crossing #15 in Section 25, facing south to north.

Exhibit 16. Stream Crossing #16 in Section 25, facing south to north.

Exhibit 17. Stream Crossing #17 in Section 25, facing northeast to southwest.

Exhibit 18. Stream Crossing #18 in Section 27, facing northeast to southwest.

Exhibit 19. Stream Crossing #19 in Section 27, facing southwest to northeast.

Exhibit 20. Stream Crossing #20 at Spreading Basin, facing east to west.

Exhibit 21. Stream Crossing #21 at Spreading Basin, facing east to west.

Exhibit 22. Stream Crossing #22 at Spreading Basin, facing northeast to southwest.

Exhibit 23. Stream Crossing #23 at Spreading Basin, facing southwest to northeast.

Exhibit 24. Stream Crossing #24 at Spreading Basin, facing northwest to southeast.