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PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

September 17, 2021

Ms. Stacey Love, Recovery Permit Coordinator
United Stated Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

Subject: Results of the 2021 Dry Season Fairy Shrimp Survey for the Boulders Mixed-Use Project (LSA Project No. TDM2101)

Dear Stacey:

This letter provides the results of a 2021 season presence/absence survey for vernal pool branchiopods for the Boulders Mixed-Use Project site. The survey area is located at Universal Transverse Mercator (UTM) coordinates 3707445 Northing/500615 Easting within projected Section 32, Township 5 South, Range 3 West, in the City of Menifee, Riverside County, as shown on the U.S. Geological Survey (USGS) 7.5 minute series *Romoland, California* quadrangle (attached Figure 1). The survey area includes 8 small ponding features totaling less than 1 acre (attached Figures 2 and 3).

METHODS

The 2020 dry season survey was conducted in accordance with the terms of Federal 10(a)(1)(A) Permits TE-777965 issued to LSA biologist Stan Spencer and TE-839213-3 issued to LSA biologist David Muth, and the May 31, 2015, *Survey Guidelines for the Listed Large Branchiopods*.

Soil samples were collected by Dr. Spencer (TE-777965) and processed by Mr. Muth (TE-839213). Dr. Spencer collected a series of 140 0.05-liter samples of soil from the 8 ponding features on August 4, 2021. The soil was dry at the time of collection. The 140 samples were combined and stored in a plastic zip-lock bag marked to indicate the site and date of collection.

Samples were processed by placing the collected material into 5-gallon buckets filled with 1 to 2 gallons of 5 percent brine solution to hydrate soils. During the approximately 10- to 15-minute hydration period, the bucket was occasionally stirred to ensure all biological material was released and floated to the surface. In small aliquots, the biological material was poured through a series of four sieves with mesh sizes of 710, 355, 212, and 150 microns. The sieves were stacked with the largest mesh size at the top and the smallest mesh size on the bottom. Material was washed through the set with water. Particles trapped in the three smallest sieve sizes were saved for analysis by washing them onto blotter paper to dry.

The sieved material was examined by Mr. Muth on August 24 and 25, 2021, using a 10- to 40-power Olympus stereo microscope. A reference cyst collection was available for comparison of any cysts found in the samples. Soil material will be stored with LSA until final deposition can be arranged.

1500 Iowa Avenue, Suite 200, Riverside, California 92507 951.781.9310 www.lsa.net

RESULTS AND CONCLUSIONS

Feature 1 is a broad, apparently natural, low area, made deeper by tire tracks and by ruts in a dirt road. The remaining features were artificially created. Feature 6 was created when a large boulder was extracted. The remaining features are road ruts. Water enters the features as direct rainfall and as sheet flow from adjacent compacted areas. Feature 4 is unvegetated. The other features have a mix of native and non-native, mostly hydrophytic, plants. Table A provides characteristics of the sampled features.

Table A: Characteristics of Feature Sampled

Estimated Maximum Depth	Estimated Maximum Length × Width	Origin	Vegetation	Soil Sample Volume	Fairy Shrimp Egg Abundance (Number)
Feature 1					
15 cm	25 × 8 m	natural topography, tire tracks, road ruts	*Amsinckia retrorsa* *Calandrinia menziesii* *Centromadia pungens* *Hirschfeldia incana* *Lepidium dictyotum* *Oncosiphon pilulifer* *Plagiobothrys leptocladus*	1.25 L	*Branchinecta – Low* (32)
Feature 2					
15 cm	10 × 4 m	road ruts	*Centaurea melitensis* *Centromadia pungens* *Erodium cicutarium* *Oncosiphon pilulifer* *Plagiobothrys leptocladus*	1.25 L	*Branchinecta – Low*(69)
Feature 3					
15 cm	10 × 1 m	road ruts	*Centromadia pungens* *Erodium cicutarium* *Hirschfeldia incana* *Oncosiphon pilulifer* *Plagiobothrys leptocladus*	0.5 L	*Branchinecta – High*(259)
Feature 4					
15 cm	6 × 6 m	road ruts	none	1.25 L	*Branchinecta – Medium*(515)
Feature 5					
15 cm	13 × 3 m	road ruts	*Amsinckia retrorsa* *Centromadia pungens* *Erodium cicutarium* *Hirschfeldia incana* *Lythrum hyssopifolia* *Oncosiphon pilulifer* *Plagiobothrys leptocladus* *Trichostema lanceolatum*	1.25 L	*Branchinecta – Medium*(350)

Table A: Characteristics of Feature Sampled

Estimated Maximum Depth	Estimated Maximum Length × Width	Origin	Vegetation	Soil Sample Volume	Fairy Shrimp Egg Abundance (Number)
Feature 6					
30 cm	6 × 4 m	boulder extraction	*Amaranthus albus* *Calandrinia menziesii* *Centromadia pungens* *Hirschfeldia incana* *Plagiobothrys leptocladus*	0.5 L	*Branchinecta – Medium*(107)
Feature 7					
15 cm	9 × 2 m	road ruts	*Centromadia pungens* *Crassula connata* *Erodium cicutarium* *Hirschfeldia incana* *Lasthenia gracile* *Lythrum hyssopifolia* *Oncosiphon pilulifer* *Plagiobothrys leptocladus* *Trichostema lanceolatum*	0.5 L	*Branchinecta – Medium*(186)
Feature 8					
15 cm	20 × 1 m	road ruts	*Amsinckia retrorsa* *Centromadia pungens* *Erodium cicutarium* *Hirschfeldia incana* *Oncosiphon pilulifer* *Plagiobothrys leptocladus*	0.5 L	*Branchinecta – Medium*(177)

A total of 1,695 Branchinecta eggs were found in the sampled features. Branchinecta eggs are not considered differentiated enough to make a species determination. Based on the results of the wet season survey, the eggs most likely belong to versatile fairy shrimp (*Branchinecta lindahli*). No eggs of Streptocephalus were found. Other invertebrates detected include ostracods and ants.

Please contact me if you require any additional information.

Sincerely,

LSA ASSOCIATES, INC.

Stanley C. Spencer, Ph.D.
Associate/Senior Botanist

Attachments: Figure 1: Fairy Shrimp Survey Area
Figure 2: Feature Sampled
Data Sheet

cc: Melody Aimar, Western Riverside County MSHCP Biological Monitoring Program

WE CERTIFY THAT THE INFORMATION IN THIS SURVEY REPORT AND ATTACHED EXHIBITS FULLY AND ACCURATELY REPRESENTS OUR WORK:

SURVEYOR:	PERMIT NUMBER	DATE:
Stanley Spencer	TE-777965	September 17, 2021
David Muth	TE-839213	September 17, 2021

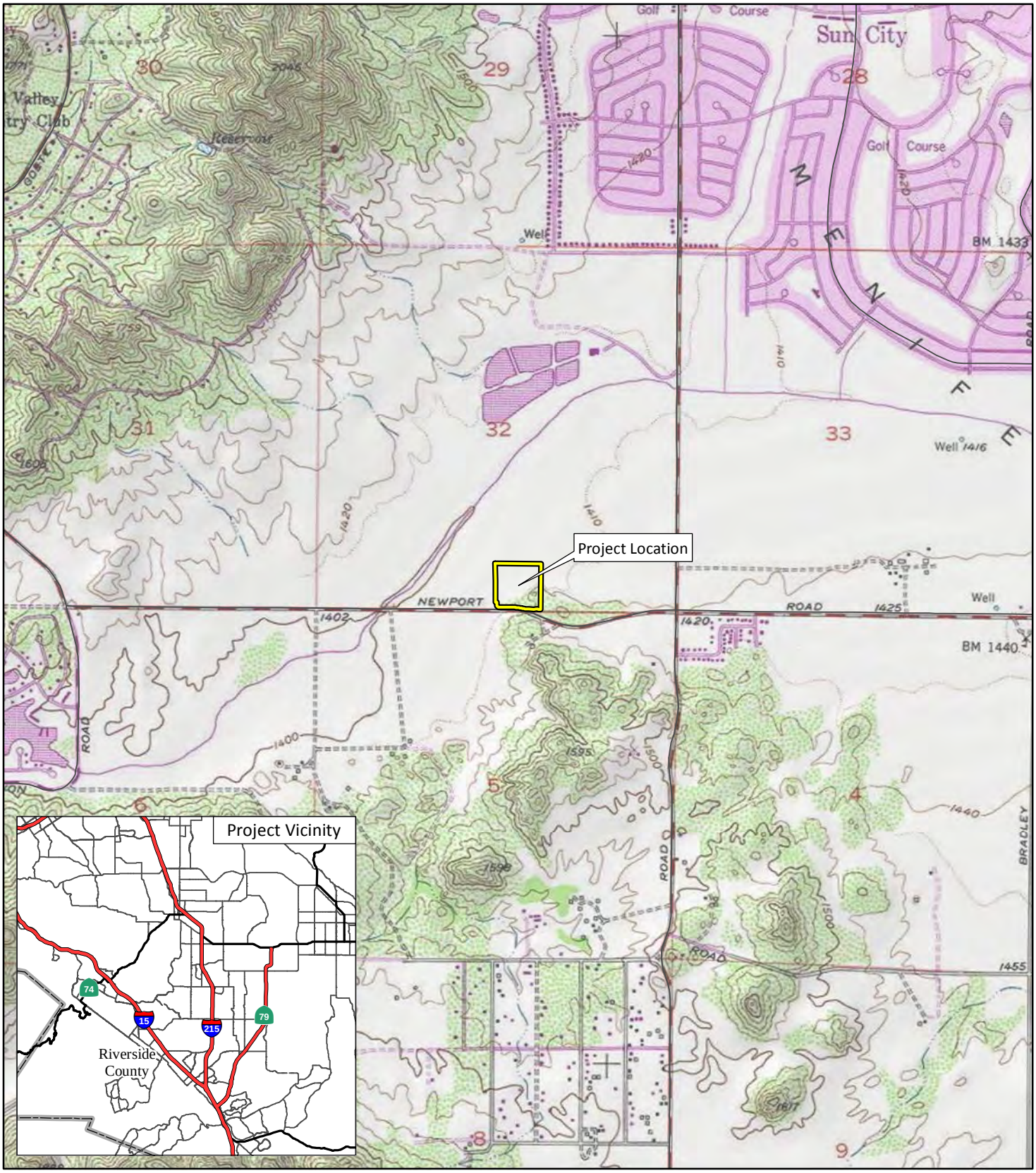

FIGURE 1

0 1000 2000
FEET

SOURCE: USGS 7.5' Quad - *Romoland* (1979), CA

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Boulders Mixed-Use Project

Project Location and Vicinity

LSA

LEGEND

- Project Location
- Off-Site Work Area
- Feature Sampled
- Photograph Locations

0 50 100
FEET

SOURCE: Nearmap (1/14/2021)

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FIGURE 2

Boulders Mixed-Use Project

Features Sampled

U.S. Fish and Wildlife Service – Data Sheet for Dry Season Sample Analysis for Listed Large Branchiopods

Project Information		Biologist Information
Project Name: **Boulders**	Quad : **Romoland**	Name and Permit Numbers of Person Who Conducted the Following Tasks:
USFWS Project Number: **None issued**	Township: **5S**	Soil Collection: **Dr. Stanley Spencer TE-777965**
County: **Riversidemennifee**	Range: **3W**	Soil Processing: **David Muth TE- TE-839213 and TE-797234**
UTMs for center of site: **4801400E/3727310N**	Section: **SW1/4 of the SE1/4 of 32**	Soil Analysis/Cysts ID: **David Muth TE-839213 and TE-797234**
		Soil Collection Date: **August 4, 2021**

Pool/ Habitat/ Basin No.	Invertebrates Present (X)					Number of Large Branchiopod Cysts										Comments
	Insect Exo-Skeletons	Micro-Turbellaria Cysts	Cladocera Ephippia	Ostracods Live/Cysts/ Carapaces	Copepods Live/Cysts	*Branchinecta* sp.	*Lepidurus pack ardi*	*Streptocephalus wootoni*	*Linderiella occidentalis*	*Lynceus brachyurus*	*Cyzicus californicus*	Hydracarina Live	Nematoda	Collembola	Other Species	
1	X					32										
2	X					69										
3	X					259										
4	X					515										
5	X					350										
6	X					107										
7	X			X		186										
8	X					177										