Appendix A

Historic Imagery

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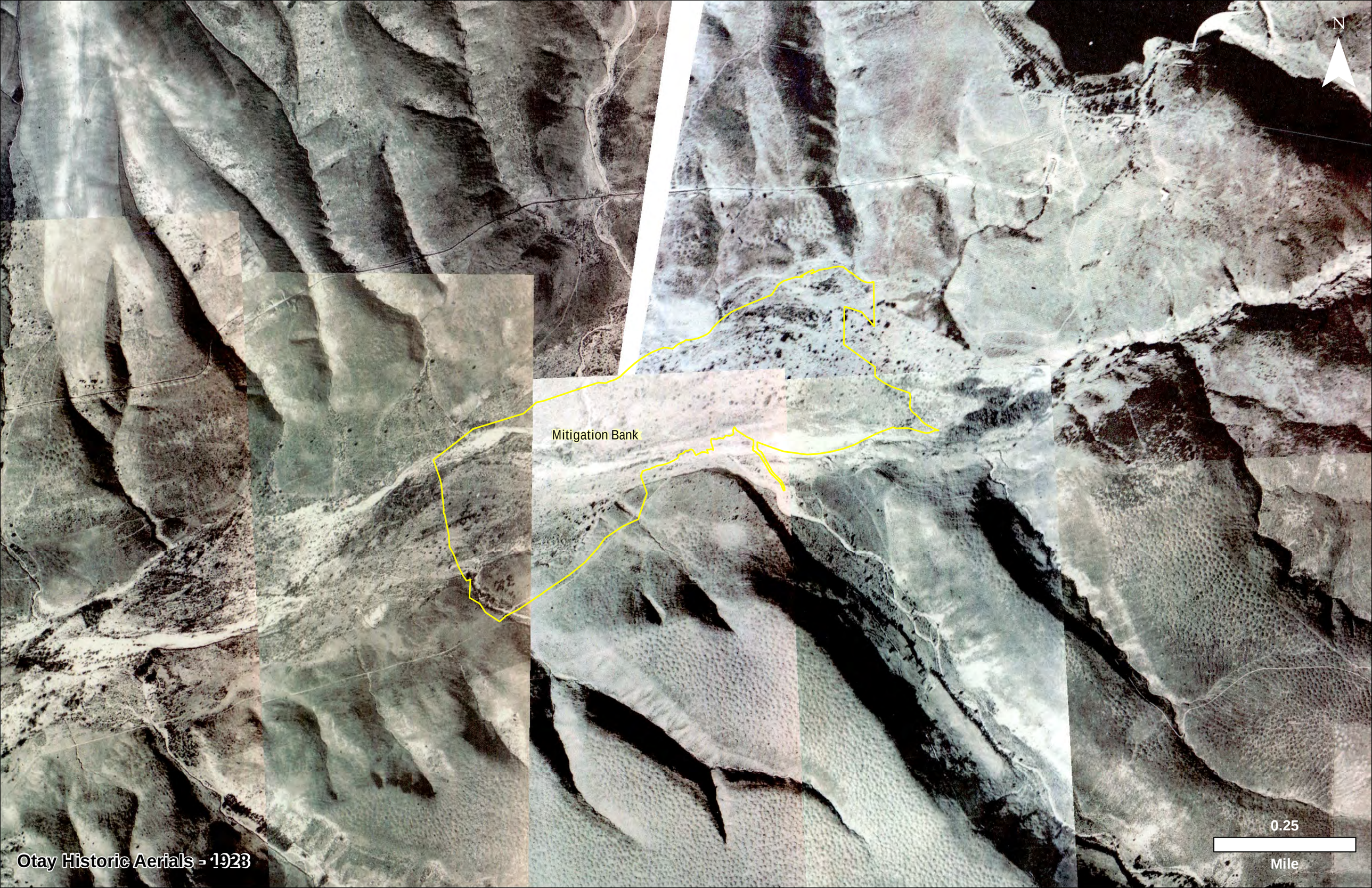
N
Mitigation Bank
Otay Historic Aerials - 1928
0.25
Mile


N
Mitigation Bank
0.25
Mile
Otay Historic Aerials - 1953

Otay Historic Aerials - 1964

Otay Historic Aerials - 1966


N
Mitigation Bank
0.25
Mile
Otay Historic Aerials - 1968


N
Mitigation Bank
0.25
Mile
Otay Historic Aerials - 1971


N
Mitigation Bank
0.25
Mile
Otay Historic Aerials - 1981

Otay Historic Aerials - 1989


N
Mitigation Bank
0.25
Mile
Otay Historic Aerials - 1996


N
Mitigation Bank
0.25
Mile
Otay Historic Aerials - 2003

Appendix B

Draft Otay River Mitigation Memorandum of Agreement

CONFIDENTIAL APPENDIX

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Appendix C

Fairy Shrimp 2017 Dry Season Report

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2017 Dry Season Fairy Shrimp Survey for Otay River Restoration Project

Prepared for:

Otay Land Company, LLC
1903 Wright Place, Suite 220
Carlsbad, CA 92008

Prepared by:

ICF
525 B Street, Suite 1700
San Diego, California 92101

June 2018

ICF. 2018. 2017 Dry Season Fairy Shrimp Survey for Otay River Restoration Project. June.

Contents

1.0 Introduction

ICF was contracted to conduct dry season fairy shrimp surveys for the Otay River Restoration Project (ORRP), a permittee-responsible mitigation site and proposed mitigation bank located below Savage dam and Lower Otay Lake in the Otay River. The mitigation site is being implemented to offset impacts associated with several Otay Ranch Village development projects as well as future projects in the vicinity.

The goal of this survey was to determine presence or absence of listed large branchiopods (fairy shrimp) in seasonally inundated depressions within the study area (Figures 1-3), for use in avoiding take of listed large branchiopods. The large branchiopods known from freshwater in southern San Diego County are San Diego fairy shrimp *(Branchinecta sandiegonensis)*, Lindahl's fairy shrimp *(Branchinecta lindahil*), and Riverside fairy shrimp (*Streptocephalus woottoni*).

2.0 Methods

ICF conducted dry season fairy shrimp surveys on 30 seasonally inundated depressions located within the study area (Figure 3). The vernal pool preserve in the northeast side of the site was not a subject of this study, will not be affected by project activities, and was not sampled (Figure 3). All seasonally inundated depressions besides #20 were previously mapped by RECON Environmental as part of land stewardship of the Otay River Regional Park, and the boundaries of the depressions are used in Figure 3. Survey methodology follows the USFWS *Survey Guidelines for the Listed Large Branchiopods* (Guidelines; USFWS 2015) as described below. Prior to initiating the surveys, a 15-day pre-survey notification letter was sent to the USFWS Carlsbad Fish and Wildilfe Office informing intent to conduct a protocol dry season survey for listed fairy shrimp (Appendix A).

2.1 Soil Collection

On November 28, 2017, ICF fairy shrimp biologist Lance Woolley (Permit# TE-14560C) collected soil samples for the dry season survey. Soil samples were collected when seasonally inundated depressions were dry. A hand trowel was used to collect soil samples from the top 1-3 centimeters of depressions soil. Whenever possible, soil samples were collected in chunks and the trowel was used to pry up intact chunks of sediment. Loosening the soil by raking or shoveling was avoided as such methods can damage cysts. For each of the 30 seasonally inundated depressions, two perpendicular transects were visually estimated, with one transect passing along the depressions lowest point and the second transect passing through the depressions second lowest point. Ten samples of approximately 100-milliliter (ml) aliquots were removed at each sub-sample site (for a total of 1 liter/ponded area), ensuring that no more than 10% of the sampled vernal pool's surface area was disturbed. Soil samples were taken as follows: two in the pool's lowest point, one at the pool's second lowest point, and two radiating in each of the four directions on the transect lines, at least 1.0 m from the pool center.

Ten 100-mililiter soil samples were collected from each pools. Each label included information necessary to identify the collection date, location of feature and name of collector for each sample.

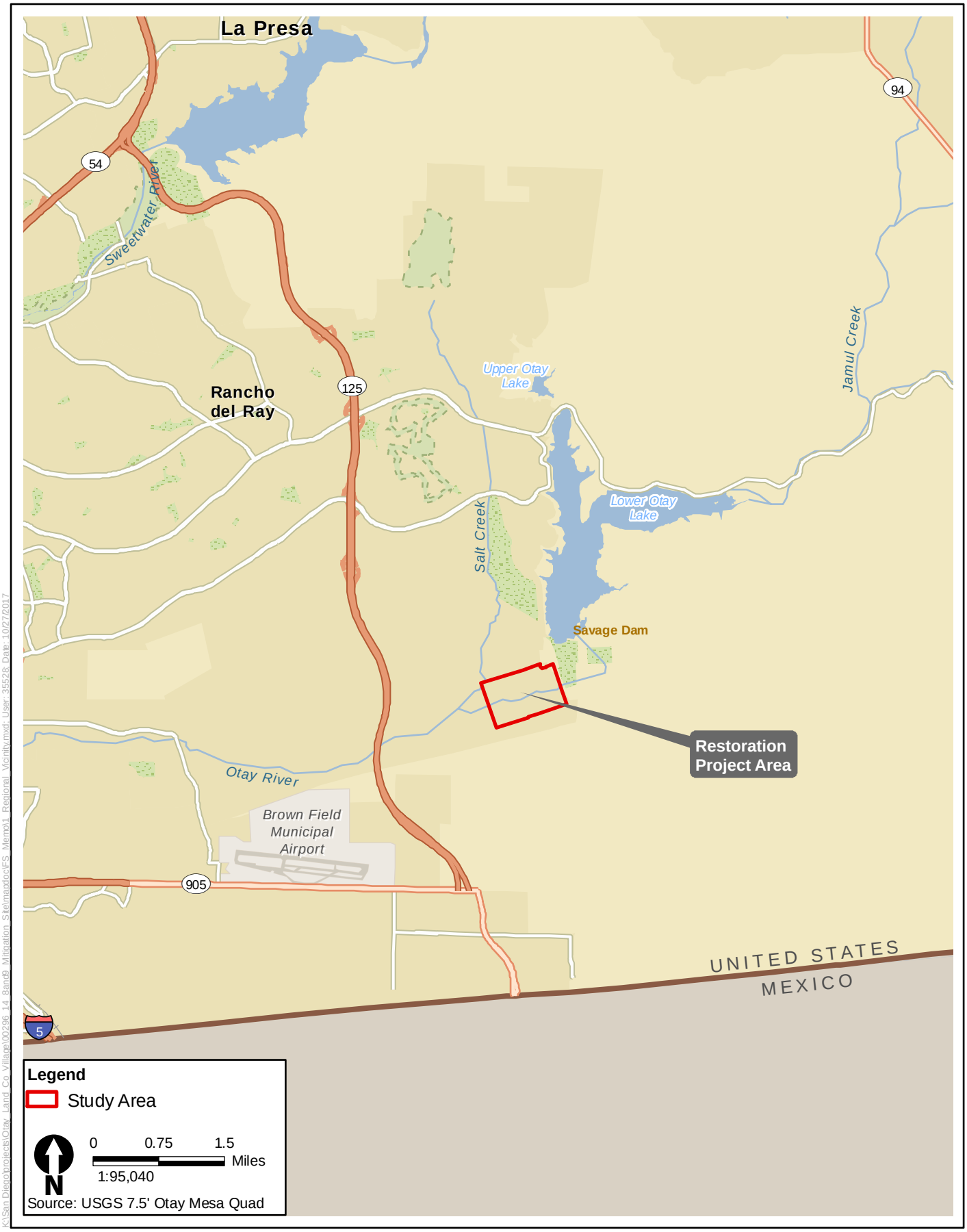

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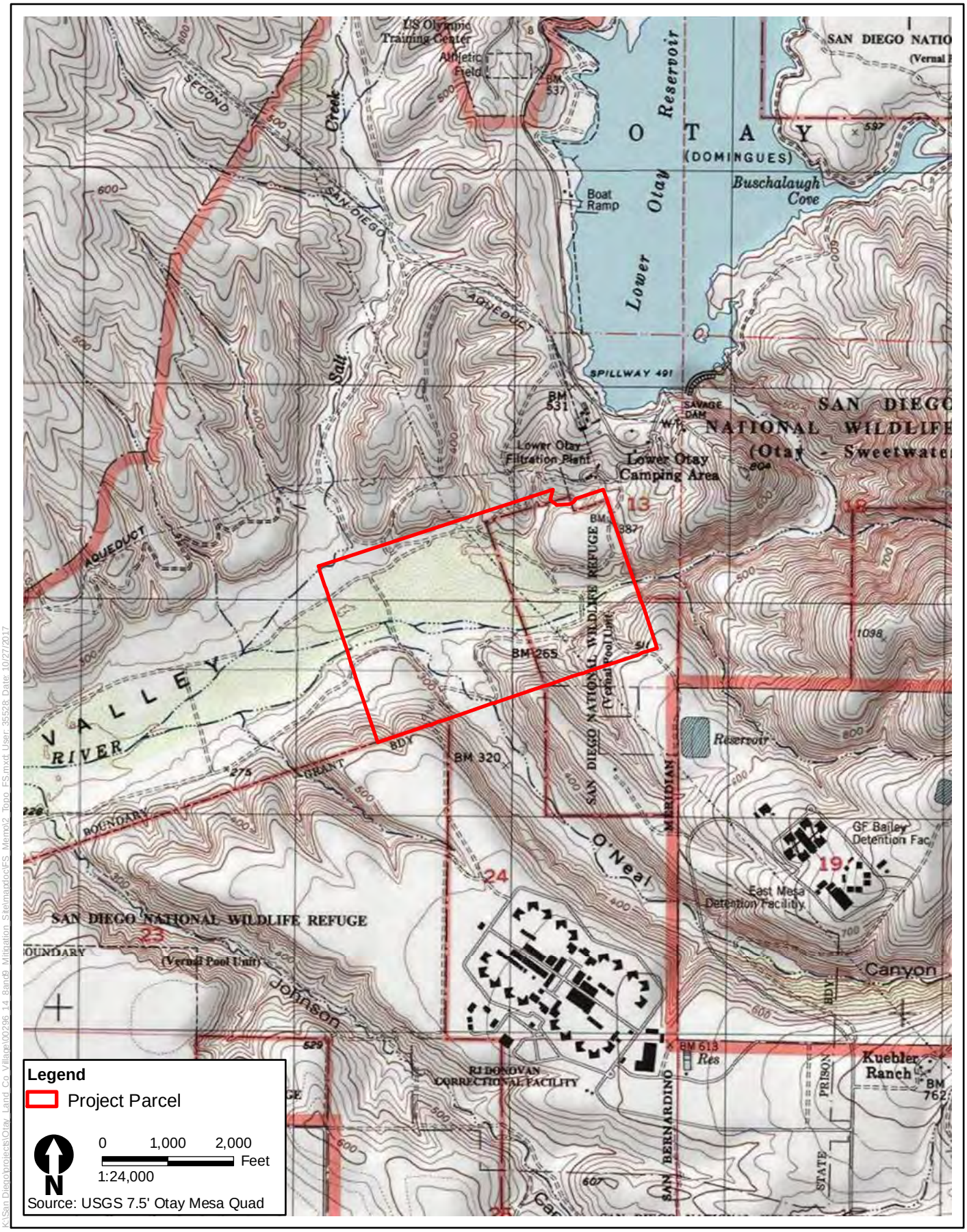
Figure 1
Regional Location
Otay River Restoration Project



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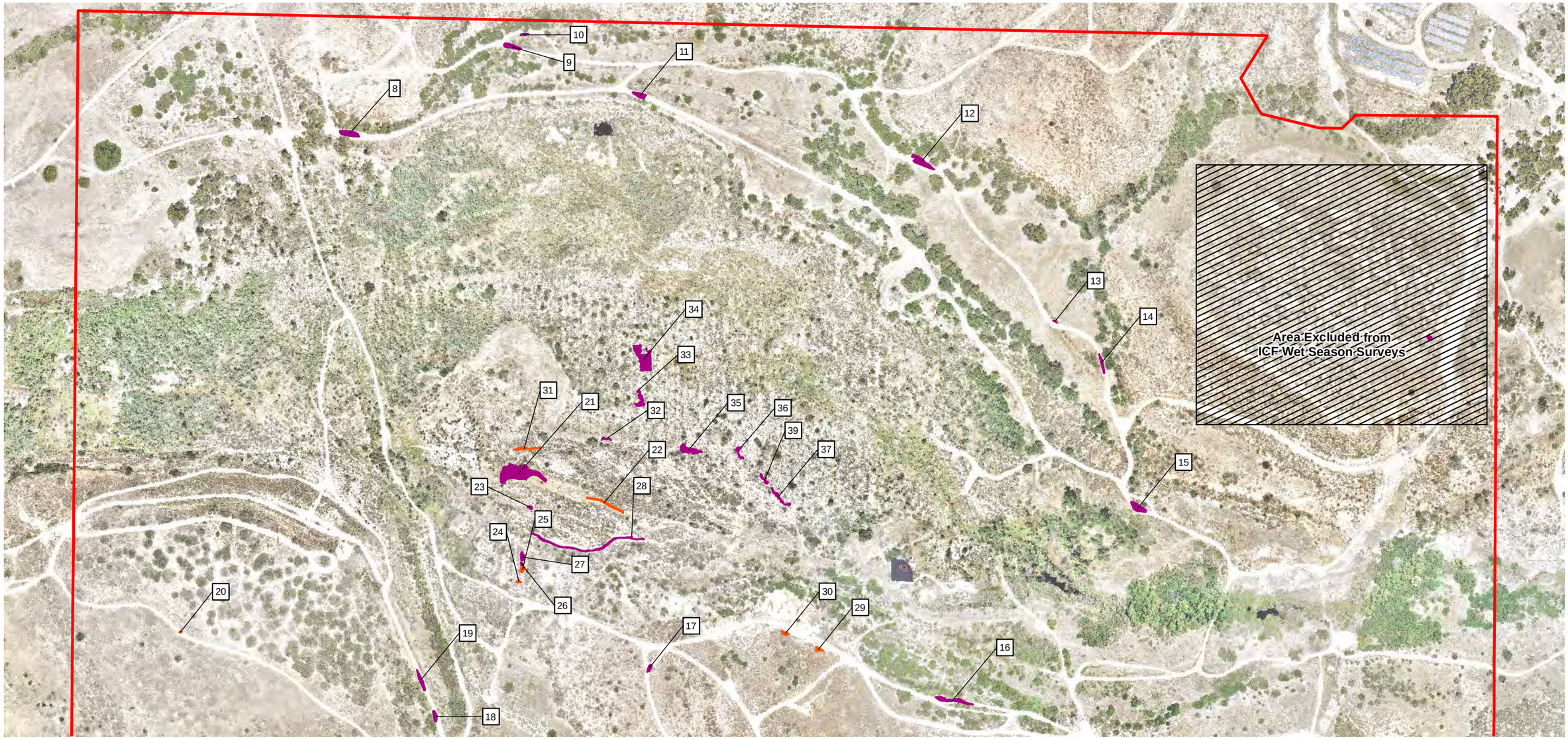
ICF

Figure 2
Project Location
Otay River Restoration Project



Legend

Project Parcel

Sampled Ephemeral Basins*

Branchinecta sp. cysts observed

no cysts observed

*No riverside fairy shrimp cysts were obtained from the sampled basins

Source: RECON; ICF, 2017

0 200 400 Feet

1:3,800

Figure 3
Surveyed Depressions
Otay River Restoration Project

2.2 Soil Processing and Analysis

Soil samples were processed by ICF fairy shrimp biologist and USFWS permitted cyst-identifier Dale Ritenour (Permit# TE-58888A-2) in accordance with the Guidelines. The soil samples were measured into ten individual plastic containers. These samples were hydrated in tap water then washed through a set of sieves. Material passing through a Number 45 (355 micrometer) USA Standard Testing Sieve, A.S.T.M.E.-11 specification was caught on a Number 70 (212 micrometer) Sieve. The 355-micrometer sieve allows the passage of cysts while the 212- micrometer sieves was selected as the appropriate size to collect cysts from large branchiopods with ranges including the study area in southern San Diego County, including *Branchinecta sandiegonensis*, *Branchinecta lindahil,* and *Streptocephalus woottoni.* The 212-micrometer sample material was rinsed into a container with approximately 200 milliliters of a saturated brine solution to float organic material, including fairy shrimp cysts. The material floating on the brine was decanted onto a paper filter. The organic material collected on the paper was examined under a stereo zoom microscope. Distinctive fairy shrimp cysts were counted if present. All sieves were soaked in a beach solution and then thoroughly cleaned after completion of the procedure for each depression, to ensure no cysts adhered to the surfaces of the sieves.

Fairy shrimp cysts were identified to the genus level through microscope examination. *Streptocephalus* cysts can be discerned from *Branchinecta* cysts based on cyst surface characteristics. Riverside fairy shrimp is the only member of the *Streptocephalus* genus known from San Diego County; therefore any observed *Streptocephalus* cysts would be accepted as Riverside fairy shrimp. *Branchinecta* sandiegonensis and *Branchinecta lindahil* are both known to occur in the Otay Mesa region. Their cysts are similar in appearance and have some overlap in size, and may not be conclusively separated and identified for each other. Therefore, *Branchinecta* cysts observed require wet season survey to confirm the species present in the depressions.

3.0 Results and Discussion

Branchinecta cysts were observed in 23 of the 30 sampled pools in the 2017 dry season sampling (Table 1). *Branchinecta* cysts were found in high abundance, averaging over 50 cysts per 100ml of soil, in depression 28. *Branchinecta* cysts were found in medium abundance, defined as averaging 11-50 cysts/100ml, in depressions 9, 10, 11, 12, 13, 14, 15, 19, 33, and 35. *Branchinecta* cysts were found in low abundance in depressions 8, 17, 18, 21, 23, 26, 27, 32, 34, 36, 37, and 39.

No Riverside fairy shrimp cysts were observed in samples in the 2017 dry season survey.

Both San Diego and Lindahl's fairy shrimp are known from the Otay Mesa area. Wet season sampling is necessary to determine which shrimp species are present. ICF is conducting a wet season fairy shrimp survey of the study area in the winter/spring of 2017-2018. Results will be provided in a separate document.

Table 1. Dry Season Sampling Results

Pool	Cyst Presence	Cyst Abundance	sample number 1	2	3	4	5	6	7	8	9	10
8	*Branchinecta* sp.	Low	1	0	2	0	0	0	0	0	3	0
9	*Branchinecta* sp.	Moderate	27	22	13	55	80	25	20	30	20	20
10	*Branchinecta* sp.	Moderate	9	10	6	15	12	15	10	15	25	10
11	*Branchinecta* sp.	Moderate	20	35	28	15	20	20	25	30	20	15
12	*Branchinecta* sp.	Moderate	9	12	10	19	14	7	22	24	20	11
13	*Branchinecta* sp.	Moderate	6	15	19	33	22	9	28	45	16	48
14	*Branchinecta* sp.	Moderate	23	5	26	14	12	24	12	35	11	22
15	*Branchinecta* sp.	Moderate	0	20	11	7	6	10	20	14	8	10
17	*Branchinecta* sp.	Low	0	0	0	1	1	1	0	1	0	0
18	*Branchinecta* sp.	Low	4	2	2	10	23	6	7	5	4	20
19	*Branchinecta* sp.	Moderate	10	6	24	12	28	45	15	18	4	8
20	-none-		0	0	0	0	0	0	0	0	0	0
21	*Branchinecta* sp.	Low	0	0	0	0	1	0	0	0	2	0
22	-none-		0	0	0	0	0	0	0	0	0	0
23	*Branchinecta* sp.	Low	0	1	4	2	6	0	3	0	4	0
24	-none-		0	0	0	0	0	0	0	0	0	0
25	-none-		0	0	0	0	0	0	0	0	0	0
26	*Branchinecta* sp.	Low	0	0	1	0	0	0	0	0	0	0
27	*Branchinecta* sp.	Low	0	1	0	0	0	0	0	0	0	0
28	*Branchinecta* sp.	High	100	200	100	250	100	90	100	60	100	100
29	-none-		0	0	0	0	0	0	0	0	0	0
30	-none-		0	0	0	0	0	0	0	0	0	0
31	-none-		0	0	0	0	0	0	0	0	0	0
32	*Branchinecta* sp.	Low	1	0	3	0	0	0	0	5	0	2
33	*Branchinecta* sp.	Moderate	10	40	20	10	12	10	20	25	30	40
34	*Branchinecta* sp.	Low	1	3	3	1	0	0	5	5	1	3
35	*Branchinecta* sp.	Moderate	20	10	10	20	20	50	20	15	20	10
36	*Branchinecta* sp.	Low	4	4	5	16	5	1	8	5	6	1
37	*Branchinecta* sp.	Low	15	10	10	20	10	10	5	8	10	7
39	*Branchinecta* sp.	Low	4	10	9	14	30	8	2	6	10	3

no *Streptocehphalus* observed in any pool

4.0 References

(U.S. Fish and Wildlife Service (USFWS). 2015. Survey Guidelines for the Listed Large Branchiopods. May 31.

5.0 Certification

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.

March 19, 2018

Dale Ritenour (Permit No. TE-58888A-2)
Vernal Pool Biologist
Author and USFWS Approved Cyst Identification

Date

Appendix A
USFWS Notification

November 8, 2017

Ms. Stacey Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

RE: 15-Day Notice for Protocol Surveys for Listed Vernal Pool Branchiopods
Otay River Restoration Project

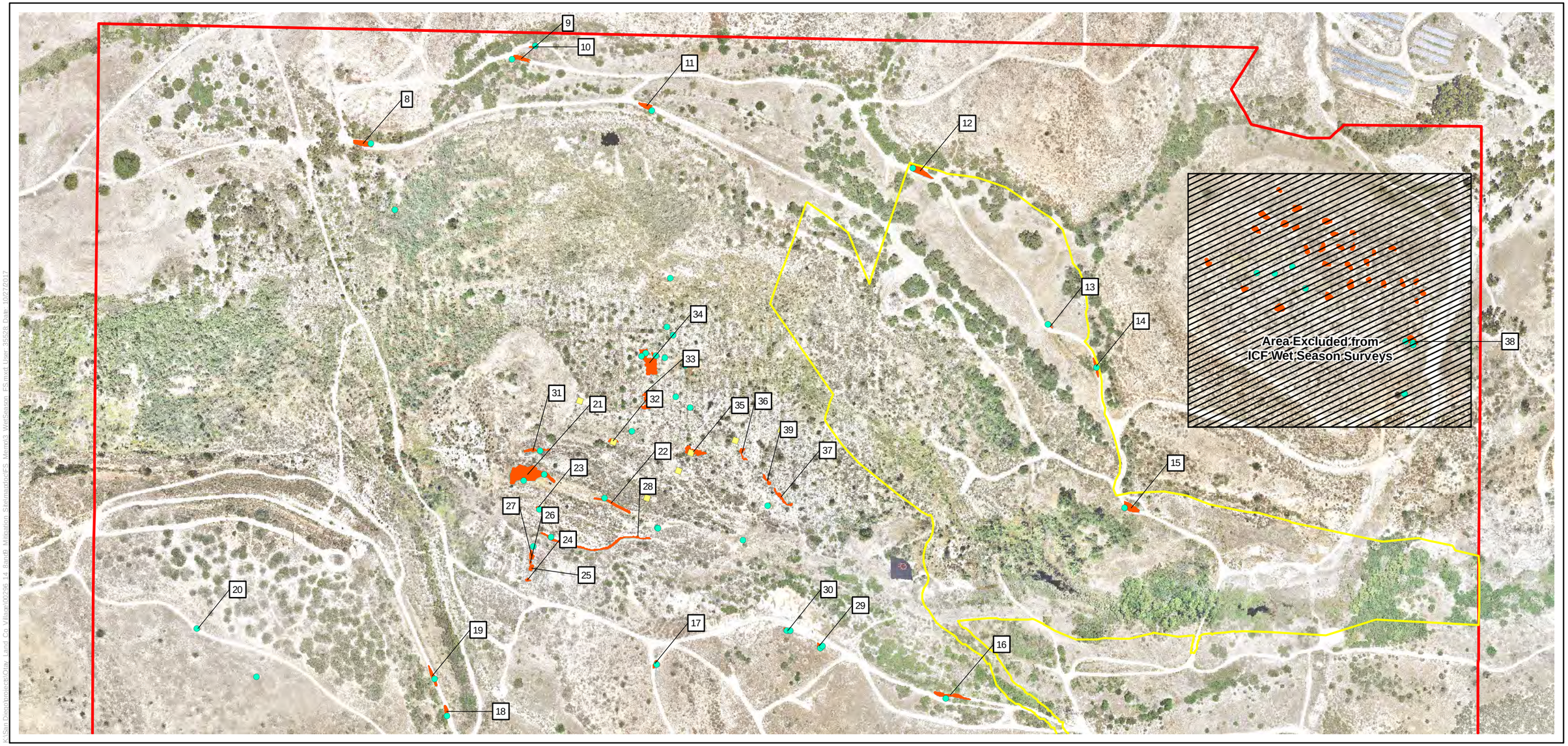
Dear Ms. Love:

ICF is planning on conducting a protocol wet season and dry season survey for listed vernal pool branchiopods within the Otay River Restoration Project (Figures 1 and 2). The surveys will be conducted to document the presence of listed branchiopods within the Otay River Restoration Project prior to commencement of project activities. Thirty-one seasonally-inundated depressions within the Otay River Restoration Project have been previously mapped and will be surveyed (Figure 3). I will be conducting the wet season survey under the guidelines stated in the 2017 Survey Guidelines for Listed Large Branchiopods issued by the U.S. Fish and Wildlife Service. I will collect soil samples following the terms and conditions of section 5 of my TE permit, in accordance with the 2017 Survey Guidelines for Listed Large Branchiopods issued by the Service. Service-approved listed branchiopod cyst identifier Dale Ritenour (TE-58888A-2) will conduct the processing and analyzation of dry season soil samples. All dry season efforts will follow the 2017 Survey Guidelines for Listed Large Branchiopods.

Please do not hesitate to contact me with any comments or questions.

Sincerely,

Lance Woolley
TE-14560C
(858) 444-3924
Lance.Woolley@icf.com



Legend

- Project Parcel
- Pre Bank Boundary
- Ponding Points
- Ponding Polygons
- Woolly Marbles
- Vernal Pools (RECON)

Source: RECON; ICF, 2017

0 200 400 Feet

1:3,830

Figure 3
Vernal Pools to Survey
Otay River Restoration Project

Appendix B
USFWS Dry Season Data Sheets

Appendix 2. U.S. Fish and Wildlife Service – Data Sheet for Dry Season Sample Analysis for Listed Large Branchiopods

Project Information

Project Name: Otay River Restoration Project
USFWS Project Number:
County: San Diego
Lat:
Long:
Quad: Otay Mesa
Township:
Range:
Section:

Biologist Information

Name of Person(2) Who Conducted the Following Tasks and Permit Number(s):

Soil Collection: Lance Wooley TE-14560C
Soil Processing: Dale Ritenour TE 58855A-2
Soil Analysis/Cysts ID: Dale Ritenour TE 58858A-2
Soil Collection Date: 11/28/2017

Pool/ Habitat/ Basin No.	Invertbrates Present (X)															Comments
	Insect Exo-Skeletons	Micro-Turbellaria Cysts	Cladocera Ephippia	Ostracods Live/Cysts/ Carapaces	Copepods Live/Cysts	Number of Large Branchiopod Cysts						Hydracarina Live	Nematoda	Collembola	Other Species	
						Branchinecta sp.	*Lepidurus packardi*	*Streptocephalus wootoni*	*Linderiella occidentalis*	*Lynceus brachyurus*	*Cyzicus californicus*					
8 9 10						6 312 127		Ø								
11 12 13						228 148 241		Ø								
14 15 17						184 106 4		Ø								
18 19 20						83 170 0		Ø								
21 22 23						3 0 20		Ø								
24 25 26						0 0 1		Ø								
27 28 29						1 1200 0		Ø								
30 31 32						0 0 11		Ø								
33 34 35						217 22 195		Ø								
36 37 39						55 105 96		Ø								

Appendix D

Fairy Shrimp 2017-2018 Wet Season Report

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2017-2018 Wet Season Fairy Shrimp Survey for Otay River Restoration Project

Prepared for:

Otay Land Company, LLC
1903 Wright Place, Suite 220
Carlsbad, CA 92008

Prepared by:

ICF
525 B Street, Suite 1700
San Diego, California 92101

September 2018

ICF. 2018. 2017-2018 Wet Season Fairy Shrimp Survey for Otay River Restoration Project. September.

Contents

1.0 Introduction

ICF was contracted to conduct wet season fairy shrimp surveys for the Otay River Restoration Project (ORRP), a permittee-responsible mitigation site and proposed mitigation bank located below Savage Dam in the Otay River. The mitigation site is being implemented to offset impacts associated with several Otay Ranch Village development projects as well as future projects in the vicinity.

The goal of this survey was to determine presence or absence of listed large branchiopods (fairy shrimp) in seasonally inundated depressions within the study area (Figures 1-3), for use in avoiding take of listed large branchiopods. The large branchiopods known from freshwater in southern San Diego County are San Diego fairy shrimp *(Branchinecta sandiegonensis)*, Lindahl's fairy shrimp *(Branchinecta lindahil*), and Riverside fairy shrimp (*Streptocephalus woottoni*).

2.0 Methods

ICF conducted wet season fairy shrimp surveys on 30 seasonally inundated depressions located within the study area (Figure 3). The vernal pool preserve in the northeast side of the site was not a subject of this study and was not sampled (Figure 3). All seasonally inundated depressions besides #20 were previously mapped by RECON Environmental as part of land stewardship of the Otay River Regional Park, and the boundaries of the depressions are used in Figure 3

Survey methodology follows the USFWS *Survey Guidelines for the Listed Large Branchiopods* (Guidelines; USFWS 2015) as described below. Prior to initiating the surveys, a 15-day pre-notification letter was sent to the USFWS Carlsbad Field Office informing intent to conduct a protocol dry season survey for listed fairy shrimp (Appendix A).

2.1 Wet Season Fairy Shrimp Sampling

The site was monitored for any inundation, beginning after the first rains in fall of 2017. Wet season sampling commenced after the first ponding was observed. Wet season sampling was conducted by Lance Woolley (Permit# TE-14560C), assisted by ICF biologist Nicole Salas. No measurable rain fell at the weather station at Brown Field in October, November, or December 2017 (NOAA 2018). The storm event on January 9 and 10, 2018 produced 1.58 inches of rainfall and produced the most rain of the season (NOAA 2018). Several pools were confirmed to be inundated on January 12, 2018. The first sampling event took place on January 19, 2018, and was considered completed on April 20, 2018, after the last pools dried.

During the wet season, biologists visited the pools after storm events of at least one inch to document when a pool was inundated (held more than 3 centimeters of standing water) (Table 1). After inundation, pools were visited once every week until the pools were no longer inundated, to assess the growth of fairy shrimp and to evaluate if the pools were refilling with late season rain events. Surveys were reinitiated if pools refilled to above 3 centimeters. During each visit, portions of the pool bottom, edges and vertical water column were sampled using a dip net or aquarium net appropriate for the size of the pool. Mesh size was no larger than 1/8 inch. Sampling tools were examined and emptied at least once every five linear meters. Depth of ponding at deepest location was recorded. Voucher specimens of all listed vernal pool branchiopods captured were be collected

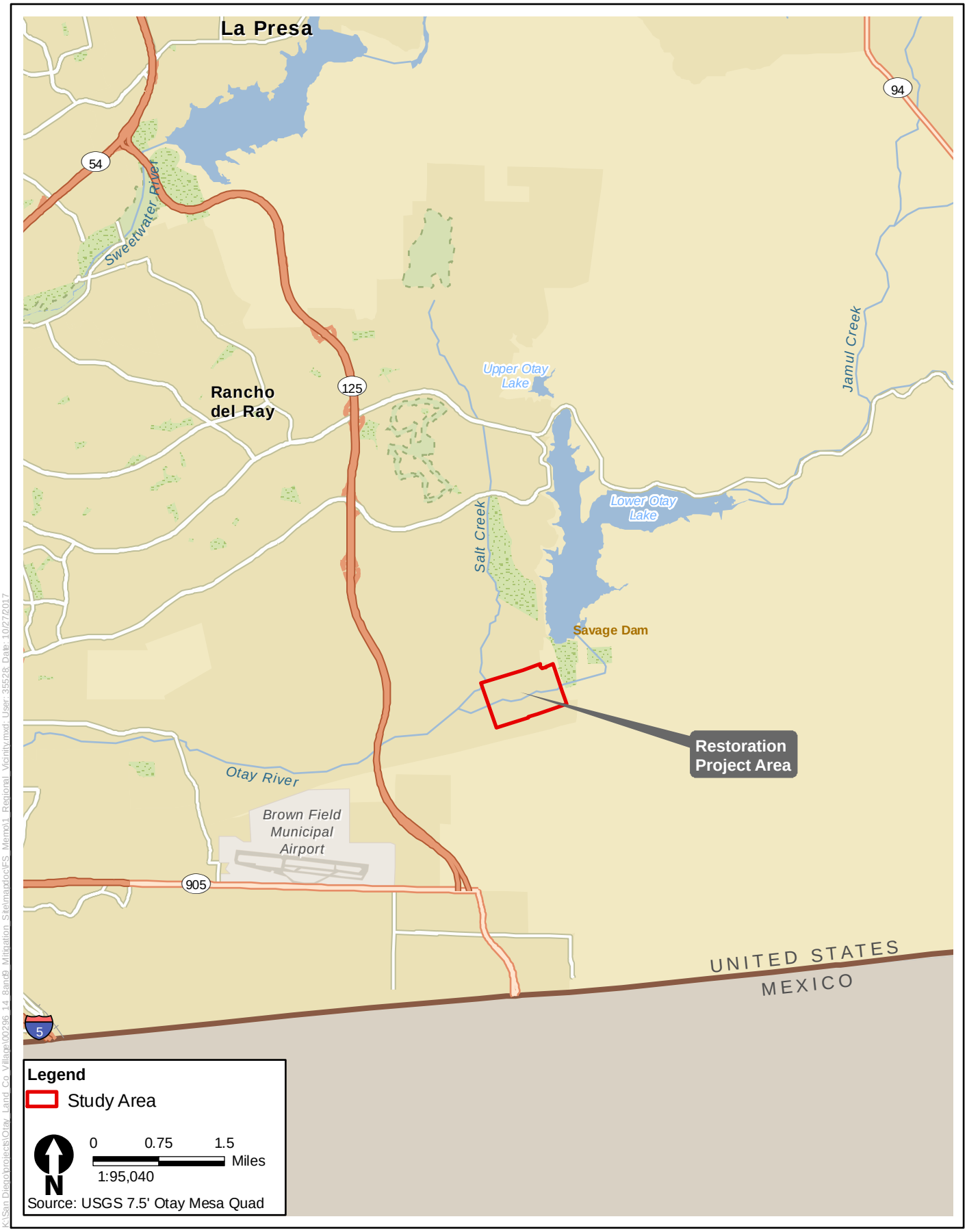

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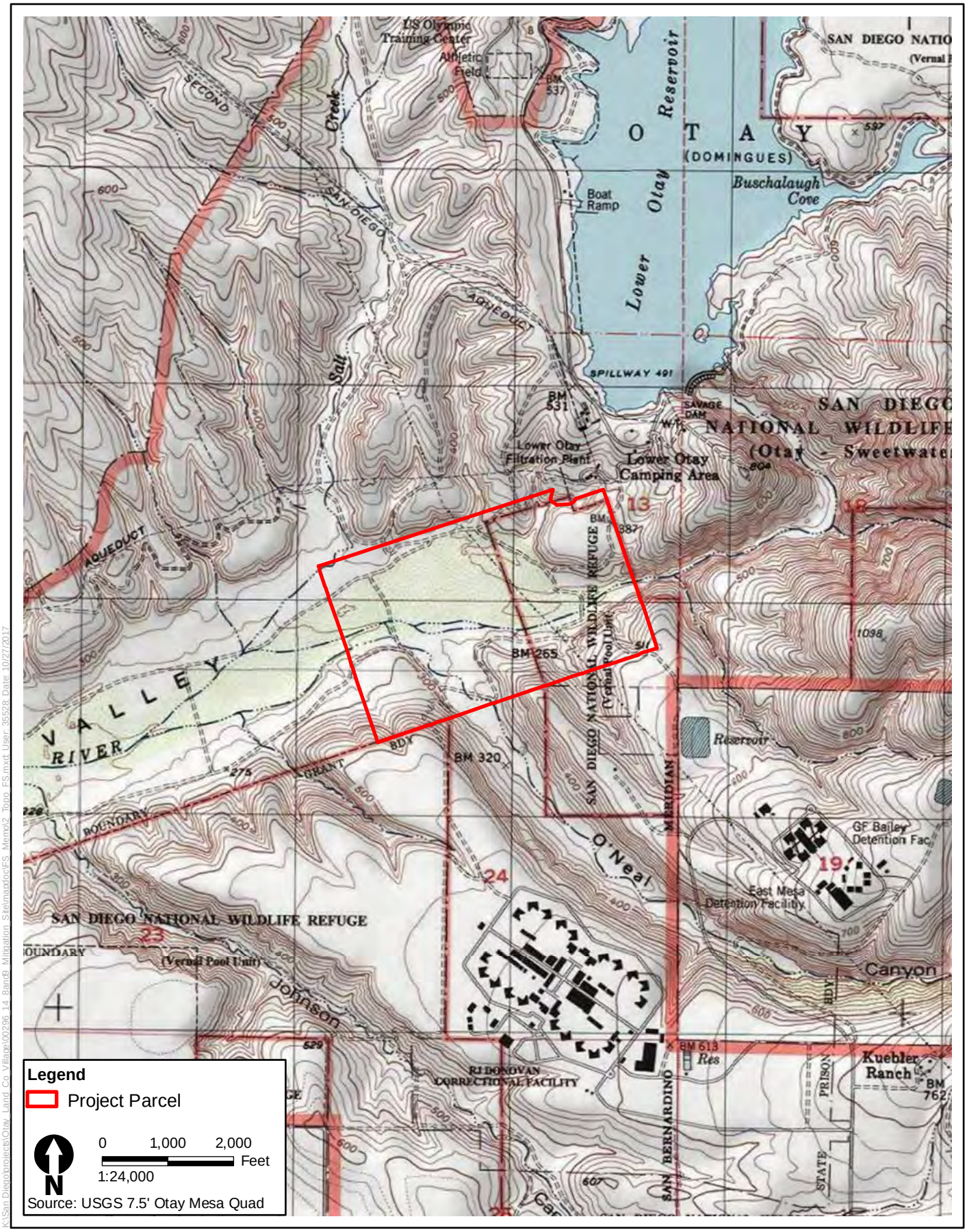
Figure 1
Regional Location
Otay River Restoration Project



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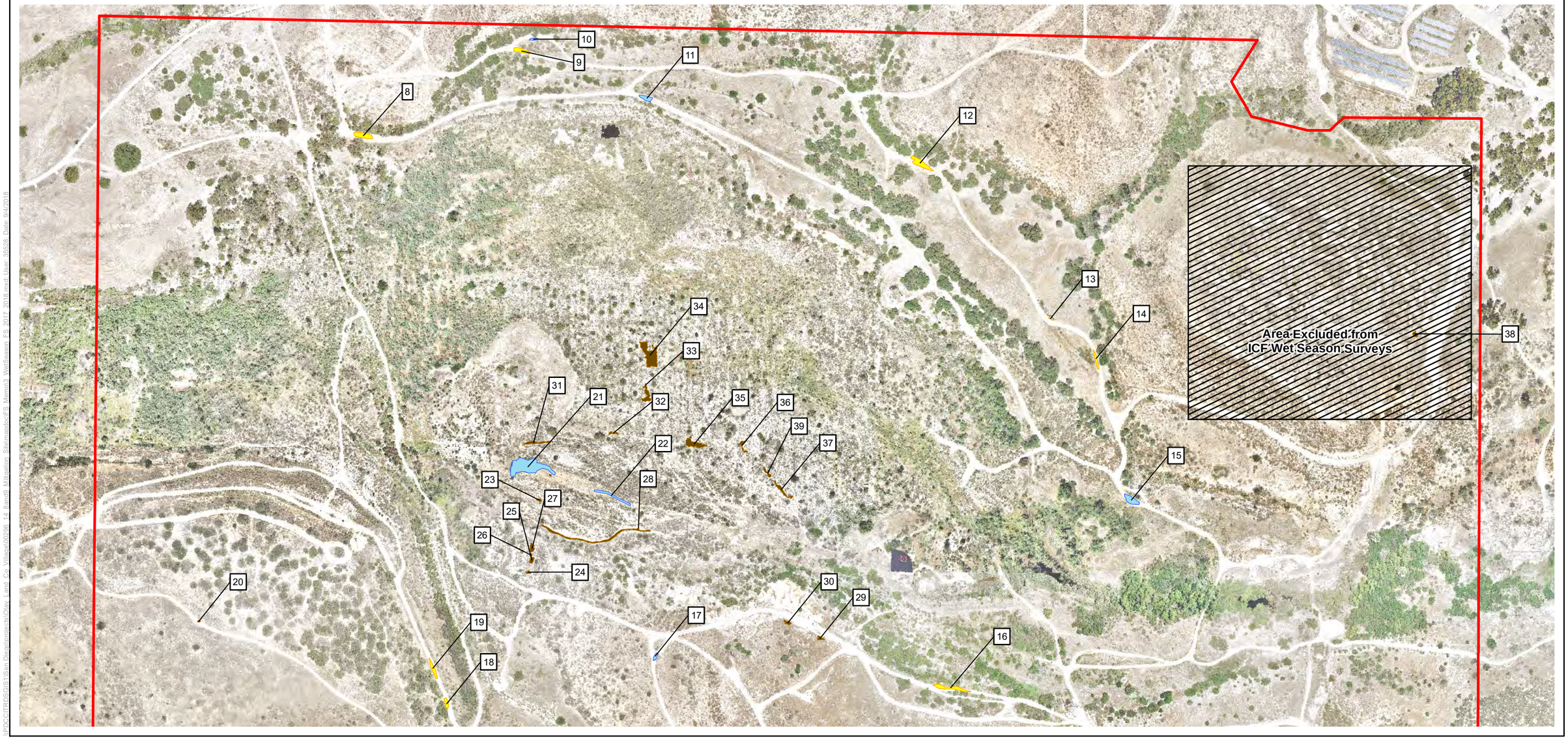
ICF

Figure 2
Project Location
Otay River Restoration Project



Legend

Project Parcel

Survey Results

- Lindahl's Fairy Shrimp
- No Ponding
- Ponding, No Shrimp

Source: RECON; ICF, 2018

N

0 200 400 Feet

1:3,830

Figure 3
2017-2018 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

and all other specimens were returned to the pool. Specimens were be only collected once for each pool, with a maximum of 20 specimens (3 specimens of either sex) or less than 10% of the population of each listed species collected.

3.0 Results and Discussion

Lindahl's fairy shrimp were observed in the following 8 of 30 basins during the 2017-2018 wet season surveys: 8, 9, 12, 13, 14, 16, 18, and 19 (Table 2; Figure 3).

No Riverside fairy shrimp or San Diego fairy shrimp were observed in any of the sampled basins in 2017-2018.

Branchinecta sp. cysts were observed in the following 23 basins during dry season sampling in 2017: 8 -19, 21, 23, 26, 27, 28, and 32-39 (ICF 2018).

2017-2018 was a year of below-average rainfall. Basins 20 and 23 through 39 never ponded during the sampling period. All other basins except 10 and 15 held water long enough in 2017-2018 to at least marginally support the life-cycle of San Diego fairy shrimp (Table 1), with 30 days being the typical average time needed for San Diego fairy shrimp to reach reproductive maturity (Eriksen and Belk 1999).

Table 1. 2018 Hydrological Monitoring – Approximate maximum ponding depth per visit (centimeters).

Pool	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16	3/23	3/30	4/6	4/13	4/20
8	dry	dry	dry	dry	dry	dry	**5**	**15**	**15**	**6**	dry	dry	dry	dry
9	**20**	**15**	**3**	dry	dry	dry	**10**	**4**	**5**	dry	dry	dry	dry	dry
10	dry	dry	dry	dry	dry	dry	dry	dry	dry	**6**	dry	dry	dry	dry
11	dry	dry	dry	dry	dry	dry	**8**	**5**	**5**	dry	dry	dry	dry	dry
12	**20**	**5**	dry	dry	dry	dry	**40**	**25**	**25**	**30**	**20**	**8**	dry	dry
13	dry	dry	dry	dry	dry	dry	**12**	**15**	**15**	**15**	**9**	dry	dry	dry
14	10	dry	dry	dry	dry	dry	**50**	**40**	**40**	**35**	**25**	**18**	**8**	dry
15	10	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
16	**10**	**10**	**4**	dry	dry	dry	**40**	**25**	**25**	**25**	**15**	**10**	dry	dry
17	dry	dry	dry	dry	dry	dry	dry	**5**	**5**	dry	dry	dry	dry	dry
18	**5**	**3**	dry	dry	dry	dry	dry	**15**	**15**	**6**	dry	dry	dry	dry
19	**5**	dry	dry	dry	dry	dry	dry	**10**	**10**	**6**	dry	dry	dry	dry
20	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
21	**40**	**37**	**35**	**20**	**10**	dry	**10**	dry	dry	dry	dry	dry	dry	dry
22	**25**	**18**	**18**	**10**	**5**	dry	**2**	dry	dry	dry	dry	dry	dry	dry
23	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
24	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
25	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
26	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
27	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
28	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
29	dry	dry	dry	dry	dry	dry	**20**	dry	dry	dry	dry	dry	dry	dry
30	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
31	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
32	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
33	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
34	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
35	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
36	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
37	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
39	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry

* = ponding observed; no depth sampled; Note: all pools dry on 4/20/2018

Table 2. 2018 Wet Season Fairy Shrimp Sampling Results

Pool	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16	3/23	3/30	4/6	4/13	4/20
8	dry	dry	dry	dry	dry	dry	*	dry	*	LFS	dry	dry	dry	dry
9	imm FS	LFS	LFS	dry	dry	dry	*	dry	*	dry	dry	dry	dry	dry
10	dry	dry	dry	dry	dry	dry	dry	dry	dry	*	dry	dry	dry	dry
11	dry	dry	dry	dry	dry	dry	*	dry	*	dry	dry	dry	dry	dry
12	imm FS	*	dry	dry	dry	dry	LFS	LFS	*	*	*	*	dry	dry
13	dry	dry	dry	dry	dry	dry	LFS	*	*	*	*	dry	dry	dry
14	LFS	dry	dry	dry	dry	dry	*	LFS	*	*	*	*	*	dry
15	*	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
16	*	LFS	*	dry	dry	dry	*	*	LFS	LFS	*	*	dry	dry
17	dry	dry	dry	dry	dry	dry	dry	dry	*	*	dry	dry	dry	dry
18	LFS	*	dry	dry	dry	dry	dry	LFS	LFS	LFS	dry	dry	dry	dry
19	LFS	dry	dry	dry	dry	dry	dry	dry	*	LFS	dry	dry	dry	dry
20	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
21	*	*	*	*	*	dry	*	dry	dry	dry	dry	dry	dry	dry
22	*	*	*	*	*	dry	*	dry	dry	dry	dry	dry	dry	dry
23	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
24	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
25	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
26	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
27	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
28	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
29	dry	dry	dry	dry	dry	dry	20	dry	dry	dry	dry	dry	dry	dry
30	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
31	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
32	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
33	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
34	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
35	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
36	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
37	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
39	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry

*** = pool inundated, no shrimp; imm FS = immature fairy shrimp; LFS = mature Lindahl's fairy shrimp observed. All basins were dry on 4/20/2017.**

4.0 References

Eriksen, C. and D. Belk. Fairy Shrimps of California's Puddles, Playas, and Pools. Mad River Press, 141 Carter Lane, Eureka, CA 95503. 196pp.

ICF. 2018. 2017 Dry Season Fairy Shrimp Survey at Otay River Restoration Project. June.

Environmental Science Associates and ICF International. 2015. Comprehensive Monitoring Plan. Prepared for the County of San Diego Department of Parks and Recreation

NOAA National Weather Service Forecast Office, San Diego, CA. Chronological RTP Listings by Station. Available: <https://www.wrh.noaa.gov/sgx/obs/rtp/rtpmap.php?wfo=sgx>

U.S. Fish and Wildlife Service (USFWS). 2015. Survey Guidelines for the Listed Large Branchiopods. May 31.

5.0 Certification

We certify that the information in this survey report and attached exhibits fully and accurately represent our work.

September 14, 2018

Lance Woolley (Permit No. TE-14560C)
Vernal Pool Biologist

Date

Appendix A
USFWS Notification

November 8, 2017

Ms. Stacey Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

RE: 15-Day Notice for Protocol Surveys for Listed Vernal Pool Branchiopods
Otay River Restoration Project

Dear Ms. Love:

ICF is planning on conducting a protocol wet season and dry season survey for listed vernal pool branchiopods within the Otay River Restoration Project (Figures 1 and 2). The surveys will be conducted to document the presence of listed branchiopods within the Otay River Restoration Project prior to commencement of project activities. Thirty-one seasonally-inundated depressions within the Otay River Restoration Project have been previously mapped and will be surveyed (Figure 3). I will be conducting the wet season survey under the guidelines stated in the 2017 Survey Guidelines for Listed Large Branchiopods issued by the U.S. Fish and Wildlife Service. I will collect soil samples following the terms and conditions of section 5 of my TE permit, in accordance with the 2017 Survey Guidelines for Listed Large Branchiopods issued by the Service. Service-approved listed branchiopod cyst identifier Dale Ritenour (TE-58888A-2) will conduct the processing and analyzation of dry season soil samples. All dry season efforts will follow the 2017 Survey Guidelines for Listed Large Branchiopods.

Please do not hesitate to contact me with any comments or questions.

Sincerely,

Lance Woolley
TE-14560C
(858) 444-3924
Lance.Woolley@icf.com

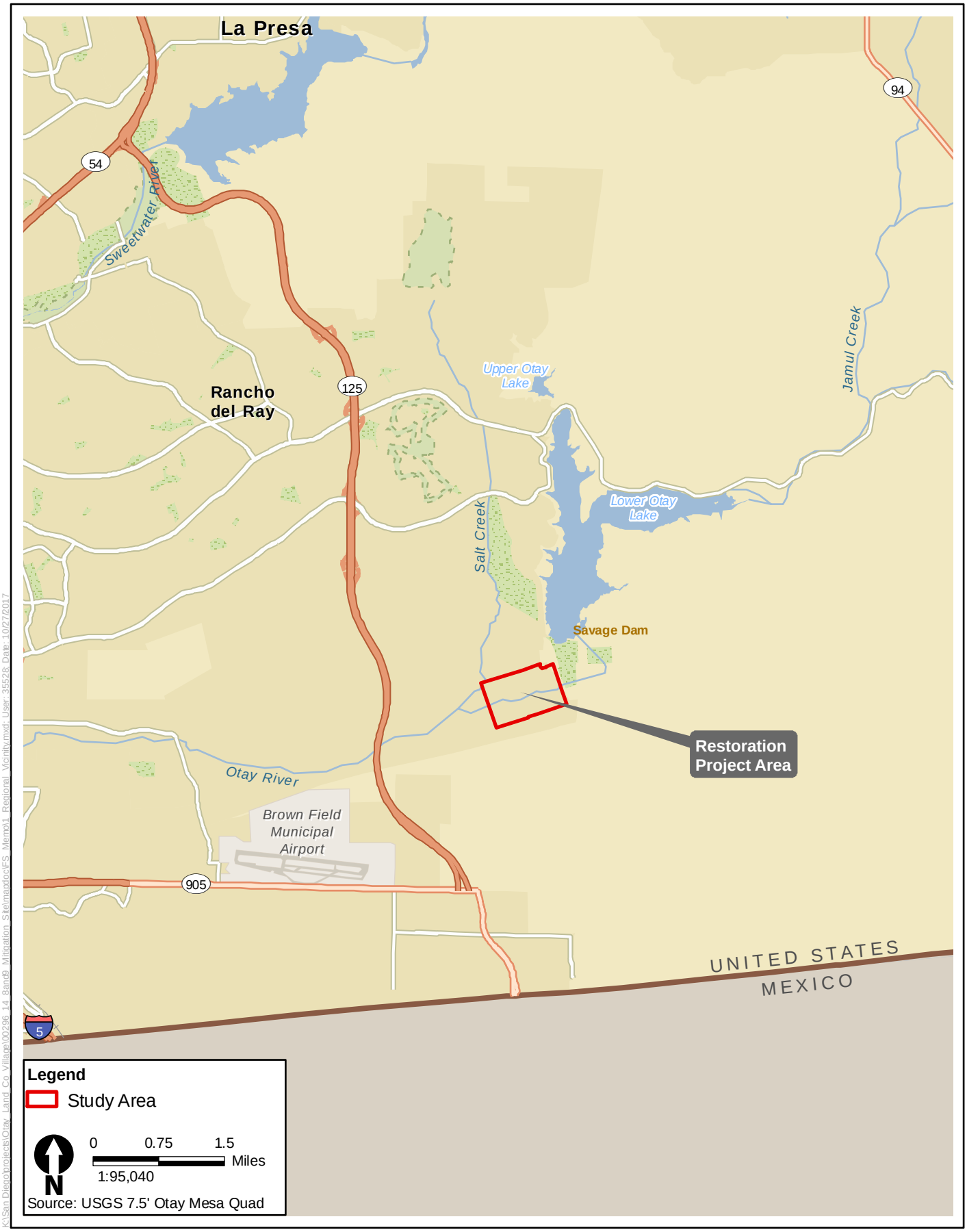


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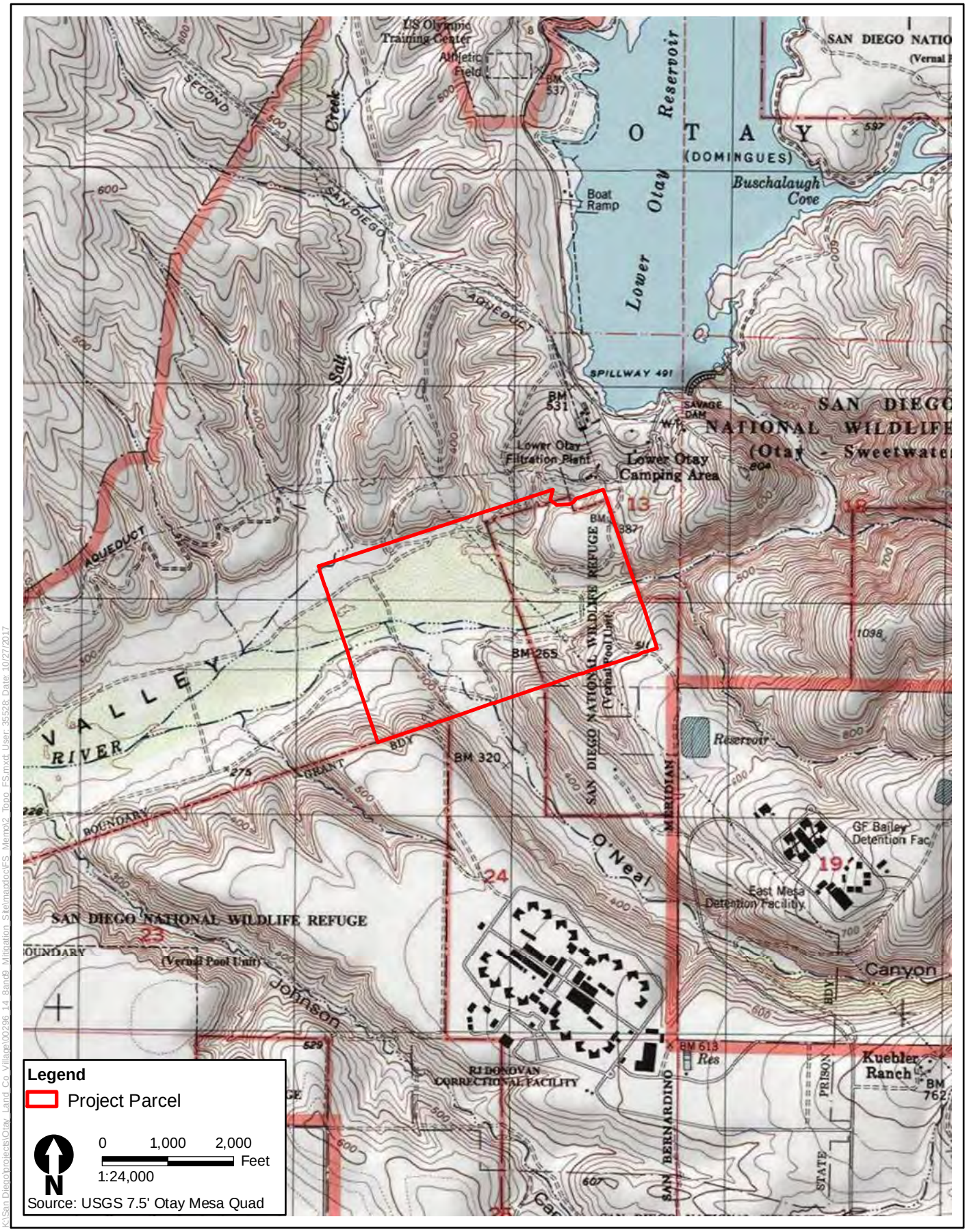
Figure 1
Regional Location
Otay River Restoration Project



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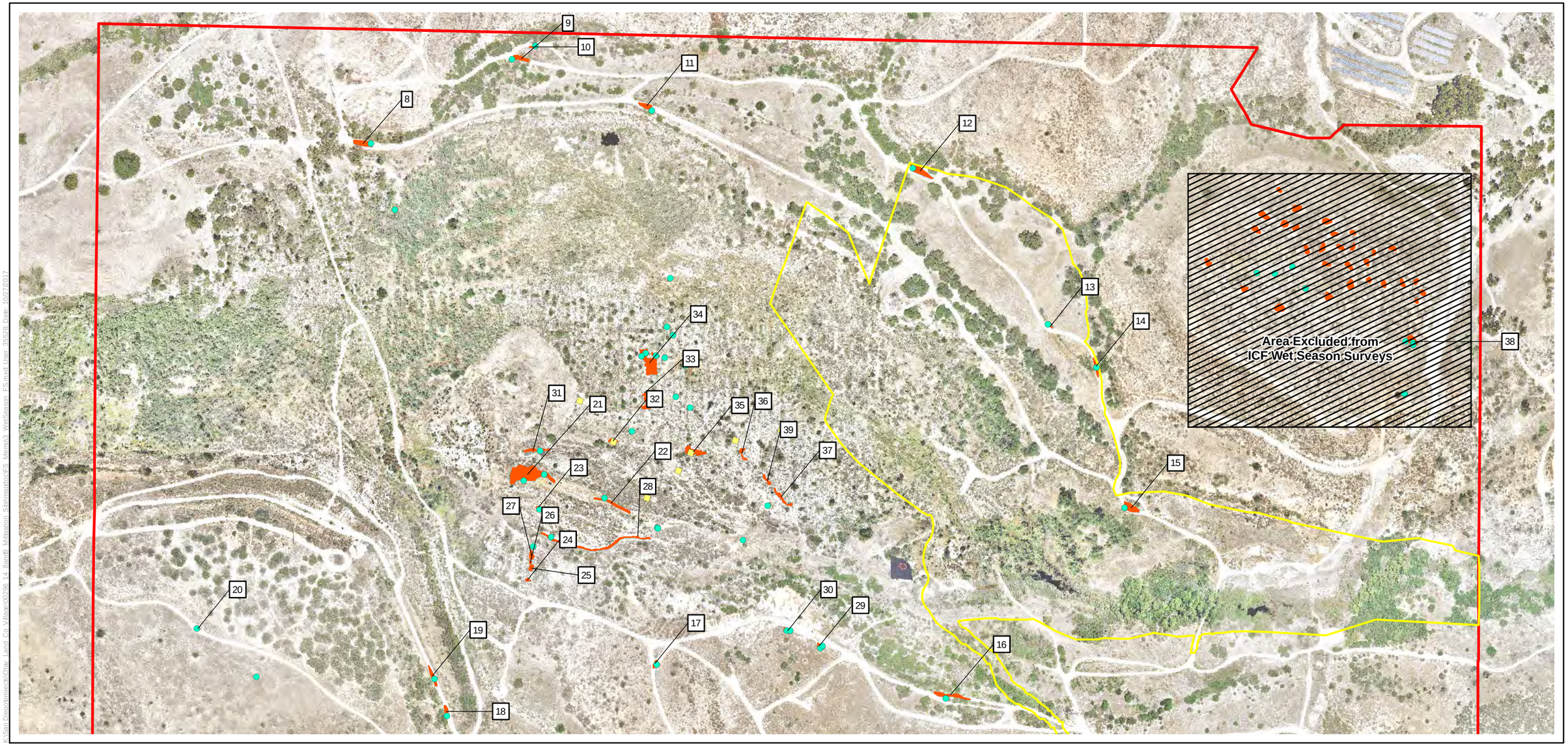
ICF

Figure 2
Project Location
Otay River Restoration Project



Legend

- Project Parcel
- Pre Bank Boundary
- Ponding Points
- Ponding Polygons
- Woolly Marbles
- Vernal Pools (RECON)

Source: RECON; ICF, 2017

0 200 400 Feet

1:3,830

Figure 3
Vernal Pools to Survey
Otay River Restoration Project

Appendix B
USFWS Wet Season Data Sheets

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 1

Date: 01/19/17 | Time: 0830-1230 | Weather Conditions: Overcast, 56 °F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	56	50	10	20	10	55	BRSP	--	--	--	--	--	--	--	--	--	D/TT	Juveniles
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	56	50	10	20	80	102	BRSP	--	--	--	--	--	--	--	--	--	D/TT	Juveniles
13	3607189, 506078 NAD83	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	57	50	8	10	400	31	BRLI	--	--	--	--	--	--	--	--	--	D/TT	8 Male BRLI Collected
15	3607047, 506213 NAD83	57	52	7	10	79	79	--	--	--	--	--	--	--	--	--	--	D/TT	
16	3606812, 506107 NAD83	57	54	7	10	22	84	--	--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	61	55	3	5	18	30	BRLI	--	--	--	--	--	--	--	--	--	D/TT	12 Male BRLI Collected
19	3606658, 505621 NAD83	61	55	3	5	24	47	BRLI	--	--	--	--	--	--	--	--	--	D/TT	3 Male BRLI Collected
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	61	55	20	40	400	428	--	--	--	--	--	--	--	--	--	--	NP, UD	

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

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Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 1

Date: 01/19/17 | Time: 00-831230 | Weather Conditions: Overcast, 56 °F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	61	56	15	25	71	71	--	--	--	--	--	--	--	--	--	--	NP, UD	
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas — Survey 1

Date: 01/19/17 | Time: 0830-1230 | Weather Conditions: Overcast, 56°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 2

Date: 01/26/2018 | Time: 0800-1230 | Weather Conditions: Sunny, 57°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	57	50	12	15	30	55	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	57	52	4	5	12	102	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
13	3607189, 506078 NAD83	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	--	--	--	--	--	31	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	58	52	8	10	84	84	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	57	51	3	3	5	30	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	57	51	15	25	200	428	--	--	--	--	--	--	--	--	--	--	NP, UD	

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 2

Date: 01/26/2018 | Time: 0800-1230 | Weather Conditions: Sunny, 57°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	57	52	13	18	71	71	--	--	--	--	--	--	--	--	--	--	NP, UD	
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 3

Date: 02/02/2018 | Time: 0930-1200 | Weather Conditions: Mostly Sunny, 70°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	70	60	2	3	4	55	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	--	--	--	--	--	102	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
13	3607189, 506078 NAD83	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	--	--	--	--	125	31	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	75	63	3	4	20	84	--	--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	77	61	15	35	125	428	--	--	--	--	--	--	--	--	--	--	NP, UD	

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 3

Date: 02/02/2018 | Time: 0930-1200 | Weather Conditions: Mostly Sunny, 70°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	77	61	11	18	71	71	--	--	--	--	--	--	--	--	--	--	NP, UD	
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 3

Date: 02/02/2017 | Time: 0930-1200 | Weather Conditions: Mostly Sunny, 70°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 4

Date: 02/09/2018 | Time: 1000-1300 | Weather Conditions: Sunny, 64°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	--	--	--	--	--	102	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
13	3607189, 506078 NAD83	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	--	--	--	--	30	31	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	--	--	--	--	--	84	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	64	60	15	20	30	428	--	--	--	--	--	--	--	--	--	--	NP, UD	

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 4

Date: 02/09/2018 | Time: 1000-1300 | Weather Conditions: Sunny, 64°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	64	60	8	10	37	71	--	--	--	--	--	--	--	--	--	--	NP, UD	
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 4

Date: 02/09/2018 | Time: 1000-1300 | Weather Conditions: Sunny, 64°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C | Survey 5

Date: 02/16/2018 | Time: 1300-1400 | Weather Conditions: Mostly Sunny, 74°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	--	--	--	--	--	102	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
13	3607189, 506078 NAD83	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	--	--	--	--	10	31	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	--	--	--	--	--	84	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	74	62	7	5	10	428	--	--	--	--	--	--	--	--	--	--	NP, UD	

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C | Survey 5

Date: 02/16/2018 | Time: 1300-1400 | Weather Conditions: Partly Sunny, 74°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	74	62	8	10	8	71	--	--	--	--	--	--	--	--	--	--	NP, UD	
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C | Survey 5

Date: 02/16/2018 | Time: 1300-1400 | Weather Conditions: Partly Sunny, 74°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C | Survey 6

Date: 02/23/2018 | Time: 0600-0700 | Weather Conditions: Mostly Cloudy, 55°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	--	--	--	--	--	102	BRLI	--	--	--	--	--	--	--	--	--	D/TT	Dry
13	3607189, 506078 NAD83	--	--	--	--	--	3	BRLI	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	--	--	--	--	--	31	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	--	--	--	--	--	84	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C | Survey 6

Date: 02/23/2018 | Time: 0600-0700 | Weather Conditions: Mostly Cloudy, 55°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C | Survey 6

Date: 02/23/2018 | Time: 0600-0700 | Weather Conditions: Mostly Cloudy, 55°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 7

Date: 03/02/2018 | Time: 1000-1300 | Weather Conditions: Sunny, 62°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	62	57	4	5	30	80	--	--	--	--	--	--	--	--	--	--	D/TT	
9	3607253, 505498 NAD83	62	56	8	10	15	55	--	--	--	--	--	--	--	--	--	--	D/TT	
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	62	57	7	8	24	46	--	--	--	--	--	--	--	--	--	--	D/TT	
12	3607290, 505906 NAD83	62	56	20	40	100	102	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
13	3607189, 506078 NAD83	62	57	9	12	4	3	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
14	3607165, 506135 NAD83	62	57	20	50	31	31	--	--	--	--	--	--	--	--	--	--	D/TT	
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	62	57	20	40	84	84	--	--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	62	58	3	10	6	428	--	--	--	--	--	--	--	--	--	--	NP, UD	

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 7

Date: 03/02/2018 | Time: 1000-1300 | Weather Conditions: Sunny, 62°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	62	58	2	2	2	71	--	--	--	--	--	--	--	--	--	--	NP, UD	
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	62	57	10	20	17	17	--	--	--	--	--	--	--	--	--	--	NP, UD	
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 7

Date: 03/02/2018 | Time: 1000-1300 | Weather Conditions: Sunny, 62°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 8

Date: 03/09/2018 | Time: 0900-1200 | Weather Conditions: Mostly Sunny, 65°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--		--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	65	58	10	15	45	102	BRLI	--	--	--	--	--	--	--	--	--	D/TT	Tadpoles
13	3607189, 506078 NAD83	65	58	4	6	3	3	--	--	--	--	--	--	--	--	--	--	D/TT	Tadpoles
14	3607165, 506135 NAD83	65	57	12	20	31	31	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	65	57	20	40	84	84	--	--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	65	58	3	5	7	30	BRLI	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 8

Date: 03/09/2018 | Time: 0900-1200 | Weather Conditions: Mostly Sunny, 65°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 8

Date: 03/09/18 | Time: 0900-1200 | Weather Conditions: Mostly Sunny, 65°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 9

Date: 03/16/2018 | Time: 0900-1200 | Weather Conditions: Overcast, 63°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	53	50	10	15	40	80	--	--	--	--	--	--	--	--	--	--	D/TT	Juvenile shrimp
9	3607253, 505498 NAD83	53	51	3	5	13	55	--	--	--	--	--	--	--	--	--	--	D/TT	juvenile shrimp
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	53	51	3	5	13	46	--	--	--	--	--	--	--	--	--	--	D/TT	
12	3607290, 505906 NAD83	53	51	15	25	102	102	--	--	--	--	--	--	--	--	--	--	D/TT	Tadpoles
13	3607189, 506078 NAD83	53	51	9	15	3	3	--	--	--	--	--	--	--	--	--	--	D/TT	
14	3607165, 506135 NAD83	53	50	20	40	31	31	--	--	--	--	--	--	--	--	--	--	D/TT	
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	55	51	15	25	84	84	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	55	52	4	5	19	19	--	--	--	--	--	--	--	--	--	--	D/TT	
18	3606631, 505644 NAD83	55	52	10	15	30	30	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
19	3606658, 505621 NAD83	55	52	7	10	9	47	--	--	--	--	--	--	--	--	--	--	D/TT	Juvenile shrimp
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 9

Date: 03/16/2018 | Time: 0900-1200 | Weather Conditions: Overcast, 63°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 9

Date: 03/16/18 | Time: 0900-1200 | Weather Conditions: Overcast, 63°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 10

Date: 03/23/2018 | Time: 1000-1200 | Weather Conditions: Overcast, 61°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	61	55	5	6	5	80	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	61	55	4	6	6	12	--	--	--	--	--	--	--	--	--	--	D/TT	Juvenile shrimp
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	61	55	10	30	100	102	--	--	--	--	--	--	--	--	--	--	D/TT	
13	3607189, 506078 NAD83	61	56	8	15	4	3	--	--	--	--	--	--	--	--	--	--	D/TT	
14	3607165, 506135 NAD83	61	56	20	35	31	31	--	--	--	--	--	--	--	--	--	--	D/TT	
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	63	56	17	25	84	84	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	64	55	3	3	3	19	--	--	--	--	--	--	--	--	--	--	D/TT	
18	3606631, 505644 NAD83	64	55	4	6	16	30	BRLI	--	--	--	--	--	--	--	--	--	D/TT	
19	3606658, 505621 NAD83	64	55	4	6	4	47	BRLI	--	--	--	--	--	--	--	--	--	D/TT	Juvenile shrimp
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
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22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 11

Date: 03/30/2018 | Time: 0800-1000 | Weather Conditions: Overcast, 58°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	58	53	5	20	70	102	--	--	--	--	--	--	--	--	--	--	D/TT	
13	3607189, 506078 NAD83	58	54	4	9	2	3	--	--	--	--	--	--	--	--	--	--	D/TT	
14	3607165, 506135 NAD83	58	54	15	25	26	31	--	--	--	--	--	--	--	--	--	--	D/TT	
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	58	54	10	15	50	84		--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 11

Date: 03/30/2018 | Time: 0800-1000 | Weather Conditions: Overcast, 58°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 11

Date: 03/30/18 | Time: 0800-1000 | Weather Conditions: Overcast, 58°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 12

Date: 04/06/2018 | Time: 0900-1100 | Weather Conditions: Partly Sunny, 61°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	61	55	3	8	15	102	--	--	--	--	--	--	--	--	--	--	D/TT	
13	3607189, 506078 NAD83	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	61	54	8	18	20	31	--	--	--	--	--	--	--	--	--	--	D/TT	
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	61	54	6	10	20	84		--	--	--	--	--	--	--	--	--	D/TT	
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 12

Date: 04/06/2018 | Time: 0900-1100 | Weather Conditions: Partly Sunny, 61°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

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Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 12

Date: 04/06/18 | Time: 0900-1100 | Weather Conditions: Partly Sunny, 61°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

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SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 13

Date: 04/13/2018 | Time: 0900-1030 | Weather Conditions: Sunny, 58°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
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9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
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16	3606812, 506107 NAD83	--	--	--	--	--	84		--	--	--	--	--	--	--	--	--	D/TT	Dry
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

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Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
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22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix 1. U.S. Fish and Wildlife Service – Data Sheet for Wet Season Surveys For Listed Large Branchiopods

Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 13

Date: 04/13/18 | Time: 0900-1030 | Weather Conditions: Sunny, 58°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

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Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 14

Date: 04/20/2018 | Time: 0800-0900 | Weather Conditions: Sunny, 56°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
8	3607130, 505379 NAD83	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
9	3607253, 505498 NAD83	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
10	3607276, 505505 NAD83	--	--	--	--	--	12	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
11	3607258, 505361 NAD83	--	--	--	--	--	46	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
12	3607290, 505906 NAD83	--	--	--	--	--	102	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
13	3607189, 506078 NAD83	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
14	3607165, 506135 NAD83	--	--	--	--	--	31	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
15	3607047, 506213 NAD83	--	--	--	--	--	79	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
16	3606812, 506107 NAD83	--	--	--	--	--	84		--	--	--	--	--	--	--	--	--	D/TT	Dry
17	3606744, 505823 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
18	3606631, 505644 NAD83	--	--	--	--	--	30	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
19	3606658, 505621 NAD83	--	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
20	3606625, 505387 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	D/TT	Dry
21	3606877, 505640 NAD83	--	--	--	--	--	428	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
For habitat conditions use two letter abbreviation as follows: NP = Natural Pool, CP = Constructed Pool; UD = undisturbed, D = disturbed: with TT = tire tracks, T = trash, P = plowed; G = grazed, UG = ungrazed by: C = cattle, H = horses, S = sheep; AB = Algal blooms present.
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SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 14

Date: 04/20/2018 | Time: 0800-0900 | Weather Conditions: Sunny, 56°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
22	3606879, 505731 NAD83	--	--	--	--	--	71	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
23	3606851, 505664 NAD83	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
24	3606779, 505677 NAD83	--	--	--	--	--	9	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
25	3606792, 505676 NAD83	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
26	3606797, 505674 NAD83	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
27	3606803, 505672, NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
28	3606827, 505714 NAD83	--	--	--	--	--	148	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
29	3606815, 505970 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
30	3606819, 505935 NAD83	--	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
31	3606903, 505643 NAD83	--	--	--	--	--	44	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
32	3606937, 505710 NAD83	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
33	3606984, 505729 NAD83	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
34	3607020, 505720 NAD83	--	--	--	--	--	236	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
35	3606954, 505790 NAD83	--	--	--	--	--	93	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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Site or Project Name: Otay River Restoration Project | **County:** San Diego | **Quad:** Otay Mesa | **Township:** 18S | **Range:** 1W | **Section:** S13

SURVEYOR / Permit Number: Lance Woolley -- TE 14560C, assisted by Nicole Salas | Survey 14

Date: 04/20/18 | Time: 0800-0900 | Weather Conditions: Sunny, 56°F

Feature ID #	UTM (Northing, Easting, Datum)	Temp (˚F)		Depth (cm)		Surface Area (m x m)		Crustaceans					Insects				Platyhelminths (flatworms)	Habitat Condition	Notes / Voucher information
		Air	Water	Average	Est. Max.	Present	Est. Max.	Anostracans	Notostracans	Copepods	Ostracods	Cladocera	Coleoptera	Hemiptera	Diptera Culicidae	Diptera Chironomidae			
36	3606967, 505834 NAD83	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
37	3606941, 505885 NAD83	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry
39	3606952, 505865 NAD83	--	--	--	--	--	21	--	--	--	--	--	--	--	--	--	--	NP, UD	Dry

Notes: Fill in abbreviated names of Anostracans and Notostracans, for all others indicate presence with a check mark. Anostracan and Notostracan Abbreviations: Use first two letters of genus and species name (e.g., LIOC = *Linderiella occidentalis*, BRLI = *Branchinecta lindahli)*.
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(Estimate grazing regime by height of grasses and forbs and density of hoof prints) LG = light grazing, MG = moderate grazing, HG = heavy grazing.

Appendix E

Fairy Shrimp 2018 Dry Season Report for Expansion

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2018 Dry Season Fairy Shrimp Survey for Otay River Restoration Expansion Parcels

Prepared for:

Otay Land Company, LLC
1903 Wright Place, Suite 220
Carlsbad, CA 92008

Prepared by:

ICF
525 B Street, Suite 1700
San Diego, California 92101

September 2018

ICF. 2018. 2018 Dry Season Fairy Shrimp Survey for Otay River Restoration Expansion Parcels. September.

Contents

1.0 Introduction

ICF was contracted to conduct dry season fairy shrimp surveys for the Otay River Restoration Expansion Parcels, a permittee-responsible mitigation site and proposed mitigation bank located below Savage dam and Lower Otay Lake in the Otay River. The mitigation site is being implemented to offset impacts associated with several Otay Ranch Village development projects as well as future projects in the vicinity.

The goal of this survey was to determine presence or absence of listed large branchiopods (fairy shrimp) in seasonally inundated depressions within the study area (Figures 1-3), for use in avoiding take of listed large branchiopods. The large branchiopods known from freshwater in southern San Diego County are San Diego fairy shrimp *(Branchinecta sandiegonensis)*, Lindahl's fairy shrimp *(Branchinecta lindahil*), and Riverside fairy shrimp (*Streptocephalus woottoni*).

2.0 Methods

ICF conducted dry season fairy shrimp surveys on 28 seasonally inundated depressions located within the study area (Figure 3). Survey methodology follows the USFWS *Survey Guidelines for the Listed Large Branchiopods* (Guidelines; USFWS 2015) as described below. Prior to initiating the surveys, a 15-day pre-survey notification letter was sent to the USFWS Carlsbad Fish and Wildilfe Office informing intent to conduct a protocol dry season survey for listed fairy shrimp (Appendix A). Wet and dry season surveys were previously conducted for the adjacent Otay River Restoration Project (ICF 2018a and b). The current study area includes the expansion parcels to the west of ORRP.

2.1 Soil Collection

On August 1, 2018, fairy shrimp biologist Brian Lohstroh (Permit# TE- 063608-6) collected soil samples for the dry season survey. Soil samples were collected when seasonally inundated depressions were dry. A hand trowel was used to collect soil samples from the top 1-3 centimeters of depressions soil. Whenever possible, soil samples were collected in chunks and the trowel was used to pry up intact chunks of sediment. Loosening the soil by raking or shoveling was avoided as such methods can damage cysts. For each of the 28 seasonally inundated depressions, two perpendicular transects were visually estimated, with one transect passing along the depressions lowest point and the second transect passing through the depressions second lowest point. Ten samples of approximately 100-milliliter (ml) aliquots were removed at each sub-sample site (for a total of 1 liter/ponded area), ensuring that no more than 10% of the sampled vernal pool's surface area was disturbed. Soil samples were taken as follows: two in the pool's lowest point, one at the pool's second lowest point, and two radiating in each of the four directions on the transect lines, at least 1.0 m from the pool center.

Ten 100-mililiter soil samples were collected from each pools. Each label included information necessary to identify the collection date, location of feature and name of collector for each sample.

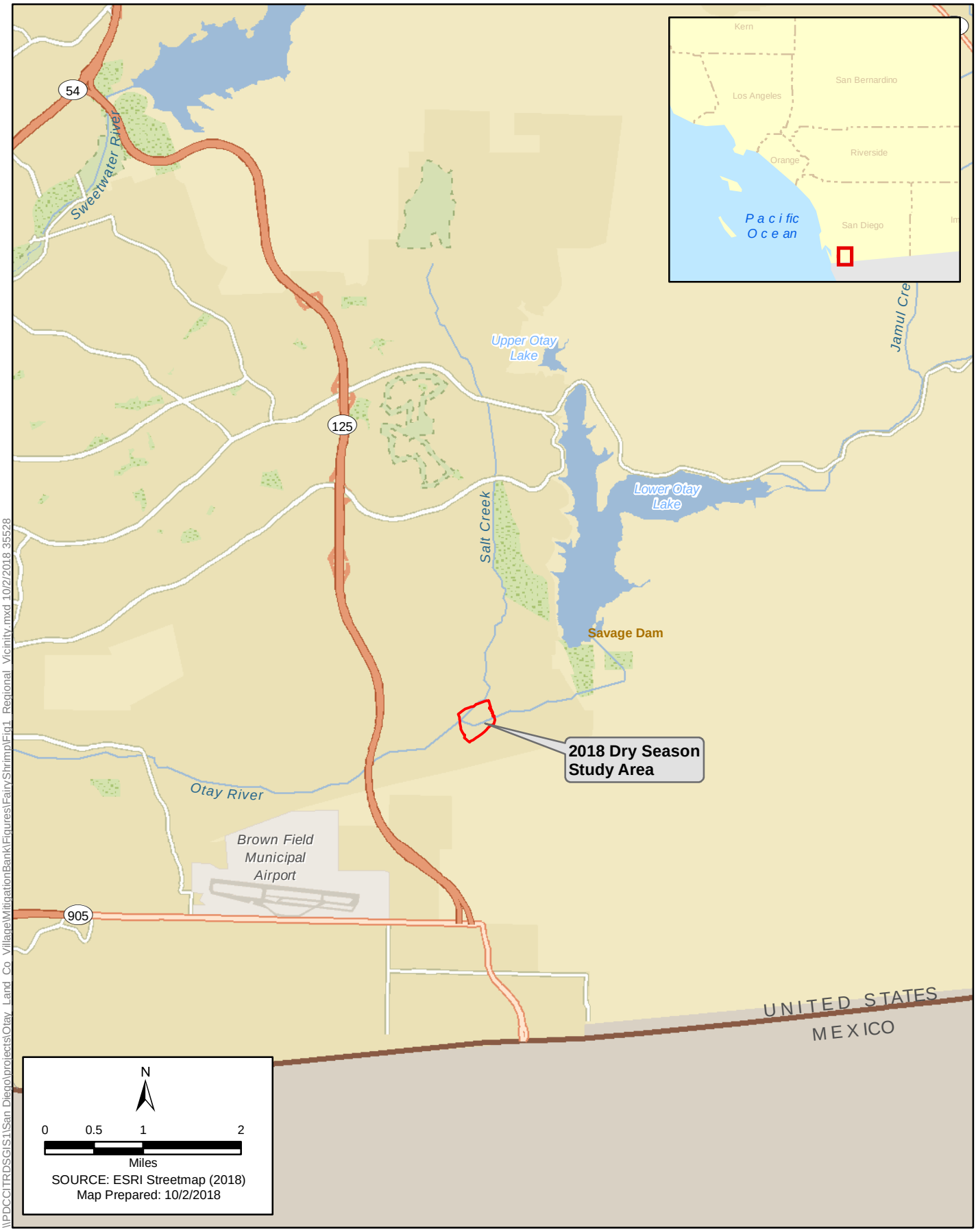
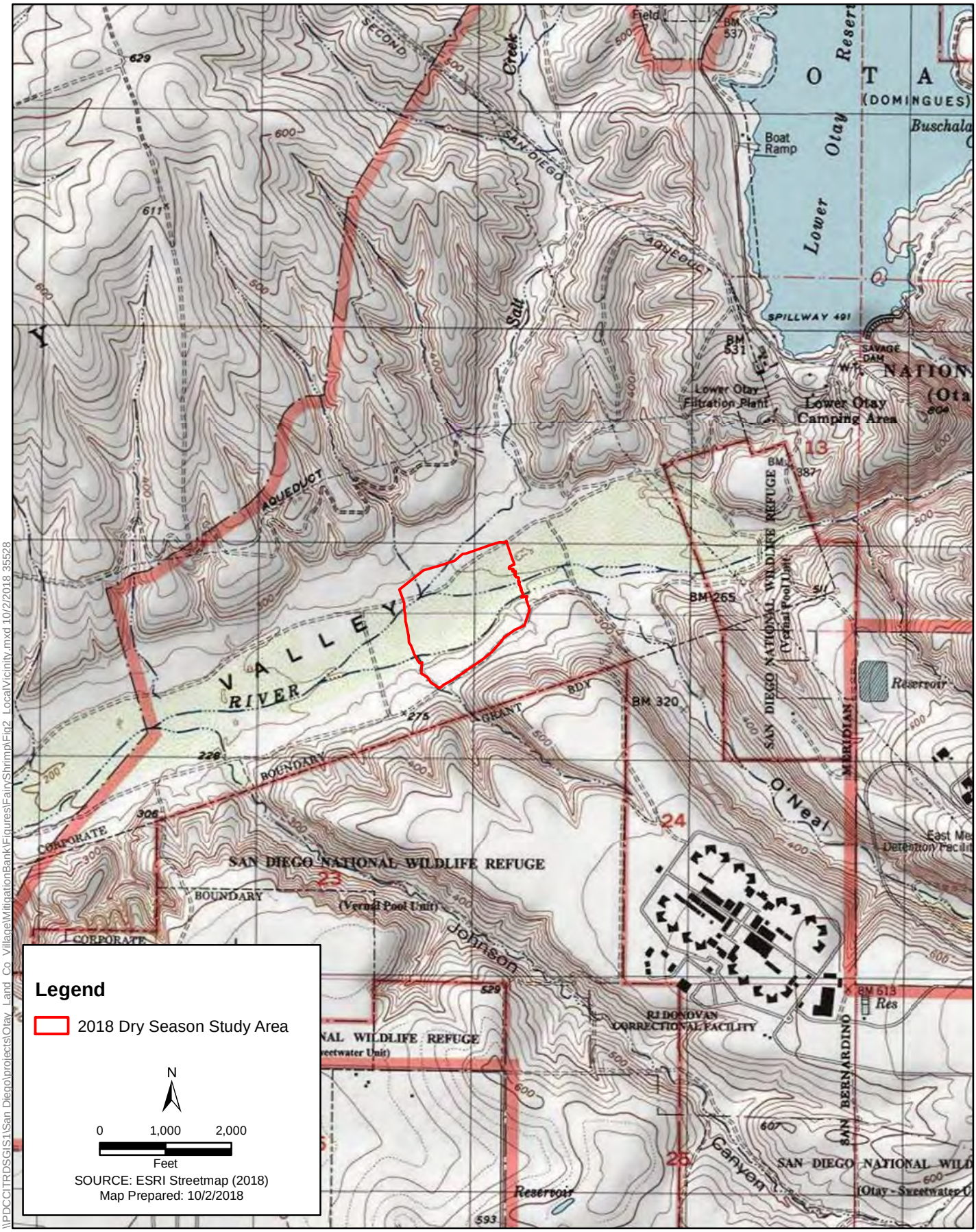
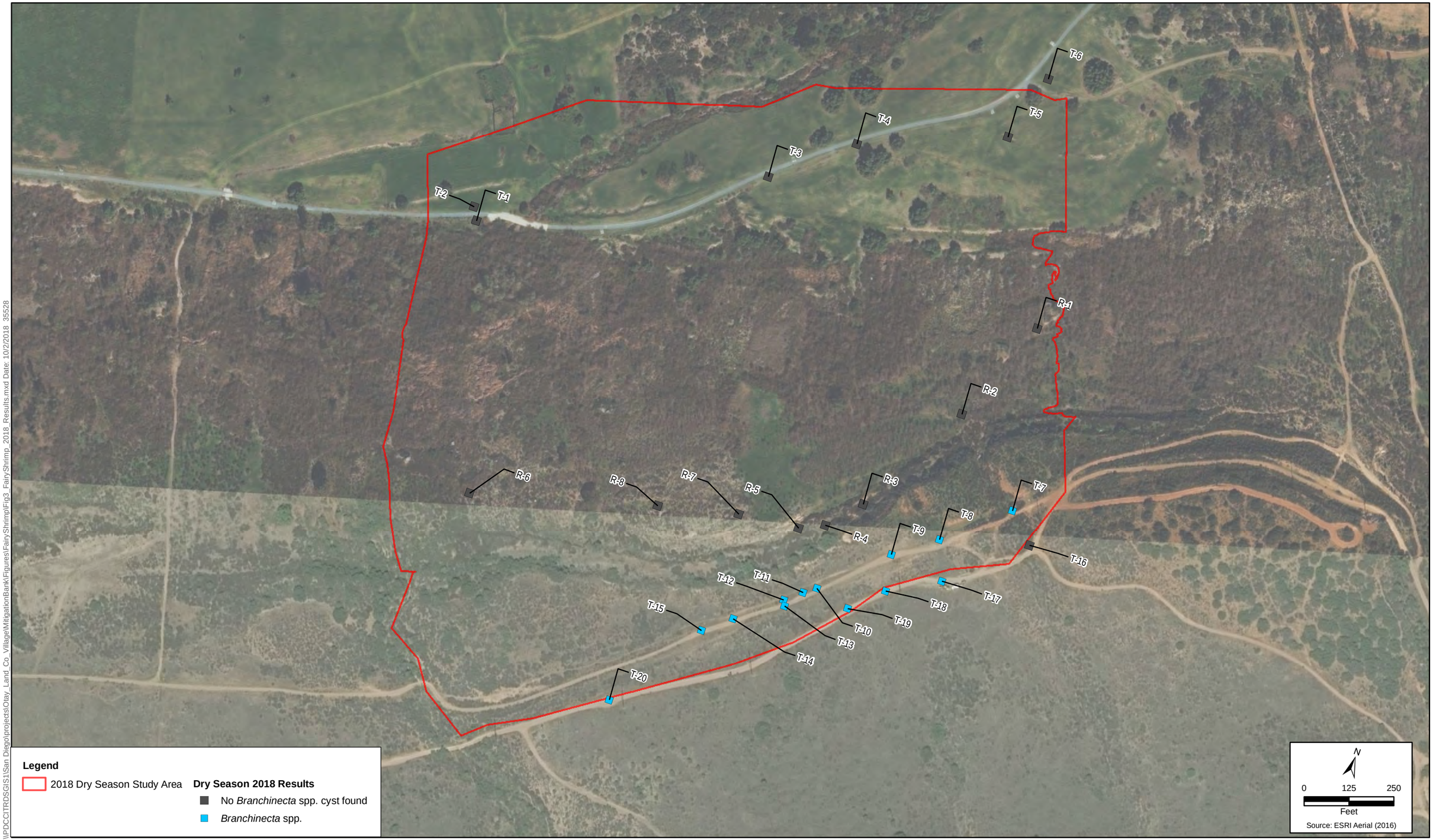


Figure 1
Regional Location
Otay River Restoration Project



\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_VillageMitigationBank\Figures\FairyShrimp\Fig2_LocalVicinity.mxd 10/2/2018 35528

Figure 2
Project Vicinity
Otay River Restoration Project



\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_VillageMitigationBank\Figures\FairyShrimp\Fig3_FairyShrimp_2018_Results.mxd Date: 10/2/2018 35528

ICF

Figure 3
2018 Dry Season Fairy Shrimp Survey Results
Otay River Restoration Project

2.2 Soil Processing and Analysis

Soil samples were processed by ICF fairy shrimp biologist and USFWS permitted cyst-identifier Dale Ritenour (Permit# TE-58888A-2) in accordance with the Guidelines. The soil samples were measured into ten individual plastic containers. These samples were hydrated in tap water then washed through a set of sieves. Material passing through a Number 45 (355 micrometer) USA Standard Testing Sieve, A.S.T.M.E.-11 specification was caught on a Number 70 (212 micrometer) Sieve. The 355-micrometer sieve allows the passage of cysts while the 212- micrometer sieves was selected as the appropriate size to collect cysts from large branchiopods whose ranges include the study area in southern San Diego County, including San Diego fairy shrimp, Lindahl's fairy shrimp, and Riverside fairy shrimp. The 212-micrometer sample material was rinsed into a container with approximately 200 milliliters of a saturated brine solution to float organic material, including fairy shrimp cysts. The material floating on the brine was decanted onto a paper filter. The organic material collected on the paper was examined under a stereo zoom microscope. Distinctive fairy shrimp cysts were counted if present. All sieves were soaked in a beach solution and then thoroughly cleaned after completion of the procedure for each depression, to ensure no cysts adhered to the surfaces of the sieves.

Fairy shrimp cysts were identified to the genus level through microscope examination. *Streptocephalus* cysts can be discerned from *Branchinecta* cysts based on cyst surface characteristics. Riverside fairy shrimp is the only member of the *Streptocephalus* genus known from San Diego County; therefore any observed *Streptocephalus* cysts would be accepted as Riverside fairy shrimp. *Branchinecta sandiegonensis* and *Branchinecta lindahil* are both known to occur in the Otay Mesa region. Their cysts are similar in appearance and have some overlap in size and may not be conclusively separated under the microscope. Therefore, *Branchinecta* cysts observed require wet season survey to confirm the species present in the depressions.

3.0 Results and Discussion

Branchinecta cysts were observed in 13 of the 28 sampled pools in the 2018 dry season sampling (Table 1). *Branchinecta* cysts were found in moderate abundance, defined as averaging 11-50 cysts/100ml, in depressions T-7, T-8, T-14, T-15, and T-17. *Branchinecta* cysts were found in low abundance in depressions t-9 through T-13 and T-18, T-19, and T-20.

No Riverside fairy shrimp cysts were observed in samples in the 2018 dry season survey of the expansion parcels.

Both San Diego and Lindahl's fairy shrimp are known from the Otay Mesa area and from the immediate vicinity (ICF 2018a and b). Wet season sampling is necessary to determine which shrimp species are present. ICF will conduct a wet season fairy shrimp survey of the study area in the winter/spring of 2018-2019. Results will be provided in a separate document.

Table 1. Dry Season Sampling Results

Basin	Shrimp cysts observed	Cyst Abundance	Sample number 1	2	3	4	5	6	7	8	9	10
R-1	none		0	0	0	0	0	0	0	0	0	0
R-2	none		0	0	0	0	0	0	0	0	0	0
R-3	none		0	0	0	0	0	0	0	0	0	0
R-4	none		0	0	0	0	0	0	0	0	0	0
R-5	none		0	0	0	0	0	0	0	0	0	0
R-6	none		0	0	0	0	0	0	0	0	0	0
R-7	none		0	0	0	0	0	0	0	0	0	0
R-8	none		0	0	0	0	0	0	0	0	0	0
T-1	none		0	0	0	0	0	0	0	0	0	0
T-2	none		0	0	0	0	0	0	0	0	0	0
T-3	none		0	0	0	0	0	0	0	0	0	0
T-4	none		0	0	0	0	0	0	0	0	0	0
T-5	none		0	0	0	0	0	0	0	0	0	0
T-6	none		0	0	0	0	0	0	0	0	0	0
T-7	*Branchinecta* sp.	moderate	55	60	65	45	55	60	40	22	35	45
T-8	*Branchinecta* sp.	moderate	21	15	20	35	18	20	33	18	23	25
T-9	*Branchinecta* sp.	low	1	3	1	2	1	2	4	3	3	5
T-10	*Branchinecta* sp.	low	1	1	0	0	0	1	0	0	0	0
T-11	*Branchinecta* sp.	low	2	1	1	1	2	3	10	11	7	3
T-12	*Branchinecta* sp.	low	1	2	4	3	0	4	14	3	2	2
T-13	*Branchinecta* sp.	low	3	1	10	6	4	7	2	10	3	0
T-14	*Branchinecta* sp.	moderate	40	9	27	12	10	9	20	25	5	11
T-15	*Branchinecta* sp.	moderate	18	13	15	19	27	20	20	17	22	20
T-16	none		0	0	0	0	0	0	0	0	0	0
T-17	*Branchinecta* sp.	moderate	9	5	6	12	13	11	8	15	20	7
T-18	*Branchinecta* sp.	low	7	4	5	6	2	3	1	3	4	1
T-19	*Branchinecta* sp.	low	3	2	2	6	4	3	2	2	3	0
T-20	*Branchinecta* sp.	low	1	0	0	0	2	1	2	0	0	4

4.0 References

ICF. 2018a. 2017 Dry Season Fairy Shrimp Survey for Otay River Restoration Project. September.

ICF. 2018b. 2017-2018 Dry Season Fairy Shrimp Survey for Otay River Restoration Project. September.

U.S. Fish and Wildlife Service (USFWS). 2015. Survey Guidelines for the Listed Large Branchiopods. May 31.

5.0 Certification

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.

September 28, 2018

Dale Ritenour (Permit No. TE-58888A-2)
Vernal Pool Biologist
Author and USFWS Approved Cyst Identification

Date

Appendix A
USFWS Notification

July 24, 2018

Ms. Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Ste. 250
Carlsbad, CA 92008

Subject: **Pre-Survey Notice for 2018 and 2019 Vernal Pool Branchiopod Surveys at Otay River Valley Mitigation Expansion, San Diego County, California**

Dear Ms. Love:

This letter serves as notification to conduct presence/absence surveys for federally listed large branchiopods (fairy shrimp) for the Otay River Valley Mitigation Expansion near Chula Vista, San Diego County. The surveys will consist of conducting dry season surveys in late summer 2018, and wet season surveys during the wet season of 2018-2019. The proposed mitigation bank expansion is located within the Otay River Valley, approximately one mile downstream of Lower Otay Lake (Figure 1). The approximately 69-acre expansion area is estimated to support 20 to 30 features that could support listed fairy shrimp species such as San Diego Fairy Shrimp (*Branchinecta sandiegonensis*) and Riverside Fairy Shrimp (*Streptocephalus woottoni*).

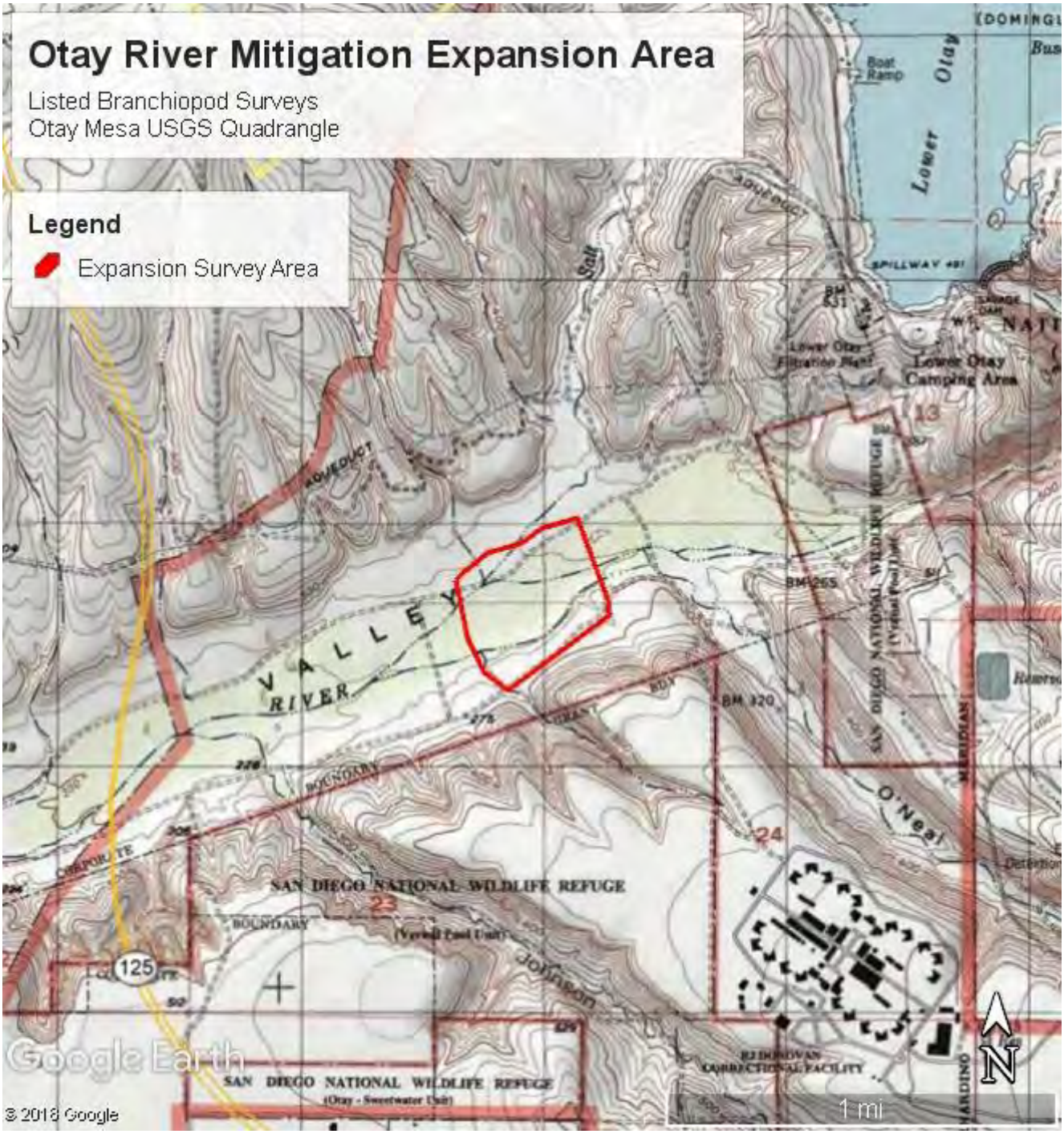
The mitigation bank is conducting the surveys to determine presence or absence of the listed species for mitigation purposes. The bank currently includes the parcels upstream of the proposed expansion area, extending approximately 0.8 mile upstream.

Fieldwork for the dry and wet season surveys will be conducted by biologist Brian Lohstroh (TE-063608-6), with dry season sample processing conducted by Dale Ritenour (TE-58888A-2) following the revised USFWS survey guidelines (November 13, 2017). Please contact me at (858) 750-9300 or via email if you have any questions about these surveys.

Sincerely,

Brian Lohstroh
Senior Biologist
ICF International
brian@lohstrohbio.com

Figure 1. Project Location and Survey Area



Appendix B
USFWS Dry Season Data Sheets

Appendix 2. U.S. Fish and Wildlife Service – Data Sheet for Dry Season Sample Analysis for Listed Large Branchiopods

Project Information

Project Name: Otay River Restoration Expansion
USFWS Project Number:
County: San Diego
Lat:
Long:
Quad: Otay Mesa
Township:
Range:
Section:

Biologist Information

Name of Person(2) Who Conducted the Following Tasks and Permit Number(s):

Soil Collection: Brian Lohstroh TE-063608-6
Soil Processing: Dale Ritenour TE-58888A-2
Soil Analysis/Cysts ID: Dale Ritenour
Soil Collection Date: August 1, 2018

Pool/ Habitat/ Basin No.	Invertbrates Present (X)															Comments
	Insect Exo-Skeletons	Micro-Turbellaria Cysts	Cladocera Ephippia	Ostracods Live/Cysts/ Carapaces	Copepods Live/Cysts	Number of Large Branchiopod Cysts						Hydracarina Live	Nematoda	Collembola	Other Species	
						Branchinecta sp.	*Lepidurus packardi*	*Streptocephalus wootoni*	*Linderiella occidentalis*	*Lynceus brachyurus*	*Cyzicus californicus*					
R-1 R-2						0 0		Ø								
R-3 R-4						0 0		Ø								
R-5 R-6						0 0		Ø								
R-7 R-8						0 0		Ø								
T-1 T-2						0 0		Ø								
T-3 T-4						0 0		Ø								
T-5 T-6						0 0		Ø								
T-7 T-8						482 228		Ø								
T-9 T-10						25 3		Ø								
T-11 T-12						41 35		Ø								
T-13 T-14						46 168		Ø								
T-15 T-16						191 0		Ø								
T-17 T-18						106 36		Ø								
T-19 T-20						27 10		Ø								

Appendix F

Fairy Shrimp 2018-2019 Wet Season Report

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September 25, 2019

Ms. Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Ste. 250
Carlsbad, CA 92008

Subject: **90-Day Survey Report for Wet Season Surveys for Listed Large Branchiopods at the Otay River Restoration Project.**

Dear Ms. Love:

This letter documents the results of protocol presence/absence surveys for listed large branchiopods conducted by ICF during the 2018-2019 wet season in support of the Otay River Restoration Project.

Introduction

ICF was contracted to conduct wet season listed large branchiopods surveys for the Otay River Restoration Project, a permittee-responsible mitigation site and proposed mitigation bank located below Savage Dam in the Otay River Valley (Figures 1 and 2; all figures provided in Attachment A). The 349.6-acre study area is located within the U.S Geological Survey Otay Mesa 7.5' quadrangle and ranges in elevation between approximately 248 and 272 feet above mean sea level. The mitigation site is being implemented to offset impacts associated with several Otay Ranch Village development projects as well as develop a mitigation bank for future projects in the vicinity.

The goal of this survey was to determine presence or absence of listed large branchiopods (*e.g.,* fairy shrimp) in seasonally inundated depressions within the study area (Figure 3), for use in avoiding take of listed large branchiopods. The large branchiopods known from freshwater in southern San Diego County are San Diego fairy shrimp (*Branchinecta sandiegonensis*), versatile fairy shrimp (*Branchinecta lindahli*), and Riverside fairy shrimp (*Streptocephalus woottoni*). San Diego fairy shrimp was determined to be present within 44 basins, versatile fairy shrimp was confirmed present in 59 basins, and no Riverside fairy shrimp were observed within the study area.

Methods

ICF conducted wet season fairy shrimp surveys within 145 seasonally inundated depressions located within the study area (Figure 3). The vernal pool preserve in the northeast side of the site was not part of this survey and was not sampled. Survey methodology follows the USFWS *Survey Guidelines for the Listed Large Branchiopods* (Guidelines; USFWS 2017).

Beginning in the Fall of 2018, rainfall events were tracked to ascertain when basins became inundated using National Weather Service forecasts and observations (NWS 2018), along with observations from nearby Weather Underground personal weather stations (WU 2018). Hydrology checks were performed as needed to confirm basin inundation, and sampling was performed on weekly intervals after initial inundation. Wet season sampling commenced after the first ponding was observed on 12/7/2018 and was conducted by permitted fairy shrimp biologists Brian Lohstroh (TE-063608-6), Linnea Spears-Lebrun (TE-58888A2.1), and Marty Lewis (TE72549C-0), with assistance from unpermitted trainees/ICF biologists Ryan Layden and Kesley Dix (Table 1).

Sampling was performed using a 1 mm mesh dip net suitable for capturing fairy shrimp adults, as well as a 255-micron mesh net to make observations of nauplii and other smaller aquatic invertebrates. Water temperature was ascertained using an infrared thermometer after gentle agitation of the water column to homogenize any potential temperature variations within the water column. Basin perimeters were logged with a Trimble R1 submeter Bluetooth GPS using ArcGIS Collector. Depth was recorded at deepest location within each basin. Additional data collected for each basin included basin type (natural/constructed/road rut), other aquatic animal species present, basin condition and if necessary, disturbance type.

A subset of the fairy shrimp captured during sampling at a given basin were identified live, in the field by a permitted biologist using a hand lens and a watch glass. One set of voucher specimens was collected for each fairy shrimp species observed in a given basin. If no vouchers were needed, captured specimens were returned to the basin live and in good condition.

Dip nets were cleaned with sanitized water between basins to prevent cross-contamination and all equipment used in the water, including boots, were cleaned and sanitized with a 3-6% sodium hypochlorite solution before and after each sampling survey visit. Basins were sampled until they became dry or after 120 days of continuous inundation, and surveys were re-initiated when basins refilled.

Results and Discussion

The 2018-2019 wet season experienced above-average precipitation for the survey area and vicinity. A total of 26.63 inches of precipitation was recorded at the Otay Mountain Weather Station (Western Regional Climate Center 2019) located approximately five miles east of the survey area and at approximately 3,500 feet in elevation. February experienced the highest amount of precipitation with over nine inches recorded.

The study area can be characterized as a wide river valley with terraces adjacent to the primary flood plain. Large portions of the study area are disturbed by agricultural activities, off-highway vehicle activity, and habitat restoration. Historic sand extraction activities from within the valley bottom has also created an undulating, boulder-strewn landscape that is ideal for the creation of numerous basins. Dominant vegetation communities present within the area include coastal sage scrub, riparian scrub, non-native grassland, Eucalyptus woodland and chaparral.

A total of 145 seasonally inundated basins were sampled for fairy shrimp throughout the 2018-2019 wet season (Figure 3). These basins included highly disturbed road ruts located within various access roads throughout the project area as well as natural basins located on the various terraces adjacent to and within the Otay River Valley bottom. The wet season sampling results for each basin is detailed below in Table 2 and summarized in Table 3. A list of aquatic species detected within the

basins is provided in Table 4. Survey results from each weekly survey are included in Attachment B: 2018-2019 Wet Season Survey Data, and representative photographs of the basins are provided in Appendix C.

Fairy shrimp were observed in 98 basins, with San Diego fairy shrimp observed in 44 basins, versatile fairy shrimp observed in 59 basins and both species confirmed in 15 basins. No Riverside fairy shrimp were observed within the survey area. 48 basins contained no fairy shrimp throughout the survey season. Voucher specimens will be accessioned at the Natural History Museum of Los Angeles per their specifications.

Wet season sampling concluded on June 6, 2019 after basin 1819-008 achieved 120 days of continuous inundation. Upon further review, this basin appeared to be part of the greater Otay River system, which supported relatively high flows and may have established flows in channels that rarely experience flow. A few other basins in the vicinity of 1819-008 also hit 120 days of continuous inundation under similar circumstances.

As many of these basins exist within access roads, it is likely that both fairy shrimp species are being spread between basins throughout the site due to the frequent off-highway vehicle traffic that occurs onsite. Results of successive fairy shrimp surveys are likely to vary over time, especially if the frequent vehicle traffic continues in the area.

Please call Brian Lohstroh at (858) 750-9300 if you have any questions.

Sincerely,

Ryan Layden
Biologist
ICF
ryan.layden@icf.com

Brian Lohstroh
Senior Biologist
ICF
brian@lohstrohbio.com

References

National Weather Service (NWS). 2018. Extended Forecast for 3 Miles SE Chula Vista-Eastlake CA. https://www.weather.gov/sgx/ Accessed November 2018-June 2019.

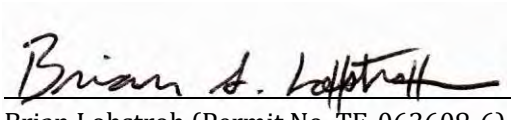
Weather Underground (WU). 2018. Personal Weather Stations near Lower Otay Lake. https://www.wunderground.com/ Accessed November 2018-June 2019.

Western Regional Climate Center. Otay Mountain Weather Station. Accessed September, 2019. https://wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCOTA

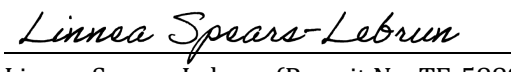
U.S. Fish and Wildlife Service (USFWS). 2017. Survey Guidelines for the Listed Large Branchiopods. November 13.

Certification

We certify that the information in this survey report and attached exhibits fully and accurately represent our work.



September 25, 2018
Brian Lohstroh (Permit No. TE-063608-6) Date
Wildlife Biologist



September 25, 2018
Linnea Spears-Lebrun (Permit No. TE-58888A2.1) Date
Vernal Pool Biologist

September 25, 2018
Marty Lewis (Permit No. TE-72549C-0) Date
Wildlife Biologist

Attachments

Table 1.	Survey Dates and Personnel
Table 2.	Wet Season Fairy Shrimp Sampling Results
Table 3.	Results Summary
Table 4.	Aquatic Species Observed
Attachment A:	Figures
Attachment B:	2018-2019 Wet Season Survey Data
Attachment C:	Representative Photographs

Table 1. 2018-2019 Survey Dates and Personnel

Survey Type	Date	Time on site	Temp (ºF)	Sky Cover (%)	Wind Speed (MPH)	Personnel
Hydrology Check	12/3/2018	1200-1530	62-66	0-0	0-2; 2-3	KD
Survey 1	12/7/2018	0900-1515	63-66	0-10	0-1; 2-4	BL, KD
Survey 2	12/13/2018	0815-1450	50-71	0-0	0-1; 2-6	BL, KD
Survey 3	12/20/2018	0820-1420	50-74	2-10	0-3; 2-4	BL, KD
Survey 4	12/28/2018	0830-1440	47-61	0-0	0-1; 3-5	BL
Survey 5	1/3/2019	0820-1310	39-63	0-0	0-1; 1-3	BL, KD
Survey 6	1/10/2019	0825-1615	53-63	90-0	0-1; 1-3	BL, KD
Survey 7	1/18/2019	0810-1550	55-63	60-20	0-3; 0-3	BL, RL
Survey 8	1/24/2019	0830-1630	50-54	10-5	0-1; 0-1	BL, KD
Survey 9	1/31/2019	0820-1345	50-63	40-100	0-1; 3-5	BL, KD
Survey 10	2/7/2019	0840-1615	49-58	0-0	0-3; 3-6	BL, RL
Survey 11	2/15/2019	0830-1506	53-59	15-100	0-7; 1-3	BL, KD
Survey 12	2/21/2019	0725-1400	52-48	100	0-3, 3-5	LSL, RL
Survey 13	2/28/2019	0730-1630	54-68	20-40	0-2; 0-2	LSL, RL
Survey 13	3/1/2019	0920-1300	67-68	30-70	0-3, 3-7	LSL, LT
Survey 14	3/7/2019	0730-1530	65-71	100-80	0; 0-2	LSL, KD
Survey 15	3/15/2019	0730-1500	56-78	55-75	0-2; 0-2	LSL, RL
Survey 16	3/21/2019	0845-1500	54-61	40-100	0-2; 3-5	BL, NS
Survey 17	3/28/2019	0715-1430	55-68	100-20	0-3; 5-8	ML, RL
Survey 18	4/4/2019	0715-1145	57-64	100-50	0-3; 3-6	ML, RL
Survey 19	4/10/2019	0745-1140	55-71	0-0	0-3; 3-6	ML, RL
Survey 20	4/17/2019	0730-1015	61-68	0-0	0-3; 0-3	ML, RL
Survey 21	4/23/2019	1115-1305	71-75	0-0	0-3; 3-5	BL, RL
Survey 22	5/1/2019	1045-1230	68-74	10-0	0-3; 5-10	BL, RL
Survey 23	5/8/2019	0730-1030	60-63	100-100	0-1; 0-1	ML
Survey 24	5/15/2019	1100-1245	70-70	60-100	0-3; 2-5	BL
Survey 25	5/23/2019	1130-1500	64-64	100-50	1-4; 2-6	BL
Survey 26	5/30/2019	0745-1040	61-66	100-10	0-3; 3-6	BL, RL
Survey 27	6/6/2019	0815-0945	63-64	100-40	0-1; 1-2	BL

Table 2. 2018-2019 Wet Season Fairy Shrimp Sampling Results

Basin Number	Fairy Shrimp Species Present	Basin Number	Fairy Shrimp Species Present	Basin Number	Fairy Shrimp Species Present
1819-001	*Branchinecta* sp.	1819-034	*B. sandiegonensis, B. lindahli*	1819-069	none
1819-002	*B. lindahli*	1819-035	*B. lindahli*	1819-070	*B. sandiegonensis, B. lindahli*
1819-003	*B. sandiegonensis, B. lindahli*	1819-036	*B. lindahli*	1819-071	*Branchinecta* sp.
1819-004	none	1819-037	none	1819-072	*B. lindahli*
1819-005	none	1819-038	none	1819-073	none
1819-006	*B. lindahli*	1819-039	*B. lindahli*	1819-074	*B. sandiegonensis, B. lindahli*
1819-007	*B. lindahli*	1819-040	*B. sandiegonensis, B. lindahli*	1819-075	*B. lindahli*
1819-008	none	1819-041	*B. sandiegonensis, B. lindahli*	1819-076	*B. lindahli*
1819-009	none	1819-042	*B. lindahli*	1819-077	*B. lindahli*
1819-010	none	1819-043	*B. sandiegonensis, B. lindahli*	1819-078	*B. lindahli*
1819-011	none	1819-044	*B. sandiegonensis*	1819-079	none
1819-012	none	1819-045	*B. lindahli*	1819-080	*B. lindahli*
1819-013	none	1819-046	*B. lindahli*	1819-081	*B. lindahli*
1819-014	*B. sandiegonensis*	1819-047	*B. sandiegonensis, B. lindahli*	1819-082	none
1819-015	none	1819-050	*B. sandiegonensis, B. lindahli*	1819-083	*B. lindahli*
1819-016	none	1819-051	*B. lindahli*	1819-084	*B. lindahli*
1819-017	none	1819-052	none	1819-085	*B. lindahli*
1819-018	none	1819-053	*Branchinecta* sp.	1819-086	*B. lindahli*
1819-019	none	1819-054	none	1819-087	*B. lindahli*
1819-020	none	1819-055	*B. sandiegonensis, B. lindahli*	1819-088	*B. sandiegonensis*
1819-021	none	1819-056	*B. sandiegonensis*	1819-089	*B. sandiegonensis*
1819-022	none	1819-057	*B. sandiegonensis*	1819-090	*Branchinecta* sp.
1819-023	*B. lindahli*	1819-058	*Branchinecta* sp.	1819-091	none
1819-024	*B. lindahli*	1819-059	*B. sandiegonensis*	1819-092	*B. sandiegonensis*
1819-025	*B. lindahli*	1819-060	*B. sandiegonensis*	1819-093	*B. sandiegonensis*
1819-026	*B. lindahli*	1819-061	*B. sandiegonensis*	1819-094	*B. sandiegonensis*
1819-027	*B. sandiegonensis, B. lindahli*	1819-062	*B. sandiegonensis, B. lindahli*	1819-095	*B. sandiegonensis*
1819-028	*B. sandiegonensis*	1819-063	none	1819-096	*B. sandiegonensis*
1819-029	none	1819-064	*B. lindahli*	1819-097	*B. sandiegonensis*
1819-030	*B. lindahli*	1819-065	*Branchinecta* sp.	1819-098	*B. sandiegonensis*
1819-031	*Branchinecta* sp.	1819-066	*Branchinecta* sp.	1819-099	*B. sandiegonensis*
1819-032	*B. sandiegonensis, B. lindahli*	1819-067	*Branchinecta* sp.	1819-100	*B. sandiegonensis*
1819-033	none	1819-068	none	1819-101	none

Table 2. 2018-2019 Wet Season Fairy Shrimp Sampling Results

Basin Number	Fairy Shrimp Species Present
1819-102	*B. sandiegonensis*
1819-103	*B. sandiegonensis*
1819-104	*B. sandiegonensis*
1819-105	*B. sandiegonensis*
1819-106	none
1819-107	none
1819-109	none
1819-110	none
1819-111	none
1819-112	*B. sandiegonensis*
1819-113	*B. sandiegonensis*
1819-114	*B. sandiegonensis*
1819-115	*B. sandiegonensis*
1819-116	*B. lindahli*
1819-117	none
1819-118	*B. lindahli*
1819-119	*B. lindahli*
1819-120	*B. lindahli*
1819-121	*B. lindahli*
1819-122	*B. lindahli*
1819-123	none
1819-124	*B. lindahli*
1819-125	*B. lindahli*
1819-126	*B. sandiegonensis, B. lindahli*
1819-127	*B. lindahli*
1819-128	*B. lindahli*
1819-129	*B. lindahli*
1819-130	*B. lindahli*
1819-131	*B. lindahli*
1819-132	*B. lindahli*
1819-133	none
1819-134	none
1819-135	none
1819-136	none
1819-137	none
1819-140	none
1819-143	none
1819-144	*B. lindahli*
1819-148	*B. lindahli*
1819-149	*B. sandiegonensis, B. lindahli*
1819-150	*B. sandiegonensis*
1819-151	none
1819-152	none
1819-153	*B. sandiegonensis*
1819-154	none
1819-155	none

Table 3. Results Summary

No. Basins	Fairy Shrimp Species Present
29	*B. sandiegonensis*
15	*B. sandiegonensis, B. lindahli*
44	*B. lindahli*
9	*Branchinecta* sp.
48	No Fairy Shrimp Observed
145	**Total Basins Sampled**
44	Basins supporting *B. sandiegonensis*
59	Basins supporting *B. lindahli*
98	Basins supporting fairy shrimp

Table 4. Aquatic Species Observed

Scientific Name	Common Name
Worms	
Nematoda	roundworms
Platyhelminthes	flatworms
Mollusks	
Gastropoda	snails
Crustaceans	
Anostraca	fairy shrimp*
Cladostera	water fleas
Coleoptera	beetles
Conchostraca	clam shrimp
Copepoda	copepods
Ostracoda	seed shrimp
Insects	
Anisoptera	dragonflies
Chironomidae	midges
Collembola	springtails
Corixidae	water boatmen
Culicidae	mosquitos
Diptera	true flies
Ephemeroptera	mayflies
Notonectidae	backswimmers
Zygoptera	damselflies
Arachnids	
Hydracarina	water mites
Amphibians	
Anaxyrus boreas halophilus	California toad
Pseudacris hypochrondriaca	Baja California chorus frog
Spea hammondii	western spadefoot
Xenopus laevis	African clawed frog

*see Table 3 for species

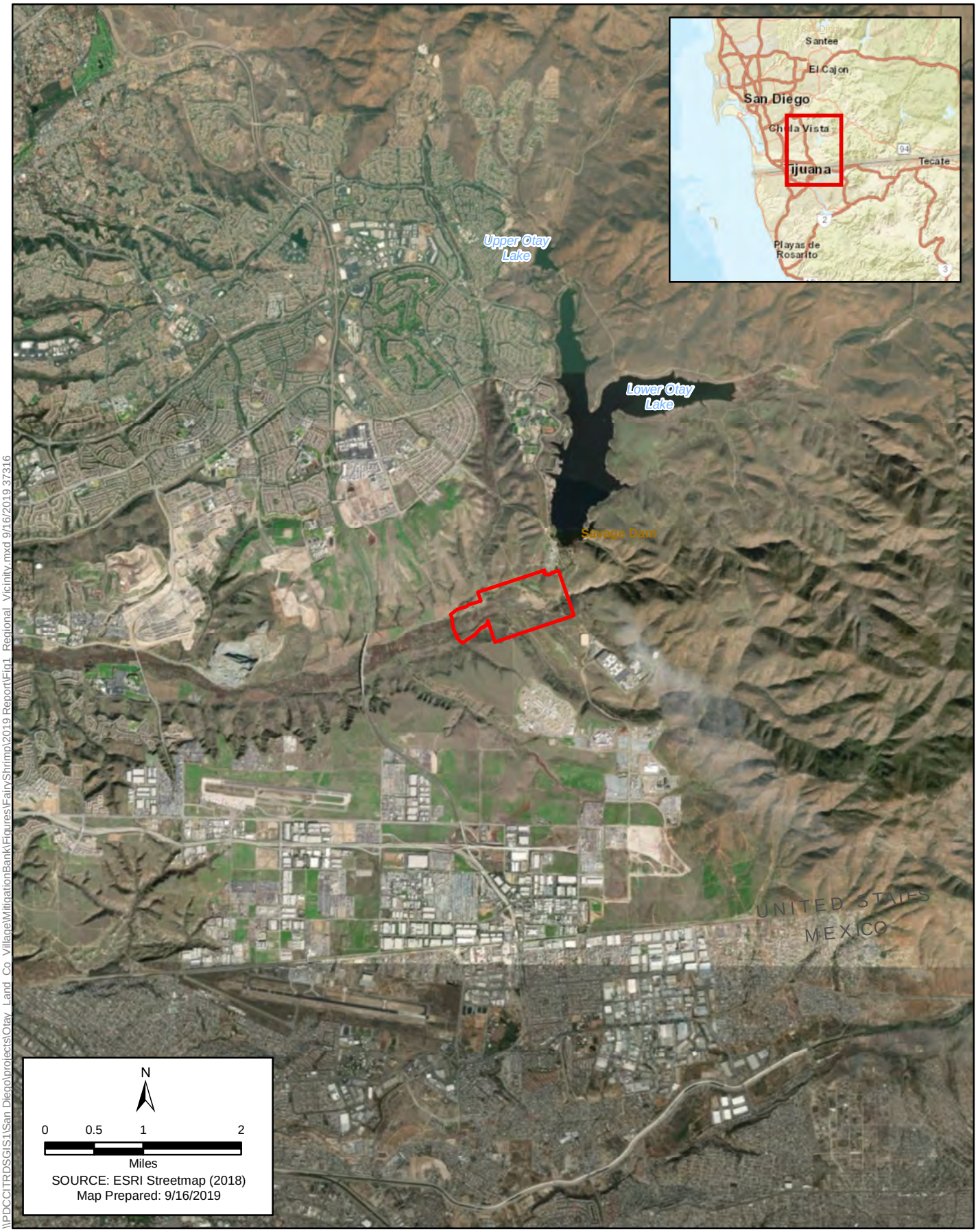


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Figure 1
Regional Location
Otay River Restoration Project

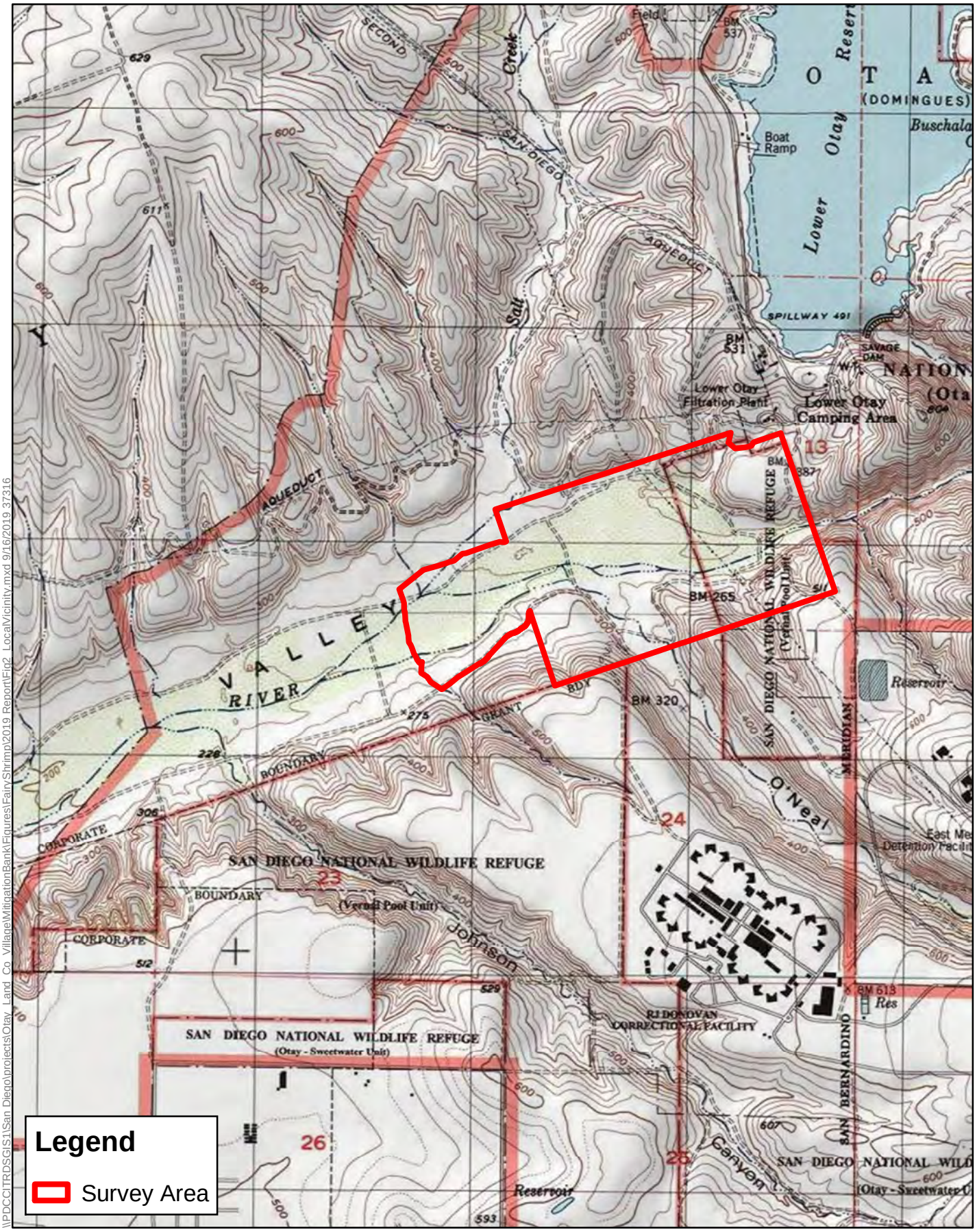

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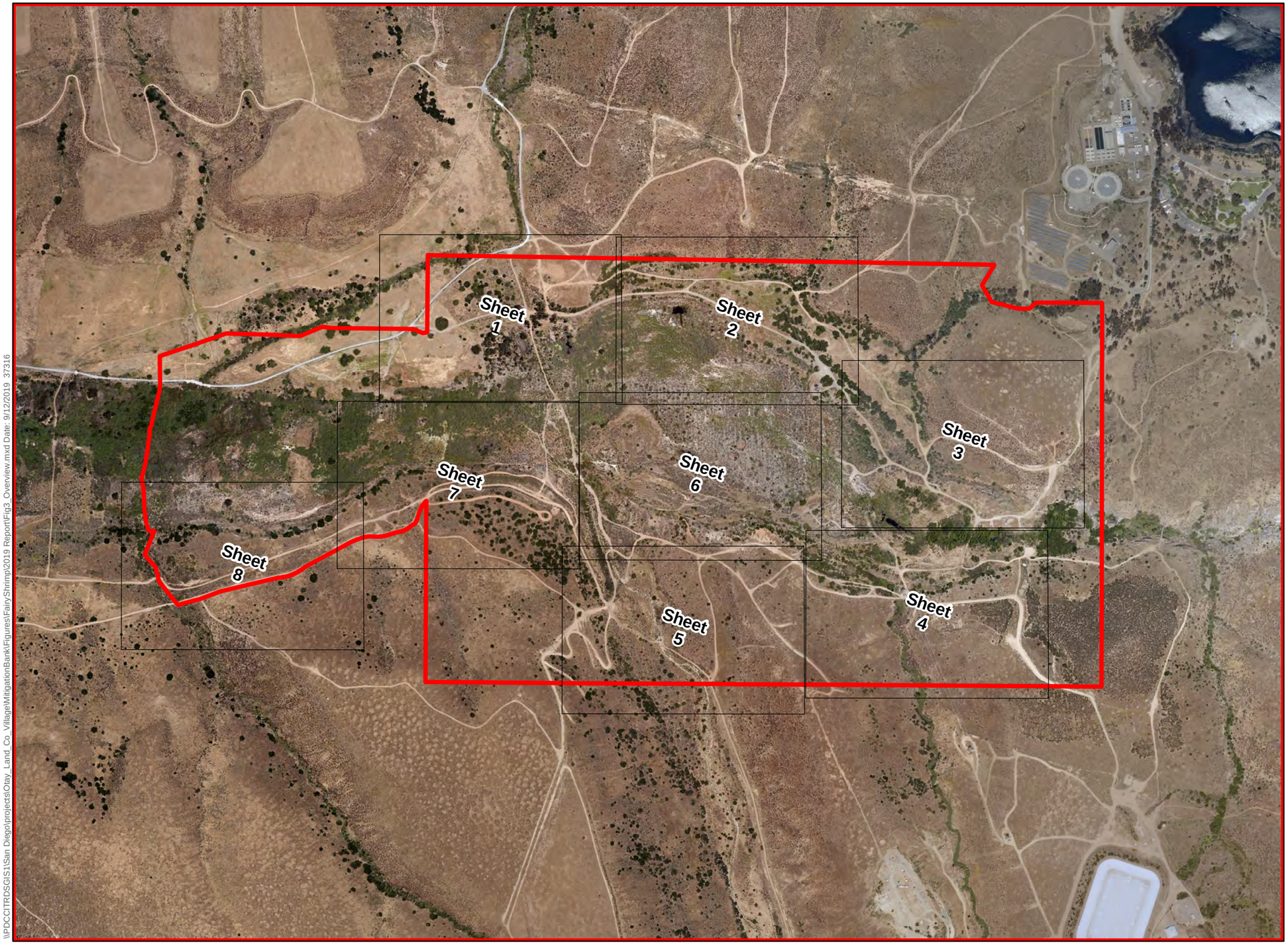
Figure 2
Project Vicinity
Otay River Restoration Project



Legend

Otay River Restoration Boundary

N

0 500 1,000

Feet

Figure 3
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

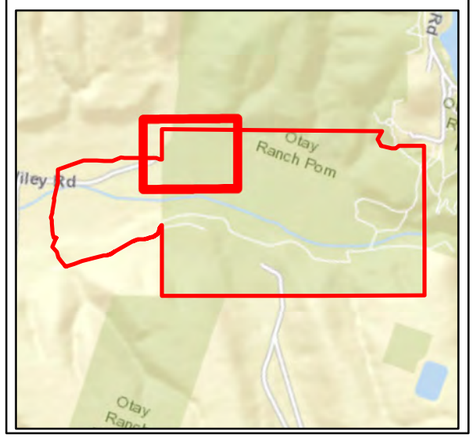
\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_Village\MitigationBank\Figures\FairyShrimp\2019 Report\Fig3_Overview.mxd Date: 9/12/2019 37316

Legend

- Otay River Restoration Boundary

Sampled Basins

- *B. sandiegonensis*; *B. lindahli*
- *B. lindahli*
- *B. sandiegonensis*
- *Branchinecta* sp.
- No fairy shrimp observed



N

0 125 250

Feet

Figure 3 Sheet 1
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

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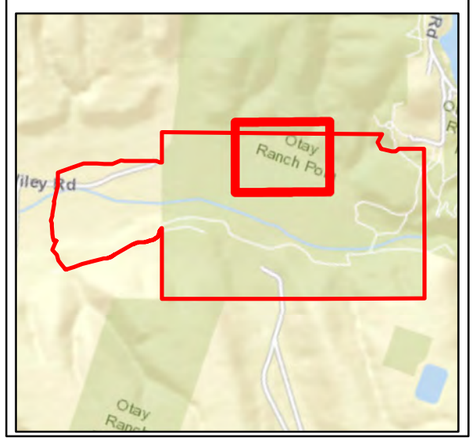
Legend

- Otay River Restoration Boundary

Sampled Basins

- *B. sandiegonensis*; *B. lindahli*
- *B. lindahli*
- *B. sandiegonensis*
- *Branchinecta* sp.
- No fairy shrimp observed



N

0 125 250

Feet

Figure 3 Sheet 2
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

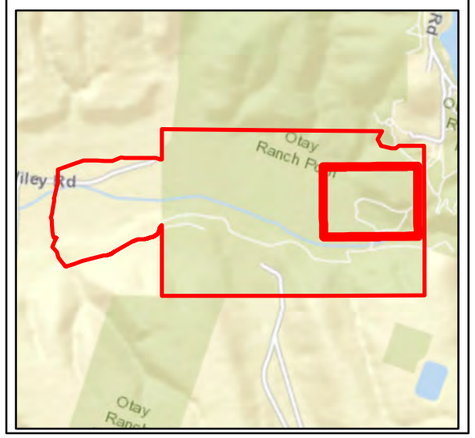
\\PDCCITRDSGIS11\San Diego\projects\Otay_Land_Co_VillageMitigationBank\Figures\FairyShrimp\Fig3_FairyShrimp_2019_Results.mxd Date: 9/16/2019 37316

Legend

- Otay River Restoration Boundary

Sampled Basins

- *B. sandiegonensis*; *B. lindahli*
- *B. lindahli*
- *B. sandiegonensis*
- *Branchinecta* sp.
- No fairy shrimp observed



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0 125 250

Feet

\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_Village\MitigationBank\Figures\FairyShrimp\2019 Report\Fig3_FairyShrimp_2019_Results.mxd Date: 9/19/2019 37316

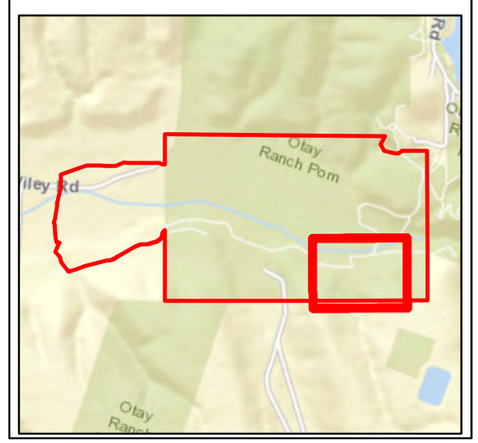
Figure 3 Sheet 3
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

Legend

- Otay River Restoration Boundary

Sampled Basins

- *B. sandiegonensis*; *B. lindahli*
- *B. lindahli*
- *B. sandiegonensis*
- *Branchinecta* sp.
- No fairy shrimp observed



N

0 125 250

Feet

Figure 3 Sheet 4
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

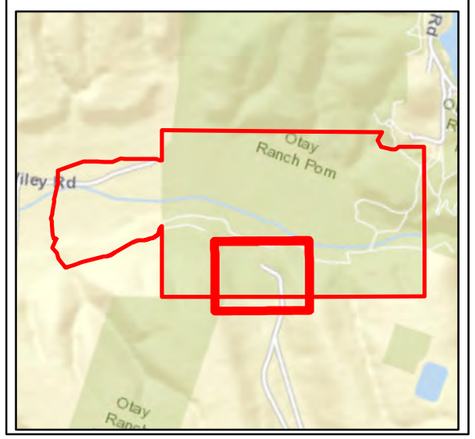
\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_VillageMitigationBank\Figures\FairyShrimp\Fig3_FairyShrimp_2019_Results.mxd Date: 9/16/2019 37316

Legend

- Otay River Restoration Boundary

Sampled Basins

- *B. sandiegonensis*; *B. lindahli*
- *B. lindahli*
- *B. sandiegonensis*
- *Branchinecta* sp.
- No fairy shrimp observed



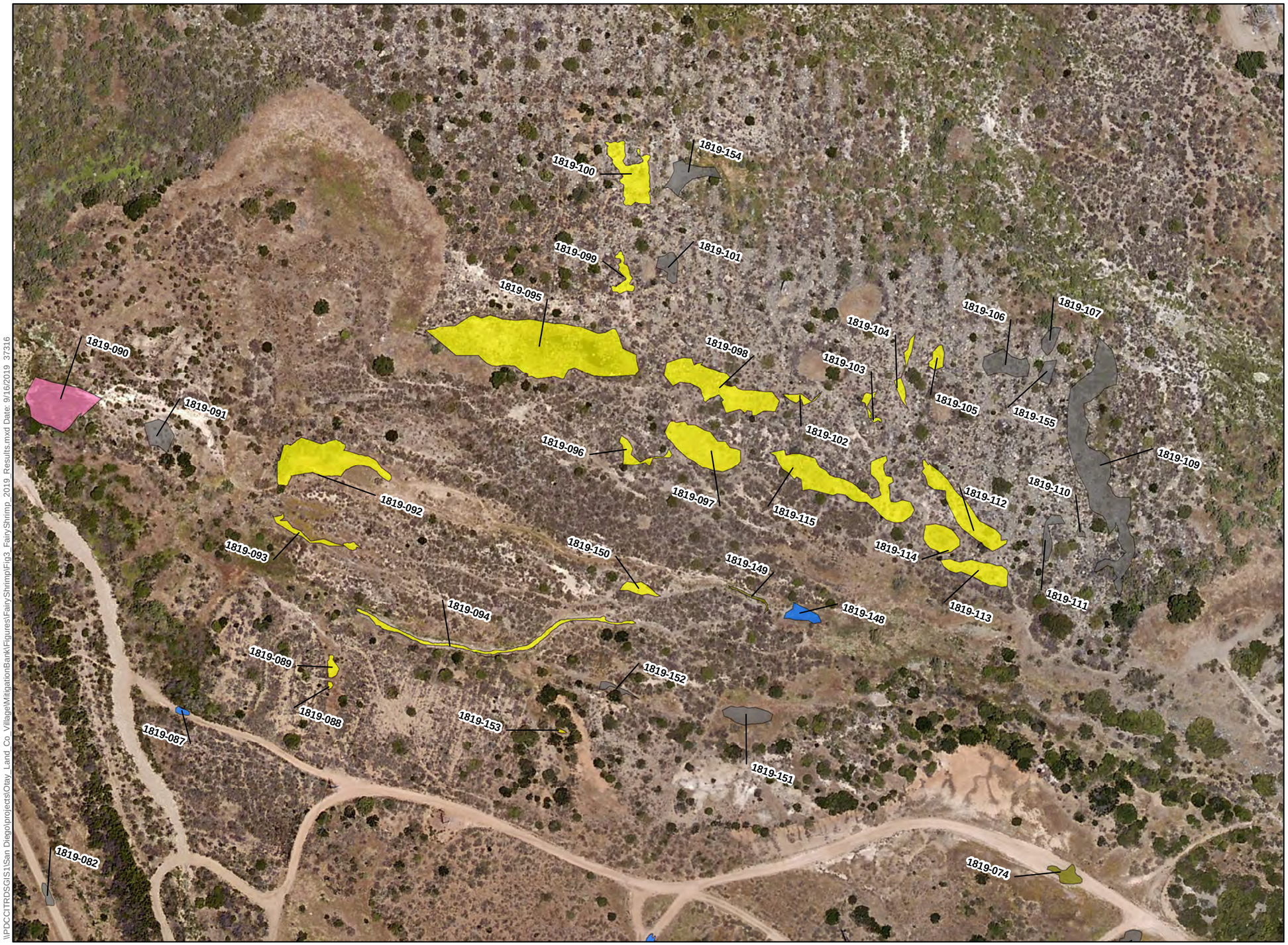
N

0 125 250

Feet

Figure 3 Sheet 5
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_VillageMitigationBank\Figures\FairyShrimp\Fig3_FairyShrimp_2019_Results.mxd Date: 9/16/2019 37316

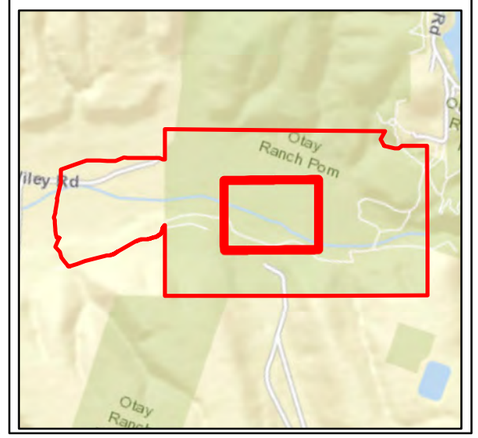


Legend

Otay River Restoration Boundary

Sampled Basins

- *B. sandiegonensis*; *B. lindahli*
- *B. lindahli*
- *B. sandiegonensis*
- *Branchinecta* sp.
- No fairy shrimp observed



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Feet

Figure 3 Sheet 6
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

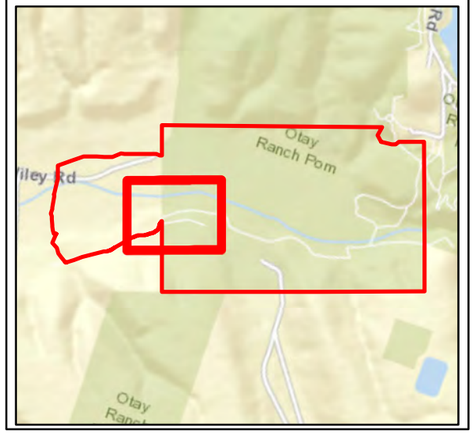
\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_Village\MitigationBank\Figures\FairyShrimp\Fig3_FairyShrimp_2019_Results.mxd Date: 9/16/2019 37316

Legend

- Otay River Restoration Boundary

Sampled Basins

- *B. sandiegonensis*; *B. lindahli*
- *B. lindahli*
- *B. sandiegonensis*
- *Branchinecta* sp.
- No fairy shrimp observed



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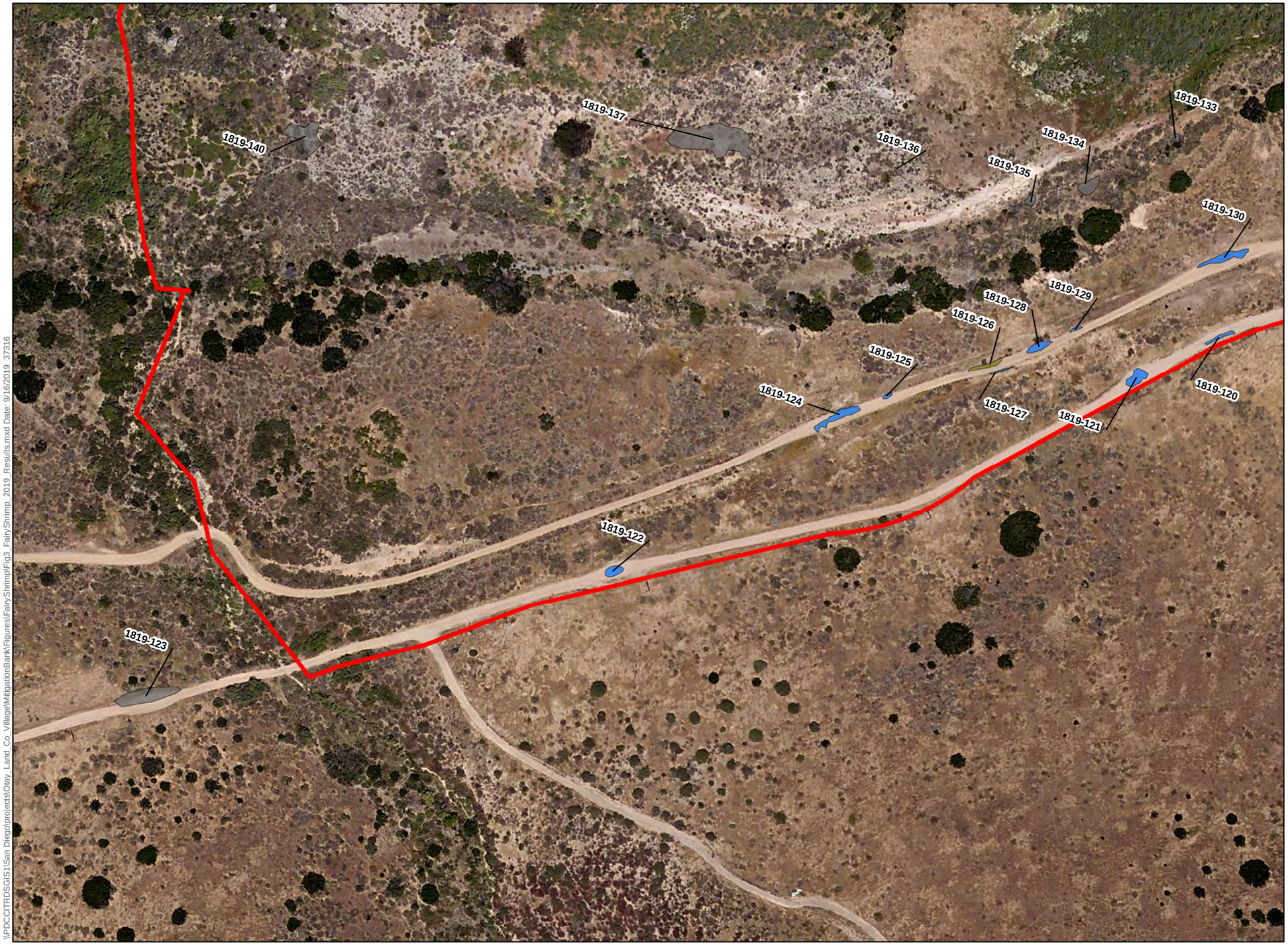
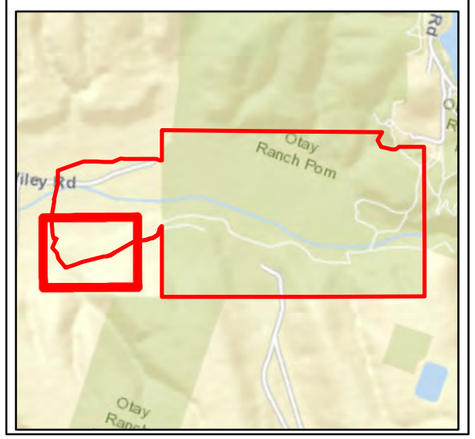
Feet

Figure 3 Sheet 7
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project





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Feet

Figure 3 Sheet 8
2019 Wet Season Fairy Shrimp Survey Results
Otay River Restoration Project

\\PDCCITRDSGIS1\San Diego\projects\Otay_Land_Co_VillageMitigationBank\Figures\FairyShrimp\Fig3_FairyShrimp_2019_Results.mxd Date: 9/16/2019 37316

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-001	12/13/2018	8.9	7.5	30	*Branchinecta* sp.	10s	no	Noto	Road Rut	Disturbed, Tire Tracks	Immatures, complex of 3 ruts
1819-001	12/20/2018	8.7	4	15	*Branchinecta* sp.	1s	no	none			2-3 ruts, only 2 females observed
1819-001	12/28/2018	8.5	2.5	1.7	*Branchinecta* sp.	1s	no	Coll			One female observed
1819-001	1/3/2019	2.8	1	1	*Branchinecta* sp.	1s	no	Cope, Coll			One female observed
1819-001	1/10/2019	9.6	0.2	2.4	None	n/a	no	Clad			
1819-001	1/18/2019	15.1	12	3.3	None	n/a	no	none			Area disced
1819-001	2/7/2019	9.1	15	7.5	None	n/a	no	none			
1819-001	2/15/2019	12.3	10	10.5	None	n/a	no	none			
1819-001	2/21/2019	6.7	19	10.5	None	n/a	no	none			
1819-001	2/28/2019	8.3	10	1.5	None	n/a	no	none			
1819-001	3/7/2019	12.5	8	5	None	n/a	no	none			
1819-002	12/7/2018	13.6	17	90	None	n/a	no	Notonectids	Road Rut	Disturbed, Tire Tracks	
1819-002	12/13/2018	10.4	7.5	56	*Branchinecta* sp.	10s	no	Ostr, Noto			Immatures
1819-002	12/20/2018	10.2	8	70	*B. lindahli*	1s	no	none			
1819-002	12/28/2018	9.4	8	12	*B. lindahli*	1s	yes	Culi, Nema, Coll			
1819-002	1/3/2019	1.5	1.5	4	*B. lindahli*	1s	no	Ostr, Coll			
1819-002	1/10/2019	10.8	7	5.6	None	n/a	no	Coll			
1819-002	1/18/2019	14.8	19	21.6	None	n/a	no	Culi			Area disced
1819-002	1/24/2019	11.4	11	18	*B. lindahli*	100s	no	Ostr, Chir			
1819-002	1/31/2019	10.6	6	3.25	*B. lindahli*	10s	no	Chir			
1819-002	2/7/2019	7.7	18	30	*B. lindahli*	10s	no	Ostr, Coll			
1819-002	2/15/2019	17.6	10.5	52	*Branchinecta* sp.	1s	no	Clad			immature female only observed
1819-002	2/21/2019	7.3	21	30	*Branchinecta* sp.	1s	no	none			Female only observed
1819-002	2/28/2019	7.8	16	10.5	*B. lindahli*	1s	no	none			
1819-002	3/7/2019	11.2	14	57.6	None	n/a	no	none			
1819-002	3/15/2019	4.3	5	3	None	n/a	no	none			
1819-002	3/21/2019	12.7	3	0.5	*B. lindahli*	1s	no	Coll			
1819-003	12/13/2018	12	0.2	0.5	None	n/a	no	none	Road Rut		
1819-003	1/24/2019	11.7	2.8	1	*B. sandiegonensis, B. lindahli*	1s	yes				
1819-003	2/7/2019	10.7	4	1.44	None	n/a	no	none			
1819-003	2/15/2019	13.7	6.5	2.25	None	n/a	no	none			
1819-003	2/21/2019	7.3	9	1.5	None	n/a	no	none			
1819-003	2/28/2019	8	2	0.025	None	n/a	no	none			
1819-004	3/7/2019	10.7	6	0.075	None	n/a	no	none	Road Rut		
1819-005	2/7/2019	7	7	8	None	n/a	no	none	Natural	Undisturbed	
1819-005	2/15/2019	11	12	18	None	n/a	no	Nema			
1819-005	2/21/2019	7.1	12		None	n/a	no	none			
1819-005	3/7/2019		2		None						<3cm, didn't sample
1819-006	2/7/2019	7.1	7	3	None	n/a	no	Nema	Road Rut	Disturbed, Tire Tracks	
1819-006	2/15/2019	11.1	10	5	None	n/a	no	Nema			
1819-006	2/21/2019	7.7	2	9	None	n/a	no	none			algal bloom
1819-006	2/21/2019	7.7	11	5	None	n/a	no	none			
1819-006	2/28/2019	7.1	4	0.125	*B. lindahli*	1s	yes	none			
1819-006	3/7/2019	9.7	10	9	None	n/a	no	none			
1819-006	3/15/2019	4.8	9	2	None	n/a	no	none			
1819-006	3/21/2019	13	2.5	0.5	None	n/a	no	Ostr			
1819-006	5/23/2019	22.1	6	3	None	n/a	no	n/a			
1819-007	12/7/2018	18.9	10	432	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-007	12/13/2018	9.5	6	336	*B. lindahli*	1000s	yes	none			
1819-007	12/20/2018	10	3	312	*B. lindahli*	100s	no	Ostr, Clad, Culi			complex of 2 features

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-007	12/28/2018	9.4	3.5	250	*B. lindahli*	10s	no	Clad			Complex of 2 pools
1819-007	1/3/2019	7.6	3.5	126	*B. lindahli*	1s	no	Clad			
1819-007	1/10/2019	11.8	9.5	70	None	n/a	no	Ostr, Coll			
1819-007	1/18/2019	14.6	12	135	*B. lindahli*	100s	no	Ostr, Clad			
1819-007	1/24/2019	10	12	176	*B. lindahli*	1000s	no	Ostr, Clad, Chir			
1819-007	1/31/2019	10.9	8	60	*B. lindahli*	1000s	no	Ostr, Clad			
1819-007	2/7/2019	9.7	18	125	*B. lindahli*	1000s	no	PSHY Larvae			
1819-007	2/15/2019	13	18	270	*B. lindahli*	100s	no	none			
1819-007	2/21/2019	8.7	15	10	*B. lindahli*	10s	no	none			water flowing in from road, spilling off road into River
1819-007	2/28/2019	10.6	10	150	*B. lindahli*	10s	no	SPHA Larvae			
1819-007	3/7/2019	10.2	10	90	None	n/a	no	none			
1819-007	3/15/2019	4.8	15	60	*B. lindahli*	10s	no	none			
1819-007	3/21/2019	14.8	7	180	*B. lindahli*	1s	no	Cole, Chir, SPHA larvae			
1819-007	3/28/2019	11.5	4	2	None	n/a	no	Ostr, Dipt, Cole, Chir			
1819-007	5/23/2019	22.9	10.5	52.5	None	n/a	no	n/a			
1819-008	1/31/2019	12.3	13	54	None	n/a	no	Ostr, Culi, Frog Larvae	Natural	Undisturbed	
1819-008	2/7/2019	9.3	20	90	None	n/a	no	Ostr, Clad, Culi, PSHY Larvae			
1819-008	2/15/2019	14.2	30	100	None	n/a	no	Ostr, Clad, Culi, PSHY Larvae		Algal blooms	
1819-008	2/21/2019	6.4	20	54	None	n/a	no	PSHY and SPHA larvae			
1819-008	2/28/2019	8.6	20	150	None	n/a	no	none			
1819-008	3/7/2019	12.7	25	5	None	n/a	no	PSHY Larvae			
1819-008	3/15/2019	6.2	20	175	None	n/a	no	none			
1819-008	3/21/2019	14	30	175	None	n/a	no	none			
1819-008	3/28/2019	12.9	25	100	None	n/a	no	Clad, Noto, Cori, Coll, Chir, Anis			Algal blooms
1819-008	4/3/2019	15.8	18	540	None	n/a	no	Noto, Cori, Anis, PSHY Larvae		Algal blooms	clawed frog larvae
1819-008	4/10/2019	12.7	16	150	None	n/a	no	Ost, Clad, Culi, PSHY Larvae		algae	clawed frog present
1819-008	4/17/2019	12.7	17	108	None	n/a	no	Ostr, Culi, Noto, Cori, Chir, Gast, Ephe			
1819-008	4/24/2019	23.1	14	99	None	n/a	no	Culi, Cole, Noto, Chir, Ephe, Anis, PSHY Larave, XELA			
1819-008	5/1/2019	25.4	9	60	None	n/a	no	Noto, Coll, Chir, Ephe, Anis, PSHY Larvae, XELA			
1819-008	5/8/2019	17.1	2	16	None	n/a	no	Chir, Cori			
1819-008	5/15/2019	21.5	30	4500	None	n/a	no	Noto, Ephe, PSHY Larvae			Dense tamarisk
1819-008	5/23/2019	18.6	50	700	None	n/a	no	Anis, XELO,		algae	River back water
1819-008	5/30/2019	18.2	50	400	None	n/a	no	Cole, Noto, Gast, XELO,		Algae	
1819-008	6/6/2019	20.3	30	500	None	n/a	no	Cole, Noto			
1819-009	2/21/2019	9.3	11	36	None	n/a	no	none	Natural		
1819-009	2/28/2019	8	14	36	None	n/a	no	none			
1819-009	3/7/2019	12	17	18	None	n/a	no	PSHY Larvae			
1819-009	3/15/2019	6	17	60	None	n/a	no	none			
1819-009	3/21/2019	13.9	9	5	None	n/a	no	Coll, Culi			
1819-009	3/28/2019	12.7	6	30	None	n/a	no	Ostr, Clad, Dipt, Culi, Chir			Algal blooms
1819-009	4/3/2019	15	20	20	None	n/a	no	Cole			
1819-009	4/10/2019	12.3	15.5	24	None	n/a	no	Cole, Chir, PSHY Larvae,		algae	
1819-009	4/17/2019	14.2	20	45	None	n/a	no	Culi, Cole, Chir, PSHY larvae			
1819-009	4/24/2019	20.7	11.5	30	None	n/a	no	Culi, Cole, Chir, PSHY larvae			
1819-009	5/1/2019	21.2	13	9	None	n/a	no	Culi, Ephe, PSHY Larvae			
1819-009	5/8/2019	16.1	5	35	None	n/a	no	PSHY Larvae, Cole, Chir, Cori		Algae	
1819-010	1/31/2019	9.8	6.2	5	None	n/a	no	Ostr, Culi, ANBO Larvae	Natural	Undisturbed	mapped as new 56, merged with new 69; 1819-010
1819-010	2/7/2019	8.7	17	15	None	n/a	no	Ostr, Clad, Culi			mapped as new 56, merged with new 69; 1819-010
1819-010	2/15/2019	13.4	20	35	None	n/a	no	Ostr, Clad, Culi PSHY Larvae			mapped as new 56, merged with new 69; 1819-010

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-010	2/21/2019	13.7	20	31.5	None	n/a	no	none			mapped as new 56, merged with new 69; 1819-010
1819-010	3/7/2019	14	19	12.5	None	n/a	no	PSHY Larvae			
1819-010	3/15/2019	7.3	18	15	None	n/a	no	none			
1819-010	3/21/2019	m	20	2	None	n/a	no	Cole, Noto, Chir			
1819-010	3/28/2019	13.9	20	25	None	n/a	no	Ostr, Clad, Culi, Cole, Chir			
1819-010	4/3/2019	15.1	18	25	None	n/a	no	Ostr, Dipt, Cole, Anis, PSHY Larave			
1819-010	4/10/2019	12.1	19	15	None	n/a	no	Ostr, Culi, PSHY Larave			
1819-010	4/17/2019	14.1	20	54	None	n/a	no	Cole, Anis, PSHY Larvae			
1819-010	4/24/2019	27.2	19	17.5	None	n/a	no	Chir, Anis, PSHY Larvae			
1819-010	5/1/2019	25.8	15.2	12.5	None	n/a	no	Ephe			
1819-010	5/8/2019	16.4	5	25	None	n/a	no	PSHY Larave, Cole, Zygo, Cori			
1819-011	2/28/2019	8.1	15	6	None	n/a	no	none	Natural		
1819-011	3/7/2019	11.5	14	4	None	n/a	no	none			
1819-011	3/15/2019	6.4	10.5	1	None	n/a	no	none			
1819-011	3/21/2019	14.7	12	m	None	n/a	no	Culi			
1819-012	2/28/2019	8.7	25	75	None	n/a	no	none	Natural		
1819-012	3/7/2019	12.3	18	45	None	n/a	no	none			
1819-012	3/15/2019	6.2	20.5	54	None	n/a	no	none			
1819-012	3/21/2019	14	12	4	None	n/a	no	Culi, Cole			
1819-012	3/28/2019	13.3	3	0.25	None	n/a	no	Ostr, Dipt, Culi			
1819-013	2/28/2019	10.1	14	15	None	n/a	no	none	Natural		
1819-013	3/7/2019	13.7	15	6.25	None	n/a	no	Diptera			
1819-013	3/15/2019	6.8	15	9	None	n/a	no	none			
1819-013	3/21/2019	15.4	6	2	None	n/a	no	Ostr, Culi, Cole			
1819-013	3/28/2019	13.7	7.5	1.5	None	n/a	no	Ostr, Dipt, Culi, Cole, Anis, PSHy Larvae			
1819-013	4/3/2019	15.3	5	1	None	n/a	no	Ostr, Anis			
1819-014	2/28/2019	8.6	21	105	*B. sandiegonensis*	1s	yes	none	Natural		
1819-014	3/7/2019	13.6	20	32	None	n/a	no	Ostracoda, Diptera			
1819-014	3/15/2019	5.7	10	15	None	n/a	no	none			
1819-015	2/28/2019	12.2	9	6	None	n/a	no	none	Natural		
1819-015	3/7/2019	13.7	4	1	None	n/a	no	Ostracoda, Diptera			
1819-016	2/28/2019	9.6	20	24	None	n/a	no	none	Natural		
1819-016	3/7/2019	13	15	1.5	None	n/a	no	PSHY Larvae			
1819-017	2/28/2019	12.3	3	0.25	None	n/a	no	none	Natural		
1819-018	1/31/2019	10.8	14	25	None	n/a	no	Ostr, Clad, Culi	Natural	Undisturbed	
1819-018	2/7/2019	9.7	30	19.25	None	n/a	no	Culi			
1819-018	2/15/2019	12.4	100	100	None	n/a	no	Coll, Chir			
1819-018	2/21/2019	7.7	91	64	None	n/a	no	Cope			
1819-018	3/7/2019	11.5	25	27.5	None	n/a	no	Diptera			
1819-018	3/15/2019	5.9	20	25	None	n/a	no	none			
1819-018	3/21/2019	14	20	12	None	n/a	no	Clad, Chir			
1819-018	3/28/2019	13.5	18	20	None	n/a	no	Ostr, Clad, Cole, Coll			
1819-018	4/3/2019	15.2	17	20	None	n/a	no	Ostr, Cole, Anis			
1819-018	4/10/2019	11.9	15.5	12	None	n/a	no	Ostr, Clad, Coll, Chir			
1819-018	4/24/2019	28.1	7	7.5	None	n/a	no	Culi, Cole, Coll, Epe		algae	
1819-018	5/1/2019	28.8	5.5	2.25	None	n/a	no	Ostr, Cope, Culi, Cole, Chir, Ephe			
1819-019	2/21/2019	9	10	6	None	n/a	no	none	Natural		Hydro Check Only
1819-019	4/17/2019	12.7	14	14	None	n/a	no	Ostr, Cole, Coll, Chir, Anis			
1819-020	2/28/2019		0		None				Natural		Dry

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-021	2/28/2019	10	25	84	None	n/a	no	none	Natural		
1819-021	3/7/2019	13.1	20	28	None	n/a	no	Diptera, SPHA larvae			
1819-021	3/15/2019	4.8	7	0.75	None	n/a	no	none			
1819-022	2/28/2019	8.3	25	15	None	n/a	no	none	Natural		
1819-022	3/7/2019	12.3	14	15	None	n/a	no	Diptera, PSHY larvae, SPHA larvae			
1819-022	3/15/2019	5.3	10	10	None	n/a	no	none			
1819-022	3/21/2019	14.4	6	7.5	None	n/a	no	ANBO Larvae, Ostr, Culi			
1819-022	3/28/2019	12.6	5	1	None	n/a	no	Ostr, Culi, Chir			
1819-022	4/3/2019	15.3	5	0.75	None	n/a	no	Ostr, Chir			
1819-022	4/10/2019	10.8	3	0.25	None	n/a	no	Ostr, Coll			
1819-022	4/17/2019	11.8	2.5	0.1	None	n/a	no	Ostr			
1819-023	2/21/2019	8.4	12	2.25	None	n/a	no	none	Road Rut		
1819-023	2/28/2019	10.5	10	1	*B. lindahli*	10s	yes	none			
1819-023	3/7/2019	13.9	6	1.3	*B. lindahli*	1s	no	Collembola			
1819-023	3/15/2019	3.9	6	1	*B. lindahli*	1s	no	none			
1819-023	3/21/2019	15.6	3	1	*B. lindahli*	1s	no	Ostr			
1819-024	12/13/2018	10.8	5	40	*B. lindahli*	1000s	yes	none	Road Rut	Disturbed, Tire Tracks	complex of 2 ruts
1819-024	1/3/2019	1.7	4	2.5	*B. lindahli*	1s	no	Coll			
1819-024	1/10/2019	10.8	4	0.8	*B. lindahli*	10s	no	Ostr, Clad, Coll			
1819-024	1/18/2019	14.5	9	9.6	*Branchinecta* sp.	1s	no	Ostr, Clad			females only observed
1819-024	1/24/2019	12.1	3	6	*Branchinecta* sp.	1s	no	Ostr, Clad, Chir, Coll			Females only present
1819-024	2/7/2019	12.2	12.2	5	None	n/a	no	Ostr, Coll			
1819-024	2/15/2019	12.8	6.8	17.5	None	n/a	no	Chir			hydrologically connected to 1819-025
1819-024	2/21/2019	8.7	9	6	None	n/a	no	PSHY Larvae			
1819-024	3/7/2019	15.7	6	2	None	n/a	no	none			
1819-024	3/15/2019	4.8	3.5	0.75	None	n/a	no	none			
1819-025	12/7/2018	16.3	38	176	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-025	12/13/2018	11.3	30	180	*Branchinecta* sp.	1000s	no	none			Immatures
1819-025	12/20/2018	7.7	22	112.5	*B. lindahli*	1000s	yes	none			
1819-025	12/28/2018	8.5	20	60	*B. lindahli*	1000s	no	none			
1819-025	1/3/2019	1.8	20	80	*B. lindahli*	100s	no	none			
1819-025	1/10/2019	9.4	13	45	*B. lindahli*	100s	no	Clad, Coll			
1819-025	1/18/2019	13.7	30	35	*B. lindahli*	10s	no	SPHA egg masses			
1819-025	1/24/2019	11.1	45	140	*Branchinecta* sp.	10s	no	SPHA Larvae/egg masses	Road Rut	Disturbed, Tire Tracks	Females only present
1819-025	1/31/2019	11.2	35	57.5	*B. lindahli*	1s	no	SPHA larvae			
1819-025	2/7/2019	10.2	10.2	24	None	n/a	no	none			
1819-025	2/15/2019	13.6	40	85	None	n/a	no	Ostr, Clad, SPHA Larvae			
1819-025	2/21/2019	8.8	46	31.5	None	n/a	no	none			receiving flow from road, breach on S. side
1819-025	2/28/2019	12.8	20	44	*Branchinecta* sp.	1s	no	none			Females only observed
1819-025	3/15/2019	5.5	30	44	None	n/a	no	none			
1819-025	3/21/2019	15.6	45	14	None	n/a	no	Ostr, SPHA Larvae			
1819-025	3/28/2019	13.9	12	21	None	n/a	no	Clad			
1819-025	4/3/2019	14.5	13	18	None	n/a	no	Clad			
1819-025	4/10/2019	15	2.5	0.025	None	n/a	no	Ostr, Clad			
1819-026	1/18/2019		8		None		no	Ostr			Hydro check only
1819-026	1/24/2019	13.9	6.6	2.25	*B. lindahli*	100s	yes	Clad, Coll	Road Rut	Disturbed, Tire Tracks	
1819-026	2/7/2019	11.9	11.9	5	None	n/a	no	Chir			
1819-026	2/15/2019	14.1	17	8.75	*B. lindahli*	10s	no	Coll			
1819-026	2/21/2019	9.4	17	9	*B. lindahli*	100s	no	none			
1819-026	2/28/2019	13.7	13	24	*B. lindahli*	100s	no	none			
1819-026	3/7/2019	15.2		8.75	*B. lindahli*	100s	no	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-026	3/15/2019	3.8	8	6.25	None	n/a	no	none			
1819-026	3/21/2019	16.2	5	2	*B. lindahli*	1s	no	Ostr			
1819-027	12/7/2018	16.9	17	48	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-027	12/13/2018	13.1	4	6	*Branchinecta* sp.	1000s	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-027	12/20/2018	11.5	1.5	0.5	*B. lindahli*	100s	yes	none			
1819-027	12/28/2018	7.5	1	0.75	None	n/a	no	Coll			likely dried before rain on 12/25
1819-027	1/10/2019	11.8	4	6	None	n/a	no	Coll			dry previous survey
1819-027	1/18/2019	15	8.5	4.5	*B. lindahli*	1000s	no	Ostr, Nema, Coll			immatures and nauplii present
1819-027	1/24/2019	13.1	4.2	6	*B. lindahli*	m	no	Ostr, Coll			
1819-027	1/31/2019	15.1	0.6	0.06	*B. lindahli*	10s	no	Ostr, Cope, Clad			
1819-027	2/7/2019	10.9	10.9	8.25	None	n/a	no	Ostr, Clad, Coll			
1819-027	2/15/2019	12.4	50	230	*Branchinecta* sp.	1s	no	none			Merged with New 8, Female only observed
1819-027	2/21/2019	7.9	17	9	*B. sandiegonensis*	10s	yes	none			
1819-027	3/15/2019	4.2	9	3	None	n/a	no	none			
1819-027	3/21/2019	15.8	3	3	*Branchinecta* sp.	10s	no	none			females only observed
1819-028	1/18/2019	15.7	10	0.96	*Branchinecta* sp.	100s	no	Coll	Road Rut	Disturbed, Tire Tracks	immatures and nauplii present
1819-028	2/7/2019	13.5	11	2.5	None	n/a	no	Coll			
1819-028	2/15/2019	12.4	50	N/A	*Branchinecta* sp.	1s	no	Nema			Merged with 1819-027, Female only observed
1819-028	2/21/2019	8.2	21	2	*B. sandiegonensis*	10s	yes	none			
1819-028	3/15/2019	5.8	9.5	0.5	None	n/a	no	none			
1819-028	3/21/2019	15.9	4.5	0.5	None	n/a	no	Cole, Chir			
1819-029	2/28/2019	13.6	5	21	None	n/a	no	none			
1819-029	3/7/2019	14.5	5	9	None	n/a	no	none			
1819-030	12/7/2018	15.3	16	288	*Branchinecta* sp.	n/a	no	Collembola	Road Rut	Disturbed, Tire Tracks	Immatures, need type/condition
1819-030	12/13/2018	12	15	256	*B. lindahli*	1000s	yes	Coll			
1819-030	12/20/2018	9.3	7.5	76.5	*B. lindahli*	10s	no	none			
1819-030	12/28/2018	5.7	5	21	*B. lindahli*	100s	no	Coll			
1819-030	1/3/2019	0.5	4.5	10.5	*B. lindahli*	10s	no	none			
1819-030	1/10/2019	12.3	10.5	56	*B. lindahli*	10s	no	Coll			
1819-030	1/18/2019	14.6	30	54	*B. lindahli*	100s	no	none		AB	
1819-030	1/24/2019	13.1	18	150	*B. lindahli*	m	no	none			
1819-030	1/31/2019	11.6	9	49.5	*B. lindahli*	1000s	no	SPHA larvae			
1819-030	2/7/2019	10.1	32	125	*B. lindahli*	100	no	none			
1819-030	2/15/2019	12.1	30	104	None	n/a	no	Nema			
1819-030	2/21/2019	8.3	25	48	None	n/a	no	none			
1819-030	2/28/2019	12.7	19	80	None	n/a	no	none			
1819-030	3/7/2019	14.4	27	65	None	n/a	no	none			
1819-030	3/15/2019	4.4	11.5	42	None	n/a	no	none			
1819-030	3/21/2019	15.6	15	16	*Branchinecta* sp.	1s	no	Culi, Noto, Chir			females only observed
1819-030	3/28/2019	15.1	0.5	6	None	n/a	no	Clad			
1819-030	5/23/2019	21.3	5.5	39.6	None	n/a	no	n/a			Four separate pools
1819-031	1/24/2019	7.6	2.5	12	*Branchinecta* sp.	m	no	none	Road Rut	Disturbed, Tire Tracks	Immatures present
1819-031	2/7/2019	10.6	3	7	None	n/a	no	none			
1819-031	2/15/2019	14.7	7	21	None	n/a	no	Nema			
1819-031	2/21/2019	7.9	6	1.5	None	n/a	no	none			
1819-031	2/28/2019	16.7	3	0.1	None	n/a	no	none			
1819-032	12/7/2018	13	14	240	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-032	12/13/2018	8	8	105	*B. sandiegonensis*	100s	yes	Coll			Complex of 3 ruts
1819-032	12/20/2018	6.1	4	90	*B. sandiegonensis*	10s	no	Coll			
1819-032	12/28/2018	6.6	5	35	*B. sandiegonensis*	100s	no	Coll			
1819-032	1/3/2019	1.6	5	40	*B. sandiegonensis*	100s	no	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-032	1/10/2019	10.3	8.5	58.5	*B. sandiegonensis, B. lindahli*	10s	yes	Coll			second voucher for B. lindahli presence.
1819-032	1/18/2019	13.1	12	36	*B. sandiegonensis, B. lindahli*	100s, 1s	no	Clad			younger males appear to be B. san.
1819-032	1/24/2019	7.6	18	67.5	*B. sandiegonensis*	100s	no	none			
1819-032	1/31/2019	11.1	7	37	*B. sandiegonensis, B. lindahli*	100s	no	none			
1819-032	2/7/2019	7.1	15	140	*B. sandiegonensis, B. lindahli*	100s/10s	no	Clad, Nema, Coll, Chir, SPHA larvae			
1819-032	2/15/2019	12.7	23	80	*B. sandiegonensis, B. lindahli*	10s/1s	no	none			
1819-032	2/21/2019	7.4	20	1.2	*B. sandiegonensis, B. lindahli*	10s	no	none			
1819-032	3/15/2019	3.2	10.5	36	None	n/a	no	none			
1819-032	3/21/2019	14.7	7	10	None	n/a	no	Clad, Culi, Coll, Chir			
1819-032	3/28/2019	12.4	4	11.25	None	n/a	no	Ostr, Cole, Chir,		Algal blooms	
1819-032	4/3/2019	14.9	3	1	None	n/a	no	Ostr, Coll			
1819-033	2/21/2019	9.5	3	6	None	n/a	no	none			Hydro Check Only
1819-034	12/7/2018	16.6	30	500	*Branchinecta* sp.	n/a	no	Collembola	Road Rut	Disturbed, Tire Tracks	Immatures, need type/condition. Irrigation Adjacent
1819-034	12/13/2018	19	28	296	*B. lindahli*	1000s	yes	Coll			Irrigation fed
1819-034	12/20/2018	7.2	18	256	*B. lindahli*	1000s	no	Coll			Irrigation fed
1819-034	12/28/2018	11.6	25	91	*B. lindahli*	1000s	no	Coll			
1819-034	1/3/2019	3.5	12	125	*B. lindahli*	100s	no	none			Irrigation fed
1819-034	1/10/2019	11.2	18	76.5	*B. lindahli*	1000s	no	Coll			irrigation fed
1819-034	1/18/2019	15	35	125	*B. lindahli*	10s	no	Clad, Coll, SPHA egg mass			immatures present
1819-034	1/24/2019	15.1	25	207	*B. sandiegonensis, B. lindahli*	100s	yes	Coll, SPHA Egg masses			
1819-034	1/31/2019	11.9	20	132	*B. lindahli*	10s	no	SPHA larvae			irrigation fed
1819-034	2/7/2019	12	35	280	*B. lindahli*	1s	no	Ostr, Clad, Coll, Chir, SPHA larvae			
1819-034	2/15/2019	11.9	35	144	*Branchinecta* sp.	1s	no	Coll, SPHA Larvae			Female only observed
1819-034	2/21/2019	9.4	30	100	None	n/a	no	SPHA Larvae			
1819-034	2/28/2019	14.8	14	150	None	n/a	no	SPHA Larvae			
1819-034	3/15/2019	6.6	22	70	None	n/a	no	SPHA Larvae			
1819-034	3/21/2019	15.7	25	24	None	n/a	no	Coll, SPHA Larvae			
1819-034	3/28/2019	15.1	6.5	10	None	n/a	no	Ostr, Cole, Cori, Chir		Algal blooms	
1819-035	2/7/2019	17.5	3	0.04	*B. lindahli*	10s	yes	Clad, Nema, Chir	Road Rut	Disturbed, Tire Tracks	
1819-035	2/15/2019	16.1	2	0.45	None	n/a	no	Nema, Coll			
1819-035	2/21/2019	11.3	11	1	None	n/a	no	none			
1819-036	12/7/2018	19.8	7	28	None	n/a	no	none			
1819-036	12/13/2018	18	6.5	10	*Branchinecta* sp.	1s	no	none			Irrigation fed, not enough to collect, female only?
1819-036	12/20/2018	15.2	2	6	*B. lindahli*	1s	yes	none			Irrigation fed
1819-036	12/28/2018	14.7	2.7	1.5	None	n/a	no	none			likely dried before rain on 12/25
1819-036	1/10/2019	15	6.5	5.25	None	n/a	no	Coll			
1819-036	1/18/2019	16.3	9.6	7.2	*B. lindahli*	10s	no	Clad		Algal blooms	
1819-036	1/24/2019	15.7	8.5	21	*B. lindahli*	100s	no	Chir	Road Rut	Disturbed, Tire Tracks	complex of 2 features
1819-036	1/31/2019	15.3	6	6	*B. lindahli*	100s	no	Ostr, Clad, Chiro, Dipt			irrigation fed
1819-036	2/7/2019	14.2	10	8.25	*B. lindahli*	10s	no	Clad			
1819-036	2/15/2019	15.5	6.5	5.25	None	n/a	no	Chir			
1819-036	2/21/2019	10.6	14	3	None	n/a	no	none			
1819-036	2/28/2019	18.2	9	4	None	n/a	no	none			
1819-036	3/7/2019	18.7	8	1.25	None	n/a	no	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-036	3/15/2019	7.3	3	0.1875	*B. lindahli*	1s	no	none			
1819-037	2/21/2019	10.5	9	1.25	None	n/a	no	none	Road Rut		Hydro Check Only
1819-038	2/21/2019	10.9	7	0.625	None	n/a	no	none	Road Rut		Hydro Check Only
1819-038	3/7/2019	19.8	4	0.2	None	n/a	no	none			
1819-039	12/13/2018	18	6	55	*Branchinecta* sp.	10s	no	Coll			Immatures, recently filled from last rain
1819-039	12/20/2018	14.4	6	12.5	*B. lindahli*	1s	yes	none			
1819-039	12/28/2018	14.1	4	2.1	*Branchinecta* sp.	1s	no	none			One female observed
1819-039	1/3/2019	11	1	1.34	None	n/a	no	Ostr			
1819-039	1/10/2019	16.2	8	10	None	n/a	no	Coll			
1819-039	1/18/2019	17.2	13	17.6	*B. lindahli*	10s	no	Coll			
1819-039	1/24/2019	17.1	10	36	*B. lindahli*	100s	no	none	Road Rut	Disturbed, Tire Tracks	
1819-039	1/31/2019	16.7	3	8	*B. lindahli*	10s	no	none			
1819-039	2/7/2019	20.7	9	40	*B. lindahli*	1s	no	Coll			
1819-039	2/15/2019	15.2	15	21	*B. lindahli*	10s	no	none			
1819-039	2/21/2019	10.6	15	28	*B. lindahli*	10s	no	none			
1819-039	2/28/2019	21.1	8	14	*B. lindahli*	10s	no	none			
1819-039	3/7/2019	19.3	5	12.5	*B. lindahli*	1s	no	none			
1819-039	3/15/2019	7.2		6	*B. lindahli*	1s	no	none			
1819-039	3/21/2019	19	3	2	None	n/a	no	Ostr			
1819-039	5/23/2019	18.9	6.5	7.8	None	n/a	no	n/a			
1819-039	5/30/2019	18.3	8	1.75	*B. lindahli*	10s	4 male/1female	n/a			
1819-040	12/13/2018	16.1	4.5	32	*Branchinecta* sp.	n/a	no	none			Immatures, recently filled from last rain
1819-040	12/20/2018	16.6	1	12.5	*B. sandiegonensis, B. lindahli*	1s	yes	none			
1819-040	12/28/2018	14.1	3	1.25	None	n/a	no	none			likely dried before rain on 12/25
1819-040	1/10/2019	14.6	5.5	3.75	None	n/a	no	none			
1819-040	1/18/2019		9		None		no				hydo check only
1819-040	1/24/2019	19	7	17.5	*B. lindahli*	10s	no	none	Road Rut	Disturbed, Tire Tracks	
1819-040	2/7/2019	19.3	6	6	*Branchinecta* sp.	100s	no	none			immatures
1819-040	2/15/2019	15.7	11	15	*B. lindahli*	10s	no	Nema			Immatures
1819-040	2/21/2019	12.3	14	21	*B. lindahli*	10s	no	none			
1819-041	1/18/2019		5		None		no				hydo check only
1819-041	1/24/2019	21.4	2.1	24.5	*B. sandiegonensis, B. lindahli*	1s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-041	1/31/2019	17.9	2	0.9	None	n/a	no	none			irrigation fed
1819-041	2/7/2019	17.9	5	23.75	None	n/a	no	none			
1819-041	2/15/2019	15	6	25	None	n/a	no	Nema			
1819-041	2/21/2019	9.1	13	4.5	None	n/a	no	none			
1819-042	1/18/2019		6		None		no				hydo check only
1819-042	1/24/2019	21.2	1.5	18	*B. lindahli*	1s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-042	2/7/2019	18.2	7.4	24	None	n/a	no	none			
1819-042	2/15/2019	16.5	7	20.4	*B. lindahli*	1s	no	none			
1819-042	2/21/2019	9.2	7	25	*B. lindahli*	1s	no	none			
1819-042	2/28/2019	20.5	5	24	*Branchinecta* sp.	10s	no	none			Female only observed
1819-043	12/13/2018	15.7	2.5	8.25	*B. lindahli*	1s	yes	none			
1819-043	1/10/2019	16.4	2	10	None	n/a	no	Coll			
1819-043	1/18/2019		6		None		no				hydo check only
1819-043	1/24/2019	19.4	3.8	28	*B. lindahli*	1s	no	none	Road Rut	Disturbed, Tire Tracks	
1819-043	1/31/2019	17.3	2.1	3	*B. lindahli*	10s	no	Clad			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-043	2/7/2019	17.2	5.5	12	*B. sandiegonensis, B. lindahli*	10s/10s	yes	Clad, Coll, Chir			
1819-043	2/15/2019	15.7	9	18	*B. sandiegonensis*	1s	no	Chir			
1819-043	2/21/2019	8.6	8	17.5	*B. lindahli*	10s	no	none			
1819-044	12/7/2018	18.8	30	108	None	n/a	no	Collembola	Road Rut	Disturbed, Tire Tracks	
1819-044	12/13/2018	16.5	12	45	*Branchinecta* sp.	n/a	no	none			Immatures, recently filled from last rain
1819-044	12/20/2018	14.8	9.5	17.5	*B. sandiegonensis*	1000s	yes	none			Irrigation fed
1819-044	12/28/2018	14.2	3	1.8	*B. sandiegonensis*	10s	no	Coll			
1819-044	1/3/2019	12.1	0.5	0.4	None	n/a	no	Ostr, Cope, Coll, Cole			Irrigation fed
1819-044	1/10/2019	16.3	2	3	Nauplii	n/a	no	Ostr			Nauplii, irrigation fed
1819-044	1/18/2019	17.5	16	7.56	*B. sandiegonensis*	100s	no	Coll			
1819-044	1/24/2019	19	7	15	*B. sandiegonensis*	10s	no	Coll			
1819-044	1/31/2019	14.9	15	7	*B. sandiegonensis*	100s	no	none			irrigation fed
1819-044	2/7/2019	15.1	25	30	*B. sandiegonensis*	100s	no	Clad, Coll, SPHA egg mass			
1819-044	2/15/2019	13.1	100	52	*Branchinecta* sp.	10s	no	Nema, Coll, Chir			Female only observed
1819-044	2/21/2019	8.3	46	20	*Branchinecta* sp.	1s	no	none			Female only observed
1819-044	3/15/2019	7.9	22	14	None	n/a	no	none			
1819-044	3/21/2019	17.1	5	4	None	n/a	no	Clad, Cole, Plat, Coll			
1819-044	3/28/2019	15.9	5	1	None	n/a	no	Ostr, Clad, Cole, Cori, Chir			
1819-045	12/7/2018	18.3	45	175	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-045	12/13/2018	11.7	30	180	*B. lindahli*	100s	yes	Noto			Irrigation fed
1819-045	12/20/2018	14.5	30	160	*B. lindahli*	100s	yes	none			Irrigation fed, second voucher for this pool for clarification
1819-045	12/28/2018	13.2	18	60	*B. lindahli*	10s	no	Coll			
1819-045	1/3/2019	7.1	5	26	*B. lindahli*	100s	no	none			
1819-045	1/10/2019	11.1	16	10.5	*B. lindahli*	10s	no	none			irrigation fed
1819-045	1/18/2019	16.6	30	20	*Branchinecta* sp.	1s	no	Ostr, Cad, Cole, PSHY egg masses			females only observed
1819-045	1/24/2019	16.4	20	45	*Branchinecta* sp.	1s	no	Ostr, Clad, SPHA eggs			Females only present
1819-045	1/31/2019	14	20	9.1	*Branchinecta* sp.	n/a	no	Ostr, Clad, Cole, Noto			Irrigation fed, Females only present
1819-045	2/7/2019	11.7	30	60	None	n/a	no	Coll			
1819-045	2/15/2019	15.3	45	112	*Branchinecta* sp.	10s	no	none			Immatures
1819-045	2/21/2019	9.1	25	52.5	*B. lindahli*	10s	no	SPHA Larvae			
1819-045	2/28/2019	16.1	30	45	*B. lindahli*	100s	no	none			
1819-045	3/7/2019	16.3	25	10	*Branchinecta* sp.	1s	no	SPHA Larvae			female only observed
1819-045	3/15/2019	6.6	35	25	*Branchinecta* sp.	10s	no	SPHA Larvae			females only observed
1819-045	3/21/2019	15.9	20	8	*Branchinecta* sp.	1s	no	Ostr, Clad, SPHA Larvae			females only observed
1819-045	3/28/2019	13.5	14	8	None	n/a	no	Ostr, Chir			
1819-045	4/3/2019	15.5	7	0.3	None	n/a	no	Ostr, Cori, Chir, PSHY Larvae			
1819-046	12/7/2018	19.9	11	24	None	n/a	no	Collembola	Road Rut	Disturbed, Tire Tracks	
1819-046	12/13/2018	1538	14	10.5	*B. lindahli*	100s	yes	Ostr			irrigation fed
1819-046	12/20/2018	16.8	6	9	*B. lindahli*	10s	no	Ostr, Culi			
1819-046	12/28/2018	14.3	6	0.12	None	n/a	no	Ostr, Culi			Irrigation fed
1819-046	1/24/2019	18.8	8	5	*Branchinecta* sp.	n/a	no	SPHA larvae			Immatures present
1819-046	1/31/2019	15.3	9	2	*B. lindahli*	10s	no	Ostr, Culi			irrigation fed
1819-046	2/7/2019	15.7	25	5	None	n/a	no	Ostr			
1819-046	2/15/2019	13.6	20	12.25	*B. lindahli*	100s	no	SHPA Larvae			immatures
1819-046	2/21/2019	9.6	23	6.25	*B. lindahli*	100s	no	none			
1819-046	2/28/2019	18.1	21	3.75	*B. lindahli*	100s	no	PSHY Larvae			
1819-046	3/7/2019	19.1	14	4	None	n/a	no	SPHA Larvae			
1819-047	12/7/2018	17.8	13	25	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Nauplii
1819-047	12/13/2018	17.2	4.5	35	None	n/a	no	none			complex of 2 pools, irrigation fed
1819-047	12/20/2018	18	6.5	21	None	n/a	no	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-047	12/28/2018	15.7	1.5	1.4	*B. lindahli*	1s	no	Ostr, Clad			
1819-047	1/10/2019	16.7	1	0.25	Nauplii	n/a	no	none			Nauplii, irrigation fed
1819-047	1/18/2019	17.8	15	12	None	n/a	no	Coll			
1819-047	1/24/2019	20.3	7	22	*B. lindahli*	10s	yes	Coll			
1819-047	1/31/2019	15.4	6.4	4.5	*B. sandiegonensis, B. lindahli*	10s	yes	Ostr, Clad			irrigation fed
1819-047	2/7/2019	16.9	9	10.5	*B. sandiegonensis, B. lindahli*	1s/10s	no	Clad			
1819-047	2/15/2019	14.6	11	21	*B. sandiegonensis, B. lindahli*	1s/1s	no	Chir			
1819-047	2/21/2019	10.1	11	14	*Branchinecta* sp.	1s	no	none			Female only observed
1819-047	3/15/2019	9.1	3.5	1	None	n/a	no	none			
1819-050	12/7/2018		8		None	n/a	no	none			Hydro check only
1819-050	1/10/2019	20.4	1.5	2	*Branchinecta* sp.	n/a	no	none			Nauplii
1819-050	1/24/2019	16.8	0.5	4.5	*B. sandiegonensis, B. lindahli*	1s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-050	2/7/2019	20.5	5	6.75	None	n/a	no	none			
1819-050	2/15/2019	18.5	6	6	None	n/a	no	Gast			
1819-050	2/21/2019	8.7	10	9	None	n/a	no	none			Flow from road, breach on S. bank
1819-051	12/13/2018	18.5	2	6	None	n/a	no	Coll			
1819-051	1/24/2019	20.4	3.5	8	*B. lindahli*	1s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-051	2/7/2019	20.3	7	8.75	None	n/a	no	none			
1819-051	2/15/2019	18.4	8	12	None	n/a	no	Chir			
1819-051	2/21/2019	9.8	14	12	None	n/a	no	none			
1819-051	2/28/2019	25	4	0.1	None	n/a	no	none			
1819-051	3/1/2019	21.6	8	4.5	*B. lindahli*	100s	no	none			
1819-052	2/7/2019	21.1	6	14	None	n/a	no	none			
1819-052	2/15/2019	18.3	9.5	15	None	n/a	no	none			
1819-052	2/21/2019	9.4	7	18	None	n/a	no	none			
1819-052	2/28/2019	26.5	3	0.15	None	n/a	no	none			
1819-053	1/24/2019	23.3	0.2	0.09	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-053	2/7/2019	20.8	4.5	6	None	n/a	no	none			
1819-053	2/15/2019	19.7	7	10	None	n/a	no	none			
1819-053	2/21/2019	9.4	8	15	None	n/a	no	none			
1819-053	2/28/2019	25.3	3	0.4	*Branchinecta* sp.	1s	no	none			Females only observed
1819-054	2/21/2019	10	15	120	None	n/a	no	none	Natural		Hydro Check Only
1819-054	2/28/2019	26.3	4	0.75	None	n/a	no	none			
1819-055	1/10/2019	19.7	8	15	None	n/a	no	Coll	Road Rut	Disturbed, Tire Tracks	
1819-055	1/18/2019	19.5	8.5	6	*Branchinecta* sp.	1s	no	none			females only observed
1819-055	1/24/2019	23.3	2.1	6.75	*B. lindahli*	1s	yes	none			
1819-055	2/7/2019	19.5	10	6	None	n/a	no	none			
1819-055	2/15/2019	19.7	8	6	*B. sandiegonensis*	10s	yes	Coll, SPHA Larvae			
1819-055	2/21/2019	10.6	14	8	None	n/a	no	none			Receiving flow from New-36
1819-055	3/15/2019	8.5	7.5	1	None	n/a	no	none			
1819-056	1/10/2019	19.6	3	10.5	None	n/a	no	Coll	Road Rut	Disturbed, Tire Tracks	
1819-056	1/18/2019	19.1	11.5	17.6	*Branchinecta* sp.	1s	no	none			Immatures
1819-056	1/24/2019	22.1	5	17.5	*B. sandiegonensis*	1s	yes	none			
1819-056	2/7/2019	20.1	13	10.5	None	n/a	no	none			
1819-056	2/15/2019	19.3	15	60	*Branchinecta* sp.	1s	no	Coll, Chir			
1819-056	2/21/2019	10.6	17	18	*Branchinecta* sp.	1s	no	none			Female only observed
1819-056	3/15/2019	6.9	5	1.5	None	n/a	no	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-057	12/13/2018	17.8	30	450	*Branchinecta* sp.	n/a	no	Clad	Natural	Undisturbed	Immatures
1819-057	12/20/2018	15.7	17	330	*B. sandiegonensis*	100s	yes	Ostr			Irrigation fed
1819-057	12/28/2018	12.3	20	240	*B. sandiegonensis*	100s	no	Ostr, Clad			
1819-057	1/3/2019	9.3	15	184	*B. sandiegonensis*	1000s	no	Ostr, Clad, Dipt, Coll, Culi			Irrigation fed
1819-057	1/10/2019	17	21	66	*B. sandiegonensis*	100s	no	Ostr, Clad, Culi, Noto, PSHY Larvae			
1819-057	1/18/2019	18.5	30	36	*B. sandiegonensis*	1s	no	Ostr, Clad, Dipt, Culi, Cole, PSHY egg masses			
1819-057	1/24/2019	19.2	30	56	None	n/a	no	Ostr, Clad, Chir, Culi, Cole			
1819-057	1/31/2019	16.3	6.8	7.4	None	n/a	no	Ostr, Clad, Chiro, ANBO Larvae			irrigation fed
1819-057	2/7/2019	15.2	40	90	None	n/a	no	Ostr, Clad, Coll			
1819-057	2/15/2019	16.9	100	70	*B. sandiegonensis*	1000s	no	Ostr, Clad, Cori, XELA Larvae			
1819-057	2/21/2019	10.1	46	90	*Branchinecta* sp.	10s	no	SPHA Larvae			Female only observed
1819-057	3/15/2019	9.1	22	60	None	n/a	no	PSHY and SPHA larvae			
1819-057	3/21/2019	16.2	25	21	None	n/a	no	PSHY, XELA Larvae			
1819-057	3/28/2019	17.8	7	3	None	n/a	no	Coll, Chir, PSHY Larvae			African clawed frog larvae
1819-058	12/13/2018	19.1	12	5	*Branchinecta* sp.	n/a	no	none	Natural	Undisturbed	Immatures
1819-058	12/20/2018	19.7	8.5	32	None	n/a	no	none			Irrigation fed
1819-058	2/7/2019	18.9	10	3.75	None	n/a	no	Coll			
1819-058	2/15/2019	17.9	10	9	*Branchinecta* sp.	1s	no	Ephe			
1819-058	2/21/2019	10.8	13	12	*Branchinecta* sp.	1s	no	none			Female only observed, spilling into New-36
1819-059	12/13/2018	16.7	15	18	*Branchinecta* sp.	n/a	no	none			Immatures
1819-059	12/20/2018	17.7	15	35	*B. sandiegonensis*	100s	yes	none	Natural	Undist	Irrigation fed
1819-059	12/28/2018	12.7	20	60	*B. sandiegonensis*	100s	no	Ostr, Coll			Complex of 2 features
1819-059	1/18/2019		13		None		no				hydo check only
1819-059	2/7/2019	17.4	40	125	None	n/a	no	SPHA egg masses			Pools 31-34 flooded together
1819-059	2/15/2019	16.7	50	N/A	*B. sandiegonensis*	n/a	no	none			Pools 31-34 flooded together
1819-059	3/15/2019	7.9	25	44	None	n/a	no	none			
1819-059	3/21/2019	15.3	35	10	None	n/a	no	Ostr, Culi, PSHY Larvae			
1819-059	3/28/2019	18	12	17.5	None	n/a	no	Clad, Culi, Chir, Anis			African clawed frog larvae
1819-060	12/13/2018	17.2	20	48	*Branchinecta* sp.	n/a	no	none			Immatures, Irrigation fed
1819-060	12/20/2018	17.6	15	28	*B. sandiegonensis*	1000s	yes	none			Irrigation fed
1819-060	12/28/2018	15.7	5	7	*B. sandiegonensis*	10s	no	none			
1819-060	1/18/2019		33		None		no				hydo check only
1819-060	1/24/2019	21.4	2.6	0.01	None	n/a	no	Ostr, Chir	Natural	Undist	
1819-060	2/7/2019	17.4	40	125	None	n/a	no	SPHA egg masses			Pools 31-34 flooded together
1819-060	2/15/2019	16.7	50	N/A	*B. sandiegonensis*	n/a	no	none			Pools 31-34 flooded together
1819-060	3/15/2019	7.1	22	75	None	n/a	no	none			combined with 1819-61
1819-060	3/21/2019	14.3	45	60	None	n/a	no	Culi, Chir, SHPA and PSHY Larvae			
1819-060	3/28/2019	17.2	13	25	None	n/a	no	Clad, Cor, Chir, Anis, PSHY Larvae			
1819-060	4/3/2019	16.1	7	2	None	n/a	no	Clad, Cori, Chir, PSHY Larvae			
1819-061	12/13/2018	14.8	22	315	*Branchinecta* sp.	n/a	no	none			Immatures, Irrigation fed
1819-061	12/20/2018	12.7	15	210	*B. sandiegonensis*	100s	yes	none			Irrigation fed
1819-061	12/28/2018	13.9	8.5	28	None	n/a	no	none			
1819-061	1/3/2019	11.6	6.5	2	*B. sandiegonensis*	1s	no	Ostr, Cole, Noto			Irrigation fed
1819-061	1/10/2019	18.2	3	9	None	n/a	no	Ostr			
1819-061	1/18/2019	18	20	22	*Branchinecta* sp.	1s	no	Ostr, Coll			females only observed
1819-061	1/24/2019	21	15	12	None	n/a	no	Ostr, Chiro	Natural	Undist	
1819-061	1/31/2019	18.4	2.7	0.04	None	n/a	no	Ostr, Chir			irrigation fed
1819-061	2/7/2019	17.4	40	125	None	n/a	no	SPHA egg masses			Pools 31-34 flooded together
1819-061	2/15/2019	16.7	50	N/A	*B. sandiegonensis*	n/a	no	none			Pools 31-34 flooded together
1819-061	3/15/2019				None						combined with 1819-60

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-061	3/21/2019	14.3	45	60	None	n/a	no	Culi, Chir, SHPA and PSHY Larvae			
1819-061	3/28/2019	17.7	18	12	None	n/a	no	Clad, Cole, Chir, PSHY Larvae			
1819-061	4/3/2019	16	19	6.75	None	n/a	no	Clad, Cole, Chir, Anis, PSHY Larvae			
1819-062	12/13/2018	18.1	8	48	None	n/a	no	none			series of ruts, irrigation fed
1819-062	12/20/2018	16	7.5	66	*B. sandiegonensis*	10s	yes	Ostr			Irrigation fed
1819-062	12/28/2018	13.5	11	4.5	None	n/a	no	Ostr, Clad, Coll			
1819-062	1/3/2019	10.1	7	8	None	n/a	no	Ostr, Clad, Coll, Hydr			rut complex
1819-062	1/10/2019	15.6	12.5	29.25	None	n/a	no	none			
1819-062	1/18/2019	16.9	17	24	None	n/a	no	Ostr, Clad			
1819-062	1/24/2019	20.8	10	17.5	*B. sandiegonensis*	1s	no	Ostr, Clad, Chir	Road Rut	Disturbed, Tire Tracks	
1819-062	1/31/2019	18.1	7	3.24	*B. lindahli*	1s	yes	Ostr, Chir			irrigation fed
1819-062	2/7/2019	17.4	40	125	None	n/a	no	SPHA egg masses			Pools 31-34 flooded together
1819-062	2/15/2019	16.7	50	259	*B. sandiegonensis*	1000s	no	none			Pools 31-34 flooded together
1819-062	2/21/2019	9.4	28	280	*B. sandiegonensis*	100s	no	SPHA Larvae			combined with 1819-061, 060, 059
1819-062	3/15/2019	7.2	10	8.75	None	n/a	no	none			
1819-062	3/21/2019	16.9	4	2	None	n/a	no	Coll, Chir, SPHA Larvae			
1819-063	2/15/2019	19.7	6.4	8	None	n/a	no	none	Road Rut		
1819-063	2/21/2019	11.4	7	7	None	n/a	no	none			
1819-064	1/24/2019	22	4	10	*B. lindahli*	1s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-064	2/7/2019	19.1	8	18	None	n/a	no	Nema			
1819-064	2/15/2019	21	9	12.1	None	n/a	no	Coll			
1819-064	2/21/2019	10.6	11	320	None	n/a	no	none			Combined with 1819-065, 066, 067, water flowing down road, strong flow into river
1819-064	3/15/2019	8.6	3	0.2	None	n/a	no	none			
1819-065	1/24/2019	20.4	1.6	15	*Branchinecta* sp.	10s	no	none	Road Rut	Disturbed, Tire Tracks	Immatures present
1819-065	2/15/2019	20.8	13	18.4	None	n/a	no	Coll			
1819-065	2/28/2019	19.8	4	0.5	None	n/a	no	none			
1819-065	3/15/2019				None						combined with 1819-064
1819-066	1/10/2019	15.4	12	28	None	n/a	no	Coll			
1819-066	1/18/2019	17.8	10.5	7.5	*Branchinecta* sp.	1s	no	none			females only observed
1819-066	1/24/2019	20.3	1.1	11.25	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-066	2/7/2019	17.5	16	13.2	None	n/a	no	Nema			
1819-066	2/15/2019	17.5	10	24	None	n/a	no	none			
1819-066	3/15/2019	6.8	6	0.75	None	n/a	no	none			
1819-067	12/13/2018	19.7	8	63	None	n/a	no	Coll	Natural	Disturbed	
1819-067	12/20/2018	15	15	54	None	n/a	no	Coll			
1819-067	12/28/2018	15.2	12	8	None	n/a	no	coll			
1819-067	1/3/2019	12.4	2	2	None	n/a	no	Coll			
1819-067	1/10/2019	18.2	2.5	3	None	n/a	no	Coll			Irrigation fed
1819-067	1/18/2019	17.5	20	27.5	None	n/a	no	Dipt, Coll			
1819-067	1/24/2019	19.8	10	16	None	n/a	no	Coll, Chir			
1819-067	1/31/2019	15.4	15	15	None	n/a	no	Coll, Chir			
1819-067	2/7/2019	17.9	30	150	None	n/a	no	Coll			
1819-067	2/15/2019	18.6	50	96	None	n/a	no	Coll			
1819-067	2/28/2019	21.5	10	21	*Branchinecta* sp.	10s	no	PSHY Larvae			Females only observed
1819-068	2/21/2019	13.1	7	6.75	None	n/a	no	none	Road Rut		Hydro Check Only
1819-069	2/21/2019	11.7	9	27	None	n/a	no	none	Road Rut		Hydro Check Only
1819-070	1/10/2019	13.8	1.5	8	None	n/a	no	Coll			Complex of 4 ruts
1819-070	1/18/2019	19	5.4	18	None	n/a	no	Coll			
1819-070	1/24/2019	16.4	3	10	*B. sandiegonensis*	1s	no	Chir	Road Rut	Disturbed, Tire Tracks	one male observed

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-070	1/31/2019	18.9	1.9	1.61	*B. sandiegonensis, B. lindahli*	1s	yes	Chir			
1819-070	2/7/2019	21.7	4.5	15	*Branchinecta* sp.	1s	no	Ostr, Chir			Female only observed
1819-070	2/15/2019	20	5	30	*B. lindahli*	1s	no	Nema, Chir			
1819-070	2/21/2019	11.5	6	20	None	n/a	no	none			
1819-070	3/15/2019	7.5	5	5.25	None	n/a	no	none			
1819-070	3/21/2019	17.2	2	0.5	*B. lindahli*	10s	no	Ostr			
1819-071	2/7/2019	20	5	8.4	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-071	2/15/2019	22.3	5	17	*Branchinecta* sp.	1s	no	none			immatures
1819-071	2/21/2019	11.4	8	8.4	None	n/a	no	none			
1819-071	2/28/2019	27.2	5	1.5	None	n/a	no	none			
1819-072	12/13/2018	16.2	20	822	*B. lindahli*	1000s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-072	12/20/2018	15.3	15	780	*B. lindahli*	1000s	no	none			
1819-072	12/28/2018	10.2	12	160	*B. lindahli*	1000s	no	none			
1819-072	1/3/2019	8.5	15	360	*B. lindahli*	1000s	no	Coll			Complex of two pools
1819-072	1/10/2019	14.8	14	271	*B. lindahli*	1000s	no	Coll			
1819-072	1/18/2019	16	35	125	*B. lindahli*	1000s	no	none			Immatures present
1819-072	1/24/2019	16.2	35	285	*B. lindahli*	1000s	no	Coll			
1819-072	1/31/2019	13.8	20	211.5	*B. lindahli*	100s	no	none			
1819-072	2/7/2019	14	30	210	*B. lindahli*	1000s	no	Ostr			
1819-072	2/15/2019	13	45	270	*B. lindahli*	100s	no	none			
1819-072	2/21/2019	9.8	25	180	None	n/a	no	none			
1819-072	2/28/2019	19.8	37	200	*B. lindahli*	1000s	no	none			
1819-072	3/7/2019	15.5	30	4	None	n/a	no	none			
1819-072	3/15/2019	9.7	36	180	*B. lindahli*	100s	no	none			
1819-072	3/21/2019	16.6	45	105	None	n/a	no	Culi, Noto, SPHA Larvae			
1819-072	3/28/2019	18.6	26	200	*B. lindahli*	10s	no	Clad, Cori, Chir			
1819-072	4/3/2019	15.8	27	160	None	n/a	no	Ostr, Cole, Cori, Chir, Anis, SPHA Larvae		algal blooms	
1819-072	4/10/2019	14.5	29	140	None	n/a	no	Ostr, Cole, Cori, Anis, PSHY/SPHA Larvae			
1819-072	4/17/2019	12.4	22	62.5	None	n/a	no	Cole, Cori, Chir, Anis, PSHY/SPHA larvae			
1819-072	4/24/2019	30.7	10	9	None	n/a	no	Noto, Anis, PSHY Larvae		algae	
1819-073	2/15/2019	16.4	18	12	None	n/a	no	Ostr	Natural		
1819-073	2/21/2019	10.1	19	7	None	n/a	no	none			
1819-073	2/28/2019	24.4	18	9	None	n/a	no	SPHA Larvae			
1819-073	3/7/2019	17.4	19	10.5	None	n/a	no	none			
1819-073	3/15/2019	8.6	15	4	None	n/a	no	none			
1819-074	12/13/2018	21	25	117	*B. lindahli*	1000s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-074	12/20/2018	18.2	18	126	*B. sandiegonensis*	100s	yes	none			second voucher collected with new species. Younger shrimp.
1819-074	12/28/2018	18.9	9.5	3	None	n/a	no	none			thick, silt laden water
1819-074	1/3/2019	13.6	0.2	2	None	n/a	no	Coll			
1819-074	1/10/2019	17.4	7	49.5	None	n/a	no	Clad, Coll, Hydr			
1819-074	1/18/2019	18.9	38	54	*B. sandiegonensis, B. lindahli*	1000s	no	none			
1819-074	1/24/2019	21.8	35	48	*B. lindahli*	100s	no	none			
1819-074	1/31/2019	17	18	40.5	*B. lindahli*	10s	no	none			
1819-074	2/7/2019	19.4	35	72	*B. lindahli*	1s	no	none			
1819-074	2/15/2019	17.7	15	77	*B. sandiegonensis, B. lindahli*	100s/100s	no	none			Immatures

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-074	2/21/2019	10.9	23	90	*Branchinecta* sp.	n/a	no	none			Female only observed
1819-074	3/15/2019	13.9	22	28	*Branchinecta* sp.	1s	no	none			female only observed
1819-074	3/21/2019	19.8	15	14	None	n/a	no	none			
1819-075	12/7/2018	22.3	7	21	*Branchinecta* sp.	n/a	no	Collembola	Road Rut	Disturbed, Tire Tracks	Immatures
1819-075	1/10/2019	18.6	4	1	None	n/a	no	Nema, Coll, Gast			
1819-075	1/18/2019		8.2		None		no				hydo check only
1819-075	1/24/2019	21.2	3	5.25	*B. lindahli*	10s	yes	none			
1819-075	2/7/2019	20.4	9.5	1.5	None	n/a	no	SPHA Larvae			
1819-075	2/15/2019	21.6	15	2.1	None	n/a	no	Chir			
1819-075	3/7/2019	19.3	11	7	None	n/a	no	none			
1819-075	3/15/2019	8.3		2	*B. lindahli*	10s	yes				
1819-076	1/10/2019	27.7	5.5	6.25	None	n/a	no	Ostr, Dipt, Coll			
1819-076	1/18/2019	19.5	11	3.6	*Branchinecta* sp.	10s	no	Dipt, Coll, SPHA Egg masses			Females and immatures only observed
1819-076	1/24/2019	19.1	5	6	*B. lindahli*	10s	yes	SPHA larvae			
1819-076	1/31/2019	17	6.8	2.89	*B. lindahli*	1s	no	Ostr, SPHA Larvae	Road Rut	Disturbed, Tire Tracks	
1819-076	2/7/2019	18.7	11	2.25	*B. lindahli*	1s	no	Ostr, SPHA larvae			
1819-076	2/15/2019	20.6	16	3	None	n/a	no	Chir, SPHA larvae			
1819-076	2/28/2019	25.9	10	3	None	n/a	no	SPHA Larvae			
1819-076	3/7/2019	20.7	12	4	None	n/a	no	SPHA Larvae			
1819-076	3/15/2019	13.2	10	2.25	None	n/a	no	none			
1819-076	3/21/2019	18.5	6	1.5	None	n/a	no	Clad, SPHA Larvae			
1819-077	1/10/2019	21.5	2.5	1	None	n/a	no	Hydr, Coll	Road Rut	Disturbed, Tire Tracks	
1819-077	1/18/2019	19.7	6	0.64	None	n/a	no	Coll			
1819-077	1/24/2019	22	2.5	1	*B. lindahli*	1s	yes	Chir			
1819-077	2/7/2019	20.5	4.5	1	None	n/a	no	none			
1819-077	2/15/2019	21.6	6	1	None	n/a	no	none			
1819-077	2/28/2019		<3		*B. lindahli*	10s	no	none			drying pool but live shrimp
1819-078	2/28/2019	28.5	7	1.125	None	n/a	no	none	Road Rut		
1819-078	3/7/2019	21	7	15.4	None	n/a	no	none			
1819-078	3/15/2019	15.9	5	0.75	*B. lindahli*	1s	yes	none			
1819-079	1/10/2019	20.6	4.5	0.6	None	n/a	no	Coll			
1819-079	1/18/2019				None		no				washed out by creek
1819-079	1/24/2019	20.7	6.4	4.5	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-079	2/28/2019	25.2	7	1.2	None	n/a	no	none			
1819-080	12/13/2018	14.9	8	90	*Branchinecta* sp.	n/a	no	none			Immatures, complex of 2 features
1819-080	12/20/2018	16.4	5.5	44	*B. lindahli*	1000s	yes	Coll			
1819-080	12/28/2018	18.7	5	20	*B. lindahli*	1000s	no	none			
1819-080	1/3/2019	15.6	7.5	39	*B. lindahli*	1000s	no	Coll			
1819-080	1/10/2019	14.5	9	31.5	*B. lindahli*	100s	no	Coll			Complex of 2 features
1819-080	1/18/2019				*Branchinecta* sp.	n/a	no				washed out by creek, Female observed
1819-080	1/24/2019	17.1	12	52.5	*B. lindahli*	100s	no	none	Road Rut	Disturbed, Tire Tracks	
1819-080	1/31/2019	18.2	8.5	18	*B. lindahli*	10s	no	Culi, Chir, SHPA Larvae			
1819-080	3/1/2019	19.9	10	6	None	n/a	no	none			
1819-080	3/7/2019	24	10	6.25	*B. lindahli*	1000s	yes	none			
1819-080	3/15/2019	18.2	8	3	*Branchinecta* sp.	1s	no	none			females only observed
1819-080	3/21/2019	18.8	3	3	None	n/a	no	Ostr, Clad, Chir			
1819-081	12/13/2018	16.7	15	144	*B. lindahli*	m	yes	none			
1819-081	12/20/2018	18.3	7.5	71.5	*B. lindahli*	1000s	no	none			
1819-081	12/28/2018	18.1	6.5	25	*B. lindahli*	1000s	no	none			
1819-081	1/3/2019	16.1	5.5	36	*B. lindahli*	100s	no	Coll			
1819-081	1/10/2019	20.1	6	34	*B. lindahli*	10s	no	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-081	1/18/2019	20.1	18	25.3	*B. lindahli*	10s	no	Coll, SPHA Egg masses		AB	
1819-081	1/24/2019	19.1	14	80	*B. lindahli*	10s	no	Clad, SPHA Larvae	Road Rut	Disturbed, Tire Tracks	
1819-081	1/31/2019	18.8	7	17.5	*B. lindahli*	10s	no	SPHA larvae			
1819-081	2/7/2019	20.4	15	42	*Branchinecta* sp.	1s	no	Chir, SPHA larvae			Female only observed
1819-081	2/15/2019	19.5	20	162	None	n/a	no	Chir, SPHA larvae			
1819-081	3/1/2019	20.4	8	30	None	n/a	no	none			
1819-081	3/7/2019	25.1	7	30	None	n/a	no	PSHY Larvae			
1819-081	3/15/2019	18.9	8	20	None	n/a	no	none			
1819-081	3/21/2019	19	4	10	None	n/a	no	Ostr, Culi, Chir			
1819-082	3/1/2019		0		None				Road Rut		Dry
1819-083	12/13/2018	13.1	4.5	8	None	n/a	no	Dipt			
1819-083	12/20/2018	12.3	2	12	*B. lindahli*	1s	yes	none			
1819-083	12/28/2018	7	6.5	5	*Branchinecta* sp.	1s	no	none			One female observed
1819-083	1/3/2019	4.9	5	6.75	None	n/a	no	none			
1819-083	1/10/2019	10.3	3	15	*B. lindahli*	1s	no	no			
1819-083	1/18/2019	17.5	12	11.7	None	n/a	no	Coll			
1819-083	1/24/2019	14.1	8	26	*B. lindahli*	10s	no	none			
1819-083	1/31/2019	15.6	9.5	5.64	*B. lindahli*	1s	no	none	Road Rut	Disturbed, Tire Tracks	
1819-083	2/7/2019	13.1	5	12	None	n/a	no	none			
1819-083	2/15/2019	16	15	24	None	n/a	no	Nema, Chir			
1819-083	3/1/2019	20.1	14	45	None	n/a	no	none			
1819-083	3/7/2019	18.9	7	11	None	n/a	no	none			
1819-083	3/15/2019	15.5	14	10	None	n/a	no	none			
1819-083	3/21/2019	18	12	3	None	n/a	no	Clad, Coll			
1819-083	3/28/2019	24.2	4.5	2	None	n/a	no	Ostr			
1819-083	5/23/2019	19.8	7.5	16	None	n/a	no	n/a			
1819-083	5/30/2019	23.1	4	1	*B. lindahli*	1s	no	Clad			
1819-084	1/10/2019	14.3	5.5	16.5	*B. lindahli*	10s	yes	none	Road Rut	Disturbed, Tire Tracks	new pool, 1st voucher.
1819-084	1/18/2019	18.2	10	10	*B. lindahli*	100s	no	Coll			
1819-084	1/24/2019	16.3	6	27.6	*B. lindahli*	10s	no	Ostr			
1819-084	1/31/2019	17.8	10.5	13.5	*Branchinecta* sp.	10s	no	none			Females only present
1819-084	2/7/2019	14.2	10.3	7	*B. lindahli*	1s	no	none			
1819-084	2/15/2019	16.5	16	7.2	None	n/a	no	Ostr, Clad			
1819-084	3/1/2019	18.2	5	16	None	n/a	no	none			
1819-084	3/7/2019	21.1	9	56.25	None	n/a	no	none			
1819-084	3/15/2019	21.6	15	6	None	n/a	no	none			
1819-084	3/21/2019	19.2	7	4	None	n/a	no	Ostr, Coll			
1819-085	12/13/2018	27.6	8	30	*B. lindahli*	100s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-085	12/20/2018	20.1	5.5	25	*B. lindahli*	1000s	no	Coll			
1819-085	12/28/2018	17.1	5	1.8	*B. lindahli*	100s	no	none			
1819-085	1/3/2019	15.3	0.5	0.4	*B. lindahli*	10s	no	none			
1819-085	1/10/2019	17.1	7.5	18	None	n/a	no	none			
1819-085	1/18/2019	20.1	8	45	*B. lindahli*	10s	no	Coll			
1819-085	1/24/2019	17.2	8	35	*B. lindahli*	100s	no	none			
1819-085	1/31/2019	19.7	10	21	*B. lindahli*	10s	no	none			
1819-085	2/7/2019	18.1	15	20	*B. lindahli*	1s	no	Ostr, Nema			
1819-085	2/15/2019	18.7	18	22.5	*Branchinecta* sp.	1s	no	Ostr, Clad, Chir, Nema			Female only observed
1819-085	3/1/2019	16.7	12	60	None	n/a	no	none			
1819-085	3/7/2019	23.3	13	20	None	n/a	no	none			
1819-085	3/15/2019	20	10	16	None	n/a	no	none			
1819-085	3/21/2019	19.3	7	m	None	n/a	no	Ostr, Coll			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-086	12/13/2018	19.3	5	36	*B. lindahli*	1000s	yes	none	Road Rut	Disturbed, Tire Tracks	
1819-086	12/20/2018	19.3	4	21	*B. lindahli*	100s	no	none			
1819-086	12/28/2018	18.3	5	4	*B. lindahli*	100s	no	none			
1819-086	1/3/2019	16.3	2.5	0.6	*B. lindahli*	10s	no	Coll			
1819-086	1/10/2019	17.8	5	8.5	*B. lindahli*	100s	no	none			
1819-086	1/18/2019	19.6	10	10	*B. lindahli*	1s	no	Coll			
1819-086	1/24/2019	16.8	7.2	13.2	*B. lindahli*	1s	no	none			
1819-086	1/31/2019	18.2	4.3	8.4	*B. lindahli*	1s	no	none			
1819-086	2/7/2019	17.5	8.5	8.4	None	n/a	no	Clad, Coll			
1819-086	2/15/2019	17.1	8	8	*Branchinecta* sp.	10s	no	Ostr, Clad			Immatures
1819-086	3/1/2019	20.4	4	10	None	n/a	no	none			
1819-086	3/15/2019		6	2	None						Hydro Check Only
1819-086	3/21/2019	19.2	4	4	*B. lindahli*	10s	no	none			
1819-086	5/23/2019	22.1	7	12	None	n/a	no	n/a			
1819-086	5/30/2019	28.3	3	4	*B. lindahli*	100s	3 male/2 female	n/a			
1819-087	12/7/2018	17.8	30	75	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-087	12/13/2018	20.1	20	40	*B. lindahli*	1000s	yes	none			
1819-087	12/20/2018	17.2	15	21	*B. lindahli*	100s	no	none			
1819-087	12/28/2018	14.9	7	6	*B. lindahli*	100s	no	none			
1819-087	1/3/2019	5.7	7	12.5	*B. lindahli*	10s	no	Coll			
1819-087	1/10/2019	17.2	14	12.5	*Branchinecta* sp.	1s	no	none			only 2 females observed
1819-087	1/18/2019	18.1	20	9.9	*B. lindahli*	1s	no	SPHA egg masses			
1819-087	1/24/2019	16	40	30	*B. lindahli*	10s	no	none	Road Rut	Disturbed, Tire Tracks	
1819-087	1/31/2019	16.4	20	18	*B. lindahli*	100s	no	Clad, SPHA Larvae			
1819-087	2/7/2019	16.2	45	16	*B. lindahli*	10s	no	SPHA larvae			
1819-087	2/15/2019	15.2	60	21	None	n/a	no	SPHA Larvae			
1819-087	2/28/2019	23.2	36	24	None	n/a	no	SPHA Larvae			
1819-087	3/7/2019	18.3	41	24	None	n/a	no	PSHY Larvae			
1819-087	3/15/2019	14.3	30	16	None	n/a	no	none			
1819-087	3/21/2019	17.2	45	10	*Branchinecta* sp.	1s	no	Culi, Cole, Chir			females only observed
1819-087	3/28/2019	20.6	16	13.5	*B. lindahli*	1s	no	Ostr, Clad, Culi, Cole, Chir			
1819-087	4/3/2019	18.1	11	3.75	None	n/a	no	Ostr, Clad, Culi, Chir			
1819-087	4/10/2019	24.1	2	0.03	None	n/a	no	Ostr, Culi			
1819-087	5/30/2019	19.3	3	1	*B. lindahli*	100s	3 male/ 1 female	n/a			
1819-088	12/7/2018	21.7	11	35	None	n/a	no	none	Natural	Undist	
1819-088	12/13/2018	m	1	2.5	*Branchinecta* sp.	100s	no	none			Immatures
1819-088	1/18/2019	19	11	11	None	n/a	no	Coll			
1819-088	2/7/2019	19.5	11	4	None	n/a	no	Ostr, Plat, PSHY eggs			
1819-088	2/15/2019	19.3	15	60	*B. sandiegonensis*	100s	yes	Ostr, Cole, Plat, Chir, PSHY eggs			Merged with 1819-089
1819-088	2/28/2019	23.5	14	54	*B. sandiegonensis*	10s	yes	none			combined with 1819-089
1819-088	3/15/2019				None						combined with 1819-089
1819-088	3/21/2019	19	5	1.5	None	n/a	no	PSHY Larvae			
1819-088	3/28/2019	22.1	4	1	None	n/a	no	PSHY Larvae			
1819-089	12/7/2018	21.8	11.5	84	None	n/a	no	none	Natural	Undist	
1819-089	12/13/2018	m	0.5	2.5	*Branchinecta* sp.	100s	no	none			Immatures
1819-089	1/18/2019	19.1	11.5	16.25	None	n/a	no	PSHY egg masses			
1819-089	2/7/2019	19.3	13	21	None	n/a	no	PSHY eggs			
1819-089	2/15/2019	19.3	15	N/A	*B. sandiegonensis*	n/a	yes	Ostr, Cole, Plat, Chir, PSHY eggs			Merged with 1819-088
1819-089	2/28/2019	25.9	14	54	None	n/a	no	none			combined with 1819-088

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-089	3/15/2019	12.6	15	37.5	None	n/a	no	none			
1819-089	3/21/2019	19.4	8	4	None	n/a	no	Culi, PSHY Larvae			
1819-090	2/28/2019	23.1	10	150	*Branchinecta* sp.	1s	no	PSHY Larvae	Natural		Female only observed
1819-090	3/7/2019	18.8	15	56	None	n/a	no	Diptera, PSHY larvae			
1819-090	3/28/2019	20.6	13	100	None	n/a	no	Ostr, Culi, Cole, Chir, PSHY Larvae		Algal blooms	
1819-090	4/3/2019	19.8	17	64	None	n/a	no	Ostr, Culi, Cole, Gast, PSHY Larvae			
1819-090	4/10/2019	23.2	17	64	None	n/a	no	Ostr, Cole, Chir, PSHY Larvae			
1819-090	4/17/2019	19	15	36	None	n/a	no	Ostr, Cole, Coll, Chir, PSHY larvae			
1819-090	4/24/2019	30	16	36	None			Ostr, Culi, Cole, Chir, Gast, Anis, PSHY Larvae			
1819-090	5/1/2019	21.6	14	64	None	n/a	no	Cole, Chir, Anis, PSHY Larvae			
1819-090	5/8/2019	18	10	300	None	n/a	no	PSHY Larvae, Culi, Cole, Anis, Zygo, Chir, Cori			
1819-090	5/15/2019	22.24	7	10	None	n/a	no	Cole, Ephe, PSHY Larvae			Spring Fed
1819-090	5/23/2019	23.2	12	200	None	n/a	no	Culi, Cole, Ephe, PSHY Larvae			Spring fed?
1819-090	5/30/2019	23.5	4.5	0.05	None	n/a	no	Ostr, Cope, Clad, Coll			
1819-091	2/28/2019	22.5	14	49	None	n/a	no	none	Natural		
1819-091	3/7/2019	21.1	11	20	None	n/a	no	none			
1819-092	2/28/2019		91	120	*B. sandiegonensis*	10s	yes	none	Natural		
1819-092	3/15/2019	15.6	50	200	None	n/a	no	SPHA Larvae			
1819-092	3/21/2019	18.2	50	90	None	n/a	no	Ostr, Culi, PSHY Larvae			
1819-092	3/28/2019	22.4	36	125	None	n/a	no	Ostr, Cole, Chir, PSHY Larvae		algal blooms	
1819-092	4/3/2019	16.4	50	77	None	n/a	no	Ostr, Culi, Chir, PSHY Larvae			
1819-092	4/10/2019	17	35.5	52.5	None	n/a	no	Ostr, Culi, Cori, Chir, PSHY Larvae			
1819-092	4/17/2019	17.5	27	17.5	None	n/a	no	Ostr, Chir, PSHY/SPHA larvae			
1819-092	4/24/2019	29.6	2	0.75	None	n/a	no	Ostr, Noto, Chir, Epe, PSHY Larvae			
1819-093	12/7/2018	20.5	6.5	13.5	None	n/a	no	none	Natural	Undist	
1819-093	2/28/2019	24.7	8		*B. sandiegonensis*	1000s	yes	none			
1819-094	2/28/2019	20.9	75	240	*B. sandiegonensis*	1000s	yes	none	Natural		
1819-094	3/15/2019	14.5	50	120	None	n/a	no	PSHY Larvae			
1819-094	3/21/2019	17.3	150	120	None	n/a	no	PSHY Larvae		AB	
1819-094	3/28/2019	21.3	72	125	None	n/a	no	Ostr, Clad, Cori, Chir, PSHY/SPHA Larvae			
1819-094	4/3/2019	17	50	157.5	None	n/a	no	Ostr, Cole, Chir, PSHY/SPHA Larvae			
1819-094	4/10/2019	20.1	41	100	None	n/a	no	Ostr, Culi, Chir, PSHY Larvae			clawed frog present,
1819-094	4/17/2019	17.6	32	80	None	n/a	no	Cole, Cori, Chir, Ephe, PSHY/SPHA larave		algae	
1819-094	4/24/2019	28	211	37.5	None	n/a	no	Chir, Ephe, PSHY Larvae, XELA, Conc			
1819-094	5/1/2019	26.2	11	50	None	n/a	no	Noto, Chir, Ephe, Anis, PSHY Larvae, Conc			
1819-094	5/8/2019	18.5	17	72	None	n/a	no	PSHY Larvae, Cole, Anis, Zygo, Chir, Cori, Noto, Ephe			
1819-094	5/15/2019	27	7	9	None	n/a	no	Cole, Noto, Chir, Ephe, Anis, XELO larvae, Conch			
1819-095	12/7/2018	19	9	64	None	n/a	no	none	Natural	Undist	
1819-095	1/18/2019	18.9	5.5	0.6	None	n/a	no	none			
1819-095	2/28/2019	13.7	70	600	*B. sandiegonensis*	1000s	yes	none			
1819-095	3/15/2019	15.4	150	700	None	n/a	no	PSHY Larvae			
1819-095	3/21/2019	18.5	175	700	None	n/a	no	Ostr, Culi, SPHA Larvae		AB	
1819-095	3/28/2019	20.2	>50	675	None	n/a	no	Cole, Gast, Anis, SPHA Larvae		algal blooms	clawed frog larvae
1819-095	4/3/2019	17	50	296	None	n/a	no	Cole, Chir, PSHY Larvae		algal blooms	clawed frog larvae

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-095	4/10/2019	17.9	>50	320	None	n/a	no	Ostr, Clad, Cori, Coll, Chir, PSHY Larvae, Conc		algae	
1819-095	4/17/2019	15.7	42	175	None	n/a	no	Ostr, Clad, Culi, Cori, PSHY larvae		algae	
1819-095	4/24/2019	25	25	100	None	n/a	no	Noto, Chir, XELA		algae	
1819-096	2/28/2019	19.4	45	40	*B. sandiegonensis*	1000s	yes	none	Natural		
1819-096	3/21/2019	18.2	60	36	None	n/a	no	Cope, PSHY and SPHA Larvae		AB	
1819-096	3/28/2019	21.6	36	30	None	n/a	no	Culi, Chir, Anis, PSHY Larvae			
1819-096	4/3/2019	17.2	35	25	None	n/a	no	Anis, PSHY Larvae		algal blooms	
1819-096	4/10/2019	18.9	30	20	None	n/a	no	none			
1819-096	4/17/2019	17.1	26.5	2.5	None	n/a	no	Culi, Cole, Anis, PSHY larvae		algae	
1819-096	4/24/2019	28.1	20	15	None	n/a	no	Ole, Anis			
1819-096	5/1/2019	22.3	16	6	None	n/a	no	Culi, Chir, Ephe, Anis, PSHY Larvae			
1819-096	5/8/2019	18.4	8	6	None	n/a	no	PSHY Larvae, Cole, Anis, Zygo, Ephe		Algae	
1819-096	5/15/2019	26.1	5.5	1	None	n/a	no	Ephe, Anis			
1819-096	5/23/2019	21.6	4.7	1	None	n/a	no	Coll, Ephe, Anis			
1819-097	2/28/2019	22.2	40	90	*B. sandiegonensis*	1000s	yes	none	Natural		
1819-097	3/7/2019	19.7	45	154	None	n/a	no	PSHY and SPHA larvae			
1819-097	3/21/2019	19.6	100	see map	None	n/a	no	Ostr, Clad, Culi, Cole, PSHY Larvae		AB	
1819-097	3/28/2019	20.4	58	108	None	n/a	no	Culi, Cole, Chir, Anis, PSHY Larvae			
1819-097	4/3/2019	17.1	41	48	None	n/a	no	Cole, Chir, Anis, PSHY Larvae		algal blooms	
1819-097	4/10/2019	18	39	50	None	n/a	no	Cori, Chir, Anis, PSHY Larvae			
1819-097	4/17/2019	16.5	30	40	None	n/a	no	PSHY/SPHA Larvae		algae	
1819-097	4/24/2019	27.7	20	28	None	n/a	no	Coll, Noto, Coll, PSHY Larvae			
1819-097	5/1/2019	22.5	11.8	15	None	n/a	no	Noto, Anis, PSHY Larvae			
1819-098	12/7/2018	15.6	17	189	None	n/a	no	none	Natural	Undist	
1819-098	12/13/2018	20.1	15	72	*Branchinecta* sp.	n/a	no	PSHY eggs			Immatures
1819-098	12/20/2018	20	8	50	*B. sandiegonensis*	1000s	yes	none			
1819-098	1/18/2019	19.3	15	61	None	n/a	no	PSHY egg masses			
1819-098	2/28/2019	21.1	28	120	*B. sandiegonensis*	1000s	yes	PSHY Larvae			
1819-098	3/15/2019	14.2	22	585	None	n/a	no	PSHY and SPHA larvae			
1819-098	3/21/2019	18.6	20	24	None	n/a	no	Clad, Culi, SPHA Larvae		AB	
1819-098	3/28/2019	22.4	25	54	None	n/a	no	Ostr, Anis, PSHY Larvae			
1819-098	4/3/2019	17.6	26	12	None			PSHY Larvae			
1819-098	4/10/2019	17.8	7	5	None	n/a	no	Cole, PSHY Larvae			
1819-099	12/7/2018	18.3	16	180	None	n/a	no	none	Natural	Undist	
1819-099	1/18/2019	19	15	236	None	n/a	no	none			
1819-099	2/28/2019	20.5	75	120	None	n/a	no	none			
1819-099	3/7/2019	19	17	28	*B. sandiegonensis*	1000s	yes	PSHY and SPHA larvae			
1819-100	12/7/2018	15.3	30	297	None	n/a	no	none	Natural	Undist	
1819-100	12/13/2018	22.2	4	2	*Branchinecta* sp.	n/a	no	none			Immatures
1819-100	1/18/2019	19.5	9	3.6	None	n/a	no	none			
1819-100	2/28/2019	21.7	35	60	*B. sandiegonensis*	1000s	yes	none			
1819-100	3/15/2019	12.6	30	280	None	n/a	no	none			
1819-100	3/21/2019	18.8	20	75	None	n/a	no	Culi, Plat, Chir, Plat, PSHY Larvae			
1819-100	3/28/2019	19.9	23	300	None	n/a	no	Culi, Cole, Gast, Anis, PSHY Larvae			
1819-100	4/3/2019	17.2	19	30	None	n/a	no	Gast, Anis, PSHY Larvae			
1819-100	4/10/2019	15.9	14	35	None	n/a	no	Culi, Cole, Gast, Anis, PSHY Larvae			
1819-101	2/28/2019	19.9	42	80	None	n/a	no	PSHY and SPHA larvae	Natural		
1819-101	3/7/2019	20.1	30	30	None	n/a	no	PSHY and SPHA larvae			
1819-101	3/15/2019	13.2	21	25	None	n/a	no	PSHY and SPHA larvae			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-101	3/21/2019	19.4	30	3	None	n/a	no	Ostr, Clad, PSHY Larvae			
1819-101	3/28/2019	19.1	21.5	6	None	n/a	no	Ostr, Clad, Dipt, Cole, PSHY Larvae			
1819-101	4/3/2019	16.5	11	6	None	n/a	no	Cole, Coll, PSHY Larvae			
1819-102	2/28/2019	16.9	27	30	*B. sandiegonensis*	100s	yes	none	Natural		
1819-102	3/15/2019	14		12	None	n/a	no	PSHY and SPHA larvae			
1819-102	3/21/2019	22	8	2	None	n/a	no	Clad, PSHY Larvae, Anis			
1819-103	12/7/2018	19.4	16	105	None	n/a	no	none	Natural	Undist	
1819-103	12/13/2018	21.7	6.5	9	*Branchinecta* sp.	n/a	no	Osra, Cope, Clad			Immatures
1819-103	1/18/2019	19.6	11	92	None	n/a	no	none			
1819-103	2/28/2019	22.2	20	80	*B. sandiegonensis*	1000s	yes	none			
1819-103	3/15/2019	16.2	14	24	None	n/a	no	PSHY and SPHA larvae			
1819-104	2/28/2019	19.3	25	60	*B. sandiegonensis*	1000s	yes	none	Natural		
1819-104	3/15/2019	16.1	13	6	None	n/a	no	SPHA Larvae			
1819-105	2/28/2019	18.6	17	12	*B. sandiegonensis*	100s	yes	none	Natural		
1819-105	3/15/2019	14.6	13	3	*B. sandiegonensis*	10s	no	none			
1819-105	3/21/2019	24.6	6	1	None	n/a	no	Ostr, Clad			
1819-106	2/28/2019	18	14	48	None	n/a	no	none	Natural		
1819-106	3/7/2019	19.3	30	84	None	n/a	no	Diptera			
1819-106	3/15/2019	17.7	30	48	None	n/a	no	none			
1819-106	3/21/2019	20.5	8	4.5	None	n/a	no	Ostr, Culi			
1819-106	3/28/2019	18.9	28	72	None	n/a	no	Ostr, Culi, Cole, PSHY Larvae			
1819-106	4/3/2019	15.9	30	35	None	n/a	no	Ostr, Culi			
1819-106	4/10/2019	15.5	17.5	12	None	n/a	no	Ostr, Culi, Cole, Anis, PSHY Larvae			
1819-106	4/17/2019	17.2	11	4.5	None	n/a	no	Ostr, Cole, Chir, Anis, PSHY larve		algae	
1819-107	2/28/2019	16.3	45	10	None	n/a	no	none	Natural		
1819-107	3/7/2019	17.4	60	48	None	n/a	no	Diptera, PSHY larvae			
1819-107	3/15/2019	12.8	50	10	None	n/a	no	none			
1819-107	3/21/2019	17.4	100	10	None	n/a	no	Ostr, Clad, Culi, Cole, Gast, PSHY Larvae			
1819-107	3/28/2019	17.4	43	10	None	n/a	no	Ostr, Culi, Cole, Gast		algal blooms	
1819-107	4/3/2019	16.2	37	15	None	n/a	no	Ostr, Culi, Cole, Gast, PSHY Larvae, Hydr			
1819-107	4/10/2019	15.1	35.5	5.25	None	n/a	no	Ostr, Cope, Culi, Cole, Gast, Anis, Hydr			
1819-107	4/17/2019	14.5	27	7.5	None	n/a	no	Culi, Cole, Gast, Anis, PSHY Larvae		algae	
1819-107	4/24/2019	25.8	18	2.5	None	n/a	no	Culi, Cole, Coll, Gast, ANBO			
1819-107	5/1/2019	29.8	10	1.125	None	n/a	no	Cope, Culi, Cole, Coll, Gast, Anis, PSHY Larvae			
1819-107	5/8/2019	18.1	8	1	None	n/a	no	PSHY Larvae, Culi, Cole, Gast		Algae	
1819-109	2/28/2019	19.8	31	400	None	n/a	no	SPHA Larvae	Natural		
1819-109	3/7/2019	19.5	50		None	n/a	no	PSHY Larvae			
1819-109	3/15/2019	13.7	36	500	None	n/a	no	none			
1819-109	3/21/2019	19.1	45	60	None	n/a	no	Culi, PSHY Larvae			
1819-109	3/28/2019	21.8	29	550	None	n/a	no	Ostr, Culi, Cole, Gast, Anis		algal blooms	
1819-109	4/3/2019	17.7	29	270	None	n/a	no	Culi, Gast, Anis, PSHY Larvae			clawed frog larvae
1819-109	4/10/2019	16.4	27	250	None	n/a	no	Culi, Cole, Chir, Gast, Zygo, PSHY Larvae,			clawed frog present
1819-109	4/17/2019	13.5	23	140	None	n/a	no	Gast, PSHY		algae	clawed frog
1819-109	4/24/2019	23.5	16	140	None	n/a	no	Cole, Gast, Anis, PSHY Larve			
1819-109	5/1/2019	26.1	14	16	None	n/a	no	Culi, Cole, Ephe, PSHY Larvae, XELA			
1819-109	5/8/2019	17.1	8	40	None	n/a	no	PSHY Larave, Cole, Gast, Anis		Algae	
1819-109	5/15/2019	24.5	8.5	30	None	n/a	no	Culi, Gast, Anis, PSHY Larvae			tail area?

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-109	5/23/2019	18.9	9	24	None	n/a	no	Culi, Gast, Anis, PSHY Larvae			
1819-109	5/30/2019	19.4	8	6	None	n/a	no	Culi, Gole, Gast, Anis, PSHY Larvae			
1819-110	3/7/2019	21.3	12	56.25	None	n/a	no	none	Natural		
1819-110	3/15/2019	15.1	11	0.5625	None	n/a	no	none			
1819-111	2/28/2019	18.5	15	4	None	n/a	no	none	Natural		
1819-111	2/28/2019	17.5	23	36	None	n/a	no	none			
1819-111	3/7/2019	18.9	21	52	None	n/a	no	PSHY Larvae			
1819-111	3/15/2019	12.9	21	36	None	n/a	no	none			
1819-111	3/21/2019	23	25	30	None	n/a	no	Ostr, Cope, Clad, PSHY and ANBO Larvae			
1819-111	3/28/2019	18.8	16	30	None	n/a	no	Ostr, Culi, Anis, PSHY Larvae		algal blooms	
1819-111	4/3/2019	16.8	15	9	None	n/a	no	Culi, Chir, Anis, PSHY Larvae			
1819-111	4/10/2019	13.9	13	6	None	n/a	no	Coll, Chir, Anis, PSHY Larvae			
1819-111	4/17/2019	12.2	10	5	None	n/a	no	Anis, PSHY Larvae		algae	
1819-112	2/28/2019	20.5	21	72	*B. sandiegonensis*	1000s	yes	PSHY Larvae			combination of 2013-37 and 2013-39
1819-112	3/15/2019	14.6	19	60	None	n/a	no	PSHY and SPHA larvae			
1819-112	3/21/2019	22.2	15	17.5	None	n/a	no	Ostr, Clad, Ephe, SPHA Larvae			
1819-112a	12/7/2018	17.1	20	162	None	n/a	no	none	Natural	Undist	
1819-112a	12/13/2018	20	15	162	*Branchinecta* sp.	n/a	no	Cope			Immatures, 2013-37
1819-112a	12/20/2018	21.6	6	18	*B. sandiegonensis*	1000s	yes	Ostr, Plat			2013-37
1819-112a	12/28/2018	19.4	19.4	0.3	*B. sandiegonensis*	10s	no	Ostr, Plat			2013-37
1819-112a	1/18/2019	18.7	18	6.75	*Branchinecta* sp.	n/a	no	Ostr, Plat			Nauplii present, 2013-37
1819-112b	12/7/2018	18.3	32	264	None	n/a	no	none	Natural	Undist	2013-39
1819-112b	12/13/2018	m	20	48	*Branchinecta* sp.	n/a	no	Cope			Immatures, complex of 2 features, 2013-39
1819-112b	12/20/2018	20.7	15	40	*B. sandiegonensis*	1000s	yes	Ostr, Plat			**2013-39**
1819-112b	12/28/2018	17.1	17.1	8	*B. sandiegonensis*	1000s	no	Ostr, Plat			2013-39
1819-112b	1/18/2019	19.3	22	10.8	None	n/a	no	Ostr, Plat			2013-39
1819-113	2/28/2019	20.8	30	32	*B. sandiegonensis*	1000s	yes	PSHY Larvae	Natural		
1819-113	3/15/2019	15.7	20	18	None	n/a	no	SPHA Larvae			
1819-113	3/21/2019	21.5	25	12	None	n/a	no	Ostr, Clad, Culi, PSHY and SPHA Larvae			
1819-113	3/28/2019	22.8	11	10	None	n/a	no	PSHY/SPHA Larvae		algal blooms	
1819-114	2/28/2019	20.4	75	35	*B. sandiegonensis*	1000s	yes	none	Natural		
1819-114	3/15/2019	13.8	50	28	None	n/a	no	SPHA Larvae			
1819-114	3/21/2019	23	100	30	None	n/a	no	Ostr, Culi, Plat, SPHA Larvae			
1819-114	3/28/2019	20.5	35.5	21	None	n/a	no	Culi, cole, SPHA Larvae		algal blooms	clawed frog larvae
1819-114	4/3/2019	17.8	29.5	15	None	n/a	no	Cole, Anis, PSHY Larvae		algal blooms	clawed frog larvae
1819-114	4/10/2019	18	23	15	None	n/a	no	Cole, PSHY Larvae			
1819-114	4/17/2019	17.2	10	12.25	None	n/a	no	Cole, Zygo, Anis, PSHY larvae			
1819-115	2/28/2019	24.1	20	425	*B. sandiegonensis*	1000s	yes	none	Natural		
1819-115	3/15/2019	16.7	14	105	*Branchinecta* sp.	10s	no	SPHA Larvae			females only observed
1819-115	3/21/2019	25.4	2	0.5	None	n/a	no	Culi, Anis, SPHA Larvae			
1819-115	3/28/2019	20.5	7	37.5	None	n/a	no	Ostr, Culi, Cole, Chir, PSHY Larvae			
1819-116	12/7/2018	21.4	12	25	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures, Complex of two pools
1819-116	12/13/2018	20.7	3.5	2	*B. lindahli*	10	yes	none			
1819-116	1/10/2019	19.7	6	7.5	None	n/a	no	Coll			Complex of 2 features
1819-116	1/18/2019	19.4	13.5	4.5	*B. lindahli*	100s	no	none			complex of 2 features
1819-116	1/24/2019	18.3	8.5	7.5	*B. lindahli*	100s	no	none			
1819-116	2/7/2019	18.2	9	12	*Branchinecta* sp.	100s	no	none			immatures
1819-116	2/15/2019	19.4	15	5	*B. lindahli*	1000s	no	none			
1819-116	3/7/2019	25	7	5	*B. lindahli*	10s	no	none			
1819-116	3/15/2019	18.5	9.5	2	*B. lindahli*	10s	yes	none			unknown sprimp collected

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-116	3/21/2019	25.9	2	0.5	*Branchinecta* sp.	10s	no	Ostr, Clad			Immatures
1819-117	5/23/2019	21.6	10	3.74	None	n/a	no	n/a			
1819-118	12/7/2018	17.9	38	360	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures, Complex of two pools
1819-118	12/13/2018	18.4	45	336	*Branchinecta* sp.	1000s	no	Coll			Immatures
1819-118	12/20/2018	15.1	45	280	*B. lindahli*	1000s	yes	Dipt, Coll, Noto			
1819-118	12/28/2018	15.1	52	90	*B. lindahli*	1000s	no	Hydr, Coll			Complex of two pools
1819-118	1/3/2019	16.7	35	189	*B. lindahli*	1000s	no	Hydr, Culi			Complex of two pools
1819-118	1/10/2019	19.7	45	96	*B. lindahli*	1000s	no	Coll			Field ID
1819-118	1/18/2019	19.7	50	125	*B. lindahli*	100s	no	Cope, Dipt, Culi, Noto, Coll, SPHA egg masses			
1819-118	1/24/2019	13.9	50	90	*B. lindahli*	100s	no	Chir, SPHA Larvae/eggs			complex of 2 features
1819-118	1/31/2019	16	50	108.1	*B. lindahli*	1000s	no	SPHA larvae			
1819-118	2/7/2019	16.9	100	100	*B. lindahli*	10s	no	none			
1819-118	2/15/2019	17.2	100	100	None	n/a	no	SPHA Larvae			
1819-118	3/1/2019	17.5	50	84	None	n/a	no	SPHA Larvae			combined with 1819-119
1819-118	3/7/2019	22.7	30	48	None	n/a	no	SPHA Larvae			
1819-118	3/15/2019	18.1	50	60	None	n/a	no	none			
1819-118	3/21/2019	21.5	50	45	None	n/a	no	Clad, Chir, SPHA Larvae			
1819-118	3/28/2019	20.8		50	None	n/a	no	Ostr, Clad, Chir, Cori			
1819-118	4/3/2019	19.4	42	20	None	n/a	no	Cori, Chir			
1819-118	4/10/2019	22.3	27	20	None	n/a	no	Chir			
1819-118	4/17/2019	19.5	5	7.5	None	n/a	no	Cole			
1819-118	5/23/2019	21.3	20	28	None	n/a	no	n/a			
1819-118	5/30/2019	21.8	9	7.5	*B. lindahli*	100s	3 male/2 female	Noto			
1819-119	3/7/2019	23.3	15	18	None	n/a	no	none	Road Rut		
1819-119	3/15/2019	17.5	20	10	None	n/a	no	none			
1819-119	3/21/2019	23.5	18	8	None	n/a	no	Ostr, Clad			
1819-119	3/28/2019	22.4	14	17.5	None	n/a	no	Clad, Chir			
1819-119	4/3/2019	19.2	17.5	10	None	n/a	no	Clad, Cori			
1819-119	4/10/2019	24.4	12	1.25	None	n/a	no	Clad, Cole			
1819-119	4/17/2019	21.4	3.5	2	None	n/a	no	Ostr, Clad, Cori			
1819-119	5/23/2019	24	8	5	None	n/a	no	n/a			
1819-119	5/30/2019	22.9	2.5	0.25	*B. lindahli*	100s	3 male/2 female	n/a			
1819-120	12/7/2018	19.5	16	175	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures, Complex of two pools
1819-120	12/13/2018	19	20	135	*B. lindahli*	1000s	yes	none			complex of 2 pools
1819-120	12/20/2018	18	8.5	85.5	*B. lindahli*	1000s	no	none			
1819-120	12/28/2018	16.7	20	30	*B. lindahli*	1000s	no	Hydr, Coll			
1819-120	1/3/2019	16.4	9	12	*B. lindahli*	10s	no	Ostr, Hydr, Coll			
1819-120	1/10/2019	20.8	15	18	None	n/a	no	Hydr, Coll			
1819-120	1/18/2019	20.1	40	15	*B. lindahli*	1000s	no	none			Immatures present
1819-120	1/24/2019	17.5	28	25	*B. lindahli*	1000s	no	none			complex of 2 features
1819-120	1/31/2019	17.1	16	17.1	*B. lindahli*	1000s	no	Cole, Cope			
1819-120	2/7/2019	17.5	25	45	*B. lindahli*	10s	no	Culi			
1819-120	2/15/2019	18.6	35	39	*B. lindahli*	1s	no	none			
1819-120	3/1/2019	18.9	14	40	*B. lindahli*	100s	no	PSHY Larvae			
1819-120	3/7/2019	24.2	25	32	None	n/a	no	SPHA Larvae			
1819-120	3/15/2019	19.9	25	22	None	n/a	no	SPHA Larvae			
1819-120	3/21/2019	24.1	15	12	None	n/a	no	Ostr, SPHA larvae			
1819-120	3/28/2019	24.4	11	8	None	n/a	no	Clad, Gast, SPHA Larvae			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-120	4/3/2019	20.7	3	1.25	None	n/a	no	Ostr, Clad, PSHY Larvae			
1819-120	5/23/2019	22.2	11.5	3.5	None	n/a	no	n/a			
1819-120	5/30/2019	24.2	2	1.5	*B. lindahli*	100s	3 male/2 female	n/a			
1819-121	12/7/2018	20	18	220	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-121	12/13/2018	17.5	20	88	*B. lindahli*	1000s	yes	Coll			
1819-121	12/20/2018	20	18	67.5	*B. lindahli*	1000s	no	none			
1819-121	12/28/2018	17.8	12.5	7	*B. lindahli*	1000s	no	Hydr, Coll			
1819-121	1/3/2019	16.9	9	18	*B. lindahli*	100s	no	Ostr, Coll			
1819-121	1/10/2019	19.5	19	45	*Branchinecta* sp.	1s	no	Coll			One female observed
1819-121	1/18/2019	20	27	30	*B. lindahli*	1000s	no	none			
1819-121	1/24/2019	17.9	16	35	*B. lindahli*	100s	no	none			
1819-121	1/31/2019	18.4	10	17.02	*B. lindahli*	1000s	no	none			
1819-121	2/7/2019	17.6	17	42	*B. lindahli*	100s	no	none			receiveing flow from hillside
1819-121	2/15/2019	15.6	25	30.25	*B. lindahli*	1s	no	none			
1819-121	3/1/2019	16.8	30	42	None	n/a	no	PSHY Larvae			
1819-121	3/7/2019	24.5	30	35	*B. lindahli*	10s	no	none			
1819-121	3/15/2019	19.6	15	20	None	n/a	no	none			
1819-121	3/21/2019	23.5	15	8	None	n/a	no	Clad, SPHA Larvae			
1819-121	5/23/2019	21.8	19	30	None	n/a	no	n/a			
1819-121	5/30/2019	23.9	6	10	*B. lindahli*	100s	3 male/2 female	Cole			
1819-122	12/7/2018	18.7	20	231	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-122	12/13/2018	18.3	18	126	*B. lindahli*	1000s	yes	none			
1819-122	12/20/2018	19.9	10	88	*B. lindahli*	1000s	no	none			
1819-122	12/28/2018	17	13	7	*B. lindahli*	1000s	no	none			
1819-122	1/3/2019	16.2	4	10	*B. lindahli*	1s	no	Clad, Culi			
1819-122	1/10/2019	20.5	15	28	None	n/a	no	Coll			
1819-122	1/18/2019	20.4	25	31.5	*B. lindahli*	1000s	no	none			
1819-122	1/24/2019	18.3	20	48	*B. lindahli*	1000s	no	none			
1819-122	1/31/2019	18.6	8	24	*B. lindahli*	1000s	no	none			
1819-122	2/7/2019	17.9	15	24	*B. lindahli*	10s	no	none			
1819-122	2/15/2019	16.9	18	63	*B. lindahli*	100s	no	none			
1819-122	3/1/2019	21.1	20	54	*B. lindahli*	100s	no	none			
1819-122	3/7/2019	24.4	20	35	*B. lindahli*	10s	no	none			
1819-122	3/15/2019	18	20	24	*B. lindahli*	10s	no	none			
1819-122	3/21/2019	23.7	8	5.25	None	n/a	no	Ostr, Clad			
1819-122	5/23/2019	22.3	14	13.5	None	n/a	no	n/a			
1819-122	5/30/2019	24.8	3.5	0.375	*B. lindahli*	10s	no	n/a			Several shrimp observed dying in adjacent drying mud pool
1819-123	3/1/2019	21.8	20	110	None	n/a	no	SPHA Larvae	Road Rut		
1819-123	3/7/2019	22.6	15	27	None	n/a	no	SPHA Larvae			
1819-123	3/15/2019	19.5	18	30	None	n/a	no	none			algal bloom
1819-123	3/21/2019	m	15	17.5	None	n/a	no	Ostr, Culi, Chir, Coll			
1819-123	3/28/2019	26.7	5	7	None	n/a	no	Ostr, Cole, Chir			
1819-123	5/23/2019	24	11	10.5	None	n/a	no	n/a			
1819-124	12/7/2018	21.2	6	140	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-124	12/13/2018	19.8	5	125	*B. lindahli*	1000s	yes	Coll			
1819-124	12/20/2018	19.5	4.5	11	*B. lindahli*	1000s	no	Coll			
1819-124	12/28/2018	18.1	5	8	*B. lindahli*	100s	no	Hydr, Coll			
1819-124	1/10/2019	20.6	7	30	None	n/a	no	Coll			
1819-124	1/18/2019	20.3	13	18	*Branchinecta* sp.	1000s	no	Coll			Immatures present

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-124	1/24/2019	19.4	6.5	25.5	*B. lindahli*	100s	no	none			
1819-124	1/31/2019	18.2	3.5	4.2	*B. lindahli*	100s	no	Coll			
1819-124	2/7/2019	18.7	8	30	*B. lindahli*	100s	no	Chiro			Immatures present
1819-124	2/15/2019	16.8	15	N/A	*B. lindahli*	100s	no	none			
1819-124	3/1/2019	20.6	10	75	*B. lindahli*	10s	no	none			
1819-124	3/15/2019	17.3	9	20	None	n/a	no	none			
1819-124	3/21/2019	23.6	5	10.5	None	n/a	no	Ostr, Culi, Coll			
1819-124	3/28/2019	27.3	4	2.5	None	n/a	no	Ostr, Clad,Cole, Chir			
1819-124	5/23/2019	20.4	4	6	None	n/a	no	n/a			
1819-125	12/7/2018	20.7	9	21	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-125	12/13/2018	19.4	6	10	*B. lindahli*	1000s	yes	none			
1819-125	12/20/2018	20.3	2.5	4.5	*B. lindahli*	100s	no	Dipt			
1819-125	12/28/2018	17.6	2	0.3	None	n/a	no	Culi			
1819-125	1/10/2019	20.7	8	6.3	None	n/a	no	Coll			
1819-125	1/18/2019	19.1	7	2.2	*Branchinecta* sp.	100s	no	Coll			Immatures present
1819-125	1/24/2019	18.6	7.5	4.5	*Branchinecta* sp.	n/a	no	none			Immatures present
1819-125	1/31/2019	17.6	3.5	1.54	*B. lindahli*	100s	no	Ostr			
1819-125	2/7/2019	18.4	8	8	*B. lindahli*	10s	no	none			Flowing into T-15, receiving flow from T-12
1819-125	2/15/2019	16.8	15	44	*B. lindahli*	100s	no	none			
1819-125	3/1/2019	24.1	10	8	None	n/a	no	none			
1819-125	3/7/2019	24.7	12	57.5	*B. lindahli*	100s	no	none			combined with 1819-124
1819-125	3/15/2019	18.4	10	3	None	n/a	no	none			
1819-125	3/21/2019	23.7	7	3	None	n/a	no	Ostr, Clad, Coll			
1819-125	5/23/2019	20.2	7.5	1.75	None	n/a	no				
1819-126	12/7/2018	19.4	16	235	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-126	12/13/2018	19.4	12	44	*B. lindahli*	1000s	yes	Coll			
1819-126	12/20/2018	18.3	11	48	*B. lindahli*	1000s	no	none			complex of 2 features
1819-126	12/28/2018	18.6	12	7.5	*B. sandiegonensis, B. lindahli*	1000s	yes	none			second voucher collected with new species.
1819-126	1/3/2019	16.8	7.5	14	*B. lindahli*	10s	no	Ostr, Clad, Hydr, Coll			looked at several males, no B. sand.
1819-126	1/10/2019	21	8	14.25	*B. lindahli*	1s	no	none			
1819-126	1/18/2019	19.8	8	18	*B. lindahli*	10s	no	none			
1819-126	1/24/2019	18.9	20	57	*B. lindahli*	1000s	no	Clad			
1819-126	1/31/2019	18.4	13.5	20	*B. lindahli*	100s	no	Ostr, Clad			
1819-126	2/7/2019	17.5	16	60	*B. lindahli*	10s	no	none			
1819-126	2/15/2019	16.9	15	54	*Branchinecta* sp.	1s	no	none			Female only observed
1819-126	3/1/2019	22.5	12	30	None	n/a	no	none			
1819-126	3/15/2019	18.7	10	13	None	n/a	no	none			
1819-126	3/21/2019	22.9	10	11.25	None	n/a	no	Ostr, Clad, Culi			
1819-126	3/28/2019	26.5	7	8	None	n/a	no	Ostr, Cole			
1819-127	12/7/2018	20.1	8	90	None	n/a	no	none	Natural	Disturbed, Tire Tracks	
1819-127	1/18/2019	20.6	12	8	None	n/a	no	none			
1819-127	1/24/2019	19.7	4	11	*B. lindahli*	10s	yes	none			
1819-127	2/7/2019	17.2	11	22.5	None	n/a	no	none			
1819-127	2/15/2019	16.8	15	4.2	None	n/a	no	Ostr			
1819-127	3/1/2019	21.6	9	22.5	None	n/a	no	none			
1819-127	3/7/2019	20.9	12	11	None	n/a	no	PSHY Larvae			
1819-127	3/15/2019	19.8	10	4.5	None	n/a	no	none			
1819-127	3/21/2019	24.1	4	3.5	None	n/a	no	Ostr, Culi, Cole, Gast, PSHY Larvae			
1819-128	12/7/2018	20	25	180	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-128	12/13/2018	19.8	30	162	*B. lindahli*	1000s	yes	Coll			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-128	12/20/2018	19.7	20	100	*B. lindahli*	1000s	no	Coll			
1819-128	12/28/2018	19.2	22	60	*B. lindahli*	1000s	no	Hydr, Clad			
1819-128	1/3/2019	15.7	12	48	*B. lindahli*	100s	no	Ostr, Coll			
1819-128	1/10/2019	20.9	13	19	*B. lindahli*	1s	no	Hydr, Coll			Field ID
1819-128	1/18/2019	20.4	26	22.4	*B. lindahli*	1s	no	Cope, Clad, Coll		AB	new cohort established
1819-128	1/24/2019	18.7	30	52	*B. lindahli*	100s	no	Clad			
1819-128	1/31/2019	17.9	20	54	*B. lindahli*	100s	no	Ostr, Clad, Coll, Chir			
1819-128	2/7/2019	18.4	30	60	*B. lindahli*	1s	no	Coll			
1819-128	2/15/2019	17.3	45	N/A	None	n/a	no	none			
1819-128	3/1/2019	19.6	12	52.5	None	n/a	no	none			combined with T-10
1819-128	3/7/2019	22.2	25	84	None	n/a	no	none			combined with 1819-129
1819-128	3/15/2019	17.1	25	20	None	n/a	no	none			
1819-128	3/21/2019	19.7	40	17.5	None	n/a	no	Ostr, Clad,			
1819-128	3/28/2019	25.1	13	9	None	n/a	no	Ostr			
1819-128	4/3/2019	21.2	10	5	None	n/a	no	Ostr, Clad, Cole			
1819-128	4/10/2019	25.5	0	0.5	None	n/a	no	Ostr, Clad			
1819-128	5/23/2019	20.8	6	4	None	n/a	no	n/a			
1819-129	12/7/2018	19.7	9	60	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-129	12/13/2018	18.1	4.5	16	*B. lindahli*	100s	yes	Coll			
1819-129	12/20/2018	20.2	2.5	9	*B. lindahli*	10s	no	Coll			
1819-129	12/28/2018	17.1	4	1.75	*B. lindahli*	1000s	no	Hydr, Coll			
1819-129	1/3/2019	15.8	1	0.28	None	n/a	no	Ostr, Cope, Clad			
1819-129	1/10/2019	21	5	7.5	None	n/a	no	Coll			
1819-129	1/18/2019	20.5	10.5	9	*B. lindahli*	100s	no	Coll			
1819-129	1/24/2019	18.6	9.5	10.2	*B. lindahli*	100s	no	none			
1819-129	1/31/2019	18.7	6.5	7.95	*B. lindahli*	100s	no	none			
1819-129	2/7/2019	18.5	8	5	*B. lindahli*	1s	no	Coll			
1819-129	2/15/2019	17.3	45	115	None	n/a	no	none			hydrologically connected to T-12, 13,14, 15
1819-129	3/1/2019	19.9	9	9	None	n/a	no	none			Combined with T-11
1819-129	3/15/2019	20.8	10	3	None	n/a	no	none			
1819-129	3/21/2019	24.1	10	3	None	n/a	no	Ostr, Clad			
1819-129	5/23/2019	20.1	5	1.2	None	n/a	no	n/a			
1819-130	12/7/2018	21.2	12	315	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-130	12/13/2018	18.4	11	175	*B. lindahli*	1000s	yes	none			
1819-130	12/20/2018	20.1	6	175	*B. lindahli*	1000s	no	none			
1819-130	12/28/2018	16.1	8	37.5	*B. lindahli*	1000s	no	none			Complex of 3 ruts
1819-130	1/3/2019	16.2	5.5	60	*B. lindahli*	1000s	no	Ostr, Hydr, Coll			
1819-130	1/10/2019	19.6	8.5	40	*B. lindahli*	100s	no	Coll			Complex of 3 features
1819-130	1/18/2019	19.9	10	57.6	*B. lindahli*	100s	no	none			
1819-130	1/24/2019	19	15	85	*B. lindahli*	10s	no	none			
1819-130	1/31/2019	18.1	15	15	*B. lindahli*	10s	no	Clad, Chir			
1819-130	2/7/2019	17.5	18	45	None	n/a	no	Nema			
1819-130	2/15/2019	16.7	20	90	None	n/a	no	Chir			
1819-130	3/1/2019	22.8	15	60	None	n/a	no	none			
1819-130	3/7/2019	22.6	17	40	None	n/a	no	none			
1819-130	3/15/2019	17.7	20	13.75	None	n/a	no	none			
1819-130	3/21/2019	24	10	11.25	None	n/a	no	Ostr, Clad			
1819-130	3/28/2019	22.5	14	17.5	None	n/a	no	Ostr			
1819-130	5/23/2019	19.8	6	1.3	None	n/a	no	n/a			
1819-131	12/7/2018	21.3	8	50	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-131	12/13/2018	20.4	4	6	*B. lindahli*	100s	yes	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-131	1/10/2019	20	5	5	None	n/a	no	Coll			
1819-131	1/18/2019	20.1	5.3	5.6	*B. lindahli*	1000s	no	Ostr, Clad			
1819-131	1/24/2019	19.4	4	9	*B. lindahli*	100s	no	Chir			
1819-131	2/7/2019	19.3	8	7.5	None	n/a	no	Chir			
1819-131	2/15/2019	16.8	10	22.5	None	n/a	no	Chir			
1819-131	3/1/2019	19.2	20	18	None	n/a	no	none			
1819-131	3/7/2019	20.7	12	18	None	n/a	no	none			
1819-131	3/21/2019	22.7	5	3	None	n/a	no	Ostr, Clad, Culi, Cole			
1819-131	3/28/2019	24.2	6	1.5	None	n/a	no	Ostr, Culi			
1819-132	12/7/2018	22.5	22	72	*Branchinecta* sp.	n/a	no	none	Road Rut	Disturbed, Tire Tracks	Immatures
1819-132	12/13/2018	19.5	20	72	*B. lindahli*	1000s	yes	none			
1819-132	12/20/2018	18.9	6	30	*B. lindahli*	1000s	no	Coll			
1819-132	12/28/2018	18.5	8.5	10.5	*B. lindahli*	100s	no	none			
1819-132	1/3/2019	16.4	3.5	10.5	*B. lindahli*	10s	no	Clad, Coll			
1819-132	1/10/2019	17	18	22.5	*B. lindahli*	100s	no	no			
1819-132	1/18/2019	19.2	25	9	*B. lindahli*	10s	no	none			
1819-132	1/24/2019	18.9	25	49	*B. lindahli*	10s	no	none			
1819-132	1/31/2019	19	18	10.5	*B. lindahli*	1s	no	Ostr, Cope			
1819-132	2/7/2019	15.6	25	12	*Branchinecta* sp.	1s	no	none			Female only observed
1819-132	2/15/2019	14.5	25	16	*Branchinecta* sp.	1s	no	Nema			Female only observed
1819-132	3/1/2019	17.3	25	35	None	n/a	no	none			
1819-132	3/7/2019	22.5	25	25	None	n/a	no	none			
1819-132	3/15/2019	18.1	20	12	None	n/a	no	none			
1819-132	3/21/2019	23.3	18	6.25	None	n/a	no	Ostr, Clad			
1819-132	5/23/2019	20.5	16	122.5	None	n/a	no	n/a			
1819-132	5/30/2019	23.7	4	1.75	*B. lindahli*	100s	2 female	n/a			
1819-133	3/1/2019	16.9	15	21	None	n/a	no	none	Natural		
1819-133	3/7/2019	19.7	15	9	None	n/a	no	none			
1819-133	3/15/2019	19.6	10	3	None	n/a	no	none			
1819-133	3/21/2019	20.1	7	3	None	n/a	no	Ostr, Culi			
1819-133	3/28/2019	22.2	4	1.5	None	n/a	no	Ostr, Culi			
1819-134	12/7/2018	20.5	3.5	6	None	n/a	no	none	Natural	Undist	
1819-134	2/7/2019	18.5	0.2	1	None	n/a	no	none			
1819-135	12/7/2018	22	3	1	None	n/a	no	none	Natural	Undist	
1819-136	12/7/2018	18.8	3.5	2	None	n/a	no	none	Natural	Undist	
1819-137	2/7/2019	16.4	20	90	None	n/a	no	Coll	Natural	Undist	
1819-137	3/1/2019	21.6	30	300	None	n/a	no	none			
1819-137	3/7/2019	24.2	35	84	None	n/a	no	none			
1819-137	3/15/2019	17.3	20	3	None	n/a	no	none			
1819-140	12/7/2018	NR	5	4	None	n/a	no	none	Natural	Undist	
1819-140	2/7/2019	16	30	40	None	n/a	no	none			
1819-140	3/1/2019		15	40	None	n/a	no	none			
1819-140	3/7/2019	21.3	10	19.25	None	n/a	no	none			
1819-143	3/7/2019	21.9	9	36	None	n/a	no	none	Road Rut		
1819-143	3/15/2019	23.6	10	2.25	None	n/a	no	none			
1819-144	1/10/2019	15.7	15.7	8.5	None	n/a	no	none	Road Rut	Disturbed, Tire Tracks	
1819-144	1/18/2019	19.8	7.2	22.5	*B. lindahli*	100s	yes	none			
1819-144	1/24/2019	15.4	0.4	1.2	None	n/a	no	none			
1819-144	2/7/2019	15.1	10	7	*B. lindahli*	1s	no	Nema			
1819-144	2/15/2019	19.3	12	10.45	*B. lindahli*	10s	no	Coll			
1819-144	3/7/2019	22.7	10	6	None	n/a	no	none			

Attachment B: 2018-2019 Wet Season Survey Data
Otay River Restoration Project

Feature	Survey Date	Water Temp (ºC)	Max Depth (cm)	Surface Area (sq m)	Anostracans Present	Population Estimate	Vouchers Collected	Other Species Present	Basin Type	Basin Condition	Comments
1819-144	3/15/2019	21.6	9.5	4	None	n/a	no	none			
1819-144	3/21/2019	23.6	1	0.25	*B. lindahli*	1s	no	Clad, Coll			
1819-144	5/23/2019	22.3	7	7.2	None	n/a	no	n/a			
1819-148	3/7/2019	21.6	21	48	*B. lindahli*	100s	yes	none			
1819-148	3/15/2019	16.8	12	16	None	n/a	no	SPHA Larvae			
1819-149	3/7/2019	20.3	30	12	*B. sandiegonensis, B. lindahli*	100s	yes	PSHY Larvae	Natural		
1819-149	3/15/2019	15.1	30	5.5	None	n/a	no	SPHA Larvae			
1819-149	3/21/2019	19.8	35	7	None	n/a	no	Ostr, Culi, PSHY Larvae			
1819-149	3/28/2019	22.4	13	3	None	n/a	no	Culi, PSHY Larvae			
1819-150	3/7/2019	22.3	23	8.4	*B. sandiegonensis*	100s	yes	none	Natural		
1819-150	3/15/2019	16.8	14	1.125	None	n/a	no	SPHA Larvae			
1819-151	3/7/2019	23.5	17	52	None	n/a	no	none	Natural		
1819-151	3/15/2019	18.1	9	21	None	n/a	no	SPHA Larvae			
1819-152	3/7/2019	23.2	20	4.5	None	n/a	no	none	Natural		
1819-152	3/15/2019	13.5	15	0.75	None	n/a	no	none			
1819-153	3/7/2019	22.4	10	17.5	*B. sandiegonensis*	1000s	yes	none	Natural		
1819-154	3/15/2019	12.2	23	300	None	n/a	no	none	Natural		
1819-154	3/28/2019	20.9		180	None	n/a	no	Ostr, Dipt, Culi, Cole, Gast, Ephe, Anis, PSHY Larvae			
1819-154	4/3/2019	16.7	21	64	None	n/a	no	Clad, Culi, Cole, Ephe, Anis, PSHY Larvae			
1819-154	4/10/2019	17.2	15	40	None	n/a	no	Cole, Gast, Anis, PSHY Larvae			
1819-154	4/17/2019	17.3	10	6	None	n/a	no	Gast, Anis, PSHY/SPHA larvae			
1819-155	3/15/2019	15.1	16	3.75	None	n/a	no	none	Natural		
1819-155	3/28/2019	17.6	38	18	None	n/a	no	none			
1819-155	4/3/2019	16.6	39	12	None	n/a	no	Ostr, Culi, Cole, Chir, Gast, Anis, PSHY Larvae			
1819-155	4/10/2019	16.1	31	6	None	n/a	no	Ostr, Clad, Culi, Cole, Anis, PSHY Larvae, Hydr			
1819-155	4/17/2019	14.9	25	6	None	n/a	no	Chir, PSHY larve			
1819-155	4/24/2019	25.3	16.5	3	None	n/a	no	Gast, Anis, PSHY Larvae			Two-striped garter snake
1819-155	5/1/2019	23.7	9	1	None	n/a	no	Ostr, Cope, Clad, Cole, Gast, PSHY Larvae			
1819-155	5/8/2019	18.2	3	1	None	n/a	no	Cole, Anis, Coll		Algae	

Key to Other Species Present:

ANBO: *Anaxyrus boreas halophilus* (California toad)
Anis: Anisoptera (dragonflies)
Chir: Chironomidae (midges)
Clad: Cladostera (water fleas)
Cole: Coleoptera (beetles)
Coll: Collembola (springtails)
Conc: Conchostraca (clam shrimp)
Cope: Copepoda (Copepods)
Cori: Corixidae (water boatmen)
Culi: Culicidae (mosquitos)
Dipt: Diptera (true flies)
Ephe: Ephemeroptera (mayflies)
Gast: Gastropods (snails)
Hydr: Hydracarina (water mites)
Nema: Nematoda (roundworms)
Noto: Notonectidae (backswimmers)
Ostr: Ostracoda (seed shrimp)
Plat: Platyhelminthes (flatworms)
PSHY: *Pseudacris hypochrondriaca* (Baja CA Chorus frog)
SPHA: *Spea Hammondii* (western spadefoot)
XELA: Xenopus laevis (African clawed frog)
Zygo: Zygoptera (damselflies)

Photo 1. (12/7/18) View facing east of basin 1819-119 in the foreground and basin 1819-118 in the background. Versatile fairy shrimp was observed in both of these basins.

Photo 2. (1/18/19) View facing southeast of basin 1819-80 located within an access road. Recent heavy rain events have diverted part of O'Neal Canyon Creek into the access road and basin. Versatile fairy shrimp was observed in this basin.

Photo 3. (2/7/19) View facing east of basin 1819-137 that is located within the bottom of the Otay River Valley. No fairy shrimp were observed in this basin.

Photo 4. (12/20/18) View facing northeast of basin 1819-32, which is near an active restoration area. Both San Diego and versatile fairy shrimp were observed in this basin.

Photo 5. (12/20/18) View facing northwest of basin 1819-44, which is within an active restoration area. San Diego fairy shrimp was observed in this basin.

Photo 6. (2/7/19) View facing west of basin 1819-007, which exists within an access road. Versatile fairy shrimp was observed in this basin.

Photo 7. (1/24/19) View facing west of basin 1819-56, which is within an access road and an active restoration area. San Diego fairy shrimp was observed in this basin.

Photo 8. (2/7/19) Overview of basins 1819-57 to 1819-62, facing south. Recent heavy rains have flooded many of these basins into one another. Both San Diego and versatile fairy shrimp were observed within these basins, which are within an active restoration area.