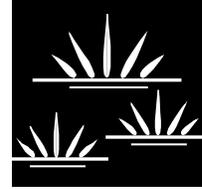


# GLENN LUKOS ASSOCIATES

Regulatory Services



July 13, 2017

Stacey Love  
U.S. Fish and Wildlife Service  
2177 Salk Avenue, Suite 250  
Carlsbad, California 92008

**SUBJECT:** Submittal Requirements for 2016-2017 Wet Season Survey for Listed Branchiopods Conducted for the Fairview Park Project, Located in the City of Costa Mesa, County of Orange, California

Dear Ms. Love:

The following letter report documents the results of wet season surveys conducted by Glenn Lukos Associates, Inc. (GLA) of seven seasonally ponded features at the above-referenced property in order to determine the presence/absence of listed branchiopods. The survey area included three features located east of Placentia Avenue for which a dry season survey was conducted in 2014 and wet season surveys were conducted in 2014-2015, 2015-2016, and 2016-2017. The 2016-2017 survey also included four additional features located west of Placentia Avenue for which the USFWS has requested an updated status of fairy shrimp<sup>1</sup>.

In October 2014, GLA biologist Kevin Livergood (TE-172638-2) conducted dry season surveys of the features located east of Placentia Avenue<sup>2</sup>. Very low densities of cysts (2-3) of the genus *Branchinecta* were detected in Features A and B. Dry season surveys were followed up with wet season surveys during the 2014-2015 rainy season. Only Feature A exhibited ponding, but ponding was very short-term and did not last for a duration suitable for the development of fairy shrimp. Due to the lack of ponding and inconclusive results of the 2014-2015 wet season survey, surveys were conducted again during the 2015-2016 wet season. However, insufficient rainfall and a lack of ponding produced inconclusive results as well. The 2016-2017 rainy season produced substantial rainfall and resulted in exceptional ponding. Therefore, per the notification to conduct the 2016-2017 wet season surveys Features A, B, and C located east of Placentia

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<sup>1</sup> Glenn Lukos Associates; May 2015 (Revised December 2015). *Fairview Park Vernal Pool Restoration and Long-term Maintenance Plan for Vernal Pools 5, 6, and 7*; page 12.

<sup>2</sup> The nomenclature for the features east of Placentia Avenue has been changed to more accurately reflect the status and condition of these features. The northernmost feature was previously identified as Feature A and is referred to in this report as Feature C. Feature B is unchanged for descriptive purposes, but as discussed below will be merged with the adjacent feature for future tracking and management. The southerly feature, formerly designated as Feature C is now designated as Feature A. The new nomenclature is provided on Exhibit 3 and is also reflected in the attached datasheets.

Avenue were monitored for ponding as well as Features 1, 4, 5, 6, and 7 located west of Placentia Avenue. East of Placentia Avenue, Features A and B exhibited suitable ponding. West of Placentia Avenue features 1, 4, 5, and 6 exhibited ponding.

Species with the potential to occur in this region include the listed endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*), endangered Riverside fairy shrimp (*Streptocephalus woottoni*), and the common versatile fairy shrimp (*Branchinecta lindahli*). In Feature A located east of Placentia Avenue, the San Diego fairy shrimp was detected during 2016-2017 surveys. West of Placentia Avenue, San Diego fairy shrimp were observed in Features 1, 4, 5, and 6. Furthermore, Riverside fairy shrimp were also detected in Features 1 and 4.

## **I. SITE LOCATION**

Fairview Park is situated along the bluffs overlooking the Santa Ana River in the City of Costa Mesa, Orange County, California. The park is located north and west of Estancia High School, south and east of Fairview Channel, west of Costa Mesa Golf Course and is bisected by Placentia Avenue in the City of Costa Mesa, County of Orange, California [Exhibit 1 – Regional Map; Exhibit 2 – Vicinity Map; and Exhibit 3: Survey Area Map]. The project site can be found on the U.S. Geological Survey (USGS) 7.5' Newport Beach Quadrangle [dated 1965 and photorevised 1981] in an unsectioned portion of Township 6 South, Range 10 West. The Universal Transverse Mercator (UTM) coordinates approximately corresponding to the site are 41316 mE and 3724857 mN (Zone 11S).

As specified on the corresponding data sheets (Appendix A) and depicted on the Survey Area Map (Exhibit 3), following are the UTM coordinates for the locations of features within the study area:

### Features East of Placentia Avenue

- Feature A: 3725405.43N, 41316.86E
- Feature B: 3725185.19N, 413103.32E
- Feature C: 3725146.40N, 413091.99E

### Features West of Placentia Avenue

- Feature 1: 3724935.11N, 412654.93E
- Feature 4: 3724732.26N, 412731.28E
- Feature 5: 3724876.68N, 412936.63E
- Feature 6: 3724820.91N, 412960.18E
- Feature 7: 3724857.09N, 412826.07E

The area east of Placentia Avenue is currently occupied by a network of model railroad tracks and sidewalks used by patrons of Costa Mesa's Miniature Railroad. Sidewalks are a component of Fairview Park – East that provide park users opportunities for passive recreation and access to portions of the park located west of Placentia Avenue. General topography is flat with areas vegetated predominantly with non-native grasses and ruderal species that occur between sidewalks and railroad tracks. As shown in the attached photo exhibit (Exhibit 4), during the wet phase the depressional features within the Survey Area were vegetated with upland grasses and forbs which had germinated with early season rains such as: Russian thistle (*Salsola tragus*), seaside barley (*Hordeum marinum*), and clustered tarweed (*Deinandra fasciculata*). However, following initial ponding, vernal pool and other wetland plants began to emerge and were evident in Features 1, 4a, 4b, and 5 as the pools dried out in March and April.

## II. METHODOLOGY

GLA biologist Kevin Livergood (TE-172638-2) submitted a request for authorization to conduct wet season surveys to the USFWS Carlsbad office on October 25, 2016. On October 27, 2016, the USFWS responded with authorization to proceed with sampling utilizing methods prescribed in the USFWS *Survey Guidelines for the Listed Large Branchiopods* dated May 31, 2015<sup>3</sup>. In accordance with the Survey Guidelines site visits were conducted within 24 hours of initial storm events to determine whether features contained a minimum of three centimeters (cm) of ponding. Once a feature was determined to be sufficiently ponded, follow up surveys were conducted within seven days in order to begin sampling for fairy shrimp.

When suitable conditions are present, sampling for the presence of fairy shrimp is performed using a dip net within representative portions of the depression bottom, edges, and vertical water column when there is adequate ponding. In the field, specimens are collected in receptacles containing distilled water and immediately transferred to a vial containing a 95% ethanol solution. Each sample is labeled according to the depression from which the sample was collected. For species identification, each specimen is inspected in the lab using a dissecting microscope and the "Key to California Fairy Shrimps" found in Eriksen and Belk (1999)<sup>4</sup>. Information pertaining to each pool, whether ponded or dry, is recorded on vernal pool data sheets [Appendix A].

Per the Survey Guidelines, when suitable conditions are present each feature is sampled once every seven days, beginning no later than seven days after initial inundation and continuing until the feature is no longer inundated, or until it has experienced 120 days of continuous ponding. In

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<sup>3</sup> USFWS. May 31, 2015. *Survey Guidelines for the Listed Large Branchiopods*.

<sup>4</sup> Eriksen, C. and D. Belk. 1999. *Fairy Shrimps of California's Puddles, Pools, and Playas*. Mad River Press, Inc. Eureka, California.

cases where features dry and refill during the same wet season, sampling is reinitiated within seven days of refilling upon meeting the three cm standing water criteria and continues until the feature is no longer inundated.

During site visits, depressional features were inspected for level of inundation, surface area of ponding, and level of disturbance. Representative photographs were taken of ponded areas during site visits [Exhibit 4].

During the 2016-2017 wet season, Fairview Park depressional features and vernal pools were monitored for ponding sufficient to support fairy shrimp. Of the surveyed features, Feature C located east of Placentia Avenue was determined to be unsuitable for fairy shrimp due to the insufficient depth and short duration of ponding. These results are corroborated by the absence of cysts per dry season protocol surveys conducted in 2014. Feature B, also located east of Placentia Avenue exhibited sufficient ponding, but is now mapped as a component of Feature A. Feature B does not exhibit characteristics suitable for fairy shrimp as a stand-alone feature, but during periods in which Features A and B are at or near maximum capacity they are connected. When they are connected, fairy shrimp located in Feature A also utilize the eastern edge of B. Therefore, the features are being combined and identified as Feature A for future tracking and management.

On the west side of Placentia Avenue, Features 1, 4, 5, and 6 exhibited sufficient ponding to support fairy shrimp and in all cases supported listed species. However, Feature 7 did not exhibit sufficient depth or duration of ponding and does not support fairy shrimp.

### **III. DESCRIPTION OF THE DEPRESSIONAL FEATURES**

Following are descriptions of each feature.

#### **FEATURE A**

Feature A consists of a vegetated depression adjacent to a gravel parking lot to the south and compacted earth trail at the edge of Placentia Avenue to the west. The predominant plant species observed in the feature included seaside barley, curly dock (*Rumex crispus*), bur clover (*Medicago polymorpha*), and Russian thistle (*Salsola tragus*). At maximum, the main feature measured approximately 10 meters (m) in width by 25 m in length. Once the adjacent meadow inclusive of Feature B was saturated and began to exhibit ponding, it connected to Feature A, thus expanding the maximum dimensions of the combined features to approximately 35m by 63m. Maximum depth is estimated to be 15 cm.

## **FEATURE B**

As discussed above, Feature B is now considered a component of Feature A. When Feature A is at or near maximum ponding it connects to Feature B. Feature B was previously identified as an individual feature due to the remnant presence of woolly marbles (*Psilocarphus brevissimus*) that were identified during the drought. However, once conditions were suitable for ponding it became evident that ponding in Feature B was connected to ponding in Feature A. Therefore, the features are being treated as a single feature (Feature A) in which the area previously identified as Feature B is ponded only during exceptionally wet years. On the attached datasheets, Features A and B are treated separately with different measurements based on weekly conditions. The dimensions of Feature A are inclusive of the depressional area previously identified as Feature B during the period of maximum inundation. When Feature B was not connected hydrologically to the meadow area adjacent to Feature A, it measured approximately 5m by 14m, with a maximum depth of 7cm; however, no fairy shrimp were detected. To reiterate, Features A and B are now combined into a single Feature A, leaving only a single feature east of Placentia Avenue with Feature C (formerly Feature A) being eliminated due to lack of detection of fairy shrimp.

## **FEATURE C**

Feature C consists of a slight depression adjacent to a sidewalk and small-scale railroad track. The depression is vegetated with upland ruderal species typical of the surrounding area. Predominant plant species include Russian thistle and seaside barley. At maximum, the feature measured approximately 15m in width by 40m in length. Maximum depth is estimated to be 6.5 cm.

## **FEATURES 1, 4, 5, 6, and 7**

Features 1, 4, 5, 6, and 7 located west of Placentia Avenue are depicted on Exhibit 3. In accordance with the restoration plan prepared in coordination with Ms. Christine Medak of the USFWS, wet season surveys are to be conducted at these features during suitable rainfall years in order to determine which fairy shrimp species are present and to estimate population density. Following is an excerpt from the approved restoration plan pertaining to surveys of these features:

*Wet season surveys for San Diego fairy shrimp will be conducted by individuals holding a valid Section 10(a)(1)(A) permit for listed branchiopods in Restored Basins 5 and 6 for a minimum of 5 years in accordance with the accepted protocol for listed vernal pool branchiopods (Survey Guidelines for Listed Large*

*Branchiopods*)<sup>5</sup> and until conditions allow for two complete wet season surveys. If ponding depth, duration, and quality are appropriate but San Diego fairy shrimp are not detected in Basin 5 or 6, the basin(s) will be inoculated with cysts collected from Restored Basin 1 or Restored Basin 4, as proposed in the current Plan. In order to confirm the presence of San Diego fairy shrimp in Vernal Pools 1 and 4 and the absence of the versatile fairy shrimp, wet-season surveys would also be conducted during suitable rainfall years during the five-year monitoring period. Should versatile fairy shrimp be confirmed in either Vernal Pools 1 or 4, such pool would not be used as a source for inoculum. The source inoculate will depend on wet season survey results and should be free of versatile fairy shrimp (*Branchinecta lindahli*). Monitoring will continue until at least two complete wet season surveys are conducted and result in positive detection of hatched San Diego fairy shrimp and gravid females in Vernal Pools 5 and 6<sup>6</sup>.

Completed Wet Season Survey Data Sheets are provided in Appendix A for sampling conducted at Features A through C and Features 1, 4, 5, 6 and 7. Feature 7 did not exhibit ponding sufficient to support fairy shrimp and was therefore not sampled. All features have been photo documented during previous surveys and assessments; however, Exhibit 4 contains representative photographs of the surveyed features taken during the 2016-2017 wet season.

#### **IV. RESULTS OF WET SEASON SURVEY**

##### **FEATURES WEST OF PLACENTIA AVENUE**

Due to an exceptionally wet rainy season, Features 1, 4, 5, and 6 were at or exceeded their capacity for ponding for at least a brief period. Weather cycles during the wet season facilitated longer-term ponding and resulted in optimal conditions for the emergence and persistence of fairy shrimp. Following is a summary of findings for each sampled feature.

##### **Feature 1**

In Feature 1 both San Diego and Riverside fairy shrimp were detected. In prior surveys, San Diego fairy shrimp were confirmed in this feature, but the 2016-2017 wet season is the first recorded occurrence of Riverside fairy shrimp at this location. Densities of San Diego fairy shrimp were highly variable with 100's of immature specimens observed in early February, but the population of mature specimens was typically 10-15 per square meter. Riverside fairy

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<sup>5</sup> U.S. Fish and Wildlife Service. May 31, 2015. *Survey Guidelines for Listed Large Branchiopods*.

<sup>6</sup> Glenn Lukos Associates; May 2015 (Revised December 2015). *Fairview Park Vernal Pool Restoration and Long-term Maintenance Plan for Vernal Pools 5, 6, and 7*; page 12.

shrimp density was also low with an average of 5-10 mature specimens observed per square meter. Specimens of both species tended to occur in pockets throughout the feature and Riverside were most often detected in deeper portions of the pool. Due to the low densities of both populations, few specimens were collected for accessioning. In total, 12 *Streptocephalus woottoni* specimens (5 male, 7 female) were collected and 8 *Branchinecta sandiegonensis* were collected (7 male, 1 female). All collected specimens will be submitted to the Natural History Museum of Los Angeles. Furthermore, California Natural Diversity Database (CNDDDB) online field survey forms have been submitted to the California Department of Fish and Wildlife (CDFW) documenting the occurrence of both species at this location.

#### **Feature 4**

Feature 4 is a vernal pool created as part of a habitat restoration program. The feature is composed of a complex of three connected depressions in which the source hydrology includes vertical rainfall and sheet flow overflowing from Feature 1 to the north. The two depressions at the north end of the complex, identified as Features 4a and 4b, are of higher quality than depression 4c, which was not altered as part of the restoration project.

Feature 4a supported a very low density of San Diego fairy shrimp with less than 10 adults typically observed throughout the entire pool during a site visit. The feature also supported a very low density of Riverside fairy shrimp. No more than five adult Riverside fairy shrimp were detected in the feature during 2016-2017 surveys. Feature 4b supported a very small, short-lived population of four San Diego fairy shrimp. Feature 4c did not support fairy shrimp; however, a portion of the feature that connected to a trail depression at the southern end supported three female versatile fairy shrimp (*Branchinecta lindahli*). No versatile fairy shrimp were detected in the main depressions of the Feature 4 complex pools.

In total, four *Branchinecta sandiegonensis* were collected from the Feature 4 complex (3 male, 1 female) and no *Streptocephalus woottoni* specimens were collected due to the very small population. All collected specimens will be submitted to the Natural History Museum of Los Angeles. Furthermore, CNDDDB online field survey forms have been submitted to CDFW documenting the occurrence of both species at this location.

#### **Feature 5**

Feature 5 has been monitored and sampled in prior years and is known to support San Diego fairy shrimp. During 2016-2017 San Diego fairy shrimp were detected in low densities at less than five specimens per square meter at the population's peak. The surface area of the feature is relatively large and fairy shrimp were detected throughout the feature, but specimens were most frequently observed on the east side of the feature where the duration of ponding is longest.

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In total, 9 *Branchinecta sandiegonensis* were collected from Feature 5 (5 male, 4 female). All collected specimens will be submitted to the Natural History Museum of Los Angeles. A CNDDDB record has been submitted to the CDFW; however, the species occurrence is already documented at this location.

### **Feature 6**

Feature 6 is typically a stand-alone depression that ponds seasonally during average to above-average rainfall years. With rainfall that is significantly above average, the feature exhibits connectivity to Feature 5 via the trail located along the east boundary. During 2016-2017 San Diego fairy shrimp were detected in the portion of the trail that connects to Feature 5. It is expected that fairy shrimp from Feature 5 have spread into Feature 6. Fairy shrimp were detected during one sampling event and less than 10 adult specimens were observed. None of the specimens were collected due to the low-density population.

### **Feature 7**

Feature 7 did not exhibit the minimum requirements for ponding as stipulated in the survey guidelines. It is recommended that this feature be removed from future surveys due to the lack of ponding even during years of above average rainfall.

### **Miscellaneous Trail Features**

During the wet-season survey the surveying biologist periodically sampled features within the extensive trail network of Fairview Park. In all instances, features that were sampled along existing trails, that were not associated with the otherwise named vernal pool features, either lacked suitability to support fairy shrimp or supported the common versatile fairy shrimp.

In cases where the versatile fairy shrimp has been identified, it is recommended that future habitat management programs consider the removal of the ponded feature to prevent hybridization of listed fairy shrimp species that occur in Fairview Park<sup>7</sup>.

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<sup>7</sup> Simovich, M., K. Davis, and A. Bohonak. 2013. Landscape homogenization threatens the genetic integrity of the Endangered San Diego fairy shrimp *Branchinecta sandiegonensis* (Branchiopoda: Anostraca). *Journal of Crustacean Biology* 33(5): 730-740.

## **FEATURES EAST OF PLACENTIA AVENUE**

### **Feature A**

San Diego fairy shrimp were identified in Feature A after the feature had been ponded for approximately one month. Population density was low, ranging from 5 to 10 specimens per square meter. Following two significant rain events in February in which two inches of rain fell per event, ponding in the feature expanded to include portions of the grassland directly north of the elongated area to the south where ponding typically occurs. San Diego fairy shrimp were detected throughout the ponded area.

### **Feature B**

Feature B exhibited ponding of sufficient depth and longevity only when the northern portion of Feature A was ponded. Based on the results of 2016-2017 sampling and hydrology monitoring, it is recommended that Feature B be combined with Feature A for tracking and measurement purposes. Feature B does not exhibit suitability for fairy shrimp as a stand-alone depression, but exhibits suitability for San Diego fairy shrimp when conditions are adequate for the species in the northern portion of Feature A.

This recommendation is corroborated by the presence of *Branchinecta* sp. cysts detected in dry-season sampling conducted in 2014. During the exceptionally wet 2016-2017 season, the feature did not support ponding sufficient to support San Diego fairy shrimp on its own, but when connected to Feature A, fairy shrimp activity could expand to the Feature B depression.

### **Feature C**

Feature C exhibited ponding of sufficient depth immediately following above-average rain events, but ponding was not sustained for sufficient duration to support fairy shrimp. During the 2016-2017 survey, no fairy shrimp were detected at this location. Based on lack of detection during both dry-season and wet-season surveys, it is recommended that this feature be removed from future surveys due to the lack of sufficient ponding even during years of above average rainfall.

Table 1 below indicates when site visits were conducted during the 2016-2017 wet season survey and indicates the species of shrimp detected during sampling. During each survey visit features were inspected for level of inundation, surface area of ponding, and level of disturbance.



Table 2 below indicates the results of dry season and wet season surveys conducted at Fairview Park since 2014. It should be noted that Feature 1 and Features 4a, 4b, and 4c have not been subject to dry season sampling. Dry season surveys of Features A, B, and C east of Placentia Avenue (2014) and Feature 7 west of Placentia Avenue (2015) resulted in no detection of cysts of the genus *Streptocephalus*; however, cysts of the genus *Branchinecta* were detected in very low densities within Features A and B.

**Table 2: Summary of Dry and Wet Season Survey Results**

Feature ID	2014 and 2015 DRY SEASON	2014-2015 WET SEASON		2015-2016 WET SEASON		2016-2017 WET SEASON	
	Cysts Present	Ponded	Fairy Shrimp Observed	Ponded	Fairy Shrimp Observed	Ponded	Fairy Shrimp Observed
A*	3 ( <i>Branchinecta</i> sp.)	Limited	No	Limited	No	Yes	BRSA
B	2 ( <i>Branchinecta</i> sp.)	No	No	No	No	Yes	BRSA
C*	0	No	No	No	No	Limited	No
1	Not Sampled	Not Sampled	---	No	No	Yes	BRSA/STWO
4a	Not Sampled	Not Sampled	---	No	No	Yes	BRSA/STWO
4b	Not Sampled	Not Sampled	---	No	No	Yes	BRSA
4c	Not Sampled	Not Sampled	---	No	No	Yes	BRLI
5	Not Sampled	Not Sampled	---	No	No	Yes	BRSA
6	Not Sampled	Not Sampled	---	No	No	Yes	BRSA
7	0	Not Sampled	---	No	No	Limited	No

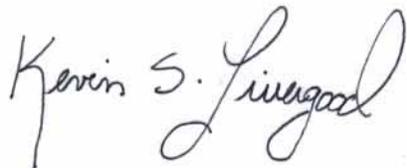
\*Note that the naming for Features A and C have been changed in the 2016-2017 report at the request of the City of Costa Mesa. All prior reports have named the depressional feature furthest north in the area east of Placentia Avenue as Feature A. In this report, all references to Feature A refer to the feature located furthest south in the area east of Placentia Avenue. Since the current Feature C (formerly Feature A) has not exhibited characteristics suitable for fairy shrimp and is proposed for removal from future sampling or monitoring, the City requested the features name be changed.

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I certify that the information in this survey report and attached exhibits fully and accurately represent my work. If you have any questions regarding this letter report, please contact me at [klivergood@wetlandpermitting.com](mailto:klivergood@wetlandpermitting.com).

Sincerely,

GLENN LUKOS ASSOCIATES, INC.

A handwritten signature in black ink that reads "Kevin S. Livergood". The signature is written in a cursive style with a large, looping initial 'K'.

Kevin Livergood  
Biologist/Regulatory Specialist  
USFWS Recovery Permit #: TE-172638-2

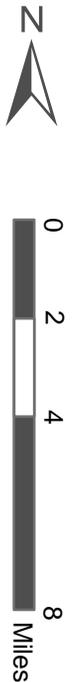
EXHIBIT 1: REGIONAL MAP

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Source: ESRI World Street Map



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



**FAIRVIEW PARK**  
Regional Map

**GLENN LUKOS ASSOCIATES**

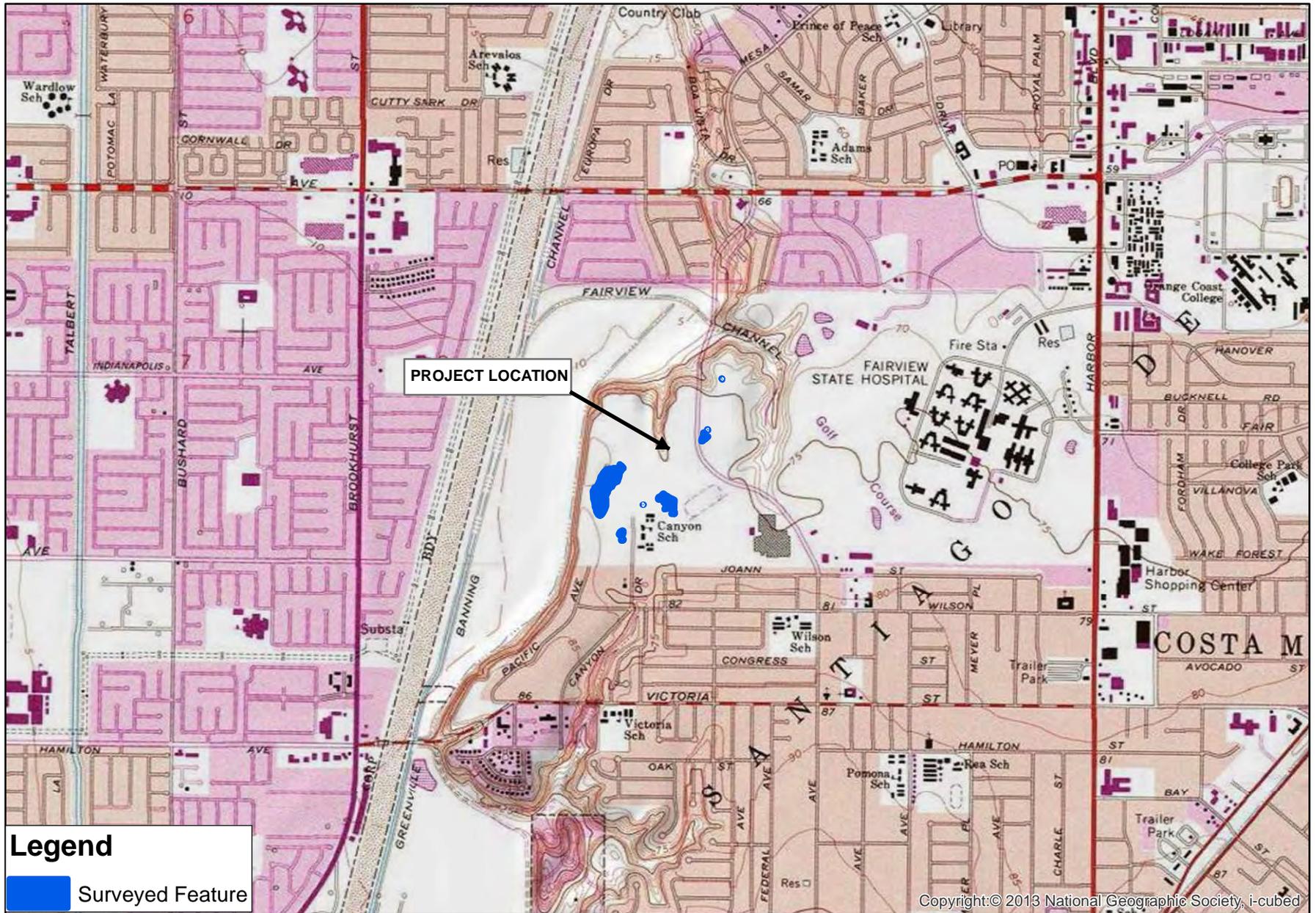
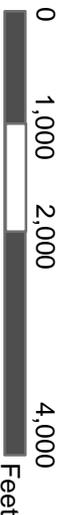


Exhibit 1

EXHIBIT 2: VICINITY MAP

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Adapted from USGS Newport Beach, CA quadrangle



**Legend**

 Surveyed Feature

**FAIRVIEW PARK**  
Vicinity Map

Copyright:© 2013 National Geographic Society, i-cubed

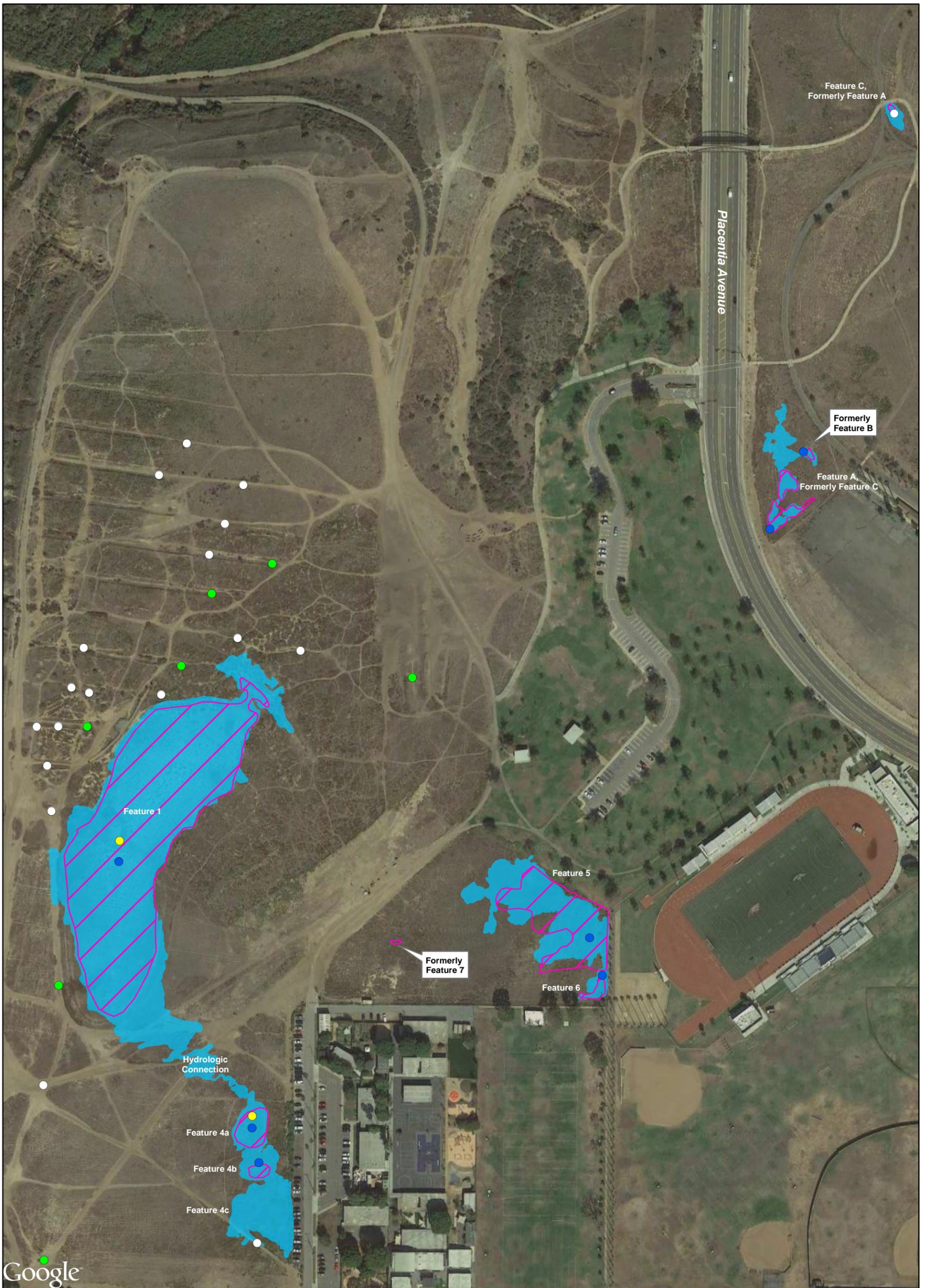
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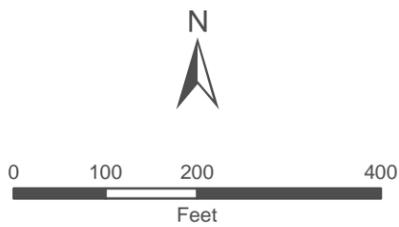
Exhibit 2

EXHIBIT 3: FAIRY SHRIMP SURVEY AREA MAP

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- 2017 Max Ponding
- Typical Ponding
- Streptocephalus woottoni*
- Branchinecta sandiegonensis*
- Branchinecta lindahli*
- No Fairy Shrimp Detected



**FAIRVIEW PARK**

2017 Wet Season Fairy Shrimp Survey Area

GLENN LUKOS ASSOCIATES



Exhibit 3

EXHIBIT 4: SITE PHOTOGRAPHS

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Photograph 1: View to the south of Feature 1 as seen on January 24, 2017 after a series of rain events dropped approximately 4.8" over five days. No fairy shrimp had been detected in the feature at that point (KL: 1/24/17).



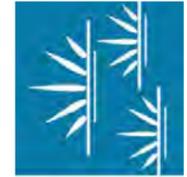
Photograph 2: View to the north of Feature 1 as seen on February 3, 2017. *B. sandiegonensis* were observed in this feature on this date and *S. woottoni* were later detected in this feature as well (KL: 2/3/17).



Photograph 3: View to the south of Feature 4a as seen on January 13, 2017 following a multi-day storm event that dropped approximately 1.3" of rain. No fairy shrimp had been detected in the feature to that point (KL: 1/13/17).



Photograph 4: View to the east of Feature 4a as seen on January 13, 2017. *B. sandiegonensis* and *S. woottoni* were later detected in low densities in this feature, though not at the time of this photo (KL: 1/13/17).



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Exhibit 4

FAIRVIEW PARK

Site Photographs



Photograph 5: View to the south of Feature 4b as seen on March 2, 2017. Four mature *B. sandiegonensis* were detected in this feature earlier in the season, though not at the time of this photo (KL: 3/2/17).



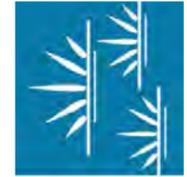
Photograph 6: View to the north of Feature 4c as seen on March 2, 2017. *B. lindahli* were detected at the southern edge of this feature along an existing trail. No fairy shrimp were detected in the deeper, central portions of the feature (KL: 3/2/17).



Photograph 7: View to the south of Feature 5 as seen on January 26, 2017 following a 6-day storm event that dropped just under 5" of rain. *B. sandiegonensis* were later detected in moderate densities in this feature (KL: 1/26/17).



Photograph 8: View to the east of Feature 5 as seen on February 9, 2017 following a 3-day storm event that dropped approximately 1.7" of rain (KL: 2/9/17).



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Exhibit 4

FAIRVIEW PARK

Site Photographs



Photograph 9: View to the south of Feature 6 as seen on January 24, 2017 following a series of storm events that dropped approximately 4.8” of rain. Less than 10 *B. sandiegonensis* were later detected in this feature (KL: 1/24/17).



Photograph 10: View to the south of Feature 6 as seen on February 9, 2017 following approximately 1.7” of rain (KL: 2/9/17).



Photograph 11: View to the west of the area in which Feature 7 was historically identified. The photo was taken on January 24, 2017 following a 4-day storm event that dropped 4.8” of rain.



Photograph 12: View to the east of the location previously identified as Feature 7. The feature exhibited limited ponding of less than 3 cm in depth for less than 7 consecutive days during the wet season survey (KL: 2/9/17).



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Exhibit 4

FAIRVIEW PARK

Site Photographs



Photograph 13: View to the northeast of the main depression of Feature A (formerly referred to as Feature C). A low density of *B. sandiegonensis* were detected in this portion of the feature (KL: 1/20/17).



Photograph 14: View to the west in the meadow portion of Feature A. Once this area ponded it had connectivity to the area identified as Feature B. *B. sandiegonensis* were detected in this meadow area (KL: 2/9/17).



Photograph 15: View to the north of the area previously identified as Feature B. Inundation occurred in this area once the meadow to the west exhibited ponding. *B. sandiegonensis* were detected on the western edge of this area when the meadow was ponded (KL: 2/16/17).



Photograph 16: View to the south of Feature C, which was previously identified as Feature A. Due to insufficient ponding and lack of suitability for fairy shrimp, it is recommended that this feature no longer be tracked as a seasonally ponded feature (KL: 1/13/17).



GLENN LUKOS ASSOCIATES

Exhibit 4



## APPENDIX A: DATASHEETS

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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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 10/25/16      **Time:** 11:00      **Weather Conditions:** 71 F, 25% cc, 2-4 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 10/23-10/24 0.55"
East - A	3725405.43N, 41316.86E	16.6	---	Dry	15		10x25 (35x63)												
East - B	3725185.19N, 413103.32E	16.6	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	16.6	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	16.6	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	16.6	---	Dry	15		24x40												
West - 4b	3724701.04N, 412737.84E	16.6	---	Dry	25		16x28												
West - 4c	3724665.39N, 412739.59E	16.6	---	Dry	28		48x53												
West - 5	3724876.68N, 412936.63E	16.6	---	Dry	20		55x95												
West - 6	3724820.91N, 412960.18E	16.6	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	16.6	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 11/22/16      **Time:** 09:10      **Weather Conditions:** 61F, 0% cc, 1-3 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 11/21/16 0.63"
East - A	3725405.43N, 41316.86E	16.6	---	Dry	15		10x25 (35x63)												
East - B	3725185.19N, 413103.32E	16.6	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	16.6	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	16.6	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	16.6	---	Dry	15		24x40												
West - 4b	3724701.04N, 412737.84E	16.6	---	Dry	25		16x28												
West - 4c	3724665.39N, 412739.59E	16.6	---	Dry	28		48x53												
West - 5	3724876.68N, 412936.63E	16.6	---	Dry	20		55x95												
West - 6	3724820.91N, 412960.18E	16.6	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	16.6	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 11/29/16      **Time:** 09:00      **Weather Conditions:** 64 F, 0% cc, 8-11 mph (Soils damp, but not muddy. No sign of ponding or saturation)

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 11/28/16 0.55"
East - A	3725405.43N, 41316.86E	17.8	---	Dry	15		10x25 (35x63)												
East - B	3725185.19N, 413103.32E	17.8	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	17.8	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	17.8	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	17.8	---	Dry	15		24x40												
West - 4b	3724701.04N, 412737.84E	17.8	---	Dry	25		16x28												
West - 4c	3724665.39N, 412739.59E	17.8	---	Dry	28		48x53												
West - 5	3724876.68N, 412936.63E	17.8	---	Dry	20		55x95												
West - 6	3724820.91N, 412960.18E	17.8	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	17.8	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 12/17/16      **Time:** 09:00      **Weather Conditions:** 54 F, 25% cc, 2-4 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 12/16/16 1.15"
East - A	3725405.43N, 41316.86E	12.2	---	Dry	15		10x25 (35x63)												
East - B	3725185.19N, 413103.32E	12.2	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	12.2	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	12.2	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	12.2	---	Dry	15		24x40												
West - 4b	3724701.04N, 412737.84E	12.2	---	Dry	25		16x28												
West - 4c	3724665.39N, 412739.59E	12.2	---	Dry	28		48x53												
West - 5	3724876.68N, 412936.63E	12.2	---	Dry	20		55x95												
West - 6	3724820.91N, 412960.18E	12.2	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	12.2	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 12/21/16      **Time:** 14:10      **Weather Conditions:** 61F, overcast, 3-6 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 12/17/16 1.21"
East - A	3725405.43N, 41316.86E	16.1	16.1	6.4	15	4.5x12	10x25 (35x63)											H2O clear, vegetated	
East - B	3725185.19N, 413103.32E	16.1	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	16.1	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	16.1	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	16.1	---	Dry	15		24x40												
West - 4b	3724701.04N, 412737.84E	16.1	---	Dry	25		16x28												
West - 4c	3724665.39N, 412739.59E	16.1	---	Dry	28		48x53												
West - 5	3724876.68N, 412936.63E	16.1	16.7	6.4	20	.5x1	55x95											Ponded on DG only	
West - 6	3724820.91N, 412960.18E	16.1	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	16.1	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 12/26/16      **Time:** 12:40      **Weather Conditions:** 62F, partly cloudy, 1-2 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 12/22/16 0.80"
East - A	3725405.43N, 41316.86E	16.7	16.1	10	15	6x28	10x25 (35x63)												
East - B	3725185.19N, 413103.32E	16.7	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	16.7	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	17.2	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	17.2	16.7	7.6	15	11x17	24x40											Vegetated, moderately turbid	
West - 4b	3724701.04N, 412737.84E	17.2	---	Dry	25		16x28												
West - 4c	3724665.39N, 412739.59E	17.2	---	Dry	28		48x53												
West - 5	3724876.68N, 412936.63E	17.2	16.7	3.8	20	.5x1	55x95											Ponded on DG only	
West - 6	3724820.91N, 412960.18E	17.2	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	117.2	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 12/30/16      **Time:** 12:50      **Weather Conditions:** 63F, partly cloudy, 4-7 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 12/28/16 1.03"
East - A	3725405.43N, 41316.86E	17.2	20	5-7.5	15	3x24	10x25 (35x63)												
East - B	3725185.19N, 413103.32E	17.2	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	17.2	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	17.2	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	17.2	20.5	6	15	11x14	24x40											Vegetated, moderately turbid	
West - 4b	3724701.04N, 412737.84E	17.2	---	Dry	25		16x28												
West - 4c	3724665.39N, 412739.59E	17.2	---	Dry	28		48x53												
West - 5	3724876.68N, 412936.63E	17.2	20.5	2.5	20	1x1	55x95											Ponded on DG only	
West - 6	3724820.91N, 412960.18E	17.2	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	17.2	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 1/6/17      **Time:** 1100      **Weather Conditions:** 62F, partly cloudy, 2-4 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 1/5/17 0.30" Since 12/16/16: 4.22"
East - A	3725405.43N, 41316.86E	16.7	16.7	15	20	9x38	10x25 (35x63)												
East - B	3725185.19N, 413103.32E	16.7	---	Dry	6.3		5x14												
East - C	3725146.40N, 413091.99E	16.7	---	Dry	7		15x40												
West - 1	3724935.11N, 412654.93E	17.8	---	Dry	25		75x270												
West - 4a	3724732.26N, 412731.28E	17.8	16.1	1	15	10x16	24x40											Vegetated, moderately turbid	
West - 4b	3724701.04N, 412737.84E	17.8	---	---	25		16x28												
West - 4c	3724665.39N, 412739.59E	17.8	---	---	28		48x53												
West - 5	3724876.68N, 412936.63E	17.8	17.8	5	20	2x1	55x95											Ponded on DG only	
West - 6	3724820.91N, 412960.18E	17.8	---	Dry	8		18x18												
West - 7	3724857.09N, 412826.07E	17.8	---	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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 1/13/17      **Time:** 1100      **Weather Conditions:** 57F, partly cloudy, 1-3 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 1/9-1/13 1.36"
East - A	3725405.43N, 41316.86E	14	15	15	20	15x40	10x25 (35x63)	BRSA			X			X				10's/Sq.m; EC=223	
East - B	3725185.19N, 413103.32E	14	---	---	6.3		5x14												
East - C	3725146.40N, 413091.99E	14	---	---	7		15x40												
West - 1	3724935.11N, 412654.93E	15.5	16.6	2.5-5	25	35x50	75x270											Very turbid; EC=120	
West - 4a	3724732.26N, 412731.28E	15.5	14.4	17.8	20	21x30	24x40				X								
West - 4b	3724701.04N, 412737.84E	15.5	---	---	25		16x28												
West - 4c	3724665.39N, 412739.59E	15.5	---	---	28		48x53												
West - 5	3724876.68N, 412936.63E	15.5	17.7	6.3-7.6	20	2x4	55x95											Ponded on DG only	
West - 6	3724820.91N, 412960.18E	15.5	---	---	8		18x18												
West - 7	3724857.09N, 412826.07E	15.5	---	---	---		---												

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 1/20/17      **Time:** 1050      **Weather Conditions:** 57F, overcast, 6mph Heavy rain expected thru 1/23/17

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 1/19-1/20 1.36"
East - A	3725405.43N, 41316.86E	13.8	14.4	17.8	20	15x40	10x25 (35x63)	BRSA			X							EC: 211; 3 fem, 2m	
East - B	3725185.19N, 413103.32E	13.8	14.4	6	6	5x14	5x14												
East - C	3725146.40N, 413091.99E	13.8	14.4	7	7	15x40	15x40												
																		Postponed to 1/24 due very heavy rain	
West - 1	3724935.11N, 412654.93E				25		75x270												
West - 4a	3724732.26N, 412731.28E				20		24x40												
West - 4b	3724701.04N, 412737.84E				25		16x28												
West - 4c	3724665.39N, 412739.59E				28		48x53												
West - 5	3724876.68N, 412936.63E				20		55x95												
West - 6	3724820.91N, 412960.18E				8		18x18												
West - 7	3724857.09N, 412826.07E			---	---		---												

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 1/24/17      **Time:** 0815      **Weather Conditions:** 45F, partly cloudy, 1-2mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 1/19-1/23 4.81" @Max ponding
East - A	3725405.43N, 41316.86E	8.3	9.2	20.3	20	10x25 (35x63)	10x25 (35x63)	BRSA		X								EC: 169; 3 fem, 1m, 1 imm.	
East - B	3725185.19N, 413103.32E	8.3	9.4	6.3	7	5x14	5x14												
East - C	3725146.40N, 413091.99E	8.3	10	7	7	15x40	15x40											EC: 163	
West - 1	3724935.11N, 412654.93E	7.7	9.2	22-25	25	75x270	75x270											EC: 96	
West - 4a	3724732.26N, 412731.28E	7.2	8.6	18-20	20	24x40	24x40	BRSA				X						EC: 74; 1 male	
West - 4b	3724701.04N, 412737.84E	7.2	8.6	18-20	25	16x28	16x28											1/23: Initial ponding	
West - 4c	3724665.39N, 412739.59E	7.2	---	---	28	---	48x53												
West - 5	3724876.68N, 412936.63E	7.2	9.7	18	20	55x95	55x95											EC: 112	
West - 6	3724820.91N, 412960.18E	7.2	8.8	8	8	18x18	18x18											EC: 123	
West - 7	3724857.09N, 412826.07E	7.2	10	1-2	2.5	1x2.5	1x2.5												

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 1/24/17      **Time:** 08:15      **Weather Conditions:** 45 F, partly cloudy, 1-2 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 1/19/17-1/23/17 4.81"
West Trail (SW)		13.3	22	3.5-5	6-8	4x24	5x28	BRLI									D	EC: 105; very low density; 7 obs.	
West Trail (SSW)		13.3	22.2	2.5	5	6x15	8x20	BRLI									D	Very low density, 4 obs.	
West Trail (W)		13.3	20.7	8	10-12	3x3	6x8	BRLI									D, TT	EC: 57; Mod. density (5/sq.m.)	
Deep Swale		13.8	16.3	20	35	9x45	12x90	BRLI										EC: 165; low density (<5/sq.m.)	
Bathroom Trail (S)		13.8	20.5	5	7-8	5x12	7x14	BRLI										EC: 298; low density (5 shrimp observed)	
Bathroom Trail (N)		13.8	20															No shrimp detected	

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.

1: Ponding (~1" deep) on south end near fence. Overflow from adjacent trail. Small pockets of shallow ponding indicate soil saturation throughout. Ponding is not widespread. 30x50m exhibits saturation or shallow ponding. Vegetated (mustard, scabimperl, dwarf nettle, salsola)

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

**Site or Project Name:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 1/26/17      **Time:** 1130      **Weather Conditions:** 54F, clear, 3-4mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 1/19-1/24 4.99"
East - A	3725405.43N, 41316.86E	15.5	15	12.7	20	10x25 (35x65)	10x25 (35x63)	BRSA				X							
East - B	3725185.19N, 413103.32E	15.5	15.5	10	7	5x14	5x14					X							
East - C	3725146.40N, 413091.99E	16.1	16	5	7	15x40	15x40					X							
West - 1	3724935.11N, 412654.93E	15	14.4	18-20	25	75x270	75x270												
West - 4a	3724732.26N, 412731.28E	15	14.4	18-20	20	24x40	24x40	BRSA					X						
West - 4b	3724701.04N, 412737.84E	15	14.4	18-20	25	16x28	16x28												1/23: Initial ponding
West - 4c	3724665.39N, 412739.59E	---	---	---	28	---	48x53												
West - 5	3724876.68N, 412936.63E	14.4	14.5	15	20	55x95	55x95												
West - 6	3724820.91N, 412960.18E	13.8	14.0	7-8	8	18x18	18x18												
West - 7	3724857.09N, 412826.07E	14.4	14.5	2	2.5	1x2.5	1x2.5												

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 2/3/17      **Time:** 1010      **Weather Conditions:** 56F, overcast, 3-4mph, rain

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 1/27 0.15"
East - A	3725405.43N, 41316.86E	13.3	15.5	5	20	6x20 (25x50)	10x25 (35x63)	BRSA										20-30 tot.pop.; EC: 182	
East - B	3725185.19N, 413103.32E	13.3	---	---	7	---	5x14												
East - C	3725146.40N, 413091.99E	13.3	---	---	7	---	15x40												
West - 1	3724935.11N, 412654.93E	13.8	16.8	18-20	25	70x260	75x270	BRSA									EC: 218	100's/sq.m (immature); 2/sq.m. mature	
West - 4a	3724732.26N, 412731.28E	13.8	17	18-20	20	22x38	24x40	STWO										3 females; EC: 149	
West - 4b	3724701.04N, 412737.84E	13.8	17.2	20	25	15x27	16x28	BRSA			X	X						EC: 239; w.toad egg masses	
West - 4c	3724665.39N, 412739.59E	13.8	16.8	25	28	45x50	48x53	BRLI										Frog eggs abundant	
West - 5	3724876.68N, 412936.63E	13.8	16.1	5-7	20	50x90	55x95	BRSA			X								
West - 6	3724820.91N, 412960.18E	13.8	---	---	8	---	18x18												
West - 7	3724857.09N, 412826.07E	13.8	---	---	2.5	---	1x2.5												

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 2/3/17      **Time:** 1010      **Weather Conditions:** Species confirmation at trail features

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
N2-Trail								BRLI										D, TT	
N3-Bike jumps								BRLI										D, TT	
N5								BRLI										D, TT	
Feature1s								BRSA										D, TT	Part of Feature 1
N6								BRLI										D, TT	
Bathroom Trail (N)																			

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 lindahl*).  
 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.

1: Ponding (~1" deep) on south end near fence. Overflow from adjacent trail. Small pockets of shallow ponding indicate soil saturation throughout. Ponding is not widespread. 30x50m exhibits saturation or shallow ponding. Vegetated (mustard, sc<sub>2</sub>gimpernel, dwarf nettle, salsola)

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

**Site or Project Name:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 2/9/17      **Time:** 0900      **Weather Conditions:** 58F, overcast, raining

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 2/6-2/8 1.74"
East - A	3725405.43N, 41316.86E	14.4	17.5	15	20	6x25(30x60)	10x25 (35x63)	BRSA				X						EC: 202; <5/sq.m.	
East - B	3725185.19N, 413103.32E	14.4	18.6	<1	7	3x10	5x14											EC: 292	
East - C	3725146.40N, 413091.99E	14.4	18.4	7.5	7	3x7	15x40											EC: 289	
West - 1	3724935.11N, 412654.93E	17.2	18.6	18-20	25	70x270	75x270	BRSA									EC: 207	100s/sq.m (immature)	
West - 4a	3724732.26N, 412731.28E	16.1	18.8	18-20	20	20x35	24x40	BRSA/STWO										BRSA: 5 obs; STWO: 1 immat.; EC: 187	
West - 4b	3724701.04N, 412737.84E	16.1	19	18	25	15x25	16x28	BRSA				X	X					EC: 185; 4 mature	
West - 4c	3724665.39N, 412739.59E	16.1	18.3	30	30	45x50	48x53	BRLI										EC: 212; 3 mature	
West - 5	3724876.68N, 412936.63E	15.5	18.5	15	20	40x80	55x95	BRSA				X						EC: 152; <5/sq. m.	
West - 6	3724820.91N, 412960.18E	15.5	17.7	10-12	8	3x6	18x18											EC: 235	
West - 7	3724857.09N, 412826.07E	16.1	19.3	2.5	2.5	1x2	1x2.5											EC: 204	

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 2/16/17      **Time:** 0825      **Weather Conditions:** 55F, overcast, 0-1 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E	12.7	14.8	10-15	20	6x23	10x25 (35x63)	BRSA		X	X							NP, UD	EC: 253; New cohort
East - B	3725185.19N, 413103.32E	12.7	---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E	12.7	---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	13.8	19.1	18-20	25	65x265	75x270	BRSA/STWO										CP; EC: 251	STWO: 10-15/sq.m.; BRSA: 1 adult
West - 4a	3724732.26N, 412731.28E	12.7	16.7	25-28	28	18x33	24x40					X						CP	
West - 4b	3724701.04N, 412737.84E	12.7	17.1	25-28	28	10x23	16x28						X	X				CP	EC: 185; 4 mature
West - 4c	3724665.39N, 412739.59E	12.7	17.0	22-25	30	40x45	48x53					X	X					D	EC: 212; 3 mature
West - 5	3724876.68N, 412936.63E	13.8	18.0	12-15	20	35x75	55x95	BRSA				X						NP	10 observed
West - 6	3724820.91N, 412960.18E	13.8	18.7	5-7	8	1x5	18x18	BRSA										NP	<10 observed, all on DG
West - 7	3724857.09N, 412826.07E	13.8	---	---	2.5	---	1x2.5											---	EC: 204

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 2/24/17      **Time:** 1210      **Weather Conditions:** 58F, partly cloudy, 3-5 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			Rain Event 2/18-2/19 1.95"
East - A	3725405.43N, 41316.86E	15.5	16.6	15	20	6x23	10x25 (35x63)	BRSA		X	X						NP, UD	5-10/sq.m.; grass area is ponded	
East - B	3725185.19N, 413103.32E	15.5	---	---	7	---	5x14										D		
East - C	3725146.40N, 413091.99E	15.5	---	---	7	---	15x40										D		
West - 1	3724935.11N, 412654.93E	14.4	16.1	15-18	25	65x265	75x270	STWO			X						CP	10-15/sq.m.	
West - 4a	3724732.26N, 412731.28E	14.4	15.5	28-30	28	18x33	24x40	STWO			X	X					CP	Many tadpoles, frog egg masses	
West - 4b	3724701.04N, 412737.84E	14.4	16.1	25-28	28	10x23	16x28				X	X					CP		
West - 4c	3724665.39N, 412739.59E	14.4	15.5	28-30	30	40x45	48x53				X	X					D		
West - 5	3724876.68N, 412936.63E	14.4	14.4	13	20	30x70	55x95	BRSA		X	X						NP	6-8 observed	
West - 6	3724820.91N, 412960.18E	14.4	16.1	2.5-5	8	14x20	18x18										NP		
West - 7	3724857.09N, 412826.07E	14.4	---	---	2.5	---	1x2.5										---		

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 3/2/17      **Time:** 1040      **Weather Conditions:** 75F, clear, 2-4 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E	23.9	17.8	7.5	20	3x10(7x15)	10x25 (35x63)	BRSA		X	X							NP, UD	<5/sq.m.
East - B	3725185.19N, 413103.32E	23.9	---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E	23.9	---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	23.9	22.2	15-20	25	65x265	75x270	STWO				X						CP	5-10/sq.m.; turbid, algae
West - 4a	3724732.26N, 412731.28E	23.9	21.1	30.5	28	20x30	24x40	STWO		X	X							CP	5 specimens obs.
West - 4b	3724701.04N, 412737.84E	23.9	21.1	18	28	17x25	16x28			X	X							CP	Many tadpoles
West - 4c	3724665.39N, 412739.59E	23.9	20.0	25-28	30	40x50	48x53											D	
West - 5	3724876.68N, 412936.63E	24.4	15.6	10-15	20	45x80	55x95	BRSA		X	X							NP	6-8 observed
West - 6	3724820.91N, 412960.18E	24.4	16.1	7-8	8	8x15	18x18											NP	
West - 7	3724857.09N, 412826.07E	24.4	---	---	2.5	---	1x2.5											---	

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 3/9/17      **Time:** 1240      **Weather Conditions:** 76F, clear, 3-5 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E	24.4	---	---	20	---	10x25 (35x63)											NP, UD	
East - B	3725185.19N, 413103.32E	24.4	---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E	24.4	---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	24.4	27.6	15-20	25	63x265	75x270	STWO				X						CP	<2/sq.m.;EC:337
West - 4a	3724732.26N, 412731.28E	24.4	25.9	18-20	28	17x27	24x40			X	X							CP	EC: 199
West - 4b	3724701.04N, 412737.84E	24.4	29.5	12-15	28	13x18	16x28			X	X							CP	EC: 266
West - 4c	3724665.39N, 412739.59E	24.4	24.7	25	30	26x40	48x53											D	EC: 329
West - 5	3724876.68N, 412936.63E	24.4	28.9	5-8	20	30x36	55x95	BRSA		X	X							NP	EC: 380
West - 6	3724820.91N, 412960.18E	24.4	---	---	8	---	18x18											NP	
West - 7	3724857.09N, 412826.07E	24.4	---	---	2.5	---	1x2.5											---	

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 3/16/17      **Time:** 1425      **Weather Conditions:** 65F, partly cloudy, 5-8 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E	18.3	---	---	20	---	10x25 (35x63)											NP, UD	
East - B	3725185.19N, 413103.32E		---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E		---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	19.2	29.0	10-15	25	55x260	75x270	STWO		X								CP	STWO @ south end only; EC:396
West - 4a	3724732.26N, 412731.28E	18.3	23.5	118-24	28	15x20	24x40				X			X				CP	EC: 256
West - 4b	3724701.04N, 412737.84E	18.3	28.7	8	28	10x15	16x28			X	X							CP	EC: 306
West - 4c	3724665.39N, 412739.59E	18.3	27.9	15-18	30	24x35	48x53											D	EC: 400
West - 5	3724876.68N, 412936.63E	20	26.2	10	20	2x5	55x95			X	X							NP	EC: 411
West - 6	3724820.91N, 412960.18E	20	---	---	8	---	18x18											NP	
West - 7	3724857.09N, 412826.07E	20	---	---	2.5	---	1x2.5											---	

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 3/23/17      **Time:** 1015      **Weather Conditions:** 62F, clear, 5-8 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E		---	---	20	---	10x25 (35x63)											NP, UD	
East - B	3725185.19N, 413103.32E		---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E		---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	17.2	18.1	10-14	25	55x250	75x270					X						CP	
West - 4a	3724732.26N, 412731.28E	16.7	18.1	10-13	28	11x17	24x40					X						CP	
West - 4b	3724701.04N, 412737.84E	16.7	---	---	28	---	16x28											CP	
West - 4c	3724665.39N, 412739.59E	16.7	17.8	14	30	13x13	48x53					X	X					D	
West - 5	3724876.68N, 412936.63E	17.8	17.5	5	20	2x5	55x95					X	X					NP	
West - 6	3724820.91N, 412960.18E	---	---	---	8	---	18x18											NP	
West - 7	3724857.09N, 412826.07E	---	---	---	2.5	---	1x2.5											---	

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 3/29/17      **Time:** 1630      **Weather Conditions:** 71F, clear, 6-8 mph

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E	---	---	---	20	---	10x25 (35x63)											NP, UD	
East - B	3725185.19N, 413103.32E	---	---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E	---	---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	18.9	27.8	8	25	44x215	270			X				X				CP	
West - 4a	3724732.26N, 412731.28E	21.7	27.8	9	28	4x7	24x40											CP	
West - 4b	3724701.04N, 412737.84E	---	---	---	28	---	16x28											CP	
West - 4c	3724665.39N, 412739.59E	---	---	---	30	---	48x53											D	
West - 5	3724876.68N, 412936.63E	---	---	---	20	---	55x95											NP	
West - 6	3724820.91N, 412960.18E	---	---	---	8	---	18x18											NP	
West - 7	3724857.09N, 412826.07E	---	---	---	2.5	---	1x2.5											---	

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 4/6/17      **Time:** 1030      **Weather Conditions:**

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E		---	---	20	---	10x25 (35x63)											NP, UD	
East - B	3725185.19N, 413103.32E		---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E		---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	17.8	22.2	5	25	15x20	75x270											CP	
West - 4a	3724732.26N, 412731.28E		---	---	28	---	24x40											CP	
West - 4b	3724701.04N, 412737.84E		---	---	28	---	16x28											CP	
West - 4c	3724665.39N, 412739.59E		---	---	30	---	48x53											D	
West - 5	3724876.68N, 412936.63E		---	---	20	---	55x95											NP	
West - 6	3724820.91N, 412960.18E		---	---	8	---	18x18											NP	
West - 7	3724857.09N, 412826.07E		---	---	2.5	---	1x2.5											---	

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 lindahl*).  
 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:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 4/13/17      **Time:** 1015      **Weather Conditions:**

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E		---	---	20	---	10x25 (35x63)											NP, UD	
East - B	3725185.19N, 413103.32E		---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E		---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	17.2	18.9	2.5-5	25	2x4	75x270											CP	5-6 small pockets of ponding
West - 4a	3724732.26N, 412731.28E		---	---	28	---	24x40											CP	
West - 4b	3724701.04N, 412737.84E		---	---	28	---	16x28											CP	
West - 4c	3724665.39N, 412739.59E		---	---	30	---	48x53											D	
West - 5	3724876.68N, 412936.63E		---	---	20	---	55x95											NP	
West - 6	3724820.91N, 412960.18E		---	---	8	---	18x18											NP	
West - 7	3724857.09N, 412826.07E		---	---	2.5	---	1x2.5											---	

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

**Site or Project Name:** Fairview Park      **County:** Orange      **Quad:** Newport Beach      **Township:** T6S      **Range:** R10W      **Section:** Unsec.

**SURVEYOR / Permit Number:** K. Livergood/TE-172638-2

**Date:** 4/21/17      **Time:** 0900      **Weather Conditions:** All features are dry

Feature ID #	UTM (Northing, Easting, Datum)	Temp (°C)		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			
East - A	3725405.43N, 41316.86E	---	---	---	20	---	10x25 (35x63)											NP, UD	
East - B	3725185.19N, 413103.32E	---	---	---	7	---	5x14											D	
East - C	3725146.40N, 413091.99E	---	---	---	7	---	15x40											D	
West - 1	3724935.11N, 412654.93E	---	---	---	25	---	75x270											CP	
West - 4a	3724732.26N, 412731.28E	---	---	---	28	---	24x40											CP	
West - 4b	3724701.04N, 412737.84E	---	---	---	28	---	16x28											CP	
West - 4c	3724665.39N, 412739.59E	---	---	---	30	---	48x53											D	
West - 5	3724876.68N, 412936.63E	---	---	---	20	---	55x95											NP	
West - 6	3724820.91N, 412960.18E	---	---	---	8	---	18x18											NP	
West - 7	3724857.09N, 412826.07E	---	---	---	2.5	---	1x2.5											---	

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 lindahl*).  
 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.

# CNDDDB Online Field Survey Form Report



California Natural Diversity Database  
Department of Fish and Wildlife  
1416 9th Street, Suite 1266  
Sacramento, CA 95814  
Fax: 916.324.0475  
[cnddb@wildlife.ca.gov](mailto:cnddb@wildlife.ca.gov)  
[www.dfg.ca.gov/biogeodata/cnddb/](http://www.dfg.ca.gov/biogeodata/cnddb/)



Source code LIV17F0004  
Quad code 3311768  
Occ. no. \_\_\_\_\_  
EO index no. \_\_\_\_\_  
Map index no. \_\_\_\_\_

This data has been reported to the CNDDDB, but may not have been evaluated by the CNDDDB staff

**Scientific name:** *Branchinecta sandiegonensis*

**Common name:** San Diego fairy shrimp

**Date of field work (mm-dd-yyyy):** 03-16-2017

**Comment about field work date(s):** Protocol survey conducted from 10/25/2016-4/21/2017

## OBSERVER INFORMATION

**Observer:** Kevin Livergood

**Affiliation:** Glenn Lukos Associates

**Address:**

**Email:** [klivergood@wetlandpermitting.com](mailto:klivergood@wetlandpermitting.com)

**Phone:** (949) 837-0404

**Other observers:**

## DETERMINATION

**Keyed in:** Eriksen, C. and D. Belk. 1999. Fairy Shrimps of California's Puddles, Pools, and Playas. Mad River

**Compared w/ specimen at:**

**Compared w/ image in:**

**By another person:**

**Other:**

**Identification explanation:**

**Identification confidence:** Very confident

**Species found:** Yes If not found, why not?

**Level of survey effort:** Work conducted per USFWS Survey Guidelines for the Listed Large Branchiopods, dated May 31, 2015

**Total number of individuals:** 100's

**Collection?** Yes

**Collection number:**

**Museum/Herbarium:** Natural History Museum of Los Angeles

## ANIMAL INFORMATION

**How was the detection made?** Collected

**Number detected in each age class:**

10-15

adults

juveniles

larvae

egg mass

unknown

**Age class comment:** 10-15 mature specimens observed per square meter in main vernal pool. Other pools contained specimens in lower densities.

**Site use description:** [Passive recreation and habitat conservation](#)

**What was the observed behavior?** [Specimens were detected during protocol survey by permitted biologist. Multiple cohorts were detected during the course of the survey with adults reaching full maturity.](#)

**Describe any evidence of reproduction:** [Females were observed with brood pouches.](#)

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**SITE INFORMATION**

**Habitat description:** [The site contains multiple seasonally ponded depressions including some restored vernal pools. BRSA were detected in 5 of the depression features.](#)

**Slope:** Land owner/manager: [City of Costa Mesa](#)

**Aspect:**

**Site condition + population viability:** [Good](#)

**Immediate & surrounding land use:** [City park, passive recreation](#)

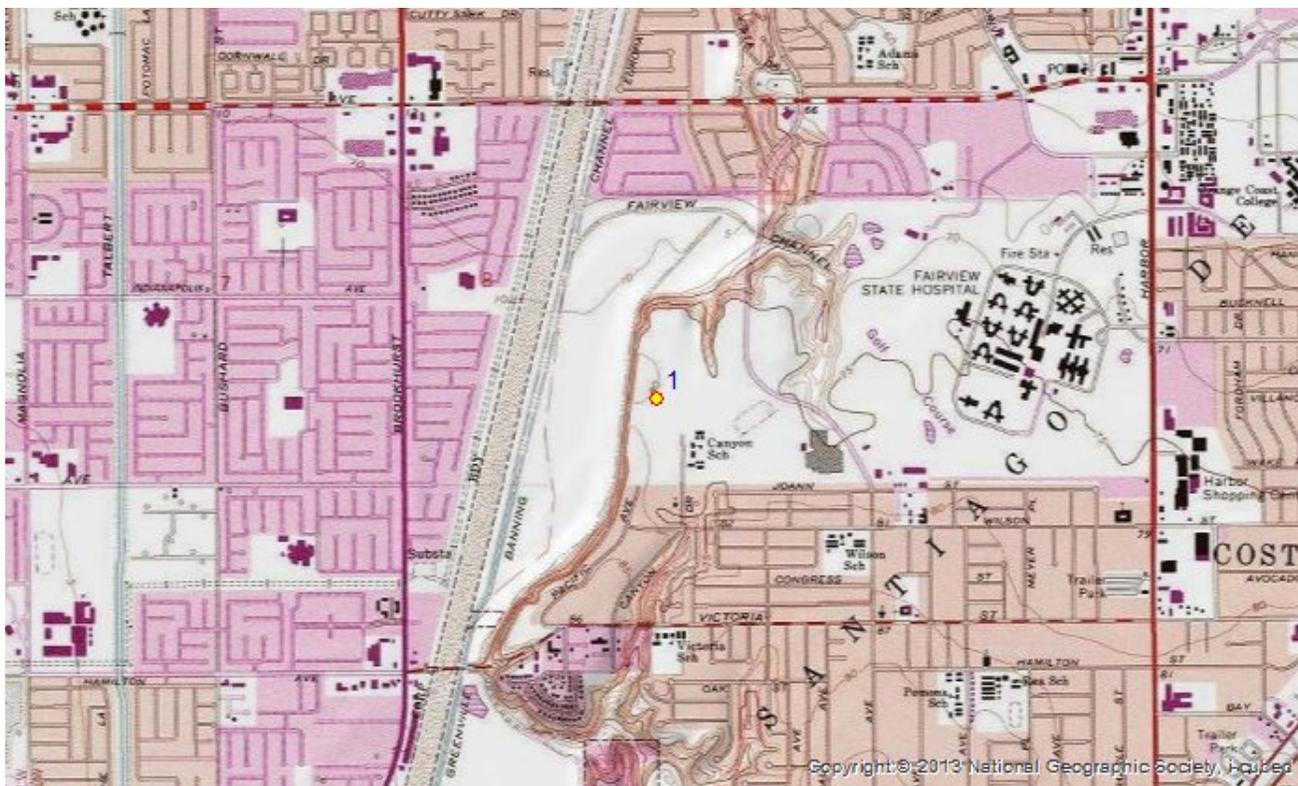
**Visible disturbances:** [Fragmentation due to trail use.](#)

**Threats:** [Encroachment by invasive species](#)

**General comments:** [The City is in coordination with USFWS regarding additional restoration and conservation efforts.](#)

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**MAP INFORMATION**



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Orange	Newport Beach	78	33.66092	-117.94189	412673	3724959	11
1	Public Land Survey	Feature Comment						
	S T06S R10W 8							

**The mapped feature is accurate within:** [100 m](#)

**Source of mapped feature:** [CNDDDB Online Field Survey Tool](#)

**Mapping notes:** [Coordinates from specific vernal pools are provided in survey report](#)

**Location/directions comments:**

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**Attachment(s):**

# CNDDDB Online Field Survey Form Report



California Natural Diversity Database  
Department of Fish and Wildlife  
1416 9th Street, Suite 1266  
Sacramento, CA 95814  
Fax: 916.324.0475  
[cnddb@wildlife.ca.gov](mailto:cnddb@wildlife.ca.gov)  
[www.dfg.ca.gov/biogeodata/cnddb/](http://www.dfg.ca.gov/biogeodata/cnddb/)



Source code LIV17F0005  
Quad code 3311768  
Occ. no. \_\_\_\_\_  
EO index no. \_\_\_\_\_  
Map index no. \_\_\_\_\_

This data has been reported to the CNDDDB, but may not have been evaluated by the CNDDDB staff

Scientific name: *Streptocephalus woottoni*

Common name: Riverside fairy shrimp

Date of field work (mm-dd-yyyy): 03-16-2017

Comment about field work date(s): Protocol survey conducted 10/25/2016-4/21/2017

## OBSERVER INFORMATION

Observer: Kevin Livergood

Affiliation: Glenn Lukos Associates

Address:

Email: [klivergood@wetlandpermitting.com](mailto:klivergood@wetlandpermitting.com)

Phone: (949) 837-0404

Other observers:

## DETERMINATION

Keyed in: Eriksen, C. and D. Belk. 1999. Fairy Shrimps of California's Puddles, Pools, and Playas.

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other:

Identification explanation:

Identification confidence: Very confident

Species found: Yes If not found, why not?

Level of survey effort: Work conducted per USFWS Survey Guidelines for the Listed Large Branchiopods, dated May 31, 2015

Total number of individuals: 19

Collection? Yes

Collection number:

Museum/Herbarium: Natural History Museum of Los Angeles

## ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

15

adults

juveniles

larvae

egg mass

unknown

Age class comment: Population density was approximately 10-15/square meter. Multiple cohorts were observed.

**Site use description:** Passive recreation and habitat conservation

**What was the observed behavior?** Specimens were detected during protocol survey by permitted biologist. Multiple cohorts were detected during the course of the survey with adults reaching full maturity.

**Describe any evidence of reproduction:** Adult females with brood pouches were observed.

**SITE INFORMATION**

**Habitat description:** The site contains multiple seasonally ponded depressions including some restored vernal pools. STWO were detected in 2 of the restored pools.

**Slope:** Land owner/manager: City of Costa Mesa

**Aspect:**

**Site condition + population viability:** Good

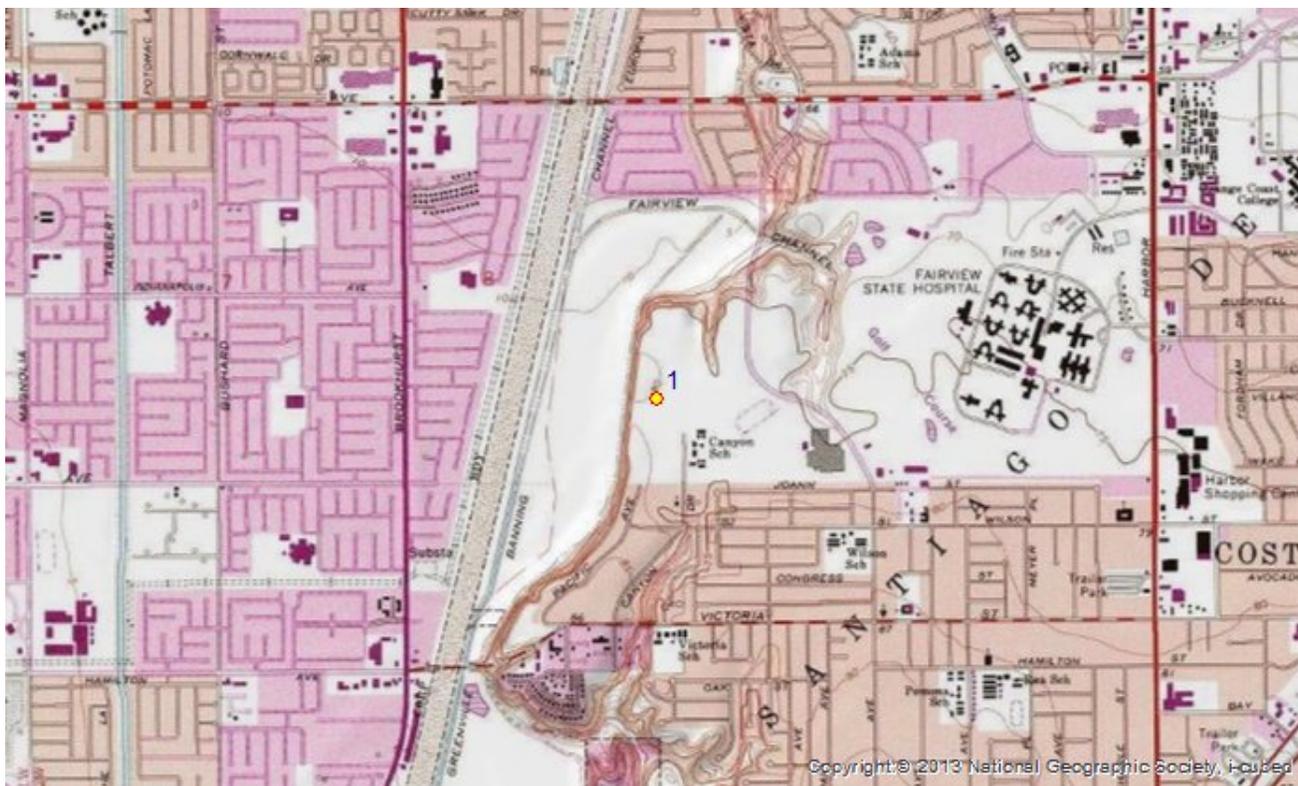
**Immediate & surrounding land use:** City park, passive recreation

**Visible disturbances:** Fragmentation due to trail use.

**Threats:** Encroachment by invasive species.

**General comments:** The City is in coordination with USFWS regarding additional restoration and conservation efforts.

**MAP INFORMATION**



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTM E NAD83	UTM N NAD83	UTM Zone
	Orange	Newport Beach	78	33.66088	-117.94196	412666	3724954	11
1	Public Land Survey	Feature Comment						
	S T06S R10W 8							

**The mapped feature is accurate within:** 100 m

**Source of mapped feature:** CNDDDB Online Field Survey Tool

**Mapping notes:** Point represents the center of the area in which a complex of pools supporting the species occurs at Fairview Park

**Location/directions comments:**

**Attachment(s):**